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The Role of Firm Pensions for Job Change in Germany*

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Abstract

This paper studies the role of occupational pensions for voluntary job mobility in Germany. The analysis is based on individual data from the German Socio-Economic Panel (SOEP) for the period 1995 – 1998. We estimate the effects of pension portability loss on voluntary job changes using a sample selection model with bootstrapping. The main findings are that occupational pension coverage reduces worker mobility by imposing a capital loss on those leaving their job before retirement age. A higher compensation in pension-covered jobs is important too.

JEL Classifications: C35, J31, J32, J63, J68

1. Introduction

The role of firm pensions for both domestic and cross-border mobility is high on the agenda of the European Union. Workers covered by occupational pensions typically suffer losses in pension rights when changing employers. These are considered to pose an obstacle to mobility. Concerns about hampered mobility have motivated reforms in occupational pension scheme legislation over recent years in many EU countries, including Germany.

However, the empirical evidence of a mobility-deterring effect of portability loss is neither ample nor entirely conclusive. Several decades of research on labour mobility have established that turnover in jobs covered by occupational pensions is indeed lower than in other jobs. Three explanations dominate in the empirical literature. Occupational pensions may reduce mobility by imposing a capital loss on those who change jobs. Likewise, pension-covered workers often receive a compensation premium which discourages mobility. Finally, workers who prefer stable employment may sort into jobs covered by

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pensions and thus be unlikely to change employer. Research into these hypotheses has so far been supplied for the U.S. and U.K. However, there are very few empirical studies of other European countries. This paper is a contribution to filling this gap.

The portability loss suffered by mobile workers depends on the portability options defined by pension regulation. Workers leaving an occupational pension plan before retirement age are usually entitled to a pension only after having completed a vesting period. If they leave before the vesting period is completed, they lose all accrued benefits. Workers whose benefits have become vested are entitled to a deferred retirement pension. In defined benefit plans, if these benefits are not price- or wage-indexed, their value erodes over the time until workers are eligible for retirement benefits.

This paper is one of the first to examine the relationship between occupational pensions and voluntary job mobility in Germany. Using the German Socio-Economic Panel (SOEP), waves 1995-1998, we estimate the effects of pension portability loss on voluntary job changes using a sample selection model. We find that pension-covered workers receive a wage premium and are less mobile than other workers. Moreover, portability loss discourages job changes for workers with both vested and non-vested benefits.

2. Occupational Pensions and Mobility

2.1 Literature

Most studies on job mobility take as their starting point the assumption that differences between wages in current and alternative jobs are the driving force behind job change, and that pension portability losses as well as other costs discourage changes of employer. A first generation of papers estimated quit or job change equations which included dummies capturing pension information as well as variables approximating potential wages and / or pension benefits in current and alternative jobs as regressors. These early studies for the U.S. found strong and significant evidence of pensions deterring worker mobility, although it was not always possible to relate this effect to specific pension plan characteristics.

Some recent studies have tried to capture the effect of occupational pensions on mobility more precisely by explicitly modeling the capital loss incurred by pension-covered mobile workers. They come to differing results. Both for the U.S. and the U.K., some studies find a sizable effect of capital loss on mobility while no such effect is apparent in other studies. However, a comparison of these results is difficult because authors use different measures of capital loss. Moreover, some papers use quits as the dependent variable, while others study layoffs or job separations.

In addition to portability losses which may cause workers to refrain from changing jobs, pension-covered workers may receive a compensation premium which discourages mobility. Evidence in favour of this argument is supplied by Gustman and Steinmeier (1993), for example, who show that pension covered workers risk wage losses when they change jobs. Higher compensation in pension-covered jobs may be a result of "savers" selecting into such jobs. According to Ippolito (2002), savers are better workers and therefore receive higher wages.

Low mobility of pension-covered workers may also result from a sorting of workers who prefer stable employment into such jobs. These individuals may have a low rate of subjective time discounting and a preference towards provision for old age. In our study we employ home ownership as a proxy for stability preferences.

