The prevalence of childbearing within cohabitation and its impact on union stability [1][2]

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Abstract

Cohabitors are usually found to have higher instability than marriages, which is explained with their lack of commitment and their selectivity. I argue that the union stability of cohabitors increases, if childbearing within cohabitation is more common, because the selection into non-marital family formation becomes weaker. The results reveal that in eastern Germany, where 61 percent of the mothers cohabit at childbirth, these mothers have the same partnership success than married mothers. Those 27 percent western Germans who cohabit show significant higher instability, which can be neither explained by socio-demographic or partnership characteristics, nor by the unobserved selectivity of those women who give birth within cohabitation. Women remaining in cohabitation after childbirth have higher separation risks than marriages in both regions, although cohabitation is more fragile in western Germany. In total, eastern and western Germans have similar stability levels.

The study signals that a higher prevalence of cohabiting families does not lead to higher overall union instability and that childbearing within cohabitation can cease to signify a lack of commitment. Though, a causal effect of cohabitation - as a family arrangement after childbirth - on stability exists also in a context with common non-marital childbearing.

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Introduction

In the past decades, births within cohabitation have dramatically increased, but there is still remarkable variation across countries (Sobotka/Toulemon 2008; Kiernan 2002, 2004; Perelli Harris et al. 2012). Due to its increase growing attention is paid by family demographers to cohabitation as a union and family context. Plenty of studies have focused on the impact of marital status on separation risks and found consistent evidence that cohabiting parents have a higher risk of dissolution than married parents (e.g. Wu/Musick 2008; Manning et al. 2004; Kiernan 2002; Andersson 2002). This is commonly drawn back on the lack of commitment within non-marital unions and the negative selection into non-marital family formation.

Although the high union instability of cohabitations with children seems to be common knowledge, little is known about the impact of the prevalence of births within cohabitation on the separation behavior. When a growing share of couples decides to remain in cohabitation during the family formation process, what might that signify about their union? Family life might get more instable if cohabiting families are more common. Alternatively, the stability of cohabiting families might increase if they are more prevalent. The rise in childbearing within cohabitation may indicate that cohabitation functions as a stable environment for childrearing, comparable to marriage (Raley 2001; Heuveline/Timberlake 2004; Kiernan 2002). Thus, the importance of commitment via marriage and the strength of selection mechanisms into cohabitation could decrease if cohabiting families become standard.

A number of recent studies suggest that the risk of union dissolution might not be universal, but rather depends on the prevalent union behavior within a specific setting (Steele et al. 2006; Le Bourdais et al. 2000; Le Bourdais/Lapierre-Adamcyk 2004; Liefbroer/Dourleijn 2006; Reinhold 2010). Some of these studies refer to the changing impact of premarital cohabitation on divorce risks (Liefbroer/Dourleijn 2006; Reinhold 2010). They argue that former cohabitors run a higher divorce risk in societies where the majority directly marries, because they deviate from the standard path – which is direct marriage. This idea can be transferred to the context of cohabiting families: Cohabitors with children should face higher union instability, if marital childbearing is the common case. In the past, a couple of comparative studies have focused on the impact of non-marital childbearing shares on separation behavior: They investigated differences among cohorts (Steele et al. 2006), countries (Clarke/Jensen 2004) and regions (Le Bourdais et al. 2000; Le Bourdais/Lapierre-

Adamcyk 2004) and found that the prevalence of childbearing within cohabitation is positively related with stability. However, Jensen and Clausen (2003) investigated the stability of cohabiting families across time and found that, despite the increasing prevalence of births within cohabitation, the dissolution risk of cohabiting couples is consistently higher than that of married couples.

The present study seeks to contribute to this discussion by focusing geographically on eastern and western Germany with recent representative data of young adults born in the 1970s and 1980s. The two parts of Germany seem to be ideal for investigating the impact of the prevalence of cohabiting families on union stability, since pronounced differences in the area of non-marital childbearing exist, while the current legal background is identical. The new data gives insights into 21th century family life of young generations of Germans. A further advantage of the study is that it considers the selectivity of cohabitors in different ways. It namely focuses on the socio-demographic characteristics, the partnership background and unobserved person-specific traits that drive the selection into childbearing within cohabitation (vs. marriage) and the risk of separation. The following aspects are emphasized: Does the higher prevalence of births within cohabitation in eastern Germany have a positive impact on the stability of these unions? Does selectivity influence *both* the likelihood to cohabit at childbirth and the risk of separation? Does this correlation depend on the normative context of childbearing? Is the timing of marriage relative to childbearing less relevant in a context of common non-marital childbearing?

The paper is structured as follows. Firstly, I present the theoretical framework that deals with the impact of union type on union stability and discuss the findings of previous studies. Secondly, the remarkable differences in non-marital childbearing within Germany are outlined and the legal role of marriage is discussed. From these aspects the working hypotheses are derived. Thirdly, the data and the methods are described. Data for this investigation come from the first wave of the German Family Panel (*pairfam*), conducted between 2008 and 2010. As methodological approach I use a piecewise continuous modeling of the relative separation risks, which is complemented by a probit model (probability of a birth within cohabitation) in a multiprocess model setting. After presenting the results I finally draw conclusions from the empirical findings.

Cohabitation and union dissolution

Empirical studies that have addressed differences in the union stability by marital status among parents consistently conclude that cohabiting unions are less stable than marital unions (United States: Wu/Musick 2008, Manning et al. 2004, Manning 2004, Raley/Wildsmith 2004; Canada: Le Bourdais et al. 2000, 2004; Norway: Jensen/Clausen 2003; Britain: Steele et al. 2006; Sweden: Kennedy/Thomson 2010; Germany: Bastin et al. 2012; cross-national studies: Kiernan 1999, 2002, Andersson 2002, 2003, Andersson/Philipov 2002, Heuveline et al. 2003, Clarke/Jensen 2004 (Norway, England/Wales); summarized in Lyngstad/Jalovaara 2010)[4]. The data used in these studies refer mostly to childbirths in the 1980s and beginning of 1990s. Probably because of the lack of appropriate data, previous German research concentrated in the past on marital stability (e.g. Brüderl et al. 1997; Wagner 1997). These studies found that couples with a birth out of wedlock had an increased risk of divorce. Recent German studies that included cohabitations mostly waived a direct comparison of marital and non-marital stability (e.g. Lois 2008, 2009), but some studies give evidence that cohabitations are more instable than marriage also in Germany (Arránz Becker 2008: 206; Bastin et al. 2012). So far, only one study has focused on the union stability of parents in eastern and western Germany and shows that eastern German women who cohabited at first childbirth possess higher prospects of partnership success than their western German counterparts, a finding given by differing survival functions for eastern and western Germany (Bastin et al. 2012).

Cross-national studies that looked on parental stability with life table estimates show that parents who cohabit at childbirth are more likely to separate than parents married at delivery at every considered age of the child (Kiernan 2002; Andersson 2002; Heuveline et al. 2003). Figure 1 refers to these results and shows the relative parental stability for parents who cohabited at childbirth compared to those married for the countries included in these studies. Considering the shares of parents cohabiting at childbirth in the respective countries make obvious that the relative stability of cohabiting parents is often lower in countries where marital childbearing is common. This negative gradient suggests that cohabitation is more likely seen as an alternative family arrangement if its prevalence is higher.

[Figure 1: Relative stability of partnerships with family formation within cohabitation compared to marriage in Kiernan 2002, Andersson 2002 and Heuveline et al. 2003]

[4] To locate the studies in space, information on country has been added.

Studies that explicitly focused on this aspect found mixed results. A Norwegian study that investigated the effect of cohabitation on parental stability across different childbirth cohorts shows that the increasing prevalence of cohabitation is not related to higher relationship stability (Jensen/Clausen 2003). A comparison of the parental stability in Norway and England/Wales led Clarke and Jensen (2004) to conclude that cohabiting at childbirth is related to higher instability in the latter area, which has also a lower percentage of births within cohabitation. Le Bourdais and colleagues (2000, 2004) found for Canada that cohabiting at childbirth is related to higher subsequent union stability in Quebec, where childbearing within cohabitation is more common than in the rest of the country. Steele and colleagues (2006) showed in a multiprocess modeling that considered the transition to marriage, childbearing and separation with British data that cohabiting women born 1970 face higher stability than women born 1958. The authors drew this back on the higher prevalence of childbearing within cohabitation in the younger cohort.

