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Absenteeism and Employment Probation: A Panel Study for Germany*

By Regina T. Riphahn** and Anja Thalmaier***

Summary

This study measures the role of incentives in workers' decisions to stay home from work for health reasons. German regulations on layoff protection differentiate between workers who are on short-term employment probation and those on regular employment contracts: only at the end of the six-months probation period is layoff protection extended to all workers. We test whether this change in employment conditions affects absenteeism. The study is based on data from the German Socio-Economic Panel, and estimates random effect probit models for men and women. We confirm the absentee-reducing effects of probation incentives for the female sample.

1. Introduction

The determinants of sick leave and absenteeism are high on the agenda of public debate and academic research in a number of countries: Sweden downsized its benefits for absent workers in 1991, after which absence rates dropped significantly (Einerhand et al. 1995). The Netherlands undertook far ranging reforms in the early 1990s to reduce work absence rates (Einerhand et al. 1995; OECD 1996). In Germany a reform of sick leave benefits was passed in 1996, reducing mandatory sick leave benefits from 100 to 80 percent of regular earnings. Across countries, regulatory changes affected benefit amounts, introduced waiting periods, or privatized the risk of sick leave payments. Thus, empirical research about absenteeism is important to assess the effectiveness of different policy tools. It is the purpose of this study to evaluate the incentive effects surrounding sick leave provisions for the case of Germany.

The recent literature investigating the determinants of absenteeism typically focuses on the effects of wages (Johansson and Palme 1996; Stephan 1994), firm size (Barmby and Stephan 1996), or gender (Vistnes 1997), where the tested hypotheses are typically derived from efficiency wage models. The majority of studies find negative correlations between income and absenteeism as well as higher absenteeism in large firms, and for women and young people.

The approach of this study differs from the existing literature in that the incentive effects in the work absence decision of employees are evaluated indirectly. The evaluation is based on a regulation in German labor law that allows probation periods in employment contracts: during such probation periods employees can quit or be fired easily, avoiding long mandatory notice periods, and, more importantly, without fulfilling the requirement of "proper

cause."¹ Since employment probation allows employers to respond quickly to unsatisfactory employee performance, we hypothesize that during employment probation absenteeism rates are below their (nonprobation) long-run levels. This study tests whether an increase in the absence probability can be observed at the end of a probation period. In addition, our specification allows for a careful comparison of the determinants of male and female absenteeism, and an evaluation of the effects of factors such as the overall unemployment situation or firm size on employee behavior.

The next section describes the institutional framework of absenteeism and probation periods in Germany. Section three discusses the data and methodological issues of our empirical approach. Results are presented in part four and section five concludes the paper.

2. Institutional Framework: Employment Probation and Sick Leave Benefits

Employment probation describes a special form of work agreement between an employer and an employee which typically precedes a regular employment contract.² The decisive characteristic of employment probation agreements in Germany is that during the probation period the detailed and binding laws governing layoff (*Kündigungsschutzgesetz*) do not apply. These regulations restrict the situations in which layoff is legally possible as well as the length of the mandatory notice period.

The purpose of probation agreements is to allow both parties, the employer and employee, to find out whether the match of the worker to the job is suitable, before being bound by a formal employment relationship. There are no legal stipulations covering employment probation; instead, this type of labor contract has been regulated in bilateral agreements between unions and employers. Sometimes the probation period preceding a regular employment contract lasts only one or three months, but it typically lasts six months. The probation period is followed either by dismissal or by a regular employment contract.

Since 1970, blue and white collar workers can claim sick leave benefits from their employer amounting to full earnings for the first six weeks of any disease or illness.

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¹ The requirement of "proper cause" mandates that employees can be laid off only for reasons connected to their person or behavior, such that, e.g., changes in business conditions are normally not sufficient to justify layoff. German labor courts are very restrictive in accepting "proper cause."

² This description of employment probation is based on Linne and Voswinkel (1986) and Preis and Kramer (1993).

Employees who are unable to work after the six-week period receive 80 percent of their earnings from their health insurance for up to another 78 weeks (BMA 1995). The laws covering the first six weeks of any health problem were changed in 1996. Since then blue and white collar workers have statutory claims to only 80 percent of last earnings. However, unions negotiated the continuation of full coverage for almost all industries.

3. Description of the Data and Methodological Issues

The Sample and Dependent Variable

The analysis is based on the first six waves of data from the German Socio-Economic Panel (GSOEP 1984-1989). Since we are interested in the occurrence of absenteeism, we select our sample based on individuals' employment status: only full- or part-time employed persons are considered. We drop the self-employed, those in minor or irregular employment, and individuals in apprenticeship programs from the sample, because different incentive mechanisms govern the behavior of these individuals. After omitting observations with missing values, our sample contains 2,927 males and 1,743 females, with a total of 8,274 male and 4,548 female person-year observations.

The dependent variable is a dichotomous indicator that describes whether a worker has missed at least one day of work due to health problems in a given calendar year. We match responses on health-related work absence (provided in the survey of year $t+1$) with information supplied for the same calendar year (provided in the survey of year t). The overall frequency of at least one day of health-related work absence was about 52 percent for the male and 60 percent for the female sample.

Measuring the Effect of Employment Probation

While the hypothesis of lower absenteeism in the first six months on a new job is clear and intuitive, its measurement is complicated by three issues: matching absenteeism behavior to job tenure, separating the probation effect on absenteeism from that of shorter employment spells (exposure), and controlling for the effects of seasonality.

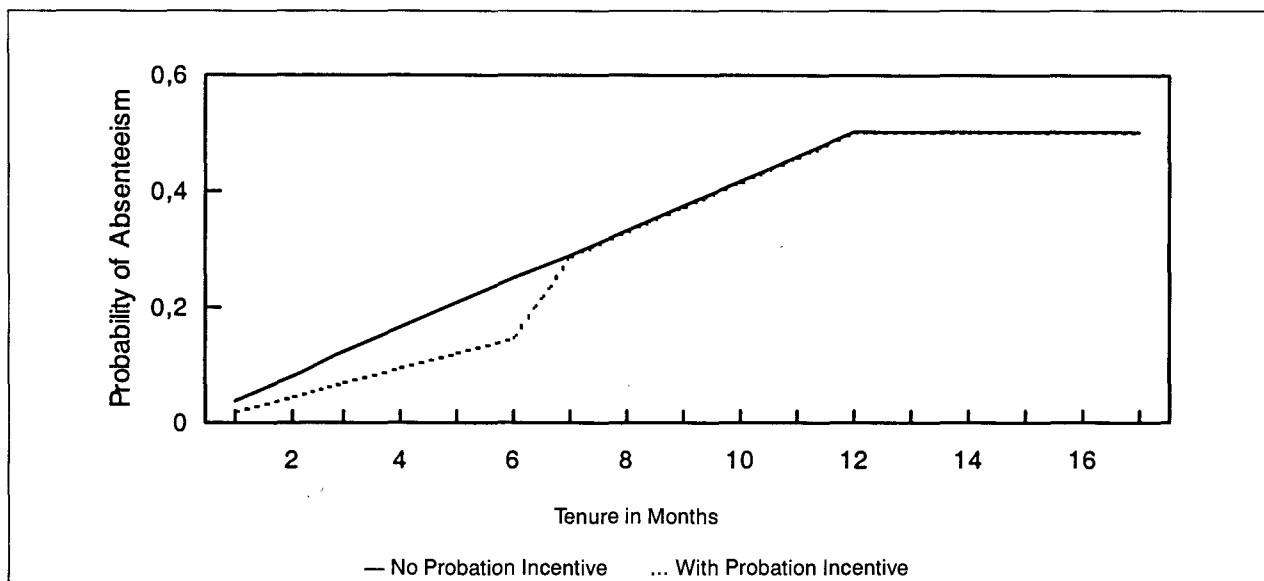
The dataset provides exact information on the beginning and duration of a given employment relationship, whereas the absenteeism indicator is surveyed only retrospectively for an entire calendar year. Therefore we cannot assign the absence event to an employment spell in situations when the individual changed employers during the calendar year; since it is not recorded during which employment spell an absence occurred. In order to be able to relate tenure and absence we consider only those new employment relationships that represent either the first job for a person, or that commence after an interruption in employment such that only one employment relationship is observed in the calendar year.³

The second problem is that short employment spells by definition have a lower risk of at least one absence for the full year. The problem is to separate absence behavior due to the incentive effects of employment probation from absence rates due to short exposure periods. Figure 1 depicts the situation. If we assume that the annual absence rate is fixed at 50 percent, then the exposure effect alone

³ By this mechanism we left-censor 169 female and 275 male job changers in the first months on their new job. These observations reenter the analysis with the beginning of the second calendar year.