Methodologically, some studies have made attempts to explicitly incorporate wages in alternative jobs into the analysis of the mobility decision. McCormick and Hughes (1984) use job satisfaction as a measure to approximate wage and non-wage benefits in alternative employments. In another approach Gustman and Steinmeier (1993) equate the actual wage observed for movers in their new jobs to the (non-observable) alternative wage. Other mobility studies use a sample selection model (Heckman 1979, Maddala 1983).

2.2 Occupational Pensions and Portability in Germany

Within the German three-tiered pension system the public first tier is most important. It is mandatory for all employees except civil servants and most self employed. The benefits are earnings-related and provided for 84% of old age incomes in 1999 (cf. Deutscher Bundestag 2001). The second tier consists of public and private occupational pensions that may be offered by employers to supplement the first tier. The third tier includes all forms of private provision such as personal pension plans.

In 1999, 21% of German pensioners received a public or private firm pension which made up approximately 25% of their total monthly income (319 euros on average) (Deutscher Bundestag 2001). Occupational pensions are delivered by many different systems, and there are few data sources which provide summary statistics about pension plan characteristics, workers covered by occupational pensions, and benefits accrued.

Pension portability in Germany is rather restrictive. Until recently, pension benefits had to be vested for persons aged 35 or older after a period of 10 years or, alternatively, after 12 years of firm tenure and 3 years of contributions to a scheme. Since 2001, contributions to occupational pension schemes are vested after 5 years with a minimum age of 30 years. This vesting period

is still longer than in some other European countries (U.K. 2 years, Netherlands 1 year).

Many EU countries have introduced a price or wage indexation of preserved benefits. In Germany, as in the U.S., there is no legal requirement to index preserved benefits under a defined benefit scheme. Because defined benefit plans prevail in Germany, most workers face real capital losses when leaving pension-covered jobs before retirement age. A transfer of accrued pension rights to new employers' pension schemes has only recently become feasible with the creation of industry-wide pension plans and an increasing number of defined contribution plans.

2.3 Portability Loss

The framework of an implicit contract between the worker and the firm (Ippolito 1985) is useful to model the capital loss imposed on those who leave jobs early. According to this approach, workers evaluate the package of wage and pension benefits when considering a career with a firm. They forego a portion of their wage throughout their working lives in exchange for a pension at retirement. The workers' implicit pension contributions are equal to the present value of expected pension benefits. Assume that the pension benefit is based on the formula $PB_i = bS_iY_i(t)$, where b is a constant reflecting the annual accrual rate of the pension plan, S_i are the years of service, and $Y_i(t)$ are the individual earnings at time t. The worker expects his level of compensation to increase with time at the rate g. A worker leaving the firm after his benefits became vested but prior to his pension age R receives only the present value of his pension benefits based on his current earnings. The capital loss at time t is the difference between the two:

$$CL_i^v = bS_iY_i(t)e^{-r(R-t)}\left(e^{g(R-t)} - 1\right), \tag{1}$$

where r is the interest rate. A worker who leaves the firm at time t^l before the time his accrued benefits are vested $(t^l < t^v < R)$ loses the present value of the entire pension capital accumulated to date,

$$CL_i^{nv}|t^l < t^v = bS_iY_i(t^l)e^{(g-r)(R-t^l)}. \tag{2}$$

For the empirical analysis, we compute the capital loss functions for vested and non-vested workers, (1) and (2), using the available wage, tenure and age data, and assuming $g = 3.9\%$ and $r = 2.3\%$, which are averages over the period 1985–94. We take the unknown constant b to be $1/60$, which is a value often assumed in other studies.

3. Model and Estimation Procedure

The individual mobility decision is modelled as a function of earnings differentials and mobility costs such as pension portability losses. A worker will change jobs if the lifetime earnings gained from moving to a new job exceed the mobility costs. However, we can only observe the wages of movers (w_m), and of stayers (w_s), respectively. The counterfactual, that is, the alternative expected wage, is not observable. Likewise, the mobility costs are not directly observable. Hence we cannot observe the actual gain from mobility, I_i^*, but only a binary random variable I_i which we can define as 1 if the gains from mobility $I_i^* \geq 0$ and 0 otherwise.

