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Unlucky at work, unlucky in love: job loss and marital stability

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Abstract

This paper analyses the relationship between a husband's job loss and marital stability, focusing on involuntary employment terminations due to plant closures or dismissals. Using discrete survival analysis techniques on data from the German Socio-Economic Panel, we find plant closures and dismissals to be associated with a 54 and 74% higher risk of marital dissolution respectively, though the strength of association varies significantly by how long ago the change in employment status occurred. We extend the previous literature by considering heterogeneity in the relationship depending on whether new employment was found. Our analysis shows that the dissolution risk remains elevated even in couples where the husband has taken up a new position. Surprisingly, the relative risk of dissolution following the first period in a new job after a job loss is about the same as the relative risk of dissolution following the first period without employment. The relationship between finding a new job and marital dissolution appears to be mediated by changes in working hours as well as wages. In two extensions, we also consider the role of the wife's employment status in moderating the relationship and show that a wife's job loss is not associated with a similar increase in the probability of divorce as a husband's.

Keywords Marriage · Job loss · Divorce · Dismissal · Plant closure

JEL codes J12 · J63 · J65

1 Introduction

This paper analyses the relationship between the job loss of the husband and marital stability, focusing on the potential for heterogeneous results depending on whether a

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new job is found. Both job loss and marital dissolution are major life events, which can have profound impacts on many aspects of an individual's life such as social contacts, expected lifetime earnings and self-image (Hill 1958; McGrath 1976). In addition to being of general interest due to the significance of these events for the individual and their family, studying the causes of divorce in economics and improving our understanding of the processes leading to separation is important for several reasons. Firstly, divorce may have a direct negative impact on welfare. Since divorce is voluntary, this proposition may appear surprising. After all, Becker et al. (1977) argue in their seminal paper that a couple "*would separate if, and only if, their combined wealth from remaining married were expected to be less than their combined wealth when separated*" (p. 1144). However, this result hinges on some crucial assumptions such as transferrable utility. It has been shown that inefficient divorces may occur under certain circumstances (Browning et al. 2014, chapter 6.5, and the literature mentioned therein), such as in the presence of household public goods under no-fault divorce laws (see e.g. Zelder 1993). Divorce may also be inefficient due to the presence of negative spillover effects, e.g. on children, who are not an active part in the decision-making process (see e.g. the meta-analysis by Amato 2001). Furthermore, individuals may also suffer from biases in their affective forecasting such as impact or projection bias (see e.g. Wilson and Gilbert 2003, for a review article on affective forecasting) or fail to anticipate long-term negative consequences more generally. Secondly, many empirical studies investigate the influence of a variety of shocks on outcomes of couples. However, frequently the sample is restricted to those couples remaining together, thereby neglecting the possibility that couples may have separated due to the impetus to be investigated. As Charles and Stephens (2004) have argued before, this may lead to biased estimates if the impact on those who separated differs from the impact on those who remained together. Thirdly, in addition to being a potential negative consequence in itself, an increase in the divorce probability might serve as an indicator for a variety of struggles within the family brought about by job loss. In this sense, divorce would be a symptom of otherwise hidden costs of job loss.

Our study adds to the existing literature on the impact of employment termination on marital stability by allowing for heterogeneity depending on whether a new job was found. This extension is particularly interesting when considering labor market policies. If job loss only matters for the divorce rate due to the resulting unemployment, pushing for a more mobile labor market with higher rates of hiring and firing would not have a cost in terms of higher divorce rates. In contrast, if the divorce risk is still elevated, even if new employment is found quickly, stronger employment protection could be beneficial for marital stability.

We apply a complementary log–log model suitable for discrete survival analysis to data from the German Socio-Economic Panel (SOEP). The estimated equation is specified at the couple level and takes information on both partners into account explicitly. Our results show that a husband's involuntary job loss is associated with a roughly 54% increase in the dissolution probability in the case of plant closings and 74% in the case of dismissals. We interpret this to be a result of information updating regarding the quality of the match, including lifetime earnings and negative characteristics brought to light by the adverse conditions, as well as short term stress. Plant closings, which are frequently used to identify exogenous job losses, show a

smaller relationship with marital dissolution than dismissals. This could be for a variety of reasons, including dismissals inducing a larger negative information update, causing more psychological stress and potentially capturing unobserved heterogeneity. Reasoning along the same lines could also explain why other types of job losses, including potentially voluntary employment terminations, are associated with a comparatively small increase in the dissolution risk of 35%. When distinguishing by how long ago a job loss occurred, we find that the increase in the dissolution risk tends to be highest in the first period following the job loss and usually becomes insignificant in later periods. When analysing heterogeneity depending on whether new employment was taken up, we find the relative risk of divorce in the first year after taking up a new job to be roughly as high as in the year after the initial job loss if no new employment was found. We argue that the overall information update associated with the job loss could remain negative, which, coupled with the stress associated with starting a new job and potentially adverse characteristics of the new job, results in a largely unchanged dissolution risk, even though finding a new job is presumably a positive signal in itself. Our mediation analysis is consistent with a working hours as well as a wage channel. Lastly, we also investigate the role of the wife's labor market status, both as a moderator for the relationship between the husband's job loss and marital stability and by considering the direct influence of a wife's job loss on marital stability.

The remainder of the paper is organized as follows. Section 2 provides some theoretical background and reviews the previous literature related to job loss and divorce. The data and the estimation technique are introduced in Section 3. Section 4 reports our key results. Robustness checks and extensions are presented in Sections 5 and 6, respectively. Section 7 outlines some limitations and Section 8 concludes.

2 Theoretical background and literature review

The basic assumption in most of the economic theory of marriage and divorce is that, given marriage and divorce is voluntary, couples form and remain together if the individuals fare better living within the couple than they would otherwise (see e.g. Becker 1974a, 1974b).[1] Conversely, a couple will separate, if remaining married is less desirable than the outside option either for both partners or for at least one partner after all possible utility transfers from the other partner, who prefers remaining married, have been realized (Zelder 1993). Becker (1991) and Becker et al. (1977) note that considering uncertainty in marriage markets is essential to understanding divorce and highlight the importance of information updating regarding the quality of the match. Furthermore, Becker et al. (1977) show that higher earnings reduce the dissolution probability, indicating that job loss may affect

[1] Most family economists would propose that there are some fundamental gains from partnership. Becker (1974a) focuses primarily on complementarities in the household production function, in particular regarding child rearing. Browning et al. (2014) provide a list of additional gains from marriage including the existence of household public goods and gains from shared consumption more generally, specialization according to comparative advantage and economies of scale in household production, solving credit market imperfections by extending credit within the family and sharing risks. However, they also note that an important role of the family is child rearing.

divorce via an earnings channel. Particularly since job displacement has been shown to have a significant and potentially long-term negative impact on household income (see e.g. Jacobson et al. 1993; Stevens 1997; Arulampalam et al. 2001; Eliason and Storrie 2006; Couch and Placzek 2010), it is plausible that job losses could reduce the perceived value of remaining married below the value of the outside option for some couples, resulting in their marital dissolution.[2] It should be noted, however, that economists do not focus exclusively on pecuniary aspects when considering the gains from marriage. Becker (1974a) stresses that *"the commodity output maximized by all households is not to be identified with national output as usually measured, but includes conversation, the quantity and quality of children, and other outputs that never enter or enter only imperfectly into the usual measures"* (p. 310). In this spirit, job displacement may result in an increased probability of divorce not only due to monetary reasons but also non-monetary ones, including information updating regarding individual characteristics of the partner not directly linked to future earning potential (Charles and Stephens 2004) as well as stress resulting directly or indirectly from the employment termination.

Many already documented aspects of the profound impact unemployment and job loss have on the individual will affect the family as a whole and could lead to marital dissolution. In addition to the aforementioned loss in current and future earnings, a strong negative effect on life-satisfaction or subjective well-being exists, even after controlling for income (see. e.g. Clark and Oswald 1994; Kassenboehmer and Haisken-DeNew 2009; Winkelmann and Winkelmann 1998; as well as McKee-Ryan et al. 2005, for a meta-analysis). Furthermore, Nikolova and Ayhan (2018) document a negative spillover effect on the partner, in terms of subjective well-being, due to the reduction in household income as well as other (psychological) stressors. Kyriacou et al. (1999) mention unemployment as one of the risk factors for domestic violence. However, establishing a causal link is difficult due to the data requirements. Results by Stevens and Schaller (2011) report that parental job loss is associated with an increase in the probability of grade repetition and Oreopoulos et al. (2008) show that children of displaced workers in low income families have lower earnings and an increased unemployment probability later in life. Collectively, these studies document that job losses constitute important events, which have an immediate as well as a potentially long-term negative impact on the family.