On the one hand, the higher instability of cohabitors is drawn back on the lack of commitment within non-marital unions. Compared to marriage, cohabitation presents a lower longer-term commitment, because rights and duties of the couple during and after the partnership are not (or to a lesser extent) regulated. Cohabitation and marriage differ for example in their legal regulation of paternal rights, the financial security/protection and the separation procedure (Blossfeld et al. 1999; Steele et al. 2006; Perelli-Harris/Sanchez-Gassen 2010). In consequence, marriage imposes high exit costs and ensures the greatest degree of stability. This can be interpreted as the causal effect of marital status on stability (Le Bourdais et al. 2000).

On the other hand, the higher relationship instability of cohabiting couples is explained by the selective traits of the cohabitors. If the lacking commitment within cohabitation causes its higher instability, a subsequent marriage should stabilize the relationship. However, plenty of studies have shown that married couples who cohabited prior to marriage have higher risks of union dissolution than couples who married directly. This is ascribed to the selectivity of cohabitors (Axinn/Thornton 1992; Hoem/Hoem 1992; Lillard et al. 1995; Brüderl et al. 1997; Svarer 2004; Teachman 2003; Kulu/Boyle 2009; Wu/Musick 2008; Reinhold 2010). Firstly, cohabitors are assumed to be more open to the idea of separation, weaker committed to family in general, less traditional and more individualistic (e.g. Lillard et al. 1995; see also Steele et al. 2006 and Wu/Musick 2008). Secondly, socio-demographic characteristics, like low educational levels or secularity, make them more likely to choose cohabitation over

marriage and to end a relationship (Jensen/Clausen 2003; McLanahan 2004; Lehrer 2000, 2004a, 2004b; Schnor 2012). Thirdly, there may be self-selection on the quality of the partner's match. The couple's compatibility has a determining influence on the union's stability (Becker et al. 1977). Couples with a low initial level of match quality are more likely to cohabit and have higher dissolution risks than direct marriages, even if they eventually marry (Brien et al. 2006).

While the socio-demographic background is not found to account completely for the higher risk of cohabitors, unobserved specific characteristics do in fact explain the higher divorce risk of former cohabitors (Hall/Zhao 1995; Lillard et al. 1995; Brüderl et al. 1997; Brien et al. 2006; Kulu/Boyle 2009). Net of selection effects, premarital cohabitation is found to either have no effect on marital stability or even to increase stability, with the latter supporting the out-weeding hypothesis. According to this hypothesis, cohabitation serves as a screening device for marriage, weeding out matches with less compatibility between the partners (Oppenheimer 1988). Couples learn about their mutual compatibility during cohabitation. The longer the partnership endures, the more the couple knows about their compatibility (Becker et al. 1977; Reinhold 2010; Brien et al.2006). The positive selection among cohabitors into marriage also explains that cohabiting couples who married have higher prospects of partnership success than couples who remain in cohabitation (Wu/Musick 2008; Kulu/Boyle 2009).

In studies that focused on the relative stability of cohabiting parents, their higher separation risk compared to married parents could not be explained by the individual and partnership information, like family of origin characteristics, educational levels or age at union formation (Wu/Musick 2008; Manning et al. 2004; Jensen/Clausen 2003). The existence of selection effects among former cohabitors should imply that also the higher separation rates of couples with a non-marital birth can be explained by their selective traits, e.g. the more liberal attitudes towards partnership and family. This hypothesis is not supported by the findings of Steele and colleagues (2006), which show that there is no selection on woman-specific unobservables. However, the relative timing of childbearing and marriage gives a hint for the impact of selectivity: Several studies have shown elevated disruption risks for marriages formed during pregnancy in comparison to marriages formed before conception (Britain: Chan/Halpin 2008; Russia: Jasilioniene 2007; US: Manning 2004). The higher instability of these so-called shotgun marriages is explained with the incentive character of the pregnancy: Pressed for time due to the impending birth the partners might shortened the evaluation period of the partnership and accepted a mismatch (Steele et al. 2006; Becker et al. 1977;

Wu/Musick 2008). Marriages formed after childbirth are also found to have an increased risk of separation compared to couples with marital childbearing (US: Wu/Musick 2008; Manning et al. 2004; Sweden: Liu 2002; Germany: Wagner 1997; Brüderl et al. 1997). This difference could be explained only in the US data by the observed characteristics of the couples (US: Wu/Musick 2008; Manning et al. 2004).

Studies that find a positive correlation of the prevalence of non-marital births and cohabitation stability explain this finding with the social perception of cohabitation relative to marriage (Steele et al. 2006; Le Bourdais et al. 2000, 2004): The decision to marry is influenced by social norms that can favor marital family formation or accept cohabiting parents. The desire to comply with these norms may then result in the rational choice to marry or to stay in cohabitation (Blossfeld et al. 1999; Ermisch 2005).
If marital childbearing is common and the prevalence of births within cohabitation is low, cohabitation may be accepted as a pre-family stage, but not as an appropriate setting for bearing and rearing children. Pregnancy gives then a high incentive to marry (Blossfeld et al 1999; Becker et al. 1977; Steele et al. 2006). Couples remain in cohabitation, because they do not match as marital partners (Ermisch 2005; Steele et al. 2006; Brien et al. 2006). In consequence, cohabitors are strongly negatively selected and possess a high risk to dissolve. Shotgun marriages have a higher risk of dissolution because the partners would not have married in absence of pregnancy.
If non-marital childbearing is accepted and a common case, pregnancy will not drive marriage. Potentially stable couples stay cohabiting because they regard cohabitation as an alternative to marriage and an appropriate setting to raise children (Steele et al. 2006; Le Bourdais et al. 2000). As a consequence, cohabitors are more heterogeneous with respect to their selective traits and shotgun marriages might not differ in their stability from other marriages (Liefbroer/Dourleijn 2006; Reinhold 2010). In this setting, the union status at childbirth may be losing its significance for stability assumptions and cohabitation act as an alternative to marriage.

The case of Germany

Germany presents a unique opportunity for comparative studies. The country can be dealt as a quasi-natural experiment, because it has undergone the division into two separate political

regimes and the re-unification afterwards. Since the turnaround in 1990, eastern and western Germany is covered by a common legal and institutional background.

To date, more than 60 percent of all children are born out of wedlock in eastern Germany, but only 27 percent of western German children are born to non-married parents (Pötzsch 2012; Kreyenfeld et al. 2011a). Differences between eastern and western Germany overshadow other regional variations (Klüsener/Kreyenfeld 2009). In European comparison, eastern and western Germany represent nearly opposite ends of the spectrum, as can be seen from Figure 2. Research has shown that most non-marital births in Europe take place within cohabiting unions; this is also the case in Germany (Sobotka/Toulemon 2008; Perelli-Harris et al. 2012; Bastin et al. 2012). The higher prevalence of births out of wedlock in eastern Germany leads to suppose that eastern Germans see cohabitation as an alternative to marriage; in contrast, marital childbearing is still the common case for western Germans (Perelli-Harris et al. 2012).

[Figure 2: Births out of marriage relative to all live births (percent) across Europe, 2010 (* data from 2009)]

In legal terms, marriage is under the special protection of the German state (Konietzka/Kreyenfeld 2005). This leads to special rights being reserved for marital unions. These rights include financial benefits, like tax advantages, spouse insurance and alimony rights after divorce; as well as legal advantages in the case of joint custody or the recognition of paternity. Current German policies provide incentives to specialization within marriage. This draws an at least normative close relationship between childbearing and marriage, as childbirth is often accompanied by a shift in the role allocation of the partners towards a traditional model. Marriage is thus seen not only as a way to institutionalize the union status, but also as a way to improve the financial situation of the family.

