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Trade Union Membership and Dismissals*

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Abstract

In Germany, there is no trade union membership wage premium, while the membership fee amounts to 1% of the gross wage. Therefore, prima facie, there are strong incentives to free-ride on the benefits of trade unionism. We establish empirical evidence for a private gain from trade union membership which has hitherto not been documented: in West Germany, union members are less likely to lose their jobs than non-members. In particular, using data from the German Socio-Economic Panel we can show that roughly 50% of the observed raw differential in individual dismissal rates can be explained by the estimated average partial effect of union membership.

JEL Classification: C 23, H 41, J 51, J 63
Keywords: dismissal, free-riding, trade union membership, survey data

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I. Introduction

Trade union membership in OECD countries ranges from 8% of the workforce in France to 75% in Sweden and the average (unweighted) union density is 34%. In Germany, net union density was about 20% in 2007 (cf. OECD 2004, Visser 2009). Trade union members have to pay a membership fee and, accordingly, individually bear the costs of membership. However, trade unions mostly provide public goods. This is particularly true in the absence of closed shops. Therefore, the question arises as to why there are so many trade union members. This question becomes even more pertinent when taking into account the fact that bargaining coverage usually exceeds union density by a large margin.

The free-rider puzzle has vexed economists and other scholars alike, at least since the publication of the seminal contribution by Olson (1965). Therefore, the literature abounds with suggestions of benefits that could explain why people are willing to pay membership fees. If employed union members earn higher wages than non-members, this will provide an incentive to become a member. Greater job security and better working conditions can also induce individuals to join a trade union. In addition, unions offer training and legal advice to their members and provide support for retired or unemployed members. Unions may also exert their market power to obtain lower prices exclusively for their members from commercial suppliers for such goods as insurance contracts or holidays. Finally, the existence of a social norm (of membership) can help to overcome the free-rider problem.

The empirical evidence on the proposed remedies to the free-rider puzzle is fairly scarce. There are a large number of studies, particularly for the US, the UK, and Australia, which establish union wage gaps, focussing mostly on collective bargaining coverage. However, in other OECD countries, and in Germany in particular, there is little indication of a union membership wage premium. In addition, the impact of unions on tenure and separation probabilities has been investigated. This literature concentrates on the voice interpretation of unions and, therefore, does not provide information on the impact resulting from an individual's membership. Finally, evidence on other private goods provided by trade unions is also limited. Accordingly, there are still many pieces missing in the puzzle of why people pay privately for being a member of an organisation which, at first sight, provides primarily public goods.

In this paper we offer empirical evidence for a private gain from trade union membership which has hitherto not been documented: we observe that in West Germany, union members are substantially less likely to lose their jobs than non-members. Our estimates based on data for a period of twenty years (1985-2005) from the German Socio-Economic Panel indicate that roughly 50% of the observed raw differential in individual dismissal rates can be explained by the estimated average partial effect of union membership. We can illustrate the magnitude of the estimated impact with the following rough calculation: the average probability of being dismissed individually within a period of one year in our sample is about 3.6% for non-members and only 1.3% for union members. The estimated average partial effect of union membership amounts to 1.4%, that is, over 50% of the raw differential of 2.3%. Given that average annual gross income of full time workers in the private sector in Germany in 2009 is about € 42,000 and assuming that a dismissal reduces annual earnings only once by 25%,[1] the expected gain from union membership would amount to almost € 150 (0.25 x 42,000 x 0.014), which covers 35% of the yearly union membership fee of one percent of gross income. As a consequence, the value of the private good provided by trade unions in the form of a lower dismissal probability is substantial, relative to the individual costs of membership. Our findings can, hence, go a long way towards explaining trade union membership in Germany.

This negative impact of individual trade union membership on the probability of being dismissed by the employer can be deemed robust. The effect can also be established over a longer time period of two years after the observation of the union membership status. Therefore, it is unlikely that the membership dismissal impact is solely due to people joining the union shortly before a dismissal occurs. Furthermore, we observe that the negative relationship between being a trade union member and the individual dismissal rate is particularly pronounced for females and blue collar workers. The negative impact of union membership on dismissals will also arise if workers of a firm are represented by a works council or they belong to such an institution. Finally, union membership has no effect in the case of plant closures.

Our data does not allow us to explicitly test for the channel by which individual trade union membership alters dismissal probabilities. We conjecture that better information and cost considerations play a role. More specifically, in Germany, trade unions provide members with information about their legal entitlements and generally support members by providing free legal representation inside and outside courts in all affairs relating to the job. If such informational and cost advantages make it less likely that a firm dismisses a trade union

[1] Burda and Mertens (2001) and Bender et al. (2002) find that average earnings losses due to worker displacement are relatively low in Germany. Only some subgroups experience substantial *permanent* earnings reductions of up to 20%. Couch's (2001) estimates indicate that a plant closure reduces earnings in the year of displacement by 13.5% and that this decline falls to about 10% (6.5%) in the first (second) year after the job loss. Finally, Schmieder, von Wachter and Bender (2010) calculate an earnings loss of 10%-15% per year for a period of more than 15 years for high-tenured employees who lost their job owing to a mass dismissal during the 1982 recession. Accordingly, a one time fall in annual earnings by 25% is a conservative assumption.

member, membership attains private good characteristics. Such a feature can rationally induce employees to incur the associated private costs.

In the remainder of the paper we proceed as follows: Section II sets the stage. We summarise the relevant literature and describe the institutional setting in Germany, with particular emphasis on the role of trade unions and on employment protection legislation. In Section III, we describe the data from the German Socio-Economic Panel (SOEP) we use to analyse the relationship between dismissals and union membership. Furthermore, this section contains a description of the empirical approaches employed. Section IV presents the empirical findings. In Section V we summarise and elaborate on the interpretation of our findings.

II. Background

II.1 Related Literature

Being a member in a trade union could, for example, (1) raise an individual's wage, (2) reduce the probability of a job loss, (3) improve working conditions, (4) provide cheaper access to training or legal advice or (5) generate utility through conforming to a social custom of membership. Subsequently, we comment more extensively on the literature dealing with benefits (1) and (2). We only briefly look at arguments (3) to (5) because there is either no evidence (at least to our knowledge) or it is indirect and, hence, at most only indicative of a mechanism to overcome the free-rider problem.