Using data from the Panel Study of Income Dynamics, Charles and Stephens (2004) show that a partner's job displacement, which could indicate negative personal traits, is associated with an increase in the divorce probability while disability is not, besides its larger long-term impact on earnings. This leads the authors to argue that information regarding a partner's non-economic suitability rather than the future pecuniary value of the match is important for marital stability. Consistent with this hypothesis the authors also show that the divorce hazard is significantly increased following layoffs but not after plant closing, which are presumably exogenous to the worker. The increase in the divorce probability is largest in the years immediately

[2] Clearly, the theoretic analysis of marriage and divorce is much more involved than this gross simplification suggests, drawing amongst others on theories of optimal sorting, search and matching, bargaining and choice under uncertainty. Just as in other strands of economic theory, conclusions may change dramatically depending on the basic assumptions made in the various models. (see e.g. Browning et al. 2014).

following the displacement and does not appear to be long-term. Rege et al. (2007) use Norwegian register data to estimate the effect of a job loss due to plant closing or significant downsizing, defined as a reduction in staff by 90% or more, on divorce risk. Applying a linear probability model, they find that families, in which the husband worked in a plant that downsized or closed, face a 0.8 percentage point increase in the risk of divorce compared to families where the husband worked in stable plants. Doiron and Mendolia (2012) distinguish between three types of involuntary job displacements: redundancies, dismissals and temporary job endings in their discrete time duration analysis of British Household Panel Survey data. Dismissals and temporary job endings are associated with a significantly increased divorce probability while estimates for redundancies are smaller and frequently insignificant. The authors attribute the diverging results to only person specific types of job displacement conveying new information about the partner's characteristics and thus the future value of the match. Eliason (2012) uses Swedish linked-employer-employee data to identify causal effects of plant closures on divorce risk. He applies a propensity score weighted discrete time logit model. In contrast to some of the aforementioned studies, he documents an increase in divorce risk following a husband's job loss due to plant closure. While the coefficient on the wife's job loss has the same sign, it is smaller in magnitude and insignificant. Eliason (2012) explains his results by a job loss not only causing financial strain but also acting as a major stressor, affecting social networks, time structure and identity of both husband and wife. Even though their focus is on the effect of job loss on fertility, using Finnish linked employer–employee data, Huttunen and Kellokumpu (2016) also find that a husband's job loss due to plant closure increases the risk of divorce. In their event study design, the effect persists even after eight years. Using administrative Israeli data, Raz-Yurovich (2012) and Kaplan and Herbst-Debby (2018) focus on employment stability, proxied by the months of employment within a year/since marriage, rather than job loss. Both papers find that a decrease in a husband's employment stability is associated with an increased risk of divorce.

Lastly, it should be noted that studies considering the evolution of divorce rates over the business cycle typically find a negative or no relationship between unemployment rates and divorce rates (see Amato and Beattie 2011; Hellerstein and Morrill 2011; Schaller 2013; Ariizumi et al. 2015; González-Val and Marcén 2017). These seemingly paradoxical results could be explained by overall poor economic conditions lowering the couples outside options relative to the value of remaining married, credit constraints driving couples to delay a costly divorce and a recession decreasing the signaling power of the individual unemployment experience.

3 Data and estimation

Our analysis uses the 1984 to 2015 waves of the German Socio-Economic Panel (SOEP), a representative annual survey following the same households over time (see Wagner et al. 2007, for a useful introduction to the SOEP). Each individual aged 17 or over living within a selected household responds to a personal questionnaire. In addition, the head of household provides information in a household questionnaire. Since the couple is the unit of analysis in our study, rather than the individual, each

observation contains information on both partners as well as household characteristics. The sample is restricted to married couples by requiring both partners living in the household to state that they are married. Thus, cohabiting couples and singles are dropped from the analysis. Homosexual couples are also excluded because many explanatory variables are coded as information on the husband and/or wife. We also consider only the last observed marriage, to avoid including the same person in multiple couples. After applying these sample restrictions, 116,069 couple-year observations for which the relevant information is available remain. This covers more than 13,000 different couples. Two tables of summary statistics, one at the couple-year level and one at the couple level can be found in Appendix A.

A household is defined as experiencing a dissolution if either the partners explicitly state that a divorce occurred in the previous year or if the marital status changes from married and living together to separated, which could be divorced or married but living permanently separated. The status "married but living permanently separated" is also included in the definition of a marital dissolution because German law (in most cases) requires couples to have lived apart for one year before they can file for divorce. Thus, living separately is often the initiation of the divorce process. We discuss this choice further in Section 7. While the underlying process is in continuous time, i.e. a couple can separate at any point during the year, a divorce is only observed at the next yearly interview. To avoid uncertainty about the timing of events, the dependent variable is marital dissolution in the following year. This is also done because it takes some time for the dissolution to occur in response to the job loss, e.g. because it is necessary to find a new apartment. However, if a significant proportion of marital dissolutions following a job loss occur almost instantaneously, our results would underestimate the true extent of the relationship.

Due to the nature of the dependent variable, we estimate a discrete-time proportional-hazard model, specifically a complementary log–log model suitable for the analysis of interval-censored data. The general hazard function for the ith couple in period t after the start of the marriage is defined as follows:

$$h_i(t) = 1 - \exp[-\exp(\beta' X_i(t) + \gamma(t))]. \quad (1)$$

The baseline hazard is defined by $\gamma(t)$ and is captured by a set of time dummies. Due to data limitations, it is not fully non-parametric. While we observe divorces at each marriage duration shorter than 40 years, and are, thus, able to include a dummy for each duration up to this point, some longer durations are missing. Therefore, we assume a constant baseline hazard for each of the periods from 40 to 50, 50 to 60 and after 60 years.

$X_i(t)$ denotes a vector of (time constant and time varying) covariates including information on job loss and controls. The key explanatory variables are indicator variables equal to one after the husband has experienced a job loss at some point during the observation period and equal to zero if the husband has not (yet) experienced a job loss. This means that in the baseline estimation once husbands enter into the job loss category they remain there indefinitely and, thus, job losses are allowed to influence the divorce hazard in all following periods. Irrespective of how the job loss variables are coded in the various specifications, we always include supplementary employment status dummy variables (pensioner, self-employed, unemployed/inactive at sample entry) to ensure that the default category is couples in

which the husband remained employed in all periods up to the current one. In specifications where we distinguish between whether a new job was found or not, a man who is initially unemployed following his job loss will be in the "no new job" category until he finds employment, at which point he switches to the respective "new job" category. In Appendix B we provide a table illustrating how the key explanatory variables are coded by considering a hypothetical employment history. In most estimations, we also distinguish between three types of job losses: plant closings, dismissals and other. The analysis focusses primarily on plant closings and dismissals, which are described as involuntary job losses, as the husband did not choose to terminate his employment relationship. We further distinguish between these two types of involuntary job loss because dismissals could be correlated with personal characteristics, which also influence the divorce hazard, while plant closings have been suggested as an exogenous source of job loss. However, there are several objections one could make regarding the construction of the various key explanatory variables and the control group, which we address in a series of robustness checks and extensions.

Additional household level controls are house ownership, number of children, age category of the youngest child, type of living area and whether it is the first or higher order marriage for one or both partners. We also control for the age, educational attainment and previous unemployment experience of both partners as well as the employment status of the wife. In an extension, we also allow for interaction effects. A table of summary statistics is included in Appendix A.

In total, we observe 10,942 employment terminations, of which 1,049 are due to dismissals and 548 due to plant closure, i.e. there are 1,597 "involuntary" job losses. The remaining 9,435 employment terminations are due to other reasons. We also observe 712 divorces. Comparing the total number of divorces to the total number of household-year observations results in an annual relative frequency of divorce (for all married couples) of roughly 0.61% within our sample, which gives some indication of the absolute magnitude of the relative risks estimated in this study.[3] Those who have experienced a plant closure have the highest relative frequency of divorce (1.50%), followed by other job losses (0.77%), dismissals (0.72%) and the reference group (0.69%). Thus, individuals in the other groups, which we added as controls (such as retirees), have a comparatively lower relative frequency of divorce.

The specification represented by Eq. (1) does not take couple-specific time-invariant characteristics into account. Ignoring unobserved heterogeneity or "frailty" in the survival analysis literature will lead to an overestimation of negative duration dependence, i.e. the baseline hazard is biased downwards, and result in a bias towards zero (smaller absolute values) of the β coefficients (Jenkins 2005). We incorporate unobserved heterogeneity in all estimations via couple-specific random effects. The adjusted hazard function for each couple i is:

$$h_i(t) = 1 - \exp[-\exp(\beta' X_i(t) + \gamma(t))v_i], \tag{2}$$

[3] According to data from the German Federal Statistical Office there were a total of 17.6 million married couples and ca. 162,000 divorces in 2016, equivalent to an annual relative frequency of divorce of roughly 0.9%. The lower relative frequency of divorce in our sample could have several possible causes. However, the most plausible explanation is that our frequency is based on several observation periods, some of which were decades earlier.

where v_i is a couple random effect, which captures time constant unobservable factors influencing the stability of the match. Estimating this model requires an assumption about the distribution of these random effects. The normal or gamma distribution are typical choices, however, several papers also apply Heckman and Singer's (1984) idea of a discrete distribution, characterized by a number of mass points and their probabilities. We assume a normal distribution. A simulation study by Nicoletti and Rondinelli (2010) showed that this choice results in unbiased coefficients even if the true distribution is a gamma or discrete distribution.