The different family structures in the eastern and western part draw the interest of family sociologists and demographers to find explanations for these differences. The proportion of non-marital births in eastern Germany was already higher when Germany was divided, in part in response to family policies that privileged non-married mothers in socialist East Germany (Klüsener et al. 2012). West German policies in contrast favored marital childbearing with financial and legal advantages (Kreyenfeld/Konietzka 2004; Konietzka/Kreyenfeld 2002). What seems to be the legacy of these policies has in fact its origins in cultural differences that existed already before the German divide (Arránz-Becker

et al. 2010): Compared to western Germany, eastern Germany traditionally had higher shares of non-marital childbearing as well as higher female labor participation, both more accepted in the Protestant than in the Catholic confession (Klüsener/Goldstein 2012). Originally dominated by the Protestant religion, eastern Germany was strongly secularized in the socialist period (Pollack 1998; Pickel 2003). The higher level of secularization among eastern Germans seems to favor non-marital childbearing still today (Kreyenfeld et al. 2011a; Arránz-Becker et al. 2010). The "pattern of disadvantage" (Perelli-Harris et al. 2010), which describes the negative relation of education and marital childbearing, is in Germany only found for single mothers, but not for cohabitors (Konietzka/Kreyenfeld 2005). Educational background does not influence childbearing within cohabitation among Germans born 1971 to 1973 (Perelli-Harris et al. 2010). Among western German women with childbirth in the 1990s, higher educated mothers were more likely to cohabit (Konietzka/Kreyenfeld 2005).
German studies that focused on the stability of marriages and cohabitations find that secularity increases instability only for the former, while low female education increases separation risks in both living arrangements (Lois 2008, 2009:198).

Hypotheses

According to existing studies, the high exit costs of marriage stabilize marital unions compared to non-marital cohabiting unions. As marriage experiences special protection by the German law, it is not likely that cohabitation reaches similar levels of union stability as marriage. I rather hypothesize that cohabitations exceed the rate of marital separation in both German parts. If cohabitation has a negative causal effect on stability – in terms of a lack of commitment – western German families should be more stable than eastern Germans due to their higher share of marriages.
As recent German research (Bastin et al. 2012) has shown, women who cohabit at childbirth in eastern Germany have higher union stability than in western Germany. With reference to the theoretical considerations and this finding, I hypothesize that (a birth within) cohabitation is related to a higher degree of union stability in eastern Germany than in western Germany, because the selectivity of eastern and western German cohabitors differs. As marital childbearing is common in western Germany, couples remaining in cohabitation should be stronger negatively selected in their partnership characteristics, especially in their partnership quality. E.g. partnership duration before family formation should be shorter for western

German than for eastern German cohabiting couples, because the former might not have had the time to accomplish the screening for marriage, while this should be of less concern for the latter. A short partnership evaluation period before parenthood should decrease stability. Socio-demographic characteristics, like religion and education, should play a minor role in the selectivity of eastern and western German cohabitors: Educational background is in previous studies not found to influence the likelihood to cohabit at the time of first childbirth among recent cohorts (Nevertheless, low educational attainments are found to favor instability). Secularity promotes childbearing within cohabitation, but it is not related to separation risks among cohabitors.

Selection can also act through individual attitudes towards marriage, family and separation. These attitudes could influence the likelihood of having a birth within cohabitation and the risk of separation. Western Germans are compared to eastern Germans less family orientated (Arránz-Becker et al. 2010) and more individualistic (Inglehart/Baker 2000), characteristics which previous literature has used to explain the higher instability among cohabitors. Further, western Germans are more heterogeneous regarding their work orientation: Western German married mothers are more traditional – expressed in their lower work orientation - than their non-married counterparts and eastern German mothers in general (Rosenfeld et al. 2004; Konietzka/Kreyenfeld 2005; Arránz-Becker et al. 2010). Altogether, this should result in a stronger impact of underlying heterogeneity for western Germany compared to eastern Germany.

Further, I assume that in the German context, the timing of marriage relative to childbearing has a determining influence on stability, as the legal and financial advantages of marriage for families can lead to marriages that would not have taken place in the absence of pregnancy. As marriage and family formation are more decoupled in the eastern region than in the western region (Konietzka/Kreyenfeld 2002, 2005), I expect to find a destabilizing effect of shotgun marriages especially for western Germany.

Data and methods

Selection of the sample

The analysis is based on the representative data of the German Family Panel (pairfam). The *Panel of Intimate Relationships and Family Dynamics* offer full fertility and partnership histories of both men and women of the birth cohorts 1971-73, 1981-83 and 1991-1993 (Huinink et al. 2010). The retrospective partnership history is restricted to information given by the anchor. The distinctive feature of this data set is that it allows distinguishing between partnerships with separate households, cohabitations and marriages. The present study uses the first wave (2008-09) of pairfam and an additional oversample of eastern German respondents, called *Demographic Differences in Life-Course Dynamics in eastern and western Germany* (DemoDiff). The first wave of DemoDiff was conducted with a one-year delay to pairfam in 2009-2010 (Kreyenfeld et al. 2011b). The initial anchor sample size – including pairfam and DemoDiff – amounts to 13,891. A drawback of this data is that information on economic activity and partner characteristics is not yet available.

The analysis is restricted to women of the birth cohorts 1971-1973 and 1981-1983. The cohorts 1981-1983 were still very young at the time of interview, but the event-history approach used in this study takes into account the different time at risk due to age differentials at the time of the interview. Nevertheless, mothers of the 1981-1983 birth cohorts represent a more selective population than mothers of the 1971-1973 cohorts: 9 out of 10 women born in 1971-1973 turned mothers until the interview date; of those born in 1981-1983 33 percent western Germans and 51 percent eastern Germans already have children. This is in line with other studies which prove that eastern Germans experience an earlier transition to parenthood than western Germans (e.g. Arránz-Becker et al. 2010).

The study concentrates on women who were at the time of first childbirth in a coresidential relationship with the biological father of the child. There is no case in which the woman was previously married. Married women who give birth with a partner other than their spouse are excluded. The analysis concentrates on respondents for whom the birth place and the place of residence at the time of interview are in the same German region (eastern vs. western

Germany).[5] Internal migrants as well as women with a foreign place of birth are not considered in the analysis to enhance the explanatory power of the region information. Individuals with inconsistencies in their fertility or partnership histories are omitted from the analysis. The analytic sample has a final size of 1,063 western German and 623 eastern German women.[6]

Method and analytical procedure

I use proportional hazard regressions to estimate the relative risks of separation. For the specification of the basic process time, piecewise continuous models are applied (Lillard/Panis 2003). The process time is union duration since the time of first birth. The risk of union disruption starts with the birth of the first child to have an equivalent starting point for all unions. The baseline thus refers to the age of the first child. The first separation after family formation is considered to be the event, even if the couple later reunites. The observation is censored 10 years after the first childbirth, with the time of interview and in case of the partner's death. Separation risks after childbirth are estimated for German women; regional background is considered as a dummy variable.

The empirical part includes analyses of potential differences in the partnership stability of eastern and western German mothers and especially addresses the role of selection. I apply a stepwise modeling strategy to observe changes in the central covariates of interest. A basic model (Model 0) focuses on differences in the separation risks of eastern and western German mothers. In a next step, information on the union form at first childbirth is added (Model 1). Model 2 further considers the influence of social-demographic characteristics in terms of the mother's school education and religious affiliation.[7] In a last step, control covariates for the partnership history are added (Model 3). The union duration before family formation is interpreted as a proxy for match quality. In the respective models 1 to 3 with suffix -a, I analyze how marital status at the time of first birth affects union stability (models without interaction of region and union information). Models with suffix –b consider differences in the impact of union status by region (interaction models).

[5] As West Berlin was affected by West German policies, the proportion of non-marital births was much smaller than in East Berlin (Klüsener/Kreyenfeld 2009). To account for these historical differences, western Berlin is counted as western Germany, although it is situated in the eastern German region.

[6] The fertility and partnership information has been cleaned and organized as episode data (Schnor/Bastin *not published yet*).

[7] As information on the partner is not available, the influence of heterogamy in educational/religional background cannot be studied.