There is ample evidence of a union-non-union wage gap, for example, in the US and the UK. More precisely, workers and employees, terms which we will use equivalently here, who are covered by collective bargaining agreements are better paid than those not covered. In the absence of a closed shop, this wage gap will provide an incentive to become a trade union member if it also exists for union members, irrespective of the coverage status. Recent studies for the US indicate a substantial membership wage premium of this kind (e.g. Schumacher 1999, Budd and Na 2000, and Eren 2009).[2] There are also corresponding findings for the UK (see Hildreth 2000 and the survey in Booth 1995) and Australia (Cai and Liu 2008). This suggests that union members actually obtain compensation for their membership fee. In the words of Budd and Na (2000, p. 804): "Some rethinking of the 'free rider' literature is warranted." For the UK, Booth and Bryan (2004) take issue with this conclusion since they find that the union membership premium, particularly in the private sector, will vanish if

[2] Combining establishment data with results from union representation elections DiNardo and Lee (2004), however, do not find sizeable wage effects for the US.

workplace effects are taken into account.[3] For Germany, there is no evidence that differential wages for members and non-members can help to explain the membership decision.[4]

Turning to the impact of trade unions on job security, Jones and McKenna (1994) base their theoretical model on the assumption that union membership reduces the probability of a (collective) redundancy. Moreton's (1998, 1999) fundamental modelling assumption is a lower probability of individual dismissals for members. The majority of contributions have an empirical focus. Medoff (1979), for example, shows layoff and rehire rates in US manufacturing to increase with the fraction of unionised workers and employees covered by collective bargaining, whereas there is no significant effect on discharges. However, the literature does not always distinguish the causes of job terminations. Freeman (1980), for example, illustrates that in the US, workers covered by union contracts have longer tenure and a lower probability of leaving their employer than their non-covered counterparts. He interprets these findings, inter alia, as evidence of a union voice mechanism. In the UK, Knight and Latreille (2000) and Antcliff and Saundry (2009) observe that union density in a workplace reduces the fraction of employees dismissed, while Booth and Francesconi (2000) find union coverage to lower the dismissal probability of females only. Moreover, Lucifora (1998) reports a negative effect of union density on separations in Italy. However, all reported effects relate to aggregate measures of unionism, and not to the impact of an individual's membership.[5]

In Germany, tenure is greater for employees covered by collective agreements (Gerlach and Stephan 2008). In addition, there is some evidence that works councils reduce labour turnover (Addison, Schnabel and Wagner 2001) and separations (Frick 1996), while they enhance the employment duration of blue collar male workers (Boockmann and Steffes 2010). Moreover, Sadowski, Backes-Gellner and Frick (1995) and Frick (1996) find that the existence of a works council reduces dismissals; a claim disputed in Kraft's (2006) replication study. Hirsch, Schank and Schnabel (2010) report that a works council reduces the separation rate, particularly for men. Finally, Schmidt (1991, chap. 4) shows that individual union membership raises job tenure and lowers unemployment duration. Summing up the findings, there is no information on the impact of a worker's membership status on the probability that this person

[3] Similar results are obtained by Koevoets (2007) and Blanchflower and Bryson (2010), inter alia.

[4] The result that individual trade union membership has no wage effects in Germany is reported by Schmidt (1991, Chap. 2), Schmidt and Zimmermann (1991), Fitzenberger, Ernst and Haggeney (1999), and Goerke and Pannenberg (2004), inter alia. Wagner (1991) finds no union membership wage effect for an encompassing sample, whereas he observes a positive (negative) impact for blue (white) collar workers in isolation.

[5] Freeman (1980, p. 653) states for his findings based on NLS data that unionism is "measured by 0-1 dummy variable for whether or not wages are set by collective bargaining." He then continues: "This variable is virtually identical with a union member variable", therefore, suggesting that individual membership effects are not relevant.

loses the job and, in particular, on the likelihood of an individual dismissal.[6] However, there are indications that the existence of a works council lowers the separation rate.

Items (3) and (4) on our list of potential benefits from trade union membership above relate to private goods which are provided exclusively to members. While there is ample anecdotal evidence of such private goods (Booth 1991, Budd and Na 2000), their effects on the probability of an individual being a member of a trade union have to the best of our knowledge not been tested rigorously. Finally, there is some (indirect) evidence that norms or social customs may have an impact on an individual's probability of being a trade union member. For example, union membership of the father has been shown to raise the likelihood of joining a trade union in the United Kingdom (Blanden and Machin 2003). Furthermore, self-employment of the father when an individual was young reduces the probability of joining a union in Germany (Goerke and Pannenberg 2004) and of being a member in some other European countries as well (Schnabel and Wagner 2007). In addition, some studies have found the membership of an individual's partner to have a positive impact (Deery and De Cieri 1991, Ingham 1995). These correlations may indicate social custom effects if behaviour by family members captures the relevance of norms.

In sum, there is evidence for the US that being a union member raises income. However, in Germany, a membership wage premium does not seem to exist and cannot, therefore, constitute a private gain from being a union member. Furthermore, there are indications that trade unions reduce separations. This evidence does not, in general, relate to an individual's membership. For Germany, in particular, we have no information as yet on the impact of individual union membership on employer-initiated terminations of employment contracts. The information on other private gains from union membership, such as improvements in working conditions is, at most, limited.

II.2 Legal and Institutional Background

This section provides a description of the German industrial relations system, insofar as it is relevant for the impact of trade unions on dismissal probabilities. The German Basic Law (i. e. constitution, Article 9(3)) states that "(t)he right to form associations to safeguard and improve working and economic conditions shall be guaranteed to every individual and to every occupation and profession." As a consequence, everyone is entitled to join a trade union. The

[6] Haile (2009) investigates determinants of job separation rates for Germany with a special focus on immigrants for the years 1984 to 2003, but does not use information on union membership nor all available samples of the SOEP.

interpretation of the corresponding section of the Basic Law is fairly broad, in that it also establishes a so-called negative freedom of association. This implies that no worker can be forced to join a trade union. Therefore, closed-shop arrangements are not feasible.

In Germany, there were about 8.3 million union members in 2007, of which 6.6 million were employees.[7] Gross trade union density in Germany in 2007 amounted to 25%. Excluding primarily pensioners and unemployed workers from the numerator of the measure gives the net union density of about 20%. The German Trade Union Federation ("Deutscher Gewerkschaftsbund", DGB), comprising eight unions, had about 6.3 million members at the end of 2008, including pensioners and unemployed workers. Note, moreover, that trade unions belonging to the German Trade Union Federation are organised according to the so-called industry principle; that is, all union members working in a particular industry will be represented by the sole union bargaining with firms in this industry or the relevant employer association.