Considering the previously outlined theoretic background we interpret this model by proposing that a couple separates following a job loss if the resulting reduction in the (perceived) value of the match causes the (perceived) value of remaining married to drop below the (perceived) value of permanently ending the relationship (for at least one partner after all potential transfers have been realized). This is more likely the case if the other observables and the value of the random effect are unfavorable. Whether the couple actually divorces in any given period then depends on the value of a time varying error term. If a marriage is very stable, for example, because the couple is well suited for each other, there is a strong support system, both partners are very emotionally committed to the relationship and/or they are strongly in love, a job loss is unlikely to cause marital dissolution.[4] Parts of these unobservables will be time constant (and, thus, captured by the random effect), change over time in a deterministic way (and, thus, be captured by the baseline hazard) or vary randomly with time (and, thus, are part of the time varying random error).

4 Results

All tables present the results in relative risk format, i.e. e^{β}. Thus, entries larger than unity imply a positive relationship between the dissolution risk and the respective explanatory variable, while entries smaller than unity indicate a lower relative risk of divorce.

Table 1 reports the results for our initial specification based on the complementary log–log model with normally distributed frailty and single-spell data.[5] The lag structure of the model implies that the reported relative risk in the first entry in column (1) can be interpreted as follows: if a husband has just or at some point in the past experienced a job loss due to plant closure, the risk of experiencing a dissolution in the next year is 74% larger than the dissolution risk of couples, in which the husband remained employed up to this point.

However, this large relative risk should be interpreted in the context of a low baseline hazard. Even though the hazard (which depends on the baseline hazard, the random effect and the values of all explanatory variables) will vary for each couple, the annual relative frequency of divorce of roughly 0.6% in our sample provides some insight into the absolute magnitude of these estimated relationships. The other relative risks can be interpreted analogously. Dismissals and job losses due to other reasons are associated with an increase in the risk of dissolution in the next period,

[4] Foster et al. (2019) and Frijters and Foster (2013) discuss love from an economics point of view.

[5] A full results table including relative risks for all control variables can be found in Appendix E.

Table 1 Marital dissolution risk, single spell (cloglog including frailty)

	(1)	(2)	(3)
Job loss (dismissal)	1.740*** (0.301)		
Job loss (plant closure)	1.541* (0.397)		
Job loss (other)	1.353*** (0.129)		
No job after job loss		1.678*** (0.261)	1.685*** (0.262)
New job after job loss		1.403*** (0.137)	
New job after job loss (dismissal)			1.785*** (0.325)
New job after job loss (plant closure)			1.639* (0.424)
New job after job loss (other)			1.327*** (0.138)
No. of failures	712	712	712
No. of couples	13,407	13,407	13,407
Couple-year observations	116,069	116,069	116,069
Log likelihood	−3,917.231	−3,916.753	−3,915.296
ρ	0.277	0.261	0.279
LR test of $\rho = 0$ (p value)	0.115	0.134	0.109

Source: SOEP, v31, own calculations

All regressions include the following variables for both husband and wife: age, dummies on migration background, education (in years), past unemployment experience in years and the following household characteristics:, dummy for house ownership, dummies for the number of children, dummies on age categories of youngest child in household, dummies on order of marriage, dummy on area (rural or urban) as well as dummies for the wife's employment status (full-time employed in private sector, part-time employed in private sector, full-time self-employed, part-time self-employed, full-time public service, part-time public service, pensioner, inactive, other is reference) and dummies for the husband's employment status (pensioner, initially unemployed/inactive, (former) self-employed). ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

but on a smaller scale of 54% and 35% respectively. However, the difference in estimates is not statistically significant.

As noted previously, we suspect that the increased probability of divorce following a job loss is the results of an information update as well as short-term stress. In this context, it plausible that involuntary job losses are associated with higher increases in the divorce risk than other types of employment termination, as the former likely convey more (negative) information and induce more stress than the latter. In particular, other types of job losses could be voluntary quits due to the availability of better employment opportunities or because the couple jointly agreed on this course of action. On the other hand, these could also encompass a temporary contract ending that was expected to be extended. Since employment terminations for other reasons capture a variety of situations and because the potential for selection bias is much higher, we focus on the two types of involuntary job losses in our analysis. However, these are also not necessarily identical in their informational content. Charles and Stephens (2004) as well as Doiron and Mendolia (2012) argue that both lay-offs and plant closures can be indicative of lower future earnings, but only lay-offs provide information about a partner's non-pecuniary suitability as a mate, which could explain the smaller point estimates associated with plant closings.

Eliason (2012) further states that plant closures, albeit independent of personal characteristics of the employees, may still operate as a stressor to the family, which would provide an additional explanation why plant closings could increase the incidence of divorce beyond their influence on expected earnings and why the estimate is still significant in our study. We would further argue that the stress brought about by any type of job loss can reveal negative aspects of the partner's personality, even if the initial employment termination is not a negative signal in itself. In this interpretation, negative character traits are revealed as the couple has to navigate the difficult circumstances. Thus, the situation could also cause the husband to update his beliefs about his wife's character traits. For example, a wife might not be willing to compromise regarding certain aspects, which would be required for her husband to find an adequate new job, such as moving to another city or changing childcare arrangements. This could be particularly relevant in the case of plant closings, where finding a new job locally might be difficult. The group of people who are more likely affected by plant closings might also respond differently to an exogenous job loss than other individuals in society, resulting in a loss of external validity when using plant closings to identify an exogenous job loss in general.[6] Furthermore, dismissals and plant closings could affect the perceived future lifetime earnings differently or induce different levels of stress, both of which we cannot control for. For these reasons, we abstain from drawing definite conclusions about the relative importance of information updating regarding personal characteristics, lifetime expected earnings and stress from the differences in estimates between plant closures and dismissals, even though we agree that the potential for signaling of personal characteristics is probably larger in the case of dismissals.

Column (2) differentiates by employment status after the job loss occurred, i.e. whether the man is still without a job or has found new employment. An unemployed or inactive husband after a job loss is associated with an increase in the dissolution risk by 68%. However, even if a new job is found, the risk of dissolution is 40% higher than in couples where the husband never experienced a job loss. The difference in estimates is not statistically significant and, even if there was an underlying difference, it could be a time effect, as those who are still unemployed are likely to have, on average, lost their job more recently. This is investigated further in Table 3. In column (3) we repeat the analysis from column (2), but allow the estimated relative risk associated with having a new job to vary depending on the type of the initial job loss. The difference in estimated relative risks is not statistically significant. Due to small cell size, we do not apply the same differentiation to the case where the husband is still unemployed. Out of the 1597 involuntary job losses, only 249 men did not start a new job between the initial job loss and the next interview. All other men either found new employment or switched into another category, such as retirees. Since the following sections provide additional insights, we postpone an interpretation of the results relating to taking up a new job to Section 6.1, which also conducts a mediation analysis.

[6] As a cursory investigation into this issue, we included a full set of dummies capturing the two-digit NACE classification at the point of job loss in an unreported regression. Key results are largely robust to this change, thus results should at least not be driven by the type of industry.

5 Robustness analyses

This section considers two key robustness checks. Firstly, the sample is restricted to couples observed from the start of their marriage. Secondly, we allow for time-varying effects.

For some couples the start of the marriage is not directly observed in the SOEP, but is only recorded in the bibliographic data. In the absence of unobserved heterogeneity, this delayed entry to the sample or left truncation of already married couples is unproblematic. However, with unobserved heterogeneity results may be biased (Jenkins 2005). To investigate this concern, Table 2 reports results based on a sample consisting of only those couples where the start of the marriage is observed. Applying this sample restriction results in a sample size reduction of more than 75% to only 25,818 couple-year observations. As a consequence, the baseline hazard had to be adjusted and is now only fully flexible for the first 20 years of marriage and assumed to be constant thereafter.

The qualitative results are robust to this adjustment. Nonetheless, when comparing the point estimates to those in Table 1, the estimated relative risks of marital dissolution associated with plant closings as well as employment termination without subsequent reemployment appear larger in this sample. However, only the difference between plant closures and other types of job loss is statistically significant. Furthermore, if new employment is found, the type of initial job loss seems to matter more. Both the relative risk associated with having a new job after a plant closure and dismissal is significantly (at the 5% level) higher than following other types of job losses.