Figure 1

Probability of Absenteeism By Months of Tenure



leads to a linear increase in the observed probability of absenteeism up to the first full year of tenure, when it reaches 50 percent (straight line). If individuals on employment probation miss work less often, we would expect a lower rate of absenteeism for the time until the sixth month of tenure which is the end of the probation period (dashed line).

The final complication in the measurement of probation incentives relates to possible seasonality effects. Since we relate absenteeism to tenure at the end of the calendar year, all employments with a tenure of two months began in November, and all those with a tenure of, say, eight months began in May. Thus, the tenure indicator might pick up seasonal effects. Unfortunately it is not possible to correct for this problem with our data. Barnby, Ercolani and Treble (1997) construct monthly absence rates based on British data and finds that the propensity to miss work is highest in the first three calendar months, lower from April through September, and higher again beginning in October. Available information for Germany confirms this pattern (see Schnabel 1997). Since both halves of the year contain periods of high and low absence rates, seasonality is unlikely to systematically bias our results on the absenteeism effects of tenure.

Our empirical model controls for longer run effects of tenure and explicitly introduces controls for exposure effects. Let X be the vector of all explanatory variables except for tenure, ϵ the composite error term, and α and β coefficients to be estimated. We formulate the absence probability for person i in period t as:

$$Pr[ABSENT_{i,t}] = \Phi[\alpha_1 TEN_{i,t} + \alpha_2 TEN_{i,t}^2 + \alpha_3 TENM_{i,t} + \alpha_4 PROB_{i,t} + \alpha_5 (PROB_{i,t} * TENM_{i,t}) + \beta X_{i,t} + \epsilon_{i,t}]$$

The overall effect of job tenure is represented by a quadratic term (TEN , TEN^2). To capture the exposure effect we control for the number of months a person has been employed, if tenure is below one year ($TENM$). The variable $TENM$ is coded zero for tenure above one year. We expect a negative coefficient for $TENM$, representing the exposure related deviation from the long-run tenure effect. To control for the effect of employment probation on the probability of absence we add an indicator for whether the observed tenure is below seven months ($PROB$). The coefficient, α_4 , indicates whether absence probabilities are lower during probation. In Figure 1 we sketch different hypothesized profiles for the risk of absenteeism with and without probation effects. To capture this potential difference in slope during the probation period, we interact the indicators for probation ($PROB$) and months of tenure ($TENM$) and estimate the coefficient α_5 . A test of the joint significance of α_4 and α_5 indicates whether the absentee behavior in the first six months deviates significantly from the combined effects of long-term tenure and exposure. The magnitudes of the potential effects can then be inferred from simulation exercises.

Specification, Further Methodological Issues, and Descriptive Statistics

Unobserved variables such as work motivation or an individual's morbidity, may influence both a person's wage and absenteeism. If that is the case, wages are endogenous in the absenteeism model and coefficient estimates may be biased. To control for this problem we use predicted wage measures in the specification.

In addition to the effects of tenure and wages, our specification controls for firm size, aggregate unemployment, human capital, marital status, and whether there are small children in the household. For health indicators, we focus on whether a person suffers a chronic disease or a handicap. Finally, we consider variables describing the individual employment situation, such as part-time employment, white collar worker, civil service, and public sector employment. Table 1 defines the variables and gives overall descriptive statistics.

Since gender differences may affect intercept and slope parameters of the model, we estimate different equations for our male and female subsamples. Given the panel nature of the data we control for unobserved person-specific heterogeneities using a random effects probit estimator along the lines of Butler and Moffitt (1982).

4. Estimation and Simulation Results

Estimation results are presented in Table 2. The controls for person-specific random effects improve the function values significantly in all models, indicating that a large fraction of the total error is due to person-specific unobservables. Due to the nonlinearity of the estimator, the magnitude of the coefficient estimates cannot be easily interpreted. Therefore, we present simulations of the covariates' effects as well.