Collective bargaining coverage is substantially higher than union density. In 2009, about 60% of all employees in West Germany were covered by collective contracts. Formally, collective bargaining agreements are only applicable to signatories of the contract, that is, in particular to members of the trade union. However, agreements are almost universally applied to all workers of a firm, irrespective of their individual union membership status. In addition, even firms not legally bound by collective bargaining agreements often apply them as well (20% of all employees). These institutional features can help to explain why there is no evidence of a union membership wage premium.

In Germany, a number of legal restrictions limit a firm's ability to dismiss workers. In general, these limitations will not prevent a firm from making a dismissal. However, terminating the employment relationship may be a lengthy and costly project.[8] In particular, the German Civil Code ("Bürgerliches Gesetzbuch", Sec. 622) establishes notification periods for dismissals, except for cases of gross misconduct, which rise with tenure. The regulations of the German Civil Code are basically applicable to all firms. This is in contrast with the Protection Against Dismissal Act (PADA, "Kündigungsschutzgesetz"), which currently applies to firms with more than ten permanent employees. Therefore, roughly 80% of the employees in our sample can benefit from its provisions. The PADA restricts the admissibility of individual and collective dismissals. Given applicability of the PADA, a worker can file a labour court suit to

[7] Visser (2009) provides data on the development of union density in Germany over time. Schnabel and Wagner (2005) present a more detailed analysis.

[8] More extensive descriptions of EPL in Germany in English are provided, for example, by Bertola et al. (1999), and Eger (2003).

contest the termination of his contract. To obtain an idea of the importance of this option, it can be noted that in 2007 (2008) about 200,000 (180,000) dismissal disputes were settled in court, though mostly not by a verdict. In general, an unlawful dismissal does not result in a reinstatement to the previous job. Instead the PADA stipulates that the court can dissolve an employment contract and must then award a severance payment. In order to avoid such court procedures, firms can offer employees a severance payment in exchange for their agreement to a termination of the employment contract. Therefore, in Germany, severance payments in the case of individual dismissals predominantly result from agreements between firms and workers. Severance payments occur in about 25% of all dismissals, there being strong variations over time and across industries. Average (median) severance payments have amounted to roughly € 15,000 (€ 7,500) over the last fifteen years (Goerke and Pannenberg 2010). Taking into account that only one in four dismissed employees receives such a payment, the expected severance payment for a dismissed worker is less than one monthly gross wage. However, in individual cases, substantial payments of up to and above € 100,000 can be observed.

The Civil Code and the PADA, together with its interpretation by labour courts, establish worker characteristics, which enhance the probability that a dismissed worker receives a severance payment and which also affect its magnitude, given a payment. In particular, the probability of a payment rises with tenure and firm size. Moreover, women are empirically observed to receive severance payments more often, while some studies also find white collar workers to be more likely to obtain such payments. In addition, the level of severance pay tends to rise with the previous wage, tenure, age, and firm size.[9]

The upshot of the regulations of the PADA is that the costs of a dismissal incurred by a firm can vary widely, depending, first, on observable worker and firm characteristics, such as tenure and firm size. Second, dismissal costs are affected by whether a worker contests the firm's dismissal decision in a labour court, and by the court outcome. As a consequence, the probabilities of either achieving a reinstatement to the previous job or of obtaining a severance payment are higher for dismissed workers whose (marginal) costs of legal representation, which is, however, not required in court, are relatively low. In Germany, trade unions provide their members with free legal advice and representation in dismissal conflicts. Accordingly, the regulations of the PADA suggest that dismissing a worker who is a member of a trade union is more costly on average than terminating the employment contract of an employee who has to directly pay the costs of legal advice and legal representation himself.

[9] See, for example, Grund (2006), Jahn (2009), and Goerke and Pannenberg (2010).

The Works Constitution Act (WCA) represents a further important source of employment protection.[10] Although the linkage between trade unions and works councils is strong, it should be noted that currently about half of all works councillors do not belong to a trade union (Goerke and Pannenberg 2007). Furthermore, it is worth pointing out that since works councils are not compulsory, in West Germany in 2009 only 45% of employees worked in firms with more than five employees in the private sector in which works councils existed, while just 10% of these firms had such an institution (Ellguth and Kohaut 2010). From our perspective, two regulations of the WCA are particularly relevant. First, the works council can delay and – in some cases – effectively prevent the dismissal of individual workers. Somewhat dated evidence suggests that works councils use this right selectively at best.[11] Second, the WCA defines specific rules for mass dismissals. In principle, the works council can enforce a "social plan", defining criteria that guide the selection of employees to be dismissed. Often, social plans also include regulations for severance payments. The criteria determining the amount of such payments resemble those used for individual dismissals. However, in contrast to individual dismissals, the compensation in the case of a job loss agreed upon under a social plan has public good character and does not depend on the effort of an individual employee. Therefore, we expect union membership to have no impact in the case of mass dismissals, and primarily focus on individual dismissals. Finally, the PADA establishes stricter employment protection rules for members of a works council than for other employees, which persist for a year after the term of office expires.

In summary, there are a number of observable characteristics, such as firm size, age, and tenure, which make an individual dismissal more costly and, thus, less likely. In addition, the firm's effective costs of a dismissal will be higher if the dismissed worker legally contests the firm's decision. This will, ceteris paribus, be more likely, the lower the costs of such a conflict. Furthermore, trade union membership tends to reduce the costs of a legal conflict because unions provide members with free legal advice and representation. In consequence, membership may have a negative impact on the individual dismissal probability.

[10] Comprehensive descriptions of the role of works councils in the German system of industrial relations in English are, for example, provided by Addison, Schnabel and Wagner (2000) and Addison, Bellman, Schnabel and Wagner (2004).

[11] Höland (1985, pp. 97 ff) finds that works councils did not object to dismissals in 70% to 80% of all cases in the 1980s. Frick and Sadowski (1995), using different data, report even higher percentages.

III. Data, Sample Statistics and Empirical Specifications

III.1 Data and Sample Statistics

Our empirical analysis is based on the German Socio-Economic Panel (SOEP), a nationally representative longitudinal data set. Starting in 1984, questionnaires were answered by the same private households each year. Currently, the total number of respondents included in the database is about 20,000.[12] We utilise data for the years 1985 to 2005 for West Germany and focus on all private-sector prime-age workers, aged between 25 and 54. The age restriction ensures that we exclude respondents in vocational training and participating in early retirement schemes. Our analysis is limited to the western part of the country since the period of observation includes German unification in 1990. In East Germany, dismissals and union membership decisions were governed by different motives than in the western part of Germany, particularly in the decade following unification.

