Occupational Pensions, Wages, and
Job Mobility in Germany

Birgitta Rabe [1]

[1] Ruhr-University Bochum, Germany, and Institute for Social and Economic Research, Essex

ISER Working Paper
2006-4

Institute for Social and Economic Research

The Institute for Social and Economic Research (ISER) specialises in the production and analysis of longitudinal data. ISER incorporates the following centres:

- ESRC Research Centre on Micro-social Change. Established in 1989 to identify, explain, model and forecast social change in Britain at the individual and household level, the Centre specialises in research using longitudinal data.

- ESRC UK Longitudinal Studies Centre. A national resource centre for promoting longitudinal research and for the design, management and support of longitudinal surveys. It was established by the ESRC as independent centre in 1999. It has responsibility for the British Household Panel Survey (BHPS).

- European Centre for Analysis in the Social Sciences. ECASS is an interdisciplinary research centre which hosts major research programmes and helps researchers from the EU gain access to longitudinal data and cross-national datasets from all over Europe.

The British Household Panel Survey is one of the main instruments for measuring social change in Britain. The BHPS comprises a nationally representative sample of around 9,000 households and over 16,000 individuals who are reinterviewed each year. The questionnaire includes a constant core of items accompanied by a variable component in order to provide for the collection of initial conditions data and to allow for the subsequent inclusion of emerging research and policy concerns.

Among the main projects in ISER's research programme are: the labour market and the division of domestic responsibilities; changes in families and households; modelling households' labour force behaviour; wealth, well-being and socio-economic structure; resource distribution in the household; and modelling techniques and survey methodology.

BHPS data provide the academic community, policymakers and private sector with a unique national resource and allow for comparative research with similar studies in Europe, the United States and Canada.

BHPS data are available from the UK Data Archive at the University of Essex
http://www.data-archive.ac.uk

Further information about the BHPS and other longitudinal surveys can be obtained by telephoning +44 (0) 1206 873543.

The support of both the Economic and Social Research Council (ESRC) and the University of Essex is gratefully acknowledged. The work reported in this paper is part of the scientific programme of the Institute for Social and Economic Research.

Acknowledgement:

Thanks to Miriam Beblo, Stephen P. Jenkins, Sophia Rabe-Hesketh, and Mark Taylor for helpful comments and suggestions.

Readers wishing to cite this document are asked to use the following form of words:

> Rabe, Birgitta (February 2006) 'Occupational Pensions, