

Individual tenure and collective contracts

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Individual Tenure and Collective Contracts

Knut Gerlach, Gesine Stephan

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Knut Gerlach (University of Hannover), Gesine Stephan (IAB)

Auch mit seiner neuen Reihe „IAB-Discussion Paper“ will das Forschungsinstitut der Bundesagentur für Arbeit den Dialog mit der externen Wissenschaft intensivieren. Durch die rasche Verbreitung von Forschungsergebnissen über das Internet soll noch vor Drucklegung Kritik angeregt und Qualität gesichert werden.

Also with its new series "IAB Discussion Paper" the research institute of the German Federal Employment Agency wants to intensify dialogue with external science. By the rapid spreading of research results via Internet still before printing criticism shall be stimulated and quality shall be ensured.

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Abstract

The paper analyses the relationship between individual tenure and the application of collective contracts at the firm level, using a multi-level model and a German linked employer-employee data set for the years 1990, 1995 and 2001. The main result is that elapsed tenure is longer in firms applying collective contracts than in companies with individual wage-setting. Thus workers in firms with collective contracts benefit not only from higher wages, but also from higher job stability. Furthermore, we find no significant changes in mean tenure during the nineties as well as stable differences across wage-setting regimes.

JEL-Code: J51

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1 Introduction

Our paper analyses the relationship between individual tenure and the application of collective contracts at the firm level, using German linked-employer-employee data and applying a multi-level model.

Job stability has increasingly attracted professional interest during the last two decades, focusing on changes in the distribution of tenure and in particular on the issue of whether job stability and tenure have decreased. This potential decline is important for at least two reasons. Firstly, it might be indicative of a change of the employment contract with the “old” contract promising to exchange hard work for job security and the “new” contract rewarding skills in accordance with actual market valuations so that incentives for job tenure decline both for employers and employees (Levine et al. 2002). Secondly, German employees assess job security to be the most important issue on the agenda of unions with a reduction of unemployment and a hike of wages ranked second and third on a scale of 13 items (IG Metall 2001).

Job stability can be measured by quits, dismissals, separations and tenure. Mumford and Smith (2004) emphasize that tenure has the advantage of capturing the behavior of workers and firms in the longer run. Similar to their approach – but using a more elaborated empirical method – we will assume that tenure is correlated with individual characteristics and that the strength and the direction of this correlation vary with the firm where an individual is employed: Some firms might find it more advantageous to establish and retain long-term relationships with their workforce, for instance companies with a highly qualified workforce.

Unions bargain for higher wages and improved working conditions of their members and are sometimes characterized as a voice institution for workers. Workers are less likely to quit under these conditions and tenure is longer than for non-unionized workers as Freeman and Medoff (1984) found for the USA. However, in continental Europe’s systems of corporatist wage-setting the application of collective wage contracts within firms is arguably more important for wages, working conditions and tenure than

individual union membership. Firms covered by collective contracts do usually not differentiate across workers with and without union membership (OECD 2004).

Accordingly, our study concentrates on the impact of collective contracts on tenure as an important firm-level determinant of individual tenure. This impact has been neglected in the literature, and in accordance with the effect of union membership on tenure in the U.S. we expect job tenure to be longer in firms applying collective contracts in Germany.

The paper is organized as follows. Section II discusses the theoretical and empirical background, and Section III presents the econometric procedure. In Section IV the variables and data are described. The empirical results are discussed in Section V, while Section VI summarizes.

2 Theoretical and Empirical Background

The literature on tenure draws on widely accepted theories like human capital theory, the theory of incentives, matching theory. A precondition of investments in firm specific capital for workers (Becker 1975) and of workers' acceptance of seniority wages (Lazear 1981) is a sufficiently long expected tenure at the present employer. In addition, efficiency wages and promotion tournaments are more efficient incentive devices when employment relationships encompass a long time horizon (Milgrom and Roberts 1992). Matching theory (Mortensen 2003) argues that information asymmetries concerning employer and employee characteristics lose importance during a longer lasting employment relationship. Recent theoretical attempts combine flows of workers and jobs into an aggregate matching model. The flow concepts of workers and jobs model tenure as the result of the decisions made by different parties - quits initiated by the worker and the layoffs initiated by the firm (Burgess and Rees 1996). More generally, search theory can explain quits, whereas layoffs are derived from the dynamic labor demand theory, modelling the process of job creation and destruction (Caballero and Hammour 1994). One important insight of these very different approaches to explain tenure is that wages and tenure are positively correlated. Abraham and Farber (1987) and Al-

tonji and Shakotko (1987) present some early empirical evidence of the proposed positive relationship.

Various potential causes for a declining duration of job tenure are addressed in the recent literature. First and foremost, the spread of new information technologies driven by their drastically falling prices tends to decimate routine tasks and to complement non-routine tasks (Autor et al. 2003). Since routine tasks often embody firm-specific human capital, the relative demand for workers with long tenure recedes. Second, during the last decade continental European labor markets have become more flexible by facilitating the use of fixed employment contracts and relaxing somewhat the restrictions imposed on dismissals. Third, trade union density and bargaining coverage rates declined in the OECD area since 1970 (OECD 2004: 145). Fourth, the composition of the workforce has changed in favor of an increasing share of female employees with generally less tenure than their male counterparts.

Recent empirical evidence indicates that the duration of job tenure has not declined substantially in the EU, the US and Japan (Auer and Cazes 2000, Neumark et al. 2000, Givord and Maurin 2004, Burgess and Rees 1998, Mumford and Smith 2004, Bergemann and Mertens 2004). For the US tenure decreased in the 1980s for younger, less qualified workers, while it declined in the first half of the 1990s for older experienced male employees. These declines were matched by an increase in tenure for older females and females with a longer education. Using the German Socioeconomic Panel Bergemann and Mertens (2004) show that women's median elapsed tenure fluctuates around 6 years in the period 1984-1999. Men's median elapsed tenure, however, declines from a maximum of 9.4 years in 1984 to 8.7 years in 1985 and barely varies till the end of the 1980s. It drops to 7.8 years in 1990 and to 7.5 years in 1999. Even excluding the outstanding value for 1984 the data indicate a decline in median elapsed tenure for men, particularly if the 1990s are compared to the 1980s. In the 1990s, however, tenure remains relatively stable for the two genders.

Since we concentrate on the impact of collective contracts on tenure, the union-exit voice discussion (Freeman 1980) provides a useful starting

point for the analysis. It emphasizes the monetary and non-monetary gratification of the current job and the personal characteristics which influence the costs of job mobility. Thus, the expression of union voice in conjunction with a wage premium due to collective contracts should reduce labor turnover and increase the incentive for employers to invest in firm-specific training as a response to the longer expected payback period. In addition, collective contracts as an application of collective voice might improve the enforcement of contracts and reduce the risk of hold up, if employers try to appropriate sunken investments of workers in training. In the German system of industrial relations, however, collective voice is frequently attributed to works councils (Hübler and Jirjahn 2003). Works councils as collective voice institutions might act differently in covered and uncovered firms. A noteworthy finding of Hübler and Jirjahn (2003) is that presence of works councils has a stronger positive effect on wages in uncovered than in covered firms which should mitigate the incentives for longer tenure we expect to find in the collective bargaining regime.

A further important point is that collectively bargained wages can be interpreted as minimum wages, and that firms applying collective contracts will adjust employment rather than wages. Firms can be supposed to utilize times with unexpectedly bad economic conditions to renege implicit labor market contracts, which have been established to cope with incentive problems in employment relationships (Valetta 1999, Levine et al. 2002). Thus, in particular during economic recessions less recruitment - instead of recruitment at lower wages - and more lay-offs should characterize these firms. However, during economic booms we would expect less voluntary quits in firms covered by collective contracts. The first effect implies that the difference in mean tenure across firms applying, respectively not applying collective contracts should increase during recessions, while the second effect would suggest that the difference should increase during boom periods.

The wage as the dominating benefit of the current job is clearly endogenous in the determination of tenure. In a seminal article Freeman (1980) has attempted to account for the simultaneity of the wage in the tenure

regression. It is obvious that the application of collective contracts tends to influence both wages and tenure. However, recent studies trying to adjust for this simultaneity obtain very diverse results (see Abowd and Kang 2002 for an overview). We thus follow the suggestion of Mumford and Smith (2004) to simplify the analysis and estimate a reduced form tenure equation. Note that a companion paper (Stephan and Gerlach 2004) shows that collective contracts raised wages and compressed returns to human capital in the 90s. Also some further investigations on the labor market impacts of unions and coverage by collective contracts for Germany emphasize the wage aspect (Jirjahn and Klodt 1998, Hübler and Jirjahn 2003, Hübler and Meyer 2001).

Not much effort, however, has been spent to analyse empirically the relationship between collective contracts and job tenure. The present paper seeks in part to redress this imbalance. It does so by exploring the correlation of tenure with individual characteristics of workers and by investigating how this correlation might depend on the firm and its employment policy: The presence or absence of collective contracts is considered to be an important element of the firm's employment policy.

The subsequent analysis is based on a linked employer-employee data set and applies a multi-level model of employment duration. For a federal German state and for the last decade we will primarily test whether tenure is longer in firms applying collective contracts than in uncovered companies and secondarily whether the effect of collective contracts on tenure varies across the business cycle.

3 Econometric Model

The following approach can be interpreted as an extension of the analysis by Mumford and Smith (2004) for Great Britain and Gerlach and Stephan (2004) for Germany, who regress at the first level tenure on characteristics of employees using a fixed effects model, and regress at the second level estimated fixed effects on firm characteristics. We apply a multivariate model consisting of two levels (Raudenbush and Bryk 2002). As has already been mentioned, the approach explores the correlation of

tenure with individual characteristics of workers and investigates how this correlation depends on firm characteristics that are essential for a firm's employment policy.

At the first level elapsed tenure t_{ij} of individual $i = 1 \dots N$ in firm $j = 1 \dots M$ is determined by a $K \times 1$ -vector of explaining variables x_{ij} , which includes a constant and $K-1$ observed worker characteristics.

$$(1) \quad t_{ij} = x_{ij}'\beta_j + r_{ij}.$$

The individual level residual is given by $r_{ij} \sim N(0, \sigma^2)$. The critical assumption is that the $K \times 1$ -vector of parameters β_j varies across firms. We assume at the second level of the model that β_j is determined by a $L \times 1$ -vector w_j , which includes a constant and $L-1$ observed firm characteristics. With $W_j = I_K \otimes w_j'$ as a $K \times K \cdot L$ -matrix it follows

$$(2) \quad \beta_j = W_j \gamma + u_j.$$

The $K \cdot L \times 1$ -parameter vector γ incorporates systematic influences on elapsed tenure in the economy. The $K \times 1$ -vector of firm level residuals $u_j \sim N(0, T)$ contains for each firm the deviation of firm-specific parameters from their expected value, given w_j resp. W_j . Concerning the covariances the following assumptions are made: $\text{Cov}(r_{ij}, u_{kj}) = 0$, $\text{Cov}(x_{kij}, r_{ij}) = 0$, $\text{Cov}(w_{\ell j}, u_{kj}) = 0$, $\text{Cov}(w_{\ell j}, r_{ij}) = 0$ and $\text{Cov}(x_{kij}, u_{k'j}) = 0$ for all k, k' and ℓ and with $k = 1 \dots K$ and $\ell = 1 \dots L$, where x_{kij} , $w_{\ell j}$ and u_{kj} are single elements of x_{ij} , w_j and u_j (Raudenbush and Bryk, 2002, p.255).

For the estimation of γ the true parameters β_j in (2) are approximated by firm-specific ordinary-least-square estimates $\hat{\beta}_j$,

$$(3) \quad \hat{\beta}_j = W_j \gamma + u_j + e_j$$

which involves an additional error term $e_j \sim N(0, V_j)$. Equation (3) is then estimated by Generalized Least Squares,

$$(4) \quad \hat{\gamma} = (\sum W_j' \Delta_j^{-1} W_j)^{-1} \sum W_j' \Delta_j^{-1} \hat{\beta}_j$$

$$\text{with } \Delta_j = \text{Var}(\hat{\beta}_j) = \text{Var}(u_j + e_j) = T + V_j.$$

However, this requires estimates of the covariance matrix T and the matrix V_j . Maximum likelihood estimates are obtained by an iterative procedure, adjusting the estimates of the fixed parameters γ during each step.