Information on union membership is available in the survey years 1985, 1989, 1993, 1998, 2001, and 2003. All private-sector prime-age workers in our sample are required to work full-time in at least one of these years. Since the main aim of our empirical work is to analyse the determinants of the propensity to be dismissed in a given period, we span time intervals of one and two years, following the survey years in which information on union membership status is available. Assessing the dismissal probability up to 24 months after the date at which membership was observed reduces the possibility that workers join a trade union in anticipation of a dismissal shortly before this occurs. Furthermore, the two years interval is the minimum time distance between subsequent surveys in which information on the membership status is available. Our data strategy leads to an unbalanced panel design for the years where union membership information is available.[13]

A key advantage of the SOEP data is that information on the type of job termination is available. Since 1985, respondents have been asked to classify their job termination from a list of items, such as "fired by the employer", "quit on one's own", "time-limited work contract", "apprenticeship had been completed", "entering pre-retirement programme" or "other reasons". The items "fired by the employer" and "quit on one's own" are included in every wave of the SOEP. Some of the other reasons have been included irregularly and additional types of job separations, such as "plant closed", have been added later on. This last item has been sporadically included in questionnaires since 1991. Furthermore, multiple answers were

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[12] Wagner, Burkhauser and Behringer (1993) or Wagner, Frick and Schupp (2007) extensively discuss the features of this panel data set. Further information is available at: http://www.diw.de/en/soep/.

[13] Since information on union membership has become available again only for the year 2007, the 2003 data are the most recent which enable us to investigate dismissals within 24 months after information on union status is provided.

allowed only until 1998. Since we are concerned with whether union membership is associated with a reduced risk of being individually dismissed, we focus on "fired by the employer" as the self-reported reason for a job termination.

To assess the relationship between union membership and the individual risk of being fired, we compare private-sector prime-age respondents working full-time in the relevant time interval with those working full-time in the survey year in which membership information is available and dismissed later on in the respective time interval. The effective sample consists of 13,679 observations for the unbalanced panel with a one-year window (sample I) and of 12,514 observations for the unbalanced panel with a two-year window (sample II). Overall union membership is about 28% in both samples. This number is higher than the net union density reported by Visser (2009) for 2007 mainly for two reasons. First, our sample includes observations from the mid 1980s onwards, when net union density was around 35%. Second, we focus on full-time workers who are, traditionally, more likely to be union members than part-timers in Germany (Beck and Fitzenberger 2004, Schnabel and Wagner 2005).

The vector of explanatory variables consists of age, tenure at the last job, job satisfaction in the last job and dummy variables for being a trade union member, for the individual expectation regarding losing the job with a chance of more than 50%, for being male, a white collar worker, of non-German nationality, a single parent, for having a spouse and children, for different firm size categories, having completed an apprenticeship, and having a university degree. Additionally, we include dummies capturing the starting year of the respective time interval, the industry (NACE 1-digit) in which the respondent works, and the state of residence ("Bundesland").

Table 1 displays the sample statistics, differentiated by union membership status[14], for key variables used in the empirical analysis for both samples.

- Table 1 about here -

The differences in the dismissal rates are striking: the raw dismissal rate of non-members amounts to about 3.6% and is almost three times as high as that of union members in sample I. It is still more than twice the dismissal rate of non-members in sample II, which covers the longer time span.[15] A similar pattern can be observed for various subgroups: Male members (non-members) have a raw dismissal rate in sample I of 1.3% (3.1%). The respective rates for females are 1.4% and 4.7%. For blue collar (white collar) workers the raw dismissal rates of non-members in sample I are roughly three and a half times (twice) as large as that of union

[14] Note that we observe about 800 observations with a change in union membership status. In particular 404 (380) workers join the union and 434 (399) leave the union for sample I (sample II). These movers help us to identify the parameter of interest in our fixed effects specifications below.

[15] The overall raw dismissal rate for the one- (two-) year window is 2.9% (5.3%).

members (not documented). Table 1 further shows that, on average, union members have greater tenure, a lower level of education, work in larger firms, are older and are more likely to be male and blue collar workers. Some of these features (such as tenure and firm size) are also associated with a greater extent of employment protection and, hence, a lower dismissal probability. Therefore, the question arises as to whether the raw differential in dismissal rates simply reflects differences in observable characteristics or whether there is an independent membership effect. Note, finally, that there are no marked differences in our sample between both groups with respect to job satisfaction and the expected job loss.

III.2 Empirical Specifications

We are interested in the determinants of the propensity of being individually dismissed by the employer in a given time interval, i. e. a one-year or a two-year period. Consider the following separation equation:

$$\begin{aligned} &P(F_{i,t->t+j} = 1 \mid x_{i,t}, c_i) = G(x_{i,t}\beta + c_i), \\ &with: t = 1985, 1989, 1993, 1998, 2001, 2003, j = 1, 2 \end{aligned} \tag{1}$$

where $F_{i,t->t+j}$ is a dummy variable indicating that a worker has been dismissed in the respective time interval; $x_{i,t}$ is a vector of explanatory variables at year t, including the union membership indicator; β is the associated parameter vector; c_i represents time invariant individual unobserved heterogeneity and G is a general function. Since we utilise an unbalanced panel data set, note that equation (1) implicitly assumes that selection is ignorable conditional on ($x_{i,t}$, c_i), i. e. $P(F_{i,t->t+j} = 1 \mid x_{i,t}, c_i, s_{i,t}) = P(F_{i,t->t+j} = 1 \mid x_{i,t}, c_i)$ where $s_{i,t}$ = 1 if $(F_{i,t->t+j}, x_{i,t})$ is fully observed (Wooldridge 2009).