Subsequently, the - observed and unobserved - selection into non-marital family formation is considered as a determinant on separation. The determinants that influence the probability of a birth within cohabitation are estimated in a probit model and then compared with the multivariate results of the hazard model.[8] I decided to consider the selection into childbearing within cohabitation in a probit model, because it offers the possibility to compare the characteristics of married and cohabiting mothers in our sample. To pay regard to unobserved selectivity, I consider the probability of cohabiting at the time of first birth as a correlated process of the transition to separation in the hazard model.

$$y = P(y) = \begin{cases} 1 \text{ if cohabiting at the time of first childbirth} \\ 0 \text{ if married at the time of first childbirth} \end{cases}$$

Probit model (probability of a birth within cohabitation (vs. marriage):

$$y = \alpha_1 + \alpha_2 Z + \delta + \rho$$

Hazard model (transition to separation after first childbirth):

$$\ln h(t|X) = \beta_1(t) + \beta_2 X + \beta_3 X(t) + \varepsilon + \rho$$

A joint residual term (ρ) controls the correlation of the unobserved heterogeneity in the probit model (δ) and in the hazard model (ε). ρ is supposed to be normally distributed with a mean value of zero and a variance of ρ^2. By linking the selectivity terms it is possible to identify a relation in the unobserved characteristics of those cohabiting at childbirth and their likelihood to dissolve. The dissolution risks including unobserved heterogeneity are modeled jointly for the two regions and separately for eastern and western Germany to test whether the selectivity argument depends on the regional background.

Based on these results I finally estimate the effect of marriage timing in the most appropriate model, which is either a multiprocess setting or a "simple" hazard model. The marriage timing covariate distinguishes between marriages formed before, during and after pregnancy. Time spent in a non-married union after childbirth is additionally controlled for.

I use STATA 11.0 for data preparation and descriptive statistics (Blossfeld et al. 2007); the multivariate analyses are performed with the help of the statistical package aML 2.9 (Lillard/Panis 2003).

[8] We use this approach as suggested in Lillard/Panis (2003), and Brüderl et al. (1997).

Results

Descriptive results

Sample composition

Table 1 shows the composition of the analytical sample separately for eastern and western Germans. It is subdivided according to the marital status at first childbirth. This format reveals if individual and partnership characteristics differ by marital status or region. Regional differences dominate differences by marital status in most of the control covariates: Among cohabiting mothers, the younger birth cohorts (1981-83) are more prevalent in the eastern region. This may be in part due to the younger age at childbirth of eastern German mothers (Kreyenfeld 2006; Arranz-Becker et al. 2010; Kreyenfeld et al. 2010).

Regional differences in the educational levels can be traced back to the different educational systems during the German division: a low level of school education was very uncommon in East Germany, but not in West Germany. Regarding the religious composition, the share of non-affiliated women is much higher among eastern Germans, which draws back on the secularization policy in the GDR. In addition, the table shows differences by marital status at childbirth: Women without religious affiliation are more likely to live in a cohabiting union at first childbirth.

Cohabiting mothers in eastern Germany have a mean longer union duration until first childbirth than western German cohabitors. Eastern and western German married mothers do not differ in their partnership duration before family formation. Eastern Germans have a lower mean number of partnerships than western Germans, which holds for both married and cohabiting unions. Cohabiting women reported more partnerships until first childbirth than married women in both regions. Eastern German mothers get on average fewer children in the observation period than western Germans.

The number of cases shows that marriage is more prevalent in the west than in the east. About 73 percent (N=780) of western German mothers were married at that time in their life course, compared to 39 percent (N=244) of eastern Germans.[9]

[9] It is coincidence that these shares are identical to the overall shares of non-marital births given by the German Federal Statistical Office. The latter considers the share of non-marital births relative to *all* live births and includes cohabiting as well as single mothers in 2010. According to these official statistics, the share of non-marital *first* births in 2010 was 37% among western Germans and 74% among eastern Germans.

[Table 1: Sample composition by region and union form at first childbirth, given in column percent and mean values, respectively.]

Table 2 shows the distribution of cases by the timing of marriage relative to family formation for eastern and western Germans. It has to be considered that for women non-married at childbirth, the final union form obtained within the process time is considered – which is either a postnatal marriage or cohabitation. It is remarkable that half of western German mothers were already married at the time of the conception of the first child and another 25 percent were marrying by the child's birth. Further, half of those who cohabited at the time of first childbirth decided for a later marriage. In eastern Germany, the situation looks quite different. Only a quarter of the women formed a marriage prior to family formation and few women married during pregnancy, so that the majority of the women was cohabiting rather than married at the time of first childbirth. Most of the women cohabiting at childbirth remained in a non-married union throughout the observation.

[Table 2: Distribution of cases by timing of marriage.]

Transition to separation

Figure 3 provides some initial insight into the transition to separation of eastern and western German women, relative to the time of first childbirth. It is obvious that the union status at the start of family formation had a determining influence on family stability in both regions. Women who were married at that time were less likely to see their unions dissolve within the first 10 years after childbirth than were women living in cohabiting union forms at the time of delivery. This difference is more pronounced in western than in eastern Germany. Ten years after the first child of a couple was born, 40 percent of the unions cohabiting at childbirth had dissolved in western Germany, while the proportion for those married at childbirth was only 20 percent. Within the eastern German region, 34 percent of the unions cohabiting at childbirth and 21 percent of the married unions had separated. The Kaplan-Meier failure curves suggest that the risk of separation is somewhat lower for cohabiting unions in eastern Germany than in western Germany.

[Figure 3: Proportion of women who separate within 10 years after their first childbirth, by union form at the time of first childbirth (including confidence intervals of 95%) and region.]

Multivariate results

Stepwise models

Table 3 shows the results of the multivariate model. A stepwise modeling procedure is applied to observe changes in the central coefficients. The regional coefficients in model 0 show that partnership stability does not differ for western and eastern German women, despite the higher prevalence of cohabitation in the eastern part of Germany. The multivariate results of the models 1-a to 3-a in Table 3 demonstrate that women who lived in a non-married coresidential partnership at the time of delivery have a significant higher risk of union disruption. The higher relationship instability of cohabiting mothers cannot be explained by their shorter union duration, their higher level of religious dissociation or their lower fertility, characteristics which are found to decrease stability. The mother's age at birth, her educational level and the number of partnerships seems to have no significant influence on the partnership stability.

Though, the regional coefficient changes significantly when religion and education is controlled for: In Model 1-a, western and eastern German mothers do not differ in their risk of union disruption. Taken the higher risk of separation of religious non-affiliated and lower educated women into account in model 2-a, western German mothers show significant lower partnership stability, compared to eastern German mothers. Separate estimations show that this change is due to the significant influence of religious background; school education does not significantly affect these regional risk differentials (results not shown).

Interaction results

An interaction of region information and the union context at childbirth reveals if cohabitation is more stable among eastern German mothers. Table 4 shows the results of this interaction. Control covariates are again added stepwise to the models to find mediating effects. Eastern German cohabiting mothers form the reference category (Models 1-b to 3-b). Likewise to the former results, the coefficients show notable changes when the religious (and educational) background is considered. Model 1-b replicates on the one hand the prior finding of Table 1 by showing significant higher partnership stability for women married at

delivery. On the other hand, the interaction terms reveal differences in the separation risks of eastern and western German cohabiting women, with the latter having an elevated risk of union disruption. Conditional on the higher level of secularization in eastern Germany, eastern German cohabiting women show in model 2-b considerable higher partnership stability than their western German counterparts, while they differ not anymore in their separation risks from western German married women. Hence, the lower separation risk of western German married women can be explained by their lower level of secularity. Model 3-b accounts for the union background and the family size (in terms of biological children). I assumed that union characteristics such as a short union duration should explain part of the higher separation risk of western German women cohabiting at childbirth relative to eastern Germans. The opposite seems to be the case in Model 3-b: the regional risk differential becomes even more pronounced. In fact, the higher level of fertility of western German women counteracts the upper mentioned assumption concerning the duration of the union before childbirth. In a modeling which does not control for further children, union characteristics reduce regional separation differences among cohabitors, but these differences stay highly significant (results not shown).

The interaction of region and marital status information demonstrate that the determining influence of the union context at childbirth can be explained with the observed characteristics in the case of eastern German mothers. This is clearly not the case for western German mothers, who show marked stability differences by the marital status at birth throughout all models.

[Table 3: Transition to first separation after first childbirth, results **from piecewise linear model, relative risks (and beta coefficients for baseline hazard).**]

[Table 4: Transition to first separation after first childbirth, results from piecewise linear model with interaction of region **and union form at first childbirth, relative risks.**

]

Selection into non-marital family formation and separation risks

Up to this point, the analysis has focused on the transition to separation and considered the influence of the union context at the time of childbirth as a control covariate. In this section I consider that women who are cohabiting at childbirth may be selective in their characteristics and attitudes, which influence their risk of separation.

The results of Model 4 (model without unobserved heterogeneity) in Table 5 demonstrate that secularity as well as a shorter union duration before childbirth increases the probability to cohabit at first childbirth and the risk of separation after family formation. Being born between 1981 and 1983 is also positively correlated with both processes. Further, the probability to be cohabiting at childbirth rather than married is higher for eastern Germans, lower educated and younger mothers, while these characteristics do not favor instability.

The inclusion of the unobserved heterogeneity factors in Model 5 does not lead to major changes in the estimated coefficients. The residual terms that control for unobserved heterogeneity in each process—i.e., "delta" (probit model) and "epsilon" (hazard model) — show positive and significant results. Both the decision to cohabit at the time of first childbirth and the transition to separation after childbirth is found to be influenced by unmeasured respondent-specific characteristics. However, these processes do not appear to be related by joint unobserved heterogeneity, as the residual term "rho" is not found to be significant. The transition to separation is, according to these results, not influenced by the unmeasured selective characteristics of those cohabiting at the time of first childbirth.

As the selection effect of cohabiting at childbirth might vary by region I also analyze separate models for eastern and western Germans. The marital status at first childbirth seems to determine separation risks only in partnerships of western German mothers; thus the results of the separate models for eastern and western Germans replicate the finding of Model 3-b. In both regions, low educational levels and a young age at childbirth favor non-marital family formation, but not separation risks. As in eastern Germany low educational levels are very rare, the effect is not significant. Further, medium educated are as likely as high educated women cohabiting at the time of childbirth. A short union duration before family formation decreases the probability of a marital first birth, while it increases the risk of union dissolution only for western German mothers. Religious affiliation has a stronger impact on the selection into cohabitation than on separation risks for western German women; the opposite is the case for eastern German mothers. In sum, I find that non-marital family formation of eastern Germans is rather determined by union characteristics than by the individual socio-demographic background; although, religious association stabilizes the partnership after birth. The lower selection on observed individual characteristics into cohabitation at the time of first childbirth in eastern Germany might explain that I find no significant unobserved person-specific heterogeneity. Only the transition into separation is driven by unobserved characteristics. In contrast, the model for western Germany shows that there is significant unobserved heterogeneity influencing both processes. The joint term

shows that there is no correlation of these unobserved characteristics. If these results are consistent (and not driven by sample size issues), the regional difference can be interpreted in the way that the probability of cohabiting at childbirth is to a greater extent driven by unmeasured characteristics in western Germany than in eastern Germany. In both regions I find unmeasured characteristics to influence the partnership stability.

[Table 5: Multiprocess modeling with and without unobserved heterogeneity]

The timing of marriage

So far, the information on union status has been considered as time-constant, only distinguishing between those married and cohabiting at the time of birth. I finally focus on the timing of marriage and investigate whether a shotgun marriage or a post-natal marriage is related to a different union stability in eastern and western Germany.

In the following model, changes in the union form after birth are considered in time-variant categories. The variable is time-constant for marriages formed prior to childbirth. Women who were married at conception in western Germany form the reference category. I draw back on the findings of the previous section and model the effect of marriage timing in a hazard model that accounts for unobserved heterogeneity in the transition to separation. The coefficients are presented with standard errors to enhance their comparability. The results in Figure 4 reveal that western German mothers who married during their pregnancy have significant higher risks of union dissolution than mothers who married before or after gestation. Non-married western German women have an almost 4 times higher risk of separation than those married prior to conception.

Eastern German women who married before first childbirth do not differ in their stability from the reference category; women who married after the entry into motherhood even show significant higher stability. Being non-married increases the risk of union disruption by 50 percent. Though, both eastern and western German non-married mothers have elevated risks of separation, but the stability is much lower for the latter.

The model accounts for individual and partnership characteristics. Unobserved heterogeneity significantly influences the transition to separation after childbirth.

[Figure 4: Model 6 – timing of marriage]

Conclusion

This study has investigated whether the prevalence of childbearing within cohabitation has an impact on union stability. I used retrospective data from the first wave of the German Family Panel (pairfam/DemoDiff). Childbearing within cohabitation is much more common for eastern than for western Germans: In 2010, only 39 percent of eastern German children are born into marriages, while 73 percent of western German births were marital. Most of the non-marital family formation takes place within cohabiting partnerships (Bastin et al. 2012). The legal context in Germany gives parents a high incentive to marry. In turn, the higher exit costs of marriage compared to cohabitation should stabilize this partnership form. I assumed that cohabitations exceed the rate of marital separation and questioned whether family life is more instable in eastern Germany due to the high prevalence of cohabiting families. The empirical results revealed that cohabitation was more instable than marriage among parents, but that eastern and western German mothers in total did not differ in their separation risks.

Within both German parts, mothers who remained in cohabitation after childbirth had a higher risk of union disruption. Though, cohabitation as a family arrangement was found to be more fragile in western Germany. The higher instability of cohabitations could not be explained by observed or unobserved characteristics; a result which also confirms previous studies (e.g. Steele et al. 2006; Wu/Musick 2008; Manning et al. 2004). The finding is in line with recent studies that emphasize the continuant importance of marriage within the context of childrearing rather than limiting the view to the marital status at childbirth (Perelli-Harris et al. 2012; Kasearu/Kutsar 2010). The marital status at childbirth is only relevant for the partnership stability of western German women: While western German women who formed a family outside marriage had significant higher instability than married women, their eastern German counterparts faced marital stability (!), when central individual and partnership characteristics are controlled for. **This signals that 1) a higher prevalence of cohabiting families does not signify higher overall instability, 2) childbearing within cohabitation can cease to signify a lack of commitment, 3) that a causal effect of cohabitation (as a family arrangement) on stability exists also in a context with common non-marital childbearing, and 4) that childrearing within cohabitation seems to work as a better predictor of union stability than a non-marital birth.**

I expected to find a destabilizing effect of shotgun marriages especially for western German mothers, as they might have accepted a mismatch due to pregnancy. The modeling of the separation risks by the timing of marriage confirmed this assumption and revealed that

western German women who married during pregnancy had a higher risk of dissolution compared to women marrying prior to pregnancy or after childbirth. Eastern German women who married before childbirth – either before or after conception - did not differ in their dissolution risks. Those who married after childbirth were shown to have an even lower risk of dissolution. This may be due to a "weeding" effect (Oppenheimer 1988), which has often been cited in research on premarital cohabitation (e.g. Liefbroer/Dourleijn 2006).

I further assumed that among women with a first birth within cohabitation, stability is higher for eastern Germans, because they are more likely to experience childbearing out of wedlock and though, their selection into cohabitation is weaker. Although stability for eastern German women who cohabited at the time of family formation was indeed higher than for western Germans, the empirical analyses were not able to capture these differences: The consideration of observed characteristics like school education, religious affiliation, partnership characteristics and family size did not explain the regional differing risks of separation among cohabiting mothers, neither did unobserved characteristics. Eastern German women chose to cohabit at childbirth mainly because they were young and the partnership was rather new, while lower educational levels and the dissociation to a Christian religion play only a secondary role. Most of these characteristics also have a negative impact on partnership stability after family formation. In the case of western German mothers, socio-demographic and partnership-specific factors as well as unobserved attitudes seemed to favor non-marital family formation. These findings demonstrate that the negative selection into childbearing within cohabitation seems to be stronger for western German women. Unobserved characteristics that are often assumed to capture time-constant person-specific attitudes did not drive both the selection into cohabitation and the risk of separation after childbirth.

In contrast to previous findings we observed that lower educated women were more likely to experience childbearing within cohabitation rather than in marriage. Lower educated women also seemed to be more likely to separate after family formation, but this effect was completely explained with the characteristics of their partnership and their family size.