To take into account presumed heteroscedasticity, the variances of r_{ij} can explicitly be modeled as

$$(5) \quad \sigma_{ij}^2 = \exp\{c_{ij}'\alpha\},$$

with C_{ij} of the vector of variables that are a source of heteroscedasticity. The functional form ensure that σ_{ij}^2 exhibits only positive values (Raudenbush and Bryk 2002, pp. 131 ff.).

This model is used to estimate models of tenure differentials across firms, conditional on characteristics of individual workers. It presupposes the availability of linked employee and firm information.

4 Data and Variables

The empirical analysis is based on a linked employer-employee data set, the Lower Saxonian data from the Salary and Wage Structure Survey ("Gehalts- und Lohnstrukturerhebung") of the Statistical Offices of the Federal German States for the years 1990, 1995 and 2001. Lower Saxony is one of the larger federal states in northwest Germany and covers around 11 percent of all West German employees. Figure 1 gives an impression of the economic situation in Lower Saxony during the time period under consideration. While Germany's unification induced a boom and correspondingly comparatively low and falling unemployment rates in 1990, the economic situation worsened after 1992, with a maximum in unemployment in 1997. In the following years unemployment was falling moderately until 2001.

The data are drawn as a two-stage random sample from all establishments in the entire manufacturing sector and in selected service sectors in Lower Saxony. Establishments as well as employees included in the data set differ in successive surveys. Our analysis is restricted to full-

time employees with a working time of at least 30 weekly hours, and employment in manufacturing, electricity, gas, water supply, construction, wholesale and retail trade, or financial intermediation. Furthermore, only workers from firms with 100 to 10.000 employees, at least 20 observations and non-zero within-firm variance for the first level explaining variables are retained. The reason for these size restrictions is that starting values for our estimates are obtained from firm-specific OLS estimates, which require a sufficient number of observations per firm.

Our dependent variable is elapsed, i.e. incomplete tenure. This variable can be utilized to describe quite neatly the structure of firms' workforces (Erlinghagen and Mühge 2002). It is however, less appropriate for analyzing the labor market situation as such than completed tenure. Note, however, that renewal theory (Burgess and Rees 1996) shows that under certain assumptions the best estimate of completed tenure can be gained by doubling the elapsed tenure period. In this paper, however, our dependent variable is elapsed tenure.

The following variables are included in x_{ij} at the individual level: A constant, a dummy for gender, years required to achieve the highest educational attainment (abbreviated as schooling) and age. The specification might seem quite parsimonious and we admit that a host of additional factors will have an impact on tenure. As a defense of our specification it should be taken into account that the individual level coefficients are dependent variables in the second stage of the estimation as equation (2) indicates. Furthermore, each additional first level variable reduces the number of observations available for the multivariate analysis, since we can utilize only the observations of workers from firms with a non-zero within-firm variance of first level variables and their interactions.

At the firm level in w_j the following variables are considered: A constant, dummies for the survey year, dummies for the application of a sectoral or firm level collective contract, dummies for the interactions between the application of collective contracts and the survey year, firm size, mean of years of schooling in a company, the share of female employees and the sectoral affiliation of the firms. Note that our data contain information on

the application of collective contracts on the firm level, but not on the presence of a works council. However, firms with more than 100 employees apart from rare exceptions do not have works councils (Addison, Schnabel and Wagner 1998); we thus basically estimate the impact of firms with and without collective coverage on tenure while holding constant the presence of works councils. Regrettably we have no information on firms' age - the duration of elapsed tenure cannot exceed the age of the firm an individual is working for.

Finally, the first level variance is modeled as a function of age according to equation (6), to account for heteroscedasticity, since the dispersion of tenure increases with individual age.

With the exception of the dummy variables for the wage-setting regime and survey year all variables are centered around their grand mean. In consequence, the first level constant β_0 from equation (1) informs us about the amount of elapsed tenure that a standard worker – mean years of age and schooling and female gender with a probability of 0.26 (Table 1) – can expect to accumulate, dependent on the firm he is working for. The second level constant γ_0 from equation (2) describes the relationship across individual characteristics and elapsed tenure within otherwise standard firms that do not apply a collective contract in the survey year 1990.