Table 2 Marital dissolution risk, excluding left truncated couples (cloglog including frailty)

	(1)	(2)	(3)
Job loss (dismissal)	1.811*** (0.415)		
Job loss (plant closure)	2.485*** (0.813)		
Job loss (other)	1.405*** (0.184)		
No job after job loss		1.973*** (0.413)	2.035*** (0.443)
New job after job loss		1.429*** (0.184)	
New job after job loss (dismissal)			2.082*** (0.501)
New job after job loss (plant closure)			2.674*** (0.903)
New job after job loss (other)			1.277* (0.183)
No. of failures	348	348	348
No. of couples	3,418	3,418	3,418
Couple-year observations	25,818	25,818	25,818
Log likelihood	−1,752.647	−1,753.269	−1,749.549
ρ	0.093	0.012	0.246
LR test of $\rho = 0$ (p value)	0.425	0.486	0.259

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 20 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

There are two explanations for these changes. The first is effect heterogeneity resulting in some groups being affected more by job loss than others. On average, couples in this sample have been married for a shorter period of time compared to the full sample. Thus, we might interpret these changes in the point estimates as an indication that involuntary job losses, and in particular plant closures, are more detrimental during early stages of the marriage. The average age of individuals in the sample is also roughly 10 years lower. Changing employment early in the career is common, which might explain why employment terminations for other reasons is not associated with a higher relative risk in this sample compared to Table 1, particularly if new employment is found. It should be noted that this robustness check also ensures that the job loss variable captures the first job loss experienced by the couple, rather than the first observed job loss in the sample. Assuming higher order job losses have, conditional on the couple surviving the previous job losses, a lower impact on the dissolution risk, estimates including left truncated couples would be too conservative. The second explanation for this result is unobserved heterogeneity of the couples. In particular, the left truncated couples, i.e. couples who already "survived" several years at the start of the observation period, are a specific subsample of all marriages, such that their average random effect might no longer be zero. In this case, excluding these couples corrects for the bias otherwise resulting in too conservative estimates (Guo 1993). However, since this cannot explain why the estimated relative risk is actually smaller for those who have found a new job after a job loss for other reasons, this does not appear to be the only explanation. Changes compared to Table 1 can, of course, also be attributed to the much smaller sample size. Due to the sizeable reduction in the sample size and because, if anything, using the full sample results in too cautious point estimates, at least for the variables of key interest, we choose to rely on the full sample for further robustness checks and extensions.

In Table 3 we relax the assumption of proportional hazards by interacting our key variables of interest with dummies, representing the time the husband has already spent in the respective status. We allow for different relative risks for the first year, the second year and for three or more years spent in a specific status. Thus, while we still assume a constant hazard after three years, the relative risks for the first and second year are flexible. We propose that couples decide on whether to divorce or not based on current and expected future income, current and expected future stress and updated beliefs about personal characteristics. However, for any of these channels to have an influence on the divorce risk beyond the initial period either the agents' foresight must be biased, new information must be released by remaining in any given status or random shocks must occur. The latter is the case, because a permanent reduction in the expected future value of the match due to the employment termination makes it more likely that negative shocks push the couple over the divorce threshold later on. The point estimates in column (1) confirm that a job loss is associated with an increase in the risk of divorce. However, the magnitude of the relationship is generally decreasing over time. This is in line with earlier results from Charles and Stephens (2004) who also found the strongest effects in the first year following a job loss. When comparing the types of job loss, the first year after a dismissal is associated with the highest increase in divorce risk. Even though the respective estimate for plant closures is larger than in the case of a job loss for other reasons, the former is not statistically significant while the latter is. However, it is

Table 3 Marital dissolution risk, time-varying effects (cloglog including frailty)

	(1)	(2)	(3)
Job loss (dismissal)			
1st year	2.618*** (0.570)		
2nd year	1.487 (0.574)		
3 or more years	1.120 (0.309)		
Job loss (plant closure)			
1st year	1.669 (0.694)		
2nd year	1.789 (0.908)		
3 or more years	1.269 (0.470)		
Job loss (other)			
1st year	1.458*** (0.182)		
2nd year	1.441** (0.227)		
3 or more years	1.212* (0.143)		
No job after job loss			
1st year		1.643*** (0.295)	1.643*** (0.295)
2nd year		1.770* (0.523)	1.770* (0.522)
3 or more years		1.755* (0.534)	1.755* (0.533)
New job after job loss			
1st year		1.693*** (0.221)	
2nd year		1.400** (0.233)	
3 or more years		1.226* (0.148)	
New job after job loss (dismissal)			
1st year			2.777*** (0.657)
2nd year			1.453 (0.606)
3 or more years			1.217 (0.339)
New job after job loss (plant closure)			
1st year			1.837 (0.766)
2nd year			1.915 (0.975)
3 or more years			1.333 (0.497)
New job after job loss (other)			
1st year			1.473*** (0.222)
2nd year			1.346 (0.249)
3 or more years			1.215 (0.155)
No. of failures	712	712	712
No. of couples	13,407	13,407	13,407
Couple-year observations	116,069	116,069	116,069
Log likelihood	−3,912.922	−3,914.464	−3,911.612
ρ	0.158	0.206	0.190
LR test of $\rho = 0$ (p value)	0.285	0.210	0.236

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

likely that this is largely due to the small number of cases in this category, since the estimate associated with plant closings is significant in Table 1, where we do not distinguish by how long ago the plant closure occurred.

Column (2) distinguishes by whether a new job is found or not. There does not appear to be a significant difference in the divorce probability after the first year in unemployment compared to after the first year in a new job, if anything the risk is higher in the latter case.[7] Reasons for this seemingly counterintuitive result are further discussed in Section 6.1. However, there are some differences between the two groups beyond the first year. Perhaps surprisingly, the relative risk of dissolution associated with not having a job after an employment termination is highest two years after the initial employment termination, though the difference in estimates between the first and second year of unemployment is not statistically significant. High relative risks of marital dissolution beyond the first year could be attributed to information updating arising from the husband failing to obtain employment after a potentially expected transition period of one year. At this point he is also considered long-term unemployed, which has been shown to be associated with greater state-dependence in the labor market status (Arulampalam et al. 2000; Plum and Ayllón 2015) and thus significantly reduced financial prospects. In addition, the husband will have also lost his unemployment insurance payments (if he was eligible) and have moved to the lower basic social security provision, which the couple might struggle to cope with.[8]

In contrast, if new employment was found, the increase in the dissolution risk appears to be large in the first year but decreases significantly over time. This could indicate that the role the initial employment termination plays in determining the expected future value of the match may fade over time as newer information becomes available, e.g. that the husband is able to hold the new job and that the family is financially secure again. An alternative interpretation is that after some time after taking up a new job, the stress associated with the job loss and taking up a new job is reduced and the family has (largely) completed the adjustment process to the new everyday life. Nonetheless, as column (3) shows, even if new employment is found the type of initial job loss still appears to matter, with involuntary job losses being associated with higher relative risks of dissolution than employment terminations for other reasons. Strikingly, the increase in divorce risk associated with the first year in a new job following a dismissal is significantly (at the 10% level) higher than the one associated with the first year in unemployment, even though the job loss itself is, on average, longer ago in this group. This is consistent with the proposition that not only the job loss itself but also taking up a new job, particularly if changing job is

[7] We could not distinguish between whether the husband had a period of (potentially prolonged) unemployment before taking up a new job or not due to small cell size. Thus, individuals in the "first year in a new job" group could differ in how long ago the initial job loss occurred. However, as noted previously most husbands were not observed in unemployment following the job loss, thus, for most couples in this group the job loss is as long ago as in the "first year with no new job" group.

[8] However, when we investigated the issue in an unreported regression, this did not appear to drive the results.

involuntary, is a stressor for the family, which might be aggravated in the case of dismissals for fear of being dismissed again.[9]

Table 3 also serves as a means to check whether it would be possible to assign more families to the control group. Falsely excluding men no longer affected by the past job loss from the control group should not bias the estimate associated with the variable capturing husbands who are still unemployed after a job loss, since the control group is still representative of unaffected individuals. If, on the other hand, still affected men migrate into the control group the estimates will be biased towards finding no relationship. However, the relative risk associated with the variable capturing job loss at some point in the past or having a new job after a job loss clearly depends on who is in that particular group. It is a normative judgment, whether the estimates should consider all men, including those who are no longer affected, or whether men should be considered as part of the reference group after a couple of years (in a new job). As we wanted to consider both options, we re-estimated Table 1 with a control group including men that have been in a new job for four years or more. The results are displayed in Appendix C.

6 Extensions

In this section, we present some model extensions to investigate variables mediating the association between job loss and divorce, how the labor market status of the indirectly affected partner moderates the relationship and whether the wife's employment termination is also associated with an increase in divorce risk.

6.1 Mediation

We have already briefly discussed the initially counterintuitive result that the relative risk of marital dissolution remains high even after finding a new job. In this section, we analyse this issue further, starting by outlining three explanations for this result. Firstly, it is not clear whether the new job provides the same level of income as before (Jacobson et al. 1993; Eliason and Storrie 2006; Couch and Placzek 2010, for papers that focus on German data see Couch 2001 or Fackler and Rippe 2017). The couple may be (negatively) surprised by the income realization, which causes an additional update of beliefs about the future earnings potential. Secondly, having lost a job (even if new employment was found) can still cause a negative information update about the non-pecuniary suitability as a mate relative to the comparison group where no job loss occurred, explaining part of, albeit not the entire, large relative risk estimate. Furthermore, depending on the type of job taken up, the information update may even be negative compared to remaining unemployed, if the new job does not meet the expectations held while still being unemployed. Thirdly, job search and taking up a new job can be associated with high levels of stress and uncertainty,

[9] Coping mechanisms have been investigated e.g. by Leana and Feldman (1988), Feldman and Brett (1983) and McCarthy and Lambert (1999). Nelson (1990) gives an overview of stressors related to taking up a new job. For an overview of theoretical and empirical papers on the effect of stress on the risk of divorce see Bodenmann et al. (2007).

which could lead to the breakdown of the relationship. In addition, the new job may have other non-monetary negative characteristics such as less desirable working hours and commuting time that place continuous strain on the couple's relationship. To investigate this issue, we included a number of controls for changes in job characteristics. In particular, the role of wages is captured by the ratio of former to current wage. Similarly, the role of working hours is captured by the ratio of former to current contracted working hours. Unfortunately, we do not have data on the exact time spent commuting. We do, however, know whether the husband commuted daily, weekly or less frequently. Thus, we decided to include a dummy variable indicating an increase in the commuting frequency, leaving no change or a decrease in commuting frequency as the default category. In addition, in order to allow the mediators to affect involuntary and other job losses differently, we interacted each mediator with whether an involuntary job loss or other job loss occurred. As a result, all mediators are equal to zero if no job loss occurred.