Tenure Effects

Of foremost interest are the effects of the tenure variables. We controlled for the long-run effects of tenure with a quadratic specification in both models, which only in one instance yields a modestly significant coefficient. The small and insignificant overall effect of tenure is plausible given the limited variation of observed absenteeism at different years of tenure (see Table 3). The predicted absence probabilities, even at higher tenure values (Table 3, bottom rows), are reasonably close to the observed probabilities in all specifications.

The incentive effects of the probation period can be evaluated based on tenure effects at tenure periods below one year. The estimation results indicate that the control variables for the exposure effect, $TENM$, are significant only at the 5 and 10 percent level. The coefficients of the probation period indicators significantly improve the fit of the

Table 1

Descriptive Statistics

Variable	Definition	Male		Female	
		Mean	Standard Deviation	Mean	Standard Deviation
ABSENT	1 if individual has been absent, else 0	0.526	0.499	0.601	0.490
Tenure Measures					
TENURE	Tenure in years	13.860	9.951	10.225	8.242
TENURE2	Tenure in years squared ($\times 10^{-2}$)	2.911	2.730	1.725	2.763
TENM	Tenure in months for first year, else 0	0.013	0.094	0.029	0.139
PROB	1 if individual in probation period, else 0	0.011	0.103	0.024	0.154
PROB*TENM	Interaction TENM * PROB	0.004	0.038	0.008	0.052
TEN1—2	1 if tenure is 1 or 2 months, else 0	0.002	0.045	0.005	0.074
TEN3—4	1 if tenure is 3 or 4 months, else 0	0.004	0.061	0.009	0.097
TEN5—6	1 if tenure is 5 or 6 months, else 0	0.005	0.070	0.009	0.096
TEN7—8	1 if tenure is 7 or 8 months, else 0	0.003	0.051	0.011	0.104
TEN9—10	1 if tenure is 9 or 10 months, else 0	0.004	0.064	0.006	0.077
TEN11—12	1 if tenure is 11 or 12 months, else 0	0.005	0.068	0.011	0.102
Wage and Human Capital Measures					
PGRWAGE	Predicted gross hourly real wage	78.895	21.406	58.086	16.776
PGRWAGEP	Predicted gross hourly real wage if parttime	20.420	26.535	17.469	28.714
SCHOOLING	Years of schooling	11.235	2.488	10.909	2.430
UNIV	1 if university degree required for job, else 0	0.109	0.312	0.060	0.238
APPREN	1 if apprenticeship required for job, else 0	0.433	0.496	0.403	0.491
TRAIN	1 if training on the job required for job, else 0	0.231	0.423	0.177	0.381
FOREIGN	1 if not of German nationality, else 0	0.294	0.456	0.235	0.424
Firm Size and Employment Measures					
PARTTIME	1 if individual works parttime, else 0	0.008	0.089	0.292	0.455
PUBLIC	1 if employed in public sector, else 0	0.242	0.428	0.306	0.461
WHITECOL	1 if white collar worker, else 0	0.301	0.459	0.565	0.496
CIVILSER	1 if civil servant, else 0	0.114	0.318	0.061	0.239
BLUECOL	1 if blue collar worker, else 0	0.585	0.493	0.374	0.484
FIRM1	1 if employed in firm with less than 20 employees, else 0	0.128	0.334	0.210	0.407
FIRM2	1 if employed in firm with more than 20 and less than 200 employees, else 0	0.270	0.444	0.283	0.451
FIRM3	1 if employed in firm with more than 200 and less than 2,000 employees, else 0	0.251	0.433	0.255	0.436
FIRM4	1 if employed in firm with more than 2,000 employees, else 0	0.353	0.478	0.255	0.436
UNEM RATE	National unemployment rate (in percent)	8.988	0.220	8.989	0.221
Demographic and Health Measures					
AGE	Age of the individual	40.728	10.913	38.120	11.182
MARRIED	1 if married, else 0	0.795	0.403	0.667	0.471
KID—16	1 if children under age 16 in household, else 0	0.500	0.500	0.350	0.477
HANDICAP	1 if individual is handicapped, else 0	0.076	0.265	0.058	0.235
CHRON	1 if individual has a chronic disease, else 0	0.230	0.421	0.261	0.439
Source: Authors' calculations using GSOEP, 1984-1989.					