The presented model results showed that secularity works as an important determinant of stability in Germany. Women without religious affiliation tended to choose cohabitation over marriage and had higher risks of separation after childbirth. But, secularity mainly accounts for regional differences rather than for risk differentials of union context. E.g. the higher union stability of western German women who married prior to childbirth can be fully explained by their lower secularity. The separate analyses confirmed that religious

background influences the selection into childbearing within cohabitation in western Germany more than in eastern Germany. On the one hand, this suggests that religion serves as a proxy for differences between eastern and western German attitudes towards marital family formation and family stability. On the other hand, it seems that religious affiliation may be too crude to capture commitment differences between cohabitation and marriage that affect stability (see Schnor 2012 for a further discussion of this topic).

The empirical analyses revealed that the risk of separation after childbirth is influenced by unobserved heterogeneity, but that this heterogeneity is not related to the probability to cohabit at childbirth. A typical drawback of the used heterogeneity models is that it remains unclear what is captured/measured by this unobserved heterogeneity terms. The data of the German family panel includes detailed information on individual attitudes at the time of interview. But as they are sensitive to life-course events, these attitudes can usually not be treated as exogenous variables in retrospective analyses (Moors 2000). However, as the assumption of unobserved heterogeneity relies on its time-constancy, I estimated a model that additionally controls for the attitude towards marital family formation (results not shown). The model results did not change, which underlines that it is not the more liberal attitude towards marriage that influences the separation risks of cohabitors.

It has to be noted that I did not consider time-variant person-specific effects like unobserved match quality (Reinhold 2010). Theoretically the latter effects are testable with instrumental variables, which are in fact empirically difficult to find (Reinhold 2010, Brien et al. 2006), since the processes of cohabitation, marriage and childbearing are strongly interrelated. I tried to capture match quality by controlling for the length of the partnership before the family was formed (referring to the weeding-out effect). The descriptive table showed that western German women who cohabit at childbirth had a shorter mean union duration before childbirth than their eastern German counterparts. The multivariate estimations have shown that a short union duration had a strong impact on both the probability to experience childbearing out of marriage as well as separation. However, union duration prior to childbirth was not able to explain the risk differences of eastern and western German cohabitors.

A drawback of the study is that it was not possible to account for the influence of economic characteristics. It is possible that heterogeneity in mothers' work orientation influences partnership stability after family formation. It has been mentioned that eastern German married mothers are more work orientated than their western German counterparts. Lower specialization within the partnership may decrease the benefits of marriage and raise the

benefits of cohabitation. In consequence, there is less self-selection into cohabitation, which improves the relationship quality of those who cohabit and leads to reduced separation rates (Reinhold 2010). Of importance for the present investigation is further the differing selection of eastern and western Germans into the sample used. Eastern German women are more likely to become mothers and to have their first child at a younger age than western Germans. The present analysis does not completely capture these different characteristics.

Plenty of studies have cemented the view of cohabitation as a very fragile form of partnership. The present investigation gave new insights into the topic of parental stability, because risk differentials by union context at childbirth were completely explained by a limited range of variables without drawing back on changes in the marital status after childbirth. The study further showed that selection mechanisms, which are usually found to explain the destabilizing influence of premarital cohabitation on marital stability, cannot be applied to the stability of parents with a non-marital family formation. It has been demonstrated that even within a framework that strongly encourages marriage, childbearing within cohabitation can cease to be selective of individuals with high risk of partnership break up, as cohabitation is more common. Still, the higher separation risks of unions remaining in cohabitation after childbirth show that cohabitation is not an equivalent substitute to marriage in terms of union stability (Wu/Musick 2008). Those remaining in cohabitation have a higher risk of dissolution than married people in both parts of Germany. Children growing up with non-married parents therefore are more likely to face parental disruption, even in the eastern German case, where parents cohabiting at childbirth are found to be less selective. However, if childbearing within cohabitation gets more and more common, it may be likely that legal reforms attempt to equalize paternal rights and financial security issues, adding a commitment character to cohabiting parents (Perelli-Harris/Sanchez-Gassen 2010). This might increase the benefits of cohabitation and though, the stability of this family arrangement.

Recent studies (Dourleijn/Liefbroer 2006; Reinhold 2010; Svarer 2004) have suggested that cohabitation ceases to be selective of separation-prone individuals when about one-half of the population cohabits. The authors referred to the issue of premarital cohabitation; future comparative research has to discover whether this critical mass level may be also relevant for the stability of couples that cohabit at childbirth.

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Appendix

Figures

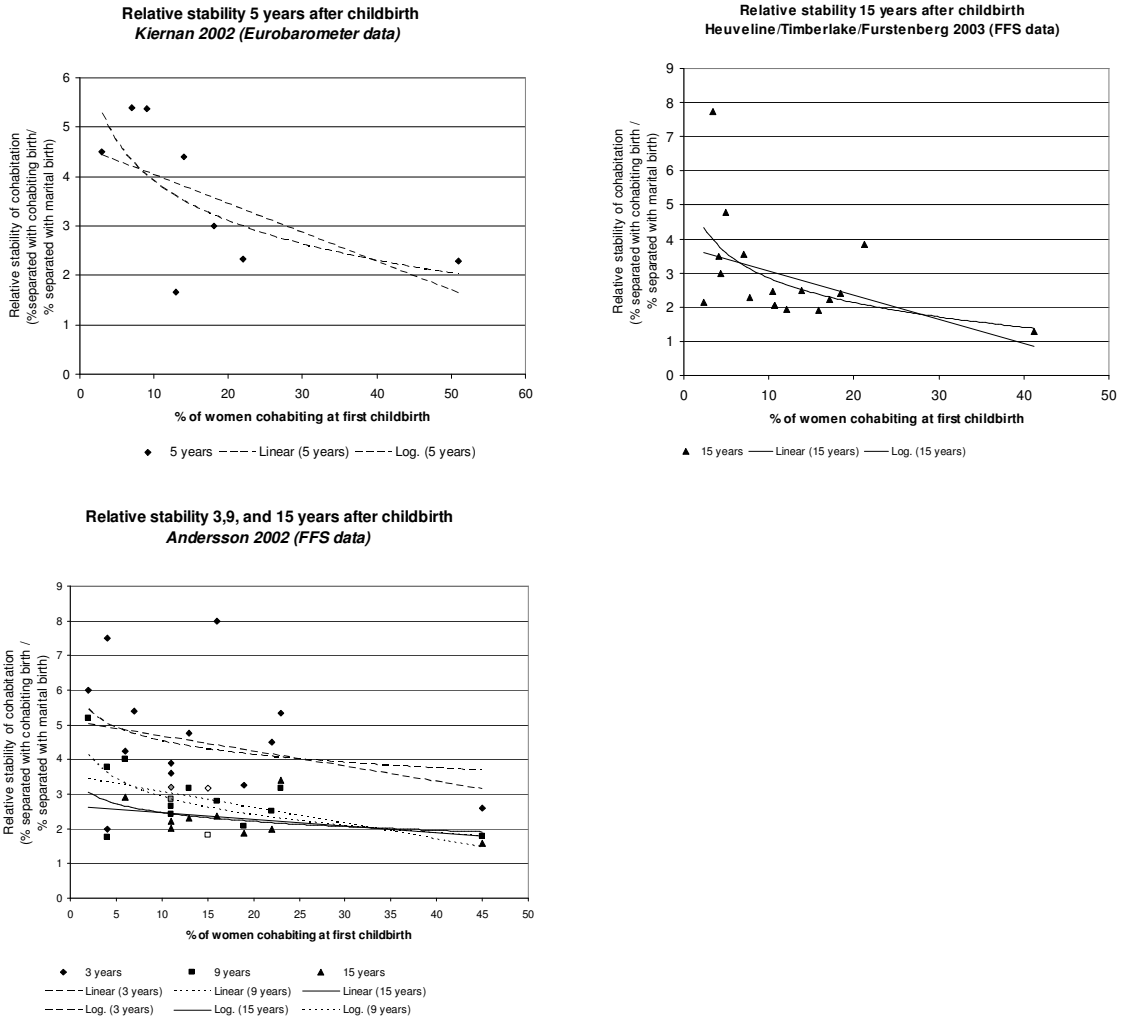

Figure 1: Relative stability of partnerships with family formation within cohabitation compared to marriage in Kiernan 2002, Andersson 2002 and Heuveline et al. 2003

Notes:

1. The percentage of women cohabiting at childbirth refers to the country-specific level given stated by the referred study.
2. The relative stability of cohabitation (at first childbirth) was calculated as the percentage of separated among parents with a birth within cohabitation divided by the percentage of separated among parents with a marital birth; the respective percentages were stated in Kiernan 2002 and Andersson 2002, while the relative stability of cohabition was given in Heuveline et al. 2003.