In the empirical specification of this model we assume for simplicity that the log of current wages is the best predictor of the log of lifetime earnings. Further assuming that mobility costs are determined by a vector of exogenous personal and job specific variables, Z_i, and interactions of these variables, we can describe a structural probit model such that:

$$I_i^* = \gamma(\ln w_{mi} - \ln w_{si}) + \delta' Z_i + u_i \tag{3}$$

and

$$u_i \sim N(0, \sigma_i^2)$$

To complete the model, it is necessary to estimate the wage differential. This can be predicted by estimating separate wage equations for movers and stayers, $\ln w_{mi} = \beta_m' X_i + \varepsilon_{mi}$ and $\ln w_{si} = \beta_s' X_i + \varepsilon_{si}$, where X_i is a vector of human capital and personal variables.

Separate estimates of the wage equations yield inconsistent parameter estimates if stayers differ in observed and unobserved characteristics from movers. We correct this selectivity bias by using a Heckman (1979) two-stage procedure. This procedure begins by estimating a reduced form probit equation which contains all variables from X_i and Z_i and examines the effect of individual characteristics on the selection into movers and stayers. This can be used to calculate the values for the selectivity terms which are the inverse Mills ratios, namely $\lambda_{mi} = \frac{-\phi(\hat{\vartheta}' W_i)}{\Phi(\hat{\vartheta}' W_i)}$ if $I_i = 1$ and $\lambda_{si} = \frac{\phi(\hat{\vartheta}' W_i)}{1-\Phi(\hat{\vartheta}' W_i)}$ if $I_i = 0$, $\phi(.)$ being the standard normal density function, $\Phi(.)$ the corresponding cumulative distribution function, and W_i a vector of all variables contained in X_i and Z_i. The selectivity correction terms are included in the wage equations, which are in turn used to predict earnings for stayers and movers. Finally, the difference in predicted income allows estimating the structural probit (3) using maximum likelihood. We use bootstrapping to correct the standard errors for the two-stage procedure. Identification is addressed by including variables in the vector Z_i which are not included in X_i as described in the following section.

4. Data Description

The analysis is based on the German Socio-Economic Panel (SOEP), an annual longitudinal survey of private households in Germany. Our sample includes the West and East German sub-samples. We concentrate on the mobility decisions of full-time employees ($\geq$ 35 hours per week), excluding civil servants, self employed and apprentices. Mobility is defined as the first occasion of voluntarily quitting a job and taking up a new full-time job between annual interviews with or without intervening unemployment. In the SOEP information about individual pension coverage was last collected in 1995. Hence this study looks at the mobility decisions of 1995 job holders with and without occupational pensions. We construct a pooled sample which covers the mobility between 1995 and 1998. Workers are dropped from the sample after their first job change or when they exit full-time employment.[1] In the whole time span, we observe 180 voluntary job changes.

In the longitudinal dataset all variables except pension status, sex, occupational degree and industry are treated as time varying. Information on mobility costs is based on personal and job characteristics in the year prior to mobility. The earnings equations make use of post-mobility information with the exception that job tenure refers to tenure at the last job for mobile workers. Post-mobility wages are deflated by the German CPI to values of 1995, and 16 implausible cases as well as cases with missings on any of the variables are deleted. Table 1 displays means of key variables in column four.

The dependent variable of the wage equations is the log of monthly gross wages in the last month before the interview. Regressors are years of tenure and dummies for sex and for highest formal occupational degree. Labour market experience and its square refers to real rather than potential experience. A dummy for pension-covered workers enters the wage equations to test for a wage premium in their jobs. Furthermore we include a dummy for residence in East Germany to account for the considerable East-West wage differentials. Finally, we use separate dummy variables for each period of observation to control for time-varying factors. In contrast to other studies, we omit further job-specific variables because we cannot assume identical job characteristics when predicting earnings in the counterfactual situation.