Table 2

Random Effects Probit Estimation and Simulation Results

	Male			Female		
	Coefficient	Standard Deviation	Simulated Effect ^{a)}	Coefficient	Standard Deviation	Simulated Effect ^{a)}
CONSTANT	2.704	0.761*	53.44	4.369	1.057*	61.84
Tenure Effects						
TENURE	-0.014	0.008***	—	0.010	0.011	—
TENURE2	0.0001	0.0002	—	-0.0004	0.0003	—
TENM	-0.435	0.203**	—	-0.357	0.192***	—
PROB	-2.012	0.409*	—	-1.522	0.453*	—
PROB*TENM	2.976	1.104*	—	1.333	1.274	—
Wage and Human Capital Effects						
PGRWAGE	0.002	0.003	6.63	-0.003	0.004	-9.92
PGRWAGEP	0.014	0.007**	—	0.010	0.004*	—
SCHOOLING	-0.029	0.022	-10.38	-0.007	0.027	-1.16
UNIV	-0.188	0.131	-13.36	0.077	0.203	4.27
APPREN	-0.065	0.070	-2.47	-0.046	0.093	-2.63
TRAIN	0.008	0.071	0.03	-0.102	0.096	-5.83
FOREIGN	0.148	0.065**	10.50	-0.075	0.086	-4.30
Firm Size and Employment Effects						
PARTTIME	-1.371	0.726***	-79.13	-0.702	0.234*	-40.10
PUBLIC	0.250	0.073*	17.44	0.055	0.074	3.69
WHITECOL	-0.259	0.061*	-18.49	-0.185	0.086**	-10.52
CIVILSER	-0.240	0.103**	-17.11	0.062	0.194	3.39
FIRM1	-0.204	0.078*	-14.48	-0.596	0.091*	-34.54
FIRM2	-0.167	0.061*	-11.83	-0.335	0.083*	-18.76
FIRM3	0.001	0.061	0.01	-0.176	0.082**	-9.54
UNEM RATE	-0.212	0.083**	-14.74	-0.313	0.115*	-16.81
Demographic and Health Effects						
AGE	-0.010	0.003*	-14.81	-0.018	0.004*	-20.69
MARRIED	0.173	0.068**	12.23	0.067	0.067	3.82
KID—16	-0.030	0.049	-2.11	-0.073	0.064	-4.18
HANDICAP	0.275	0.090*	19.19	0.308	0.126**	16.70
CHRON	0.310	0.048**	21.71	0.392	0.059*	21.68
e	0.432	0.030*	—	0.371	0.042*	—
Number of Observations		8,274			4,548	
Log Likelihood		-5,223.42			-2,781.61	

* significant at 1 percent; — ** significant at 5 percent; — *** significant at 10 percent. — ^{a)} The „simulated effects” columns describe the differences between two simulated absent probabilities relative to the baseline prediction (first row). The baseline prediction presents the average probability of an absence, calculated at observed values for all variables and using the estimated coefficients. The other values are similarly calculated with values for dichotomous variables set to 1 versus 0. For continuous variables, the compared values approximate one standard deviation above and below variable means: predicted wages, 100 versus 40, schooling, 14 versus 9 years, unemployment rate, 9 versus 8 percent, and age 50 versus age 30. For simulation of tenure effects, see Table 3.

Source: Authors' calculations using GSOEP, 1984-1989.

Table 3

**Tenure Effects on the Probability of Work
Absence for Health Reasons**

	Male			Female		
	Cases	Observed Probability	Predicted Probability ^{a)}	Cases	Observed Probability	Predicted Probability ^{a)}
BASELINE	8,274	52.65	53.44	4,548	60.07	61.84
TEN1—2	17	17.65	8.50	25	24.00	15.90
TEN3—4	30	19.35	16.64	42	20.93	19.91
TEN5—6	40	31.71	28.59	41	30.95	24.47
TEN7—8	21	36.36	49.37	48	44.00	54.28
TEN9—10	33	41.18	45.80	26	55.56	51.58
TEN11—12	37	52.63	43.68	46	52.08	49.95
TENURE (2 years)	671	55.59	58.97	499	58.52	62.83
TENURE (5 years)	272	55.51	57.51	221	60.65	63.53
TENURE (10 years)	330	54.99	55.21	208	65.73	64.09
TENURE (20 years)	227	54.25	51.24	95	60.95	62.96
TENURE (30 years)	84	48.15	48.13	14	56.32	58.75