In interpreting the results the following restriction should be taken into account: The applied method does not control for self-selection of workers into firms and of firms into wage-setting regimes. Furthermore, the data are not a panel and do not allow to control for unobserved worker heterogeneity. Thus, the results presented have to be interpreted as correlations rather than as causal relationships.

5 Empirical Results

Descriptive results are summarized in Table 1. Mean tenure in the pooled sample is 11.65 years, with a minimum in 1990 (11.04 years) and a maximum in 1995 (12.14 years). With respect to wage-setting regimes a

rank order of mean tenure is clearly visible: 12.72 years for firms applying firm level collective contracts, followed by 11.91 years in the group of firms applying sectoral level contracts and 8.35 years in firms negotiating individual wages. Figure 2 displays the distribution functions of elapsed tenure by wage-setting regime and gender – women working in firms negotiating wages individually have the shortest tenure, whereas men working under firm level collective contracts exhibit the longest mean tenure.

Returning to Table 1, average tenure has been more than three years higher for men than for women in 1990, but the difference declines to less than two years in 2001. As expected, tenure decreases with years of schooling and increases with age. Remarkably, the share of workers of age up to 25 in the sample dropped from 16 percent in 1990 to 6 percent in 2001, while the share of middle-aged workers has increased and the share of older workers has remained constant. Furthermore, mean tenure increases slightly with firm size and there are noticeable differences across sectors, with mean tenure being above average in particular in electricity, gas, water supply and in financial intermediation.

Table 2 presents the results of the multi-level model. Probability values refer to heteroscedastic-consistent, Huber-corrected standard errors (Raudenbush and Bryk 2002, pp. 276 ff.). Remember that the first level constant β_0 is a function of firm characteristics and describes elapsed tenure for a standard worker, dependent on the characteristics of the firm this worker is employed at. The second level constant γ_0 describes the impact of individual characteristics on elapsed tenure in an otherwise standard firm that does not apply any collective contract in 1990.

Let us start discussing results for the first level constant. *Ceteris paribus* elapsed tenure is 1.4 years longer for a standard worker under sectoral level collective contracts than in firms applying individual level contracts (row 4, column 1) and 1.6 years higher in companies with firm level collective contracts (row 7, column 1). These differences are smaller than those found in the descriptive analysis, but – in line with our basic hypothesis – the impact of collective contracts on tenure is significant and

positive. Thus although the distinctions across wage-setting regimes found in the descriptive statistics are partly a result of the sample composition, an impact of the wage-setting regime is detected after controlling for observed individual and firm characteristics. Self-selection of workers and firms into collective contracts as well as unobserved heterogeneity of workers and firms might play a role in explaining the longer mean tenure under collective contracts.

A noteworthy result is that all year dummies are insignificant (rows 2, 3, 5, 6, 8, 9, column 1) indicating that we do not find significant changes in elapsed tenure for the standard worker over the time period investigated. It follows that differences in mean tenure across years found in the descriptive statistics (Table 1) can be due to changes in the composition of the workforce covered by the sample. A companion paper (Stephan and Gerlach 2004) shows that collective contracts have raised wages and compressed returns to human capital during the nineties. The results obtained in this paper suggest that the stronger impact of collective contracts on wages during recessions does not carry over to the length of tenure. One interpretation might be that companies with collective contracts are characterized by less recruitment and more lay-offs during recessions as well as by declining quits during boom periods so that the effect of collective contracts on tenure hardly varies across the business cycle.

Given the focus of this paper we comment only briefly on the results of the other firm level variables. A standard worker's tenure increases slightly, but significantly, with firm size (row 10, column 1) and is comparatively higher in the sectors electricity, gas, water supply and financial intermediation and declines in construction (rows 11, 14, 12, column 1) which accords with our priors. A standard worker's elapsed tenure can be expected to be longer if he or she works in a firm with above average years of schooling of the workforce, which could imply positive external effects of schooling (row 15, column 1). Furthermore, the share of female workers within a firm has a significantly negative sign (row 16, column 1), i.e. reducing a standard worker's tenure.