Mobility costs are modeled as a function of the capital loss variables described in Sub-section 2.3. As the data include no information on the vesting

[1] Individuals exiting full-time employment may have different moving probabilities than those not exiting. We have estimated a model including a correction for selectivity in exits, employing regional unemployment rates, years to retirement, gender, and its interaction with the number of dependent children in the household as instruments. We found no significant selection effects, and the results of the model remained the same. Hence we interpret exits from full-time employment as censored responses. Outcomes are treated as a discrete time duration.

status of pension rights, we code the pensions of persons aged 35 years and older with a minimum firm tenure of 10 years as vested, otherwise as unvested. The choice of further variables modeling mobility costs is guided by the standard results of the mobility literature. Among job-specific variables we include fixed-term contract, occupational status, firm size and industry in the last job to capture job-specific mobility costs. Among the personal variables we include age, home ownership, marital status, and number of children under the age of 16 in the household. We use home ownership to control for personal preferences towards mobility vs. stability. We also include dummies for the period of observation and a gender dummy to represent the differing mobility behaviour of men and women. Separate estimates for men and women are not feasible because of too few cases of mobility.

5. Empirical Results

Descriptive evidence shows that mobility among 1995 job holders is low, the average mobility rate over the three-year period between 1995 and 1998 being 2.2%. Individuals without pension-covered jobs in 1995 (3/4 of the sample) are two times more likely to change jobs in this time period than are individuals in jobs covered by pensions (2.6% vs. 1.3%).

The first column of Table 1 presents the results of the reduced-form probit estimate. The estimate represents the effect of individual and job characteristics on the selection into stayers and movers, both via the wage differential of moving versus staying and via the mobility costs. In the reduced form of the model, the capital loss variables have no significant influence on mobility, although the coefficients have the expected sign.

Columns two and three of Table 1 present the wage equations of movers and stayers corrected for selectivity bias. The coefficients of the variables follow standard expectations. Higher educational degrees are associated with higher earnings; females and individuals with residence in eastern Germany earn significantly less. There is a non-linear relationship between earnings and experience in the labour market. The firm tenure variable is not significant for movers, which is in line with the expectation that new employers do not reward tenure at the last employer. The results for the pension status dummy confirm that workers in pension-covered jobs receive significantly higher wages. Finally, the coefficient of λ_s for stayers is negative and significant, giving evidence of a positive selection into the stayers' group: stayers have unobserved characteristics which grant them higher wages than movers would receive in case of immobility. There is also evidence of positive selection into the movers' group.

Table 1

Reduced Form and Selection-corrected Wage Equations

	(1) reduced form probit		(2) mover's wage equation		(3) stayer's wage equation		(4) mean
College / university	0.441	(2.62)**	0.737	(5.67)**	0.571	(26.10)**	0.10
Vocational degree	0.240	(2.01)*	0.243	(2.12)*	0.155	(11.96)**	0.74
Female	-0.174	(2.00)*	-0.140	(2.97)**	-0.154	(15.19)**	0.34
East	-0.186	(2.19)*	-0.283	(4.53)**	-0.273	(22.93)**	0.30
Experience	-0.022	(1.14)	0.025	(2.40)*	0.014	(6.78)**	19.4
Experience sq. / 100	0.0019	(0.04)	-0.081	(2.96)**	-0.033	(7.65)**	4.90
Tenure	-0.028	(3.48)**	0.0028	(0.42)	0.0038	(5.31)**	11.1
Occ. pension	0.142	(0.83)	0.149	(2.53)**	0.128	(10.98)**	0.25
CL_i^v (eq. 1/1000)	-0.014	(0.82)					1.87
CL_i^{nv} (eq. 2/1000)	-0.030	(1.57)					1.05
Fixed-term contr.	0.240	(1.50)					0.03
White collar	0.238	(2.54)**					0.36
Manager	0.200	(1.56)					0.15
Firm size 20-199	-0.121	(1.38)					0.30
Firm size 200-1999	-0.238	(2.32)*					0.28
Firm size $\geq$ 2000	-0.313	(2.82)**					0.24
Age	-0.0036	(0.34)					40.7
Home ownership	-0.243	(3.04)**					0.38
Married	0.061	(0.70)					0.68
Children < 16	0.058	(1.37)					0.68
λ_m			-0.168	$(1.64)^+$			
λ_s					-0.622	(4.45)**	
Constant	-1.34	(4.43)**	7.52	(28.33)**	8.11	(297.59)**	
Observations	8,335		180		8,155		
log likelihood	-754.33						
R-squared			0.47		0.44		