The results are reported in Table 4. Considering the results reported in columns (1) to (4), which do not allow for variation in the relative risks across time, it appears that the ratio of current to former wage individually absorbs more of the total estimated relationship between obtaining a new job after an involuntary job loss and marital dissolution than the other controls. This also renders the relative risk insignificantly different from unity. The inclusion of the ratio of hours worked also has a similarly large impact on the estimated relative risks compared to Table 1, while the changes in commuting frequency reduce the estimates only slightly. However, this could also be the case because the available commuting measure is difficult to interpret.[10] When all controls are included jointly, no significant relationship between having obtained a new job after any form of employment termination and the risk of marital dissolution remains. When we allow for heterogeneous effects for the first, second and following years in an employment status in columns (5) to (8) the pattern is more complex. However, it should be noted that in Table 3 column (3), of all the variables related to a new job, only the one for dismissals and other types of job losses are significant and only in the first year. Both of these also become insignificant after including all the additional explanatory variables in Table 4. However, now only the inclusion of the ratio of hours worked also renders these relative risks insignificant unilaterally. On the other hand, looking beyond the first period, the reduction in the point estimates is the largest for the inclusion of the relative wage, with some relative risks even falling below unity, though none are significantly different from one. The case for a wage-based explanation rather than an hours-worked-based explanation is also made stronger by the fact that only the relative wage is associated with a significant point estimate itself. However, these results should only be viewed as a first tentative investigation into possible channels as small cell sizes, particularly when differentiating by how long ago changes in employment status occurred, could diminish the reliability of the estimates.

It would also be interesting to analyse the underlying reasons, such as an income channel, for the estimated relative risks for other changes in employment status (e.g.

[10] Commuting frequency could reduce both because the husband no longer has to commute, but also because he has to commute further and decides to stay in the city of his employment for some nights of the week.

Table 4 Additional new job controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
New job after job loss	1.687*** (0.266)	1.719*** (0.268)	1.710*** (0.266)	1.744*** (0.275)				
1st year					1.645*** (0.299)	1.665*** (0.300)	1.664*** (0.298)	1.689*** (0.306)
2nd year					1.773* (0.529)	1.806** (0.535)	1.802** (0.531)	1.842** (0.549)
3 or more years					1.803* (0.561)	1.826** (0.559)	1.809* (0.550)	1.922** (0.599)
New job after job loss (dismissal)	1.813**** (0.383)	1.403 (1.100)	1.284 (0.313)	1.373 (1.527)				
1st year					2.491*** (0.754)	2.226 (1.879)	2.214*** (0.662)	1.900 (2.194)
2nd year					1.641 (0.763)	1.203 (1.097)	1.179 (0.521)	1.465 (1.749)
3 or more years					1.480 (0.437)	1.096 (0.916)	0.891 (0.283)	1.029 (1.187)
New job after job loss (plant closure)	1.747** (0.483)	1.201 (0.973)	1.015 (0.330)	1.173 (1.341)				
1st year					1.885 (0.868)	1.532 (1.393)	1.551 (0.715)	1.481 (1.817)
2nd year					2.414* (1.243)	1.924 (1.803)	1.106 (0.668)	1.528 (1.930)
3 or more years					1.419 (0.572)	0.835 (0.765)	0.761 (0.338)	0.837 (1.013)
New job after job loss (other)	1.299** (0.154)	1.341 (0.451)	1.622** (0.391)	1.656 (0.728)				
1st year					1.462** (0.271)	1.381 (0.499)	1.937** (0.529)	1.776 (0.830)
2nd year					1.281 (0.300)	1.505 (0.560)	1.712* (0.495)	1.791 (0.869)
3 or more years					1.228 (0.174)	1.259 (0.431)	1.459 (0.365)	1.544 (0.690)

Table 4 continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Additional controls (interacted with type of job loss)								
Changes in Commuting	Yes			Yes	Yes			Yes
Ratio hours worked		Yes		Yes		Yes		Yes
Ratio wages			Yes	Yes			Yes	Yes
No. of failures	649	679	695	617	649	679	695	617
No. of couples	13,257	13,355	13,363	13,194	13,257	13,355	13,363	13,194
Couple-year observations	110,555	113,477	114,197	107,365	110,555	113,477	114,197	107,365
Log likelihood	−3,597.899	−3,755.886	−3,882.687	−3,432.204	−3,596.318	−3,752.779	−3,817.713	−3,430.436
ρ	0.342	0.263	0.256	0.272	0.318	0.187	0.147	0.240
LR test of $\rho = 0$ (p value)	0.044	0.144	0.138	0.119	0.067	0.254	0.299	0.164

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included. The control group consists of couples in which the man has never experienced a job loss while in the sample as well as couples in which the man has lost his job, found a new job and holds this job for four or more years

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

involuntary job loss without taking up a new job). However, unlike in the case of taking up a new job, there are no convincing additional control variables to capture various channels. As a cursory investigation into the importance of the income channel as a whole, not only regarding taking up a new job, we did include current equivalent household income in an unreported regression. The key results remained largely unchanged in sign, significance level and magnitude. Changes in household income also do not seem to be associated with changes in the dissolution risk, since the respective estimated relative risk is virtually equal to unity. However, the inclusion of current household income only removes an indefinite part of the actual expected lifetime-income effect, which is not observed in the SOEP. Since our primary aim is to consider the entire relationship between job loss on divorce, including the unobservable (expected lifetime-) income channel, we do not control for household income in any of the regressions reported in Sections 4 and 5. It may appear surprising, that the relative wage in the old and new job seems to be associated with the dissolution probability, while income itself is not. However, this is consistent with a high importance of reference income effects, which has already been documented in the life satisfaction literature (see Stutzer 2004; Clark et al. 2008). This literature also documents an asymmetry, where upward comparisons (such as to higher own past earnings) hurt more than downward comparisons benefit satisfaction with life, which could be very relevant in the case of job losses (Ferrer-i-Carbonell 2005).

6.2 The wife's labor market status

How well a couple is able to cope with an employment termination of the husband likely also depends on the wife's labor market outcomes around the time of the job loss, though the direction of the influence is, a priori, not clear. In Table 5 we allow for different effects of job losses on the risk of separation depending on the wife's labor market position in the period immediately before and after the job loss of the husband. In particular, we consider four different combinations, which are interacted with the various types of job loss of the husband: the wife was employed in both periods, the wife was not employed in either period, the wife took up a job (which could be by chance or an added worker effect) and the wife also lost her job. The default category is no job loss by the husband. The current labor market status of the woman is also controlled for separately, as the interactions only consider the wife's labor market statuses around her husband's job loss.

In column (1), the estimated relative risk of separation is generally lower if the wife remained employed compared to a wife who was unemployed or inactive in both periods. The reasons for this result can be manifold. Firstly, an employment termination likely has a stronger impact on the couple's finances if the wife is not employed, potentially leading to more intense stress due to the temporary financial hardship, but also less certainty about future finances. It could also be the case that traditional gender norms are more prevalent amongst (previous) single earner couples, making the husband's deviation from the "male breadwinner norm" due to the experienced employment termination more detrimental to the stability of these matches. However, when we include a dummy capturing whether the husband currently is or was a "breadwinner" prior to his job loss in unreported regressions, the

Table 5 Marital dissolution risk, interaction with woman's employment status (cloglog including frailty)