Let us now turn to the individual level variables. With the exception of two sectors we do not find an impact of individual gender on the duration of elapsed tenure having controlled for individual and firm characteristics (column 2). However, as has been noticed above we find a significant effect of the share of female workers within firms. We interpret this finding in the sense that women are segregated in companies with on average low tenure. A similar finding has been obtained for Great Britain by Mumford and Smith (2004). Age is highly significant for the duration of elapsed tenure. Furthermore, age "pays more" in terms of its impact on tenure in firms applying collective contracts, in larger firms and in sectors (electricity, gas, water supply and financial intermediation) with presumably strong internal labor markets (column 3). Evidently these companies and sectors continue to protect their workers against economic forces which tend to reduce tenure. With a worker's years of schooling his expected elapsed tenure falls (column 4). This might be explained by the fact that better qualified workers spend more years on education and start working at a higher age. Furthermore, they might on average be more mobile than workers with less education. The result does, however, not support the - theoretically ambivalent - idea that qualified workers have in general more firm-specific human capital and are more strongly affected by incentive problems inducing the pay of seniority wages than workers with less education (see Lazear 2004, on a discussion of the relation between general and specific human capital). Schooling is the only individual level variable where we find an impact of the year dummies – in 2001 the effect of schooling on tenure was less negative in firms negotiating individual level contracts.

Finally, it should be noted that the standard deviation of the firm level residuals u_j from equation (2) is significantly different from zero for all first level variables (row 17). There are idiosyncratic firm-specific differences in the relationships between individual characteristics and tenure beyond the systematic differences explained by our firm-level covariates. We interpret this in the sense that it is important to account for firm heterogeneity when investigating determinants of individual tenure.

6 Summary

The main result of our analysis is that elapsed tenure is significantly longer in firms applying collective contracts than in companies negotiating wages individually. On the one hand unions might – in conjunction with works councils – act as a voice mechanism with the results of a longer average tenure of the workforce and an improved productivity (Freeman and Medoff 1984). On the other hand the German system of industrial relations combined with specific restrictions of the labor law might tend to segregate the workforce into wage-setting regimes. Workers in firms applying sectoral and firm level collective contracts gain from higher wages and have an on average longer tenure.

In line with the literature our analysis does not indicate significant changes in mean tenure during the nineties. Moreover, while the impact of collective contracts on wages has increased during the survey years, which are characterized by different phases of the business cycle, the correlation between collective contracts and tenure remains constant.

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Figures and Tables

Figure 1: Lower Saxonian unemployment rate (in percent of dependent labor force) for the time period 1985 to 2002