Notes: $^+$ significant at 10 %; * significant at 5 %; ** significant at 1 %. Reduced form probit (1): dependent variable is binary, equalling 1 if mobile and 0 if not. Absolute value of z-statistics in parentheses. Controls for industry and year of mobility decision. Wage equations (2) and (3): dependent variable is log of monthly gross wages, deflated to 1995 values by Consumer Price Index. Robust standard errors derived using the Sandwich estimator for clustered data. Absolute value of t-statistics in parentheses.

Source: German Socio-Economic Panel (SOEP), 1995 – 1998; author's calculations.

Table 2

Structural Probit Mobility Equation

	structural probit		marginal probabilities
Log of predicted wage differential	2.156	(1.39)	0.060
Fixed-term contract	0.375	(2.15)*	0.0158
White collar	0.281	(2.77)**	0.0087
Manager	0.310	(2.192)*	0.0111
Firm size 20-199	-0.138	(1.47)	-0.0036
Firm size 200-1999	-0.282	(2.53)**	-0.0069
Firm size $\geq$ 2000	-0.347	(2.86)**	-0.0080
Age	-0.020	(2.36)*	-0.00056
Female	-0.225	(1.98)*	-0.0058
Home ownership	-0.267	(3.35)**	-0.0070
Married	0.022	(0.27)	0.00062
Number of children < 16	0.033	(0.78)	0.00092
Occupational pension	0.244	(1.31)	0.0079
CL_i^v (equation 1/1000)	-0.038	(1.96)*	-0.0011
CL_i^{nv} (equation 2/1000)	-0.043	(2.15)*	-0.0012
Constant	0.017	(0.04)	
Observations	8,335		
log likelihood	-766.53		
Observed P			0.022
Predicted P (at sample means of other variables)			0.011

Notes: * significant at 5 %; ** significant at 1 %. Dependent variable is binary, equalling 1 if mobile and 0 if not. Bootstrapping used to derive robust standard errors for two-stage procedure (1000 iterations). T-statistics in parentheses. Controls for industry and time.

Source: German Socio-Economic Panel (SOEP), 1995 – 1998; author's calculations.

The coefficients of the wage equations are applied to each individual's characteristics to calculate a mover's and a stayer's wage. We find that average predicted wage differentials are negative for movers and for stayers, the average wage loss being smaller for movers than for stayers. A closer look at the data reveals that the effect of unobservables on observed wages is quite substantive. When predicting a mover's and a stayer's wage for each individual, we can not take account of selectivity because the counterfactual selectivity terms are unknown. Thus the predicted wage differentials measure only the differences in returns to human capital and pension status[2] and neglect the selection effects.

In Table 2 we report the results of the structural probit mobility equations and the corresponding marginal probabilities. The coefficients of the non-pension variables confirm most of the standard expectations about mobility behaviour. Worker mobility tends to increase with growing wage gains (or diminishing wage losses). However, the coefficient is not significant. A possible explanation is that selection effects – as explained above – are more important for worker mobility than differences in returns to human capital.