Sources: Kiernan 2002; Andersson 2002; Heuveline/Timberlake/Furstenberg 2003; own presentation.

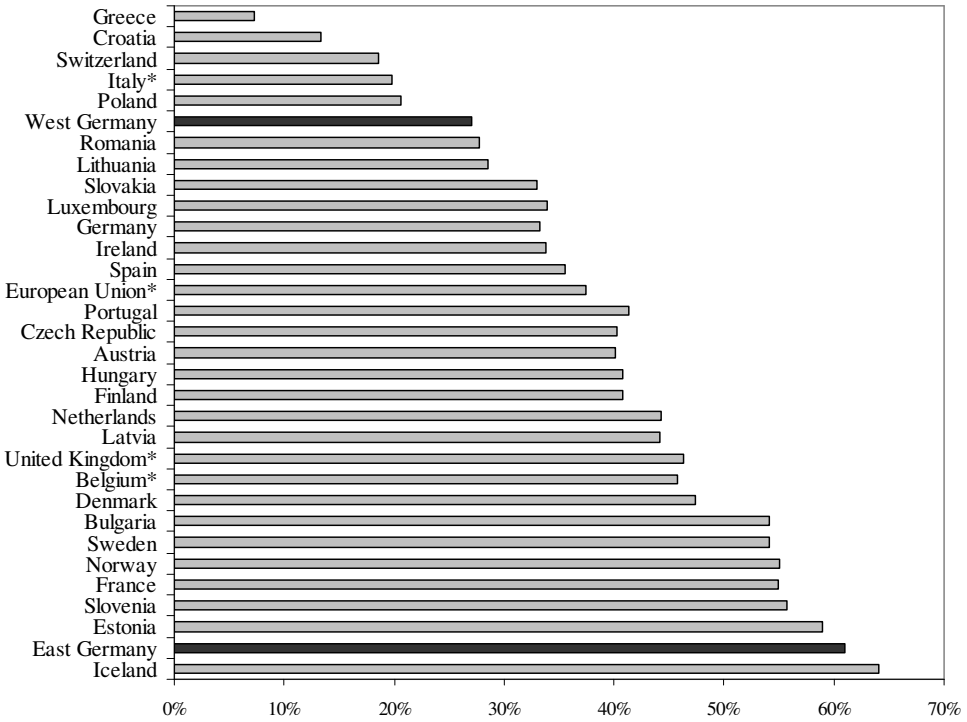

Figure 2: Births out of marriage relative to all live births (percent) across Europe, 2010 (* data from 2009)
Source: Eurostat, Federal Statistical Office (Pötzsch 2012).

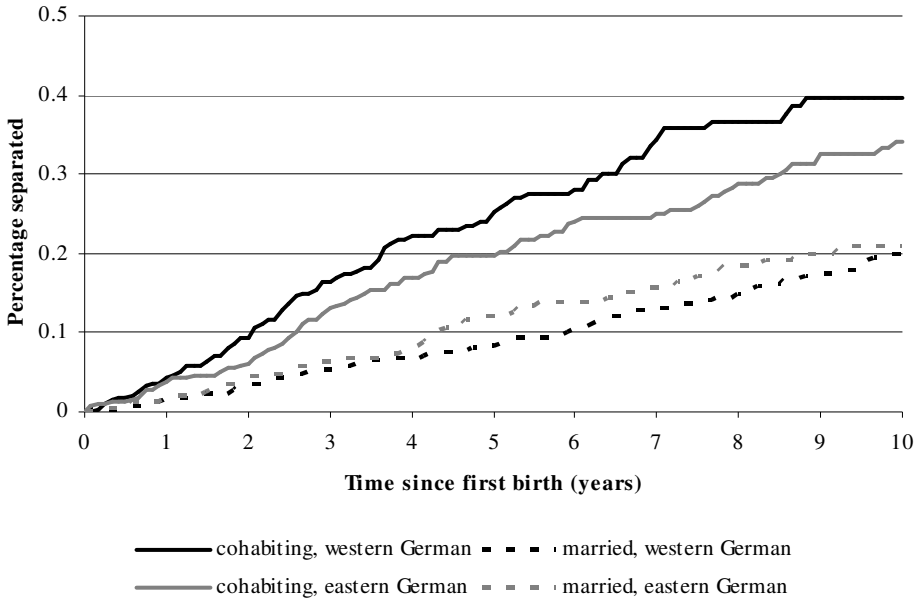

Figure 3: Proportion of women who separate within 10 years after their first childbirth, by union form at the time of first childbirth (including confidence intervals of 95%) and region.
Source: *pairfam* (2008/2009), *DemoDiff* (2009/2010), own estimates.

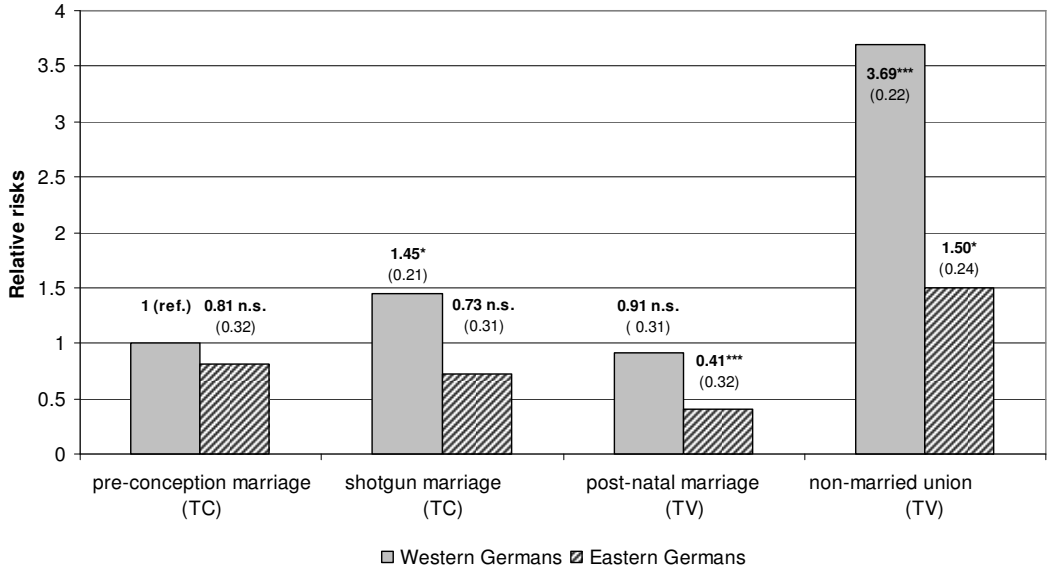

Figure 4: Model 6 – timing of marriage
Notes:

- Model 6 controlled for the region and the timing of marriage relative to childbearing (interaction), the piecewise continuous baseline (age of first child), birth cohorts, religious affiliation, school education, age at first birth (linear and squared), union duration before family formation, union order, the birth of further biological children and unobserved heterogeneity.
- Results of unobserved heterogeneity term: 0.50***
- *** p<0.01: ** p<0.05; * p<0.10.
- Standard deviation in brackets.
- TC: time-constant category; TV: time-variant category
- Source: *pairfam* (2008/2009), *DemoDiff* (2009/2010), own estimates.