We use the following three specifications to estimate the parameters of interest: (1) a pooled probit specification, (2) a correlated random effects probit specification (CRE_Probit) and (3) a linear probability model with fixed effects (LPM_FE). While G is the standard normal cumulative distribution function for specifications (1) and (2), it is only the identity function for the linear probability model (3). The pooled probit specification serves as a benchmark. However, since it does not take into account time-invariant unobserved individual heterogeneity, we additionally use the specifications (2) and (3) (CRE_Probit, LPM_FE). Both of these specifications explicitly allow the unobservable individual heterogeneity to be correlated with elements of $x_{i,t}$. In particular, with respect to the correlated random effects probit specification, we assume that c_i is related to the time averages of some explanatory variables $\overline{x}_i$ and propose the following conditional normality assumption:

$c_i \left|(x_{i1}, x_{i2}, ..., x_{iT}) \sim Normal(\psi + \overline{x}_i \xi, \delta_a^2)\right.$. Moreover, we allow the variance to change over time, i. e. $\delta_{a,i}^2 = \left\{\exp(z_i \gamma)^2\right\}$, where z_i is a vector of time dummies (see Wooldridge 2009 for a general discussion), and test for multiplicative heteroscedasticity using a Wald-test with H_0: $\gamma = 0$ (Greene 2003, pp. 680 ff). Pooled methods for nonlinear panel data are used, since they identify the average partial effects without restrictions on time series dependencies. If homoscedasticity is not rejected, we will use a pooled probit CRE-specification. Otherwise we utilise a pooled heteroscedastic probit CRE-approach. In our empirical application it turns out that only the time averages of the two variables "job satisfaction" and "white collar worker" are significantly different from zero in the CRE_Probit. Furthermore, only in two out of 16 CRE_Probit specifications is homoscedasticity rejected.

To make the parameter estimates from the two probit specifications comparable to the linear probability model with fixed effects (LPM_FE), we calculate average partial effects (APEs) for the parameter estimates of the union membership indicator obtained from the nonlinear specifications. In particular, for each worker we predict the difference in the individual response probability if union membership equals 1 and, alternatively if union membership equals 0. Subsequently, we average the difference across all workers. Standard errors of the APEs are panel bootstrapped with 500 replications (see Papke and Wooldridge 2008 for details).[16]

In West Germany, females are less likely to be members of a trade union and their interests are often argued to be less well represented by unions than those of their male counterparts (Beck and Fitzenberger 2004, Fitzenberger, Kohn and Wang 2010, Schnabel and Wagner 2005). Besides using the effective samples for the one-year and two-year period as given in Table 1, we therefore also present separate estimations for males and females. This allows us to check whether the determinants of dismissal rates differ with gender, as Booth and Francesconi (2000), for example, find for the UK. Moreover, Beck and Fitzenberger (2004), Fitzenberger et al. (2010) and Schnabel and Wagner (2007) amongst others, as well as our descriptive evidence contained in Table 1, indicate that union membership in Germany is predominantly a blue collar phenomenon. Therefore, we further split our estimation subsample according to the occupational status of workers. Finally, we investigate the impact of works councils and of a potential misclassification of the reason for a dismissal. Note that we do not incorporate

[16] An alternative empirical strategy would be a competing risk approach for discrete time data with the exit destinations "plant closure", "fired by employer", "voluntary quit" and "mutual agreement". Using a simple independent competing risk approach we find a significant APE of union membership on the likelihood of being fired, similar in size to the results presented below. The estimated APEs of union membership on the likelihood of observing one of the other exit destinations are never significantly different from zero. Note that Hausman tests do not reject the null that error terms are i.i.d. across destinations, while Small-Hsiao tests do in three out of four cases.

information on individual wages before the job separation into our analysis. Therefore, we pursue a reduced-form approach like Boockmann and Steffes (2010), among others.

IV. Empirical Results

Table 2 displays the estimated parameters of the three specifications for the full sample and the one-year time interval. The estimated coefficients of the union membership dummy always indicate a significantly negative relationship between trade union membership and the propensity of being individually dismissed. The parameter estimate of the linear probability model with fixed effects (LPM_FE) implies that joining the union goes along with a 1.7% (percentage point) decrease in the probability of being individually dismissed. The size of the estimated effect is remarkable, since the average raw dismissal rate is 2.9% in the estimation sample.[17] Our result holds given that we can control for individual job satisfaction as well as for the individual expectation of losing the job at the start of the respective time interval. Both variables are good predictors of individual mobility patterns. The estimated coefficients are significantly negative (positive) for the satisfaction (job loss) variable across all specifications.

- *Table 2 about here* -

Workers in firms with less than 5 employees have never been covered by the Protection Against Dismissal Act (PADA). They exhibit a significantly higher probability of being fired across all specifications.[18] Moreover, in two out of three specifications there is a negative correlation between tenure and the propensity of being dismissed.[19] This is consistent with the claim that stricter employment protection legislation for workers with higher tenure reduces their dismissal probability.

We also investigated the same specification for which results are reported in Table 2 for the two-year window. Furthermore, for both time intervals, one- and two-year window, subsamples of male and female employees were analysed. Since the estimated parameters for the explanatory variables are very similar to the ones presented above in Table 2, we abstain from presenting their whole set for all specifications. Instead, Table 3 contains only the estimated average partial effect (APE) of the union membership indicator and the corresponding estimated parameter for all specifications. The APEs allow us to compare the effect of union membership on the probability of being dismissed across all specifications.

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[17] In addition to industry dummies we also included union density in equation (1). The results (not reported) indicate that union density at the industry level has no significant impact on the probability that an individual is dismissed.

[18] Our result is in line with evidence presented by Bergemann and Mertens (2004) for firms with less than 20 employees.

[19] Note that in the LPM_FE specification, tenure is only identified by workers who have changed their job.

- Table 3 about here -

The estimated APEs of union membership are negative and virtually always significant. They indicate a substantial gain from joining a trade union: averaging the estimated APEs depicted in Table 3 for the two full samples of males and females shows that being a union member reduces the risk of being dismissed by about 1.5%. Given the average raw dismissal rate differential of about 3% between non-members and union members across both effective samples, our results imply that union membership is associated with a 50% decrease of the (raw) risk of being fired. This indicates a remarkable private gain from union membership in West Germany in the last 20 years and might help to explain why union members are willing to pay non-negligible membership fees, although they can free-ride on many of the services offered by German unions.

Considering the estimated APEs for the two subsamples of male full-time employees, we find significant effects of union membership on individual dismissal probabilities for the two probit specifications only. The estimated average partial effects for the CRE_Probit specification are slightly smaller than the ones for the whole sample but nevertheless indicate significant private gains of union membership for male workers.

Table 3 reveals significantly negative APEs of union membership on the individual probability of being dismissed for both subsamples of female workers across all econometric specifications. Given an average dismissal rate of 4% in the two effective subsamples, an estimated APE of about 3% implies that the average probability of being dismissed for a female worker in the private sector is reduced by 75% if she is a member of the trade union. This indicates that the private gains from union membership for female workers considerably exceed those for male workers. Note that in Germany, the probability of being a trade union member is lower for females than for males. Therefore, our results indicate that other benefits from membership besides the lower dismissal rate may be more pronounced for men than for women.