	(1)	(2)
Job loss (dismissal) × woman remained employed	1.888*** (0.438)	
Job loss (dismissal) × woman remained unemployed/inactive	2.104** (0.686)	
Job loss (dismissal) × woman took up job	0.605 (0.441)	
Job loss (dismissal) × woman lost job	2.283* (1.124)	
Job loss (plant closure) × woman remained employed	1.056 (0.420)	
Job loss (plant closure) × woman remained unemployed/inactive	1.898 (1.028)	
Job loss (plant closure) × woman took up job	2.205 (1.636)	
Job loss (plant closure) × women lost job	2.833* (1.756)	
Job loss (other) × woman remained employed	1.234* (0.152)	
Job loss (other) × woman remained unemployed/inactive	1.344* (0.210)	
Job loss (other) × woman took up job	2.050*** (0.396)	
Job loss (other) × women lost job	1.651** (0.350)	
No job after job loss × woman remained employed		2.009*** (0.391)
No job after job loss × woman remained unemployed/inactive		1.639* (0.465)
No job after job loss × woman took up job		1.737 (0.694)
No job after job loss × women lost job		1.453 (0.687)
New job after job loss (dismissal) × woman remained employed		1.750** (0.437)
New job after job loss (dismissal) × woman remained unemployed/inactive		2.238** (0.759)
New job after job loss (dismissal) × woman took up job		0.717 (0.522)
New job after job loss (dismissal) × women lost job		2.431* (1.197)
New job after job loss (plant closure) × woman remained employed		1.094 (0.434)
New job after job loss (plant closure) × woman remained unemployed/inactive		1.997 (1.080)
New job after job loss (plant closure) × woman took up job		2.381 (1.760)
New job after job loss (plant closure) × women lost job		2.963* (1.830)
New job after job loss (other) × woman remained employed		1.096 (0.153)
New job after job loss (other) × woman remained unemployed/inactive		1.351* (0.236)
New job after job loss (other) × woman took up job		2.117*** (0.452)
New job after job loss (other) × women lost job		1.740** (0.407)
No. of failures	712	712
No. of couples	13,407	13,407
Couple-year observations	116,069	116,069
Log likelihood	−3,910.248	−3,905.789
ρ	0.298	0.266
LR test of $\rho = 0$ (p value)	0.080	0.117

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

estimated relative risk associated with the dummies was typically insignificant. Lastly, some inactive women may have only remained with their partner due to financial dependency, causing a dissolution as soon as this reason for staying with the partner is no longer present. Consistent with the first explanation, a husband's involuntary job loss is also associated with a particularly high relative risk of divorce, if the wife also lost her job. Alternatively, this could be explained by the even higher stress levels, if both partners experience an employment termination simultaneously.

However, even though the wife's continued employment reduces the estimated relative risk of divorce associated with the husband's employment termination, our findings do not rule out counteracting processes. For example, Knabe et al. (2016) showed that the husband's life-satisfaction is impacted less severely by unemployment if the wife is also unemployed, which should presumably decrease the dissolution risk. Perhaps this explains why, in column (2), when we consider only cases where the husband did not find a new job, the dissolution risk is actually higher if the woman remained employed (compared to remaining unemployed), while the converse is true if a new job was found. Whatever the explanation, the results in column (2) are inconsistent with an income channel as the only explanation and could point towards a gender norm based interpretation, which has already been analyzed by Bertrand et al. (2015) by looking at relative income within the household. However, in our study it seems to be less about who earns more and more about stronger deviations from gender norms, such as if the husband is unemployed and the wife is employed. It is likely that several channels interact in complex ways, making it difficult to pinpoint one specific explanation. Furthermore, it should be acknowledged that the differences in point estimates are typically not significant due to large standard errors resulting from small cell sizes.

6.3 Job loss of women

Even though the primary focus of our analysis rests on the husband's employment termination, given the increase in female labor market participation and changing gender norms, this perspective might be too limited. Table 6 replicates some key results using the wife's job loss as the primary explanatory variable instead of the husband's. Compared to Table 1 significant differences in the estimated relative risks emerge. There is no statistically significant association between the wife's job loss and marital dissolution, if we do not distinguish by whether a new job was found or not. Furthermore, there is even a negative and significant relationship if no new employment is taken up, which is likely driven by women in stable relationships leaving their jobs voluntarily to become homemakers. These results indicate that there are still significant asymmetries in the response to job loss depending on the gender of the directly affected partner. This is consistent with persistent gender norms, such as the male-breadwinner model, and previous results in the literature (Weiss and Robert 1997; Eliason 2012; Raz-Yurovich 2012; Bertrand et al. 2015; Kaplan and Herbst-Debby 2018). However, it should be acknowledged that some studies do not find gender differences (Charles and Stephens 2004).

Table 6 Marital dissolution risk, single spell (cloglog including frailty), women

	(1)	(2)	(3)
Job loss (dismissal)	1.097 (0.253)		
Job loss (plant closure)	0.924 (0.302)		
Job loss (other)	0.964 (0.094)		
No job after job loss		0.756** (0.091)	0.757** (0.092)
New job after job loss		1.164 (0.125)	
New job after job loss (dismissal)			1.119 (0.299)
New job after job loss (plant closure)			0.993 (0.344)
New job after job loss (other)			1.178 (0.130)
No. of failures	712	712	712
No. of couples	13,412	13,412	13,412
Couple-year observations	116,144	116,144	116,144
Log likelihood	−3,939.443	−3,931.237	−3,931.093
ρ	0.051	0.130	0.134
LR test of $\rho = 0$ (p value)	0.438	0.326	0.321

Source: SOEP, v31, own calculations

All regressions include the following variables for both husband and wife: age, dummies on migration background, education (in years), past unemployment experience in years and the following household characteristics: dummy for house ownership, dummies for the number of children, dummies on age categories of youngest child in household, dummies on order of marriage, dummy on area (rural or urban) as well as dummies for the husband's employment status (fulltime employed in private sector, part-time employed in private sector, fulltime self-employed, part-time self-employed, fulltime public service, part-time public service, pensioner, inactive, other is reference) and dummies for the wife's employment status (pensioner, initially unemployed/inactive, (former) self-employed). ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

7 Limitations

Throughout the analysis, we distinguish between involuntary job losses and employment terminations for other reasons because these likely differ in their information content and because an endogeneity problem may arise when considering voluntary employment terminations. For similar reasons, which have also been outlined in more detail above, the group of couples with an involuntary job loss is further separated into husbands who experienced a plant closure rather than an individual lay-off. However, splitting the two types of involuntary job loss reduces the cell size once we consider certain model extension, which increases the standard errors and reduces the reliability of the results. As a result, the differences between the estimates associated with the two types of involuntary job loss are also frequently insignificant. We have already discussed in detail in Section 5, why we would be cautious to interpret differences in estimates as an indication of the relative strengths of the various channels outlined in this study. Furthermore, Charles and Stephens (2004) already argued in their analysis, that any time-constant personal traits driving the results would be inconsistent with declining relative risks over time, making it

unlikely that the results on dismissals are only driven by omitted variable bias due to unobservable time-constant personal traits. For these reasons and because the readability is improved by a reduced number of estimated relative risks, we re-estimated all results pooling the two types of involuntary job losses into one category as a robustness check (see Appendix D). However, even if time constant personality traits do not (fully) explain the estimated results, this does not mean that character traits are irrelevant for marital stability, as they can still influence the hazard of the couple through other channels. Furthermore, part of our interpretation is based on information updating regarding these characteristics. Even though some personality traits might be constant, the perception of these traits could be affected by the employment termination, as certain negative traits are brought to the light of day, and this perception might be what ultimately matters for marital stability. Thus, while we cannot be sure that the results are necessarily causal, the proposed character trait based explanation is not, per se, add odds with a causal relationship.

In the estimations distinguishing by whether new employment was obtained, the potential for endogeneity is particularly high. Thus, these results should be interpreted as correlations. However, even though causation cannot be claimed, studying correlations and their drivers, in our case changes in job characteristics, provides valuable insights.

We also want to note that our estimations are based only on married couples. Being married has several legal implications, which cohabitation has not, including different regulations regarding taxes and eligibility for social security benefits. Furthermore, separation involves a potentially lengthy and costly divorce process, which in Germany requires living separately for at least one year. On average, though obviously not in every case, marriage is associated with a higher commitment to the relationship than cohabitation. Due to these differences, the results in this paper cannot be transferred to cohabiting couples and the two groups should not be pooled in the analysis. It would certainly be interesting to investigate differences between these two groups, but this would exceed the scope of the paper and is left for future research.

Another potential concern is that a couple is defined as experiencing a marital dissolution as soon as they live "permanently separated", because, as noted above, this is the first step in the divorce process. This is a common choice in the literature (see Charles and Stephens 2004; Doiron and Mendolia 2012). However, this could be problematic, if couples do not actually divorce and, even more so, if they did not even intend to separate but were forced to live apart due to a new job in another city. Even though the question asks specifically about marital status and the "living permanently separated" category is, in our interpretation, not aimed at this latter group of couples, they might still assign themselves to this group. We have taken a careful look at the marital histories in our analysis. However, it is, unfortunately, not possible to do this perfectly. Even though the SOEP attempts to follow both partners after a separation, a major problem is the high rate of sample attrition shortly after the switch to "living permanently separated", probably due to the upheaval brought about by the separation.[11] It is not practical to simply exclude these couples from the

[11] There is also the potential that couples drop out of the sample immediately upon separation, such that the separation is not recorded in the SOEP. This would cause our results to be too conservative.

analysis, as this would likely result in a downward bias of the estimates. It is also not clear how couples who are observed to remain separated for several years, never return to living with each other but also never officially divorce before dropping out of the sample, should be treated. Thus, the only cases that are concerning as well as trackable in the data are those who live separately from their partner for some time and then return to living together with the same partner. Out of the 712 dissolution there are 4 such cases. Results are robust to excluding these individuals from the analysis, as can be seen in Appendix F.