^{a)} Predicted probabilities are obtained by setting the tenure variables to the values indicated in column (1) and predicting the probability of absence, holding other characteristics constant at observed values. Observed probabilities reflect average absence probabilities, given that tenure takes on the value indicated in column (1).
Source: Authors' calculations using GSOEP, 1984-1989.

model, indicating that they pick up additional variation in tenure effects on absenteeism during the first year of tenure.

Table 3 presents predicted values of the absence probabilities by tenure month. They suggest that there is indeed a strong discrete increase in absence probabilities at the end of the probation period, i.e., between months 5-6 and 7-8 for both subsamples. This appears to confirm the expected response in absence probabilities to the incentives set by the probation period.

Wages, Firm Size, and Human Capital Measures

While the efficiency wage model clearly predicts negative effects of earnings on the rate of absenteeism, we find the coefficient estimates for predicted full-time wages (*PGRWAGE*) to be imprecisely estimated, although there is a significantly larger positive effect of part-time wages on the probability of absenteeism. Winkelmann (1996) similarly does not find a significant wage effect on absenteeism. The simulated wage effects differ in direction for men and women and are of relatively small magnitude (see Table 2). An increase in wages from DM 40 to DM 100 is followed by a 6.63 percent increase in the absenteeism

risk for men and a decline by about 10 percent for women. Thus, only women seem to respond along the lines suggested by the efficiency wage hypothesis.

The evidence suggests that human capital has only insignificant effects on absenteeism. The simulated effects are larger for men than for women and suggest that individuals with many years of schooling and who work in a job requiring a university degree are less likely to be absent.

The efficiency wage model generated clear predictions that working in a small firm would reduce absenteeism. This effect is confirmed in our estimation, with simulation results corroborating Barmby and Stephan (1996) and Johansson and Palme (1996). Both subsamples' coefficient estimates are significantly different from zero and yield large differences in the predicted absence probability. Working in a firm with fewer than 20 workers reduces the risk of absenteeism by 14.5 and 34.5 percent below average for men and women, respectively. The coefficients of the aggregate unemployment rate are highly significant, and simulation results suggest surprisingly large behavioral responses to this measure. We find lower absenteeism for part-time workers, white collar workers, and those working outside the public sector. Working part-time yields the single strongest reduction in the risk of absenteeism among all variables for both samples.

Demographic and Health Effects

Within this last group of measures we find that being older has a large negative effect while being in poor health yields a significant and large increase in the risk of absenteeism for both male and female employees. Surprisingly, the presence of children does not affect parents' propensity to be absent for health reasons. The effect of being married on the risk of absenteeism was not clear *a priori*. On the one hand, married individuals are typically healthier (Waite 1995), suggesting reduced absences; on the other hand, the threat of unemployment may not be as effective if there is another adult in the household to earn an income. Our simulation results suggest that the latter argument dominates.

5. Conclusions

This study presented an evaluation of the behavioral effects of layoff protection for German workers. This effect can be identified because the labor market instrument of employment probation introduces a change in layoff pro-

tection for workers who are retained in the firm beyond the typical six-month probation period. If we find that these individuals change their behavior at the end of the probation period, this suggests the presence of incentive effects from layoff protection regulation.

Indeed, we found significantly lower absence rates in the first six months of employment than the average behavior would have suggested. However, since predicted absence probabilities do not match observed rates very closely, we suspect that these findings were largely driven by the parameterization of the tenure measures in the model. In future work we will test whether probation period effects can be measured using less heavily parameterized specifications.

Additionally, we tested a number of hypotheses regarding other determinants of absenteeism. We found large effects deriving from part-time employment, much lower absence rates in small firms, and strong absence effects of poor health and high aggregate unemployment. The male and female sample seem to respond differently to a number of characteristics such as wages, human capital, nationality, and civil servant status.

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