Union members are predominantly blue collar workers (see for example Table 1). Table 4 depicts the results of the estimated APEs of the union membership indicator and the underlying estimated parameters for subsamples of blue collar and white collar workers.

- Table 4 about here -

The estimated APEs are always significantly negative for blue collar workers. The APEs are slightly higher than those for the full samples. Given a raw difference in individual dismissal rates between non-members and union members for the subsample of blue collar workers with a one-year window of about 3.5% = 4.8% - 1.3%, the APEs indicate that the estimated union membership effect can explain about 50% of the raw dismissal rate differential.

In sum, we observe a significantly negative association between trade union membership and the probability of being dismissed individually for full-time, prime-age private sector workers in West Germany during the period 1985 to 2005. These effects are particularly strong for blue collar workers and females, but are virtually non-existent for white collar workers. Hence, given the identifying assumptions of our two panel data specifications, we can establish a causal effect of union membership on individual dismissal probabilities.

As reported in Section II.1, there is some evidence for Germany that works councils lower turnover and separation rates. Since almost half of all works councils in 2004-2005 actively recruited union members (Behrens 2009) and because the average share of unionised works councillors in an industry is positively correlated with the likelihood of being a union member (Goerke and Pannenberg 2007), one might suspect that our measured effect of union membership on dismissals is affected by (the missing information on) the existence of a works council. In the period considered, the SOEP provides contemporaneous information on works council at the workplace of the respondents and union membership for the year 2001 only. To check whether the existence of a works council is associated with the individual dismissal risk, we use cross sectional data for 2001 drawn from our two effective subsamples with a one-year window and a two-year window. Furthermore, we drop observations from firms with less than 5 employees, since works councils can only exist in firms with at least five full-time employees (Sec. 1 WCA). In both probit specifications of equation (1) we do not find a significant association between the existence of a works council and the propensity of being dismissed. However, the estimated APE of union membership is always significantly negative and the estimated size is -0.02 in both cases.[20] Hence, conditional on information on the existence of a works council at the workplace, we still observe a significantly negative relationship between union membership and the risk of being individually dismissed, which is quantitatively almost identical to the results presented above in Tables 3 and 4.

In addition to information on the existence of works councils, in 2001 the SOEP contained a question on whether an individual was a works councillor. Their large majority belong to a trade union (Goerke and Pannenberg 2007). Besides, the PADA contains very strict requirements that have to be fulfilled in order to dismiss a works councillor. When we additionally include the information on individual works council membership in both probit

[20] In preliminary regressions we also used probit specifications including an interaction term of "works council exists" and the individual membership dummy. However, more than 90% of union members in our samples work in firms, in which a works council exists. This leads to multicollinearity problems, which render the identification of the parameter of the interaction terms impossible.

specifications of equation (1), based on the cross-sectional data described in the previous paragraph, the estimated APEs of union membership remain significantly negative and the estimated size is also virtually unchanged at -0.02. Furthermore, the estimated APEs of being a member of a works council are not significant. Therefore, we have supportive evidence that the impact of union membership on dismissals is not due to the fact that works councillors are mostly members of a trade union and subject to stricter employment protection rules than other employees are.

As discussed in Section III.1, response items in the SOEP relating to job separations have changed over time, i. e. the reason "plant closed" has been added sporadically since 1991 and multiple answers were allowed for until 1998. Hence, some employees who worked in a plant that was closed might have classified themselves as having been "fired by the employer" in those years in which the answer "plant closed" was unavailable. Moreover, in years in which both reasons for job separations were available but multiple answers not feasible, workers might have misclassified themselves either as "fired by the employer" or as having lost the job because the "plant closed".

To gauge the effects of potential misclassifications, we investigate the determinants of dismissals for three samples. The first is the full sample including all available survey waves, in which we will set the dependent variable equal to 1 if the dismissal occurred either because the worker was "fired by the employer" or because the "plant closed". Accordingly, this sample explicitly includes all cases of collective dismissals. The second subsample includes the survey years 1993, 2001 and 2003 only, in which both reasons for separations ("fired by the employer" and "plant closed") were available in the questionnaire, and the dependent variable will equal 1 if the employee claimed to be "fired by the employer". The third subsample is also based on the same survey waves 1993, 2001 and 2003. However, the dependent variable will be set to 1 if the dismissal occurred because the "plant closed". Table 5 presents the estimates of the APEs of the union membership indicator and the corresponding parameter estimates based on the three subsamples for both time spans.

- Table 5 about here -

The estimates based on the full sample are similar to the ones presented in Table 3. We find a significantly negative relationship between union membership and the propensity of being dismissed. However, the estimated APE of about -0.010 is smaller than the effect found for individual dismissals. Moreover, the significance level is reduced. One potential explanation can be derived from the parameter estimates based on the second and third subsample, i. e. based on the survey years, for which we can explicitly distinguish between individual and collective dismissals. For the subsample using the plant closure variable, we obtain positive parameter estimates for the union membership dummy, which are not significantly different from zero in five out of six cases. However, focussing on individual dismissals, we consistently find negative parameter estimates, which are significant in half of the specifications. Hence, the somewhat smaller estimated APEs of union membership for the full sample where both reasons for separations are taken into account might be explained by the differential effects of union membership for individual and collective dismissals. Such effects could arise because plant closures are likely to be mass dismissals for which different regulations apply in Germany than for individual dismissals. Since the rules governing the selection of employees who can be dismissed by a firm if it closes a plant are more restrictive than in the case of individual dismissals, there is less scope for individual membership effects to arise. Our findings are generally consistent with this perspective. More importantly, however, we can conclude from the results summarised in Table 5 that our main findings as summed up in Tables 2, 3 and 4 are not affected by potential misclassifications of the causes of a job losses. As pointed out above, some of those respondents who replied that they were fired by the employer may not have been dismissed individually but in the context of a collective dismissal. If the individual union membership effect for plant closures and, therefore most likely, also for mass dismissals is weaker than the impact in the case of individual employment terminations, we tend to underestimate the impact of a worker's membership in a trade union on the probability of being dismissed individually.