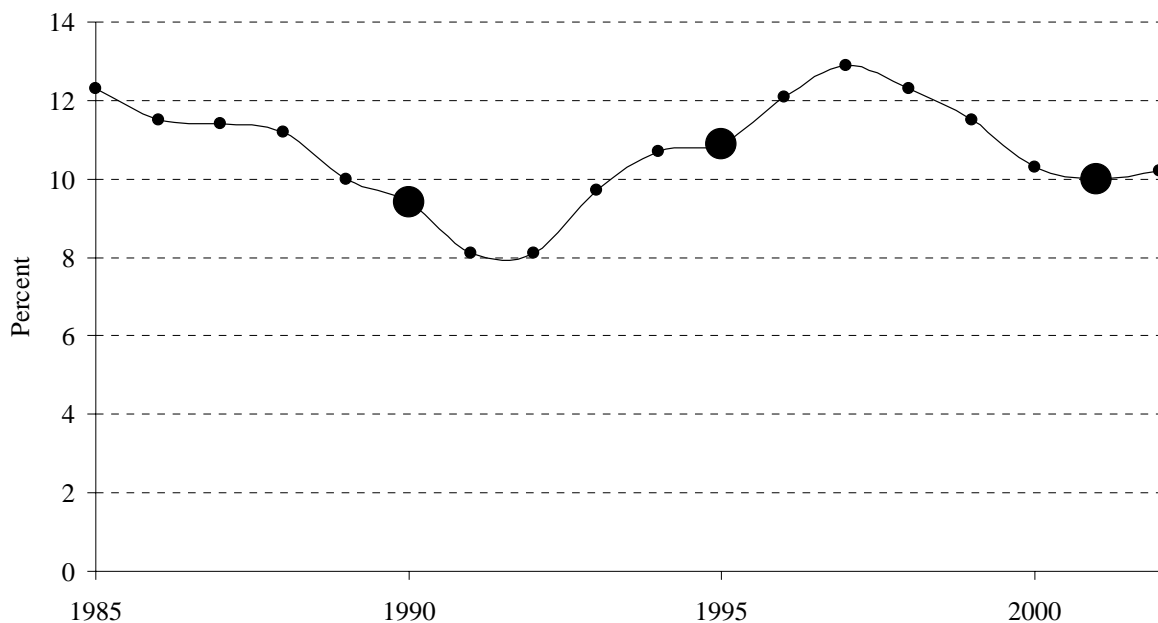


Figure 2: Distribution of elapsed tenure by gender and wage-setting regime (1990, 1995 and 2001 pooled)