8 Conclusion

This study extends the previous literature by allowing the relationship between employment termination and marital stability to depend on whether new employment was found. A job loss due to plant closure is associated with an increase in the estimated risk of dissolution by roughly 54%, while the risk is even increased by 74% if the husband experienced a dismissal. These baseline results are broadly in line with previous studies, though not all have found significant estimates for the case of plant closings (Charles and Stephens 2004; Doiron and Mendolia 2012; Eliason 2012). Without distinguishing by how long ago a change in employment status occurred, the dissolution probability of those who have found a new job remains elevated, though by less than if the husband remains jobless. However, the highest increase in dissolution risk, at roughly 177%, is associated with the first year in a new job following a dismissal, but unlike in the case where no new employment is obtained, this positive relationship appears to fade fast. The mediation analysis supports a working hours based channel and a prominent role of the ratio of the wage in the old and new job. The results are primarily consistent with reference income effects, particularly regarding own past income, as the relative risk of dissolution does not vary with the income level. However, we cannot make statements about the influence of lifetime expected earnings, as these are not observed. Even though we do not find any association between a wife's job loss and marital stability, the wife's labor market status appears to moderate the estimates associated with the husband's job loss. Interestingly, if the husband found new employment after an involuntary job loss the dissolution risk is higher, if the wife is not employed herself, while the converse is true, if the husband did not find a new job.

Our results provide evidence that the elevated risk of divorce is not just the result of the unemployment associated with job loss. Thus, having to switch jobs frequently could also have a cost in terms of marital stability. However, one has to be cautious when using any estimation results based on a population with a specific set of laws already in place to predict the impact of a fundamental labor market policy change, such as moving from high employment protection to flexicurity.[12] An economy wide

[12] A system in which firms can adjust their workforce more flexibly, while social security provisions and active labor market policies are in place to support individuals affected by a job loss.

increase in turnover implies that each individual employment termination would not be unusual and a new job would typically be found quickly. The negative signal regarding personal characteristics and future earning potential would (presumably) be reduced or even eliminated. However, the stress experienced due to employment termination, job search and taking up new employment would likely remain relevant to a certain degree. If couples are exposed to this event more frequently, it needs to be evaluated whether accompanying policies are sufficient to dissipate the negative consequences. The potential consequences for even the most private aspects of people's lives, including their relationships, should not be ignored when discussing labor market policies.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

9 Appendix A: summary statistics

Tables A1 and A2

10 Appendix B: variable generation

Table B1 illustrates the values of the job loss and new job variables for a hypothetical observation, in which we attempt to cover most of the transitions that could occur. However, due to limited space we do not distinguish by type of job loss in this table. Thus, each job loss variable presented here could (depending on the specification) actually represent three dummy variables, one for each reason for the job loss (plant closure, dismissal and other).

Table A1 Descriptive statistics I—couple-year level

	Cases	In %
Dummy variables		
Dissolution		
0	115,357	99.39
1	712	0.61
Husband, labor market status		
Dismissal	4,032	3.47
Job loss (other)	41,117	35.42
Plant closure	1,932	1.66
Husband employed	25,641	22.09
Husband pensioner	42,991	37.04
Husband (former) self-employed	10,021	863
Husband initially unemployed/inactive	280	0.24
Wife, labor market status		
Wife employed fulltime	6,344	5.47
Wife employed part-time	5,513	4.75
Wife pensioner	25,609	22.06
Wife self-employed, fulltime	2,878	2.48
Wife self-employed, part-time	1,137	0.98
Wife employed in public service, fulltime	16,711	14.40
Wife employed in public service, part-time	17,669	15.22
Wife unemployed/inactive	33,243	28.64
Wife other	6,965	6.00
Husband migration background		
No migration background	91,421	78.76
Direct migration background	19,227	16.57
Indirect migration background	5,343	4.60
Unknown migration background	78	0.07
Wife migration background		
No migration background	91,075	78.76
Direct migration background	19,181	16.53
Indirect migration background	5,721	4.93
Unknown migration background	92	0.08
Number of children in household		
0	69,221	59.64
1	21,233	18.29
2	19,164	16.51
3 or more	6,451	5.56
Age of youngest child in household		
<5	14,602	12.58
5–10	15,353	13.23
11–15	12,134	10.45
>15		
Owner of house		
0	50,804	43.77
1	65,265	56.23
Urban		
0	38,509	33.18
1	77,560	66.82

Table A1 continued

	Cases	In %
First marriage		
First marriage for husband, second or later marriage for wife	7,785	6.71
First marriage for wife, second or later marriage for husband	4,137	3.56
First marriage for both	77,971	67.18
Second or later marriage for both	26,176	22.55
Continuous variables		
	Mean	S.d.
Husband years of education	12.082	2.783
Wife years of education	11.505	2.550
Husband past unemployment experience in years	0.622	1.699
Wife past unemployment experience in years	0.700	1.886
Age of husband	52.551	14.525
Age of wife	49.734	14.424

Source: SOEP, v31, own calculations

Table A2 Descriptive statistics II—couple level

	Cases	In %
Dissolution		
0	12,695	94.69
1	712	5.31
Dismissal		
0	12,611	94.06
1	796	5.94
Job loss (other)		
0	8,018	59.80
1	5,389	40.20
Plant closure		
0	12,986	96.86
1	421	3.14
Husband migration background		
No migration background	10,276	76.65
Direct migration background	2,509	18.71
Indirect migration background	599	4.47
Unknown migration background	23	0.17
Wife migration background		
No migration background	10,195	76.04
Direct migration background	2,540	18.95
Indirect migration background	640	4.77
Unknown migration background	32	0.24
First marriage		
First marriage for husband, second or later marriage for wife	1,015	7.57
First marriage for wife, second or later marriage for husband	547	4.08
First marriage for both	8,551	63.78
Second or later marriage for both	3,294	24.57

Source: SOEP, v31, own calculations

Table B1 Time varying variables generation

Time	Labor market status events	Job loss	New job	No new job after job loss	Job loss 1st year	Job loss 2nd year	Job loss 3 or more years	New job 1st year	New job 2nd year	New job 3 or more years year	No job after job loss 1st year	No job after job loss 2nd year	No job after job loss 3 or more years
1	Currently employed	0	0	0	0	0	0	0	0	0	0	0	0
2	Currently unemployed, job loss between period 1 and 2	1	0	1	1	0	0	0	0	0	1	0	0
3	Currently unemployed	1	0	1	0	1	0	0	0	0	0	1	0
4	Currently unemployed	1	0	1	0	0	1	0	0	0	0	0	1
5	Currently employed, found new job between period 4 and 5	1	1	0	0	0	1	1	0	0	0	0	0
6	Still employed	1	1	0	0	0	1	0	1	0	0	0	0
7	Currently unemployed, Job loss between period 6 and 7	1	0	1	1	0	0	0	0	0	1	0	0
8	Employed, new job between period 7 and 8	1	1	0	0	1	0	1	0	0	0	0	0
9	Employed, job loss and new job take-up between period 8 and 9	1	1	0	1	0	0	1	0	0	0	0	0

11 Appendix C: husbands return to reference group after four or more years in a new job

Table C1

12 Appendix D: pooling plant closures and dismissals into one "involuntary job loss" variable

Tables D1–D4

13 Appendix E: full results table

Table E1

14 Appendix F: excluding couples that move back in together

Table F1

Table C1 Marital dissolution risk, single spell, different control group (cloglog including frailty)

	(1)	(2)	(3)
Job loss (dismissal)	1.989*** (0.361)		
Job loss (plant closure)	1.547 (0.460)		
Job loss (other)	1.422*** (0.135)		
No job after job loss		1.630*** (0.244)	1.634*** (0.244)
New job after job loss		1.518*** (0.149)	
New job after job loss (dismissal)			2.087*** (0.405)
New job after job loss (plant closure)			1.679* (0.499)
New job after job loss (other)			1.407*** (0.154)
No. of failures	712	712	712
No. of couples	13,407	13,407	13,407
Couple-year observations	116,069	116,069	116,069
Log likelihood	−3,914.295	−3,914.475	−3,912.738
ρ	0.130	0.144	0.138
LR test of $\rho = 0$ (p value)	0.319	0.296	0.305

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included. The control group consists of couples in which the man has never experienced a job loss while in the sample as well as couples in which the man has lost his job, found a new job and holds this job for four or more years

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

Table D1 Marital dissolution risk, plant closures and dismissals pooled (cloglog including frailty)