V. Summary and Interpretative Conclusion

Based on self-reported reasons for the termination of employment contracts, we find that for the period 1985 – 2005 the probability of being individually dismissed for a full-time, prime-age worker in the private sector in West Germany is almost 3.6% annually. This figure describes the dismissal risk for a worker who does not belong to a trade union. If, however, the worker is a trade union member, the dismissal probability will only be 1.3%. This differential in raw dismissal rates can partly be explained by the personal characteristics of workers. In particular, we find that employees with longer tenure, working in larger firms and characterised by higher job satisfaction are less likely to be individually dismissed. Most importantly, however, being a member of a trade union reduces the probability of being dismissed substantially and significantly. Across various specifications the decline in the raw dismissal rate due to being a trade union member is about 50%. Therefore, we detect a private gain from trade union membership in West Germany which has hitherto not been noted. Our empirical findings provide a foundation for theoretical models of trade union membership based on the assumption that dismissal rates vary with an individual's union status (Moreton 1998, 1999). Furthermore, we find that the effect of trade union membership on the individual dismissal probability is particularly pronounced for females and non-existent for white collar workers.

Our data does not allow us to explicitly test for the mechanism by which trade union membership reduces the probability of being dismissed individually. We conjecture that it is more costly for firms to dismiss workers if they are union members. This could be the case because German employment protection legislation gives workers the entitlement to contest a dismissal at a labour court. Trade unions generally support their members in such legal conflicts. According to a recent survey, 12% of all union members have been represented by their union in court and almost 50% have obtained legal advice from union staff at least once during their membership. Furthermore, in 2008 for example, the German Trade Union Federation (DGB) represented union members in more than 70,000 proceedings in labour courts, of which about 26,000 were directly related to dismissal conflicts.[21] In addition, we know that the probability of obtaining a severance payment will be higher if a labour court is involved. As one consequence, it has been established that trade union membership raises the likelihood that a dismissed worker obtains a severance payment (Goerke and Pannenberg 2010). Furthermore, Berger and Neugart (2010) show for a small sample of workers dismissed by the same firm in Germany between 2003 and 2006 that being represented by a union lawyer raises the probability of winning a labour court case. If, therefore, being a member of a trade union raises the costs of a dismissal, firms will, ceteris paribus, be more likely to terminate the employment contract of a non-union worker. This will particularly be true if the union status is known. But even if firms are unaware of a worker's membership, we would expect such a dismissal effect to be feasible. Contesting a dismissal decision in court entails the positive probability that the worker will be reinstated in the job or that the firm will withdraw its decision. If trade union members are more prone to contest a dismissal decision, there will be a membership effect even if firms are not aware of the union status ex-ante.

The preceding argument does not apply to collective redundancies. This is the case because fighting a mass dismissal bears resemblance to the purchase of a public good. Any labour court ruling on the admissibility of a collective redundancy applies to all dismissed workers, irrespective of their union status. Therefore, the lower costs of contesting a collective dismissal for a trade union member may not translate into a lower probability of such an event. Lack of appropriate data, however, does not allow us to explicitly test the above hypothesis.

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[21] These figures can be found at http://www.einblick.dgb.de/download/2008/einblick_08_08.pdf and http://www.einblick.dgb.de/download/2009/einblick_09_03.pdf (in German)

On the one hand, the system of industrial relations and employment protection legislation in Germany differ from the institutional and legal frameworks in other countries. On the other hand, trade union support for members in dismissal cases appears to be widespread in OECD member states (cf. Venn 2009). Therefore, it seems worthwhile to investigate whether the private gain from trade union membership which we have identified for Germany can also be observed in other countries.

Tables

Table 1: Descriptive Statistics

	One-year Window (Sample I)		*Two-year Window (Sample II)*	
	Non-member	Union member	Non-member	Union member
Dismissal rate	3.56	1.30	6.32	2.73
Expectations regarding job loss	10.49	11.09	10.19	10.69
Job satisfaction in last job	7.29	7.12	7.30	7.12
Male	72.52	81.83	73.87	82.47
Age	38.78	40.18	38.92	40.18
Tenure at last job	9.57	13.17	9.70	13.21
Firm size: $X < 5$ employees	22.81	4.98	22.27	5.07
Firm size: $5 \leq X < 200$ employees	30.32	21.54	30.46	21.32
Firm size: $200 \leq X < 2000$ employees	23.43	33.15	23.76	33.62
Firm size: $X \geq 2000$ employees	24.44	40.33	24.51	39.99
White collar worker	54.78	27.29	54.30	27.50
Apprenticeship	67.48	69.49	67.34	69.47
University degree	16.07	4.77	15.92	4.87
Number of observations	9821	3858	8921	3593

Source: SOEP 1985-2005.
The sample is an unbalanced panel of the survey years 1985, 1989, 1993, 1998, 2001, 2003.
All variables except dismissal rates are measured in the respective years. All variables except "Job satisfaction", "Age", and "Tenure" refer to percentages. "Age" and "Tenure" refer to absolute values in years and "Job satisfaction" to an average value stemming from an interval ranging from zero to ten.

Table 2: Union Membership and Dismissals in West Germany

- full sample / one-year window -

	Pooled Probit		Correlated Random Effects Model (CRE_Probit)		Linear Probability Model with fixed effects (LPM_FE)	
	Coeff.	*SE*	*Coeff.*	*SE*	*Coeff.*	*SE*
Union membership	-0.254**	0.072	-0.291**	0.090	-0.017*	0.008
Job satisfaction in last job	-0.072**	0.012	-0.107**	0.019	-0.006**	0.001
Expectations regarding job loss	0.553**	0.063	0.632**	0.079	0.040**	0.009
Age	0.003	0.003	0.002	0.004	--	--
Male	-0.140*	0.060	-0.050	0.079	--	--
Foreigner	0.107+	0.063	0.083	0.081	--	--
Single parent	0.159	0.110	0.014	0.151	--	--
Couple with children	0.034	0.056	-0.038	0.070	--	--
Tenure at last job	-0.051**	0.006	-0.040**	0.007	0.002*	0.001
Firm size: X < 5 employees	0.423**	0.082	0.414**	0.107	0.043**	0.016
Firm size: 5 ≤ X < 200 employees	0.248**	0.078	0.199*	0.100	0.012	0.010
Firm size: 200 ≤ X < 2000 empl.	0.183*	0.082	0.146	0.102	0.009	0.007
White collar worker	-0.176**	0.063	0.136	0.198	-0.004	0.011
Apprenticeship	-0.074	0.061	-0.074	0.077	--	--
University degree	-0.216*	0.099	-0.179	0.130	--	--
Year 1989	-0.222*	0.096	-0.161	0.115	-0.016**	0.006
Year 1993	0.055	0.087	0.118	0.108	-0.013	0.008
Year 1998	-0.010	0.088	0.030	0.111	-0.022+	0.011
Year 2001	-0.126	0.086	-0.378**	0.116	-0.041**	0.013
Year 2003	-0.193*	0.089	-0.148	0.112	-0.037**	0.014
Average (job satisfaction last job)	--	--	0.081*	0.033	--	--
Average (white collar worker)	--	--	-0.401+	0.223	--	--
Dummy variables: Regions	*yes*		*yes*		*yes*	
Dummy variables: Industry	*yes*		*yes*		*yes*	
Wald_X (df)	463.3** (32)		344.2** (34)		79.86** (22)	
Wald_CRE (df)	--		8.72* (2)		--	
Number of observations	13586		10777		10777	

Source: SOEP: 1985-2005.