According to our estimates, a fixed-term contract strongly increases job change probability, confirming the assumption that workers prefer stable employment. The results also show that mobility is higher among managers and white-collar workers and from smaller firms than among blue-collar workers and from larger firms. The occupational status proxies the ability to perform an efficient job search, with a higher status implying lower transaction costs. Furthermore, mobility from large firms is more costly because they offer more and better career opportunities than small firms do. Career opportunities also differ by industry (results not displayed).

Older workers are less likely to change jobs than younger workers are. This may be because of older workers' shorter pay-off period from mobility. Women are significantly less mobile than men, arguably because they tend to work in occupations with less outside career opportunities and face more social restrictions in their household backgrounds. Home ownership also significantly reduces job changes, by assumption because stability-oriented persons select into property which is costly to transfer. Marital status and the number of children have no significant effect on mobility, possibly because they influence job changes in both directions. We could argue, for example, that having children makes mobility more costly. On the other hand, responsibility for a family usually makes workers seek better career opportunities, thus increasing the probability of changing jobs.

Of most interest in this paper are the results for the capital loss variables. Coefficients on the measures of capital loss are negative and significant both for vested and non-vested workers. The more the capital loss increases for both vested and non-vested workers, the less likely it is that they will change employer. The coefficient on the pension coverage dummy is insignificant and positive. This suggests that the pension status may act, for example, as a proxy for non-pecuniary job attributes not captured in our model.

[2] By including pension status in the wage equations we assume this status to be invariant. This assumption seems plausible for pension holders who are unlikely to move to a non-pensionable job, sacrificing the wage premium. However, individuals without pensions may change jobs to improve their pension status. Hence our wage estimates for movers without pensions are downward biased. This is a second explanation for predicted negative wage differentials.

The capital loss variables capture real capital loss under the assumption that the benefit formula is wage-related and assuming values for expected wage growth, expected inflation rate, and the annual accrual rate (see Section 2.3). Evaluated at the means of the other variables, the marginal probability of job change declines by 0.11 (0.12) percentage points or a relative change in mobility probability of 10% (11%) for a 1,000 deutschmark (511 euro) real loss of pension benefits for vested (non-vested) benefits. Thus we observe an influence of firm pensions on job change, but the influence of other factors (e.g. home ownership, gender, fixed-term contract) is stronger.

In an alternative specification of the model which adds tenure to the variables proxying mobility costs, the coefficients on the capital loss variables are insignificant. This is probably a result of the correlation between tenure and capital loss. It may also indicate that our measures of capital loss are inaccurate. Better data on pension plan characteristics and benefits accrued are required to construct more reliable variables. We omit tenure in our preferred specification because in a human capital approach the mobility-deterring effect of tenure is via the wage differentials.[3]

6. Summary and Conclusions

This paper provides evidence that occupational pension coverage in Germany reduces worker mobility through the mechanisms discussed in earlier papers for the U.S. and U.K.: There is a higher level of compensation in pension-covered jobs which makes mobility from such jobs less attractive. Sorting into pension-covered jobs also plays a role in reducing mobility if we accept that home ownership is an adequate proxy for stability preferences. Finally, we find that pension coverage deters voluntary job transitions by imposing a capital loss on early leavers. Thus our paper contributes to showing that the effects of occupational pensions on mobility do not differ substantively between the Anglo-American countries studied thus far and Germany, whose labour market stands out for its relatively rigid regulation and correspondingly high firm attachment and internal flexibility.

Distinguishing between capital loss of pension benefits which are vested and those which are not yet vested, we find that both sources of capital loss pose an obstacle to job changes. According to our estimations, both loss of benefits which are not vested and loss due to erosion of real capital value over time of vested benefits deter worker mobility to nearly the same extent. A relative change in mobility probability of around 10% for a 1000 deutschmark

[3] In a matching framework tenure is a general indicator for the quality of a match. The pension quit literature attempts to analyze factors such as selection effects in wages, sorting into stable jobs, and firm pensions as components of a good match.

(511 euro) capital loss is considerable, although other personal and job-specific aspects like gender and having a fixed-term contract are more important for the mobility decision.

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