	(1)	(2)	(3)	(4)
Job loss (involuntary)	1.679*** (0.255)			
1st year		3.027*** (0.650)		
2nd year		1.654 (0.635)		
3 or more years		1.204 (0.323)		
Job loss (other)	1.352*** (0.129)			
1st year		1.674*** (0.209)		
2nd year		1.581*** (0.256)		
3 or more years		1.293** (0.149)		
No job after job loss			1.739*** (0.281)	
1st year				1.756*** (0.328)
2nd year				1.964** (0.597)
3 or more years				1.476 (0.503)
New job after job loss (involuntary)			1.952*** (0.349)	
1st year				3.118*** (0.719)
2nd year				1.600 (0.663)
3 or more years				1.294 (0.354)
New job after job loss (other)			1.495*** (0.152)	
1st year				1.740*** (0.261)
2nd year				1.477** (0.282)
3 or more years				1.335** (0.169)
No. of failures	712	712	712	712
No. of couples	13,407	13,407	13,407	13,407
Couple-year observations	116,069	116,069	116,069	116,069
Log likelihood	−3,917.320	−3,921.811	−3,925.803	−3,921.097
ρ	0.200	0.025	0.199	0.055
LR test of $\rho = 0$ (p value)	0.182	0.468	0.183	0.420

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

Table D2 Marital dissolution risk, plant closures and dismissals pooled (cloglog including frailty); excluding left truncated couples

	(1)	(2)
Job loss (involuntary)	1.976*** (0.399)	
Job loss (other)	1.405** (0.183)	
No job after job loss		2.037*** (0.443)
New job after job loss (involuntary)		2.238*** (0.475)
New job after job loss (other)		
No. of failures	348	348
No. of couples	3,418	3,418
Couple-year observations	25,818	25,818
Log likelihood	−1,753.020	−1,749.769
ρ	0.056	0.232
LR test of $\rho = 0$ (p value)	0.457	0.274

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 20 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

Table D3 Marital dissolution risk, plant closures and dismissals differentiated (cloglog including frailty); additional new job controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
New job after job loss	1.686*** (0.266)	1.718*** (0.268)	1.708*** (0.266)	1.743*** (0.275)				
1st year					1.646*** (0.300)	1.665*** (0.300)	1.662*** (0.298)	1.687*** (0.306)
2nd year					1.774* (0.529)	1.806** (0.535)	1.800** (0.531)	1.841** (0.548)
3 or more years					1.805* (0.562)	1.826** (0.559)	1.808* (0.550)	1.921** (0.599)
New job after job loss (involuntary)	1.790*** (0.319)	1.335 (1.039)	1.199 (0.276)	1.321 (1.467)				
1st year					2.283*** (0.590)	1.984 (1.649)	2.015** (0.565)	1.774 (2.033)
2nd year					1.911* (0.672)	1.428 (1.228)	1.162 (0.435)	1.502 (1.755)
3 or more years					1.460 (0.360)	1.002 (0.828)	0.854 (0.240)	0.975 (1.117)
New job after job loss (other)	1.299** (0.154)	1.341 (0.451)	1.622** (0.392)	1.656 (0.729)				
1st year					1.463** (0.272)	1.380 (0.499)	1.937** (0.520)	1.776 (0.831)
2nd year					1.282 (0.300)	1.506 (0.560)	1.712* (0.495)	1.791 (0.870)
3 or more years					1.229 (0.174)	1.260 (0.432)	1.461 (0.366)	1.544 (0.691)
Additional controls (interacted with type of job loss)								
Changes in commuting	Yes			Yes	Yes			Yes
Ratio hours worked		Yes		Yes		Yes		Yes
Ratio wages			Yes	Yes			Yes	Yes
No. of failures	649	679	695	617	649	679	695	617
No. of couples	13,257	13,355	13,363	13,194	13,257	13,355	13,363	13,194
Couple-year observations	110,555	113,477	114,197	107,365	110,555	113,477	114,197	107,365
Log likelihood	−3,597.906	−3,755.999	−3,882.969	−3,432.300	−3,596.625	−3,753.433	−3,818.059	−3,430.598
ρ	0.343	0.268	0.262	0.275	0.322	0.195	0.158	0.245
LR test of $\rho = 0$ (p value)	0.044	0.138	0.131	0.116	0.064	0.240	0.282	0.157

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

Table D4 Marital dissolution risk, plant closures and dismissals pooled: interaction with woman's employment status (cloglog including frailty)

	(1)	(2)
Job loss (involuntary) × woman remained employed	1.604** (0.330)	
Job loss (involuntary) × woman remained unemployed/inactive	2.051** (0.589)	
Job loss (involuntary) × woman took up job	0.966 (0.499)	
Job loss (involuntary) × woman lost job	2.472** (0.970)	
Job loss (other) × woman remained employed	1.234* (0.152)	
Job loss (other) × woman remained unemployed/inactive	1.345* (0.211)	
Job loss (other) × woman took up job	2.048*** (0.396)	
Job loss (other) × woman lost job	1.651** (0.350)	
No job after job loss × woman remained employed		2.008*** (0.391)
No job after job loss × woman remained unemployed/inactive		1.640* (0.465)
No job after job loss × woman took up job		1.738 (0.695)
No job after job loss × women lost job		1.455 (0.688)
New job after job loss (involuntary) × woman remained employed		1.515* (0.329)
New job after job loss (involuntary) × woman remained unemployed/inactive		2.171*** (0.643)
New job after job loss (involuntary) × woman took up job		1.109 (0.577)
New job after job loss (involuntary) × women lost job		2.616** (1.027)
New job after job loss (other) × woman remained employed		1.096 (0.153)
New job after job loss (other) × woman remained unemployed/inactive		1.352* (0.237)
New job after job loss (other) × woman took up job		2.117*** (0.453)
New job after job loss (other) × women lost job		1.741** (0.408)
No. of failures	712	712
No. of couples	13,407	13,407
Couple-year observations	116,069	116,069
Log likelihood	−3,912.034	−3,907.128
ρ	0.300	0.268
LR test of $\rho = 0$ (p value)	0.079	0.115

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random component. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

Table E1 Marital dissolution risk, single spell (cloglog including frailty)—full results

	(1)
Husband's labor market status (default: remained employed)	
Job loss (dismissal)	1.740*** (0.301)
Job loss (plant closure)	1.541* (0.397)
Job loss (other)	1.353*** (0.129)
Husband unemployed/inactive at sample entry	0.579 (0.421)
Husband pensioner	0.557** (0.153)
Husband became self-employed	1.164 (0.167)
Husband self-employed at sample entry	2.468* (1.266)

Table E1 continued

	(1)
Control variables on the husband	
Husband years of education	0.987 (0.186)
Husband direct migration background	0.580*** (0.102)
Husband indirect migration background	1.040 (0.176)
Husband unknown migration background	1.254 (1.007)
Husband years of unemployment experience	1.030 (0.026)
Husband age	0.979** (0.010)
Wife's labor market status (default: other)	
Wife employed full-time	1.227 (0.261)
Wife employed part-time	1.326 (0.256)
Wife self-employed full-time	2.689*** (0.607)
Wife self-employed part-time	0.950 (0.417)
Wife public service full-time	1.376* (0.239)
Wife public service part-time	1.118 (0.192)
Wife pensioner	0.948 (0.294)
Wife unemployed/inactive	0.822 (0.134)
Control variables on the wife	
Wife years of education	0.970 (0.021)
Wife direct migration background	0.670** (0.118)
Wife indirect migration background	1.117 (0.180)
Wife unknown migration background	0.644 (0.682)
Wife years of unemployment experience	1.026 (0.026)
Control variables on the household	
House ownership	0.733*** (0.064)
Urban	1.112 (0.097)
First marriage for husband/higher order for wife	1.813*** (0.359)
First marriage for wife/higher order for husband	1.739*** (0.352)
Both higher order marriage	1.288** (0.176)
1 child in household	1.905*** (0.353)
2 children in household	1.883*** (0.411)
3 or more children in household	2.098*** (0.537)
Age of youngest child in household: 0–1	0.370*** (0.098)
Age of youngest child in household: 2–4	0.566*** (0.123)
Age of youngest child in household: 5–10	0.595** (0.121)
Age of youngest child in household: 11–15	0.747 (0.143)
No. of failures	712
No. of couples	13,407
Couple-year observations	116,069
Log likelihood	−3,917.231
ρ	0.277
LR Test of $\rho = 0$ (p value)	0.115

Source: SOEP, v31, own calculations

The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

Table F1 Marital dissolution risk, single spell (cloglog including frailty)—excluding couples who are back together

	(1)	(2)	(3)
Job loss (dismissal)	1.764*** (0.306)		
Job loss (plant closure)	1.552* (0.400)		
Job loss (other)	1.367*** (0.130)		
No job after job loss		1.742*** (0.271)	1.750*** (0.272)
New job after job loss		1.410*** (0.138)	
New job after job loss (dismissal)			1.806*** (0.330)
New job after job loss (plant closure)			1.649* (0.427)
New job after job loss (other)			1.331** (0.138)
No. of failures	707	707	707
No. of couples	13,402	13,402	13,402
Couple-year observations	116,049	116,049	116,049
Log likelihood	−3,905.307	−3,904.576	−3,903.051
ρ	0.281	0.262	0.281
LR test of $\rho = 0$ (p value)	0.110	0.131	0.206

Source: SOEP, v31, own calculations

All regressions include the same control variables as in Table 1. ρ is the proportion of the (total) variance explained by couple-specific random components. The baseline hazard is modeled via 42 dummies on marriage duration. A constant is not included

*Indicates that exp(coeff) is significantly different from 1 at 10% level, ** at 5% and *** at 1%

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