The sample is an unbalanced panel of the survey years 1985, 1989, 1993, 1998, 2001, 2003.

Dependent variable: individual dismissal (0/1).

Standard errors of the coefficients are robust to general second moment misspecification.

Significance levels: ** (0.01), * (0.05), + (0.10).

CRE_Probit: pooled probit specification of correlated random effects model.

Wald_X: Wald-test with H0: no joint significance of all regressors.

Wald_CRE: Wald-test with H0: independence of x_{it} and c_i.

Table 3: Union Membership and Dismissals: Average Partial Effects (APEs)

	Pooled Probit		Correlated Random Effects Model (CRE_Probit)		Linear Probability Model with fixed effects (LPM)	
	Coeff.	*APE*	*Coeff.*	*APE*	*Coeff.*	*APE*
			One-year Window			
			All			
	-0.254**	-0.013**	-0.291**	-0.011**	-0.017*	-0.017*
N	13586		10777		10777	
			Males			
	-0.197*	-0.009**	-0.210*	-0.008*	-0.008	-0.008
N	10216		8451		8451	
			Females			
	-0.472**	-0.026**	-0.639*	-0.021**	-0.042*	-0.042*
N	3370		2326		2326	
			Two-year Window			
			All[§]			
	-0.214**	-0.018**	-0.292**	-0.015**	-0.017[+]	-0.017[+]
N	12427		9862		9862	
			Males			
	-0.223**	-0.017**	-0.246**	-0.015**	-0.005	-0.005
N	9494		7820		7820	
			Females			
	-0.213[+]	-0.022*	-0.309*	-0.021*	-0.056*	-0.056*
N	2933		2042		2042	

Source: SOEP: 1985-2005.
The sample is an unbalanced panel of the survey years 1985, 1989, 1993, 1998, 2001, 2003.
Dependent variable: individual dismissal (0/1). APE: average partial effect.
Standard errors of the coefficients are robust to general second moment misspecification.
Standard errors of the APEs are panel bootstrapped with 500 replications.
Significance levels: ** (0.01), * (0.05), + (0.10).
CRE_Probit: pooled probit specification of correlated random effects model.
[§] CRE_Probit with multiplicative heteroscedasticity. Wald-test variance function: $\chi^2(4)=11.21^*$.

Table 4: Union Membership and Dismissals: APEs for blue collar and white collar workers

	Pooled Probit		Correlated Random Effects Model (CRE_Probit)		Linear Probability Model with fixed effects (LPM)	
	Coeff.	*APE*	*Coeff.*	*APE*	*Coeff.*	*APE*
			One-year Window			
			Blue collar worker			
	-0.340**	-0.020**	-0.356**	-0.015**	-0.021*	-0.021*
N	7182		5725		5725	
			White collar worker			
	-0.093	-0.004	-0.395^{+}	-0.009*	-0.012	-0.012
N	6404		4603		4603	
			Two-year Window			
			Blue collar worker[§]			
	-0.273**	-0.027**	-0.376**	-0.019**	-0.020^{+}	-0.020^{+}
N	6624		5229		5229	
			White collar worker			
	-0.100	-0.007	-0.237	-0.011^{+}	-0.017	-0.017
N	5803		4217		4217	

Source: SOEP: 1985-2005.
The sample is an unbalanced panel of the survey years 1985, 1989, 1993, 1998, 2001, 2003.
Dependent variable: dismissal (0/1). APE: average partial effect.
Standard errors of the coefficients are robust to general second moment misspecification.
Standard errors of the APEs are panel bootstrapped with 500 replications.
Significance levels: ** (0.01), * (0.05), + (0.10).
CRE_Probit: Pooled probit specification of correlated random effects model.
[§] CRE_Probit with multiplicative heteroscedasticity. Wald-test variance function: $\chi^2(4)$=12.16*.

Table 5: Checks of robustness: changing questionnaire set of reasons for separation

	Pooled Probit		Correlated Random Effects Model (CRE_Probit)		Linear Probability Model with fixed effects (LPM)	
	Coeff.	*APE*	*Coeff.*	*APE*	*Coeff.*	*APE*
			One-year Window			
			All; both reasons for separation			
	-0.148*	-0.010**	-0.133^{+}	-0.007*	-0.014^{+}	-0.014^{+}
N	13711		10910		10910	
			Subsample years 1993, 2001, 2003; individual dismissal			
	-0.361**	-0.017**	-0.540**	-0.014**	-0.013	-0.013
N	7607		4829		4829	
			Subsample years 1993, 2001, 2003; plant closing			
	0.128	0.005	0.296*	0.009^{+}	0.008	0.008
N	7508		4771		4771	
			Two-year Window			
			All; both reasons for separation			
	-0.107*	-0.012*	-0.097^{+}	-0.009^{+}	-0.006	-0.006
N	12676		10121		10121	
			Subsample years 1993, 2001, 2003; individual dismissal			
	-0.236**	-0.021**	-0.171	-0.009	-0.002	-0.002
N	6843		4378		4378	
			Subsample years 1993, 2001, 2003; plant closing			
	0.131	0.009	0.179	0.010	0.014	0.014
N	6665		4309		4309	

Source: SOEP: 1985-2005.
The sample is an unbalanced panel of the survey years 1985, 1989, 1993, 1998, 2001, 2003 or as described above.
Dependent variable: reason for separation (0/1). APE: average partial effect.
Standard errors of the coefficients are robust to general second moment misspecification.
Standard errors of the APEs are panel bootstrapped with 500 replications.
Significance levels: ** (0.01), * (0.05), + (0.10).
CRE_Probit: pooled probit specification of correlated random effects model.

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