Tables

		Western Germany			Eastern Germany		
			Union form at first childbirth			Union form at first childbirth	
		Overall	Cohabiting	Married	**overall**	Cohabiting	Married
Birth cohorts	1971-1973	**78%**	68%	82%	**66%**	57%	81%
	1981-1983	**22%**	32%	18%	**34%**	43%	19%
Age at first childbirth (mean)	Overall	**27.0**	26.3	27.3	**25.4**	24.9	26.3
	Born 71-73	**27.6**	27.8	27.6	**25.9**	25.7	26.1
	Born 81-83	**22.8**	22.0	23.4	**23.4**	23.1	24.3
Educational level	Low	**22%**	28%	20%	**3%**	5%	1%
	Middle	**41%**	36%	43%	**65%**	66%	64%
	High	**37%**	36%	37%	**31%**	29%	34%
	Missing Info.	**<1%**	<1%	<1%	**<1%**	1%	/
Religious affiliation	Catholic	**41%**	37%	43%	**3%**	2%	5%
	Protestant	**41%**	43%	40%	**20%**	17%	25%
	Non-aff.	**12%**	18%	10%	**75%**	80%	68%
	Else aff.	**6%**	3%	7%	**2%**	<1%	3%
Union duration prior to childbirth, in years (mean)		**5.3**	3.6	5.9	**5.1**	4.6	5.9
Number of children born in observation period (mean)		**1.8**	1.7	1.8	**1.5**	1.4	1.6
Partnership order (mean)		**2.0**	2.2	1.9	**1.6**	1.7	1.5
Number of subjects		**1072**	288	784	**627**	384	243
Number of events		**176**	78	98	**126**	88	38

Table 1: Sample composition by region and union form at first childbirth, given in column percent and mean values, respectively.
Source: *pairfam* (2008/2009), *DemoDiff* (2009/2010), own estimates.

	Western Germany	Eastern Germany
Married (Preconception)	517 (48%)	163 (26%)
Married (Shotgun)	267 (25%)	80 (13%)
Postnatal marriage (within observation period)	144 (13%)	154 (25%)
Non-married (within observation period)	144 (13%)	230 (36%)
Overall cases	1,072 (100%)	627 (100%)

Table 2: Distribution of cases by timing of marriage.
Source: *pairfam* (2008/2009), *DemoDiff* (2009/2010), own estimates, not weighted sample.

		Model 0	Model 1-a	Model 2-a	Model 3-a
Baseline [a] (ls)	Intercept	-6.7558***	-6.4698***	-7.1056***	-5.0359***
	1st Child 0-1 years	0.0366***	0.0368***	0.0368***	0.0454***
	1st Child 2-5 years	-0.0032	-0.0031	-0.0031	0.0029
	1st Child 6 years and older	0.0016	0.0011	0.0008	-0.0007
Region	Western Germany	0.89	1.14	1.68***	1.82***
	Eastern Germany	1	1	1	1
Birth cohort	1971-73	1	1	1	1
	1981-83	2.23***	1.83***	1.78***	1.33*
Union form *at* 1st childbirth	**Married**		**0.48*** **	**0.53*** **	**0.65*** **
	Cohabiting		**1**	**1**	**1**
Religious affiliation	Catholic			1	1
	Protestant			1.20	1.08
	Non-affiliated			2.13***	1.82***
	Other affiliated			0.70	0.56
Educational level	Low			1.27*	1.12
	Middle			1	1
	High			0.81	0.97
	Missing			2.66**	3.52**
Union duration prior to childbirth					0.89***
Age at 1st birth					0.92
Age at 1st birth^2					1.00
Union order					0.95
Further biological children	No further child				1
	One further child				0.46***
	More than one further child				0.36***

Table 3: Transition to first separation after first childbirth, results from piecewise linear model, relative risks (and beta coefficients for baseline hazard).

Notes:

*** p<0.01: ** p<0.05; * p<0.10.

ls = linear spline

[a] = β-values

Source: *pairfam* (2008/2009), *DemoDiff* (2009/2010), own estimates.

	Union form *at* 1st childbirth	Model 1-b	Model 2-b	Model 3-b
Western Germans	**Cohabiting**	1.33**	1.98***	2.15***
	Married	0.55***	0.89	1.20
Eastern Germans	**Cohabiting**	1	1	1
	Married	0.62***	0.68**	0.84

Table 4: Transition to first separation after first childbirth, results from piecewise linear model with interaction of region and union form at first childbirth, relative risks.

Notes: *** p<0.01: ** p<0.05; * p<0.10.

Model 1-b controlled for the region and union form at first childbirth (interaction), the piecewise continuous baseline (age of first child), and birth cohorts. Model 2-b controlled for the region and union form at first childbirth (interaction), the piecewise continuous baseline (age of first child), birth cohorts, religious affiliation, and school education. Model 3-b controlled for the region and union form at first childbirth (interaction), the piecewise continuous baseline (age of first child), birth cohorts, religious affiliation, school education, age at first birth (linear and squared), union duration before family formation, union order, and birth of further biological children.

Source: *pairfam* (2008/2009), *DemoDiff* (2009/2010), own estimates.

		Model 4 (*without unobserved heterogeneity*)	Model 5 (*controlling for unobserved heterogeneity*)	Model 5a (Western Germany)	Model 5b (Eastern Germany)
		exp(β)	exp(β)	exp(β)	exp(β)
Probit model (cohabiting at first childbirth)					
intercept [a]		4.668***	4.801***	4.899***	4.359**
Region	Western Germans	0.45***	0.43***		
	Eastern Germans	1	1		
Birth cohort	1971-73	1	1	1	1
	1981-83	1.77***	1.81***	1.62***	2.06***
Educational level	Low educated	1.30**	1.31**	1.31**	1.40
	Middle educated	1	1	1	1
	High educated	1.02	1.03	1.09	0.94
	Missing	2.25	2.37	1.59	X[b]
Religion	Catholics	1	1	1	0.62*
	Protestants	1.09	1.08	1.06	0.80
	Non-affiliated	1.40***	1.40***	1.35*	1
	Other affiliation	0.42***	0.41***	0.40***	0.22*
Age 1st birth		0.69***	0.69***	0.65***	0.73**
Age 1st birth^2		1.01***	1.01***	1.01***	1.01**
Union duration prior to childbirth		0.92***	0.92***	0.89***	0.94**
Hazard model (family stability)					
Baseline[a] (ls)	Intercept	-5.048***	-4.958**	-2.883	-4.840
	0-1 years	0.0450***	0.0474***	0.0504***	0.0444**
	2-5 years	0.0030	0.0044	0.0089	0.0006
	6 years and older	-0.0004	0.0004	-0.0001	0.0016
Union form at 1st birth	Married	0.65***	0.63***	0.52**	0.97
	Cohabiting	1	1	1	1
Region	Western Germans	1.81***	1.91***		
	Eastern Germans	1	1		
Birth cohort	1971-73	1	1	1	1
	1981-83	1.34*	1.32	1.06	1.66*
Religion	Catholics	1	1	1	0.66
	Protestants	1.08	1.10	1.19	0.34***
	Non-affiliated	1.80***	1.89***	1.50	1
	Other affiliation	0.56	0.52	0.48	0.44
Educational level	Low educated	1.12	1.15	1.08	1.06
	Middle educated	1	1	1	1
	High educated	0.98	0.97	1.01	0.98
	Missing	3.55**	3.53	2.39	4.17**
Age 1st birth		0.92	0.90	0.82	0.93
Age 1st birth^2		1.00	1.00	1.00	1.00
Union duration prior to childbirth		0.89***	0.89***	0.82***	0.96
Union order		0.95	0.96	0.93	0.97
Further biological children	No further child	1	1	1	1
	One further child	0.46***	0.43***	0.38***	0.52***
	More than one further child	0.36***	0.33***	0.30***	0.28**
Delta[a] δ (probit)			0.26**	0.36**	0.31
Epsilon[a] ε (hazard)			0.54***	0.60**	0.57*
Rho[a] ρ			0.006	-0.28	0.80

Table 5: Multiprocess modeling with and without unobserved heterogeneity
Notes: *** p<0.01: ** p<0.05; * p<0.10.

ls = linear spline

[a] = β-values

X^{b} = estimation contains no result for this category, due to small category size.

Source: *Pairfam* (2008/2009), *DemoDiff* (2009/2010), own estimates.