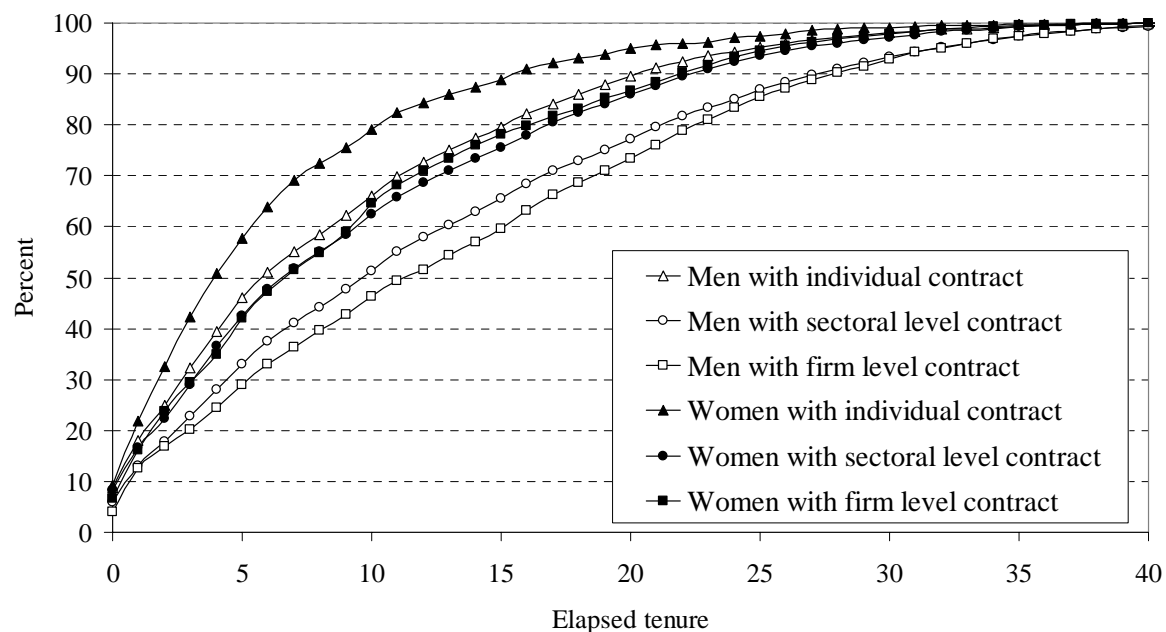


Table 1: Mean tenure and sample composition

	Pooled		1990		1995		2001	
	Mean	Share	Mean	Share	Mean	Share	Mean	Share
All	11.65	1.00	11.04	1.00	12.14	1.00	11.89	1.00
Individual characteristics								
Men	12.39	0.74	11.98	0.73	12.87	0.74	12.28	0.77
Women	9.52	0.26	8.45	0.27	10.08	0.26	10.59	0.23
Secondary school	11.60	0.20	10.69	0.22	12.18	0.19	12.53	0.17
Secondary school and apprenticeship	12.16	0.71	11.48	0.72	12.72	0.70	12.40	0.71
High-school and apprenticeship	7.00	0.03	6.07	0.02	7.09	0.04	7.72	0.04
Advanced technical college	9.97	0.03	9.83	0.02	10.25	0.03	9.67	0.04
University degree	6.44	0.02	5.10	0.01	6.92	0.03	6.77	0.03
Age <= 25	2.87	0.10	2.69	0.16	3.37	0.07	2.73	0.06
Age 26-45	8.86	0.58	8.69	0.53	8.94	0.60	8.99	0.62
Age >= 46	19.60	0.32	19.49	0.31	19.95	0.33	19.18	0.32
Firm characteristics								
Individual wage contracts	8.35	0.10	7.56	0.10	8.74	0.10	9.06	0.10
Sectoral collective contract	11.91	0.78	11.26	0.78	12.32	0.78	12.34	0.77
Firm level collective contract	12.72	0.12	12.43	0.12	13.73	0.12	11.49	0.12
Firm size 100-499	11.04	0.57	10.09	0.51	11.43	0.66	11.79	0.54
Firm size 500-999	12.15	0.22	11.26	0.26	12.96	0.20	12.99	0.17
Firm size >= 1000	12.81	0.21	12.88	0.23	14.22	0.15	11.45	0.29
Manufacturing industry	11.53	0.73	11.03	0.74	12.11	0.71	11.46	0.72
Electricity, gas, water supply	14.62	0.06	14.24	0.05	15.14	0.07	14.18	0.07
Construction	10.00	0.03	9.27	0.02	9.64	0.05	11.62	0.03
Wholesale and retail trade	9.84	0.10	9.37	0.12	9.31	0.09	11.47	0.11
Financial intermediation	13.60	0.08	12.04	0.08	14.45	0.08	14.98	0.07
Observations	96335		37847		37227		21261	
Number of firms	1739		631		715		393	

Table 2: Pooled estimates for the systematic parameters γ

Second level (firm)	First level (individual)							
	Constant		Gender		Age		Schooling	
	γ	Prob.	γ	Prob.	γ	Prob.	γ	Prob.
Constant	10.17**	0.00	0.03	0.84	0.43**	0.00	-0.32**	0.00
1995	-0.15	0.75	-0.15	0.51	-0.03	0.25	-0.06	0.45
2001	-0.27	0.62	-0.06	0.87	0.01	0.85	0.31**	0.00
Sectoral contract	1.38**	0.00	0.24	0.18	0.11**	0.00	0.00	0.97
1995	0.75	0.14	-0.03	0.90	0.05	0.08	-0.01	0.94
2001	0.78	0.19	0.07	0.84	0.02	0.53	-0.46**	0.00
Firm contract	1.60**	0.00	0.10	0.69	0.10**	0.00	0.10	0.30
1995	0.79	0.25	0.01	0.98	0.06	0.14	-0.05	0.70
2001	0.45	0.65	-0.38	0.44	0.01	0.90	-0.49**	0.01
Firm size/ 1000	0.69**	0.00	0.04	0.48	0.04**	0.00	-0.02	0.15
Electricity. gas. water supply	1.77**	0.00	-0.73**	0.00	0.04*	0.01	-0.09	0.16
Construction	-2.41**	0.00	0.36	0.23	-0.13**	0.00	0.17*	0.05
Wholesale and retail trade	-0.11	0.64	0.61**	0.00	-0.02	0.15	0.33**	0.00
Financial intermediation	3.93**	0.00	0.12	0.45	0.15**	0.00	0.07	0.22
Mean years of schooling	0.24*	0.05	0.07	0.28	0.02*	0.02	-0.34**	0.00
Share of female employees	-3.32**	0.00	-1.26**	0.00	-0.23**	0.00	0.18*	0.03
Std.-dev. u_j	2.90**	0.00	1.09**	0.00	0.16**	0.00	0.38**	0.00
Log Likelihood	-301938		Log Likelihood starting values				-326468	

First level constant: Base tenure.

Second level constant: Impact on tenure in firms not applying any collective contract in 1990.

Probability values based on robust heteroscedasticity-resistant t-values.

*) $\alpha = 0.05$. **) $\alpha = 0.01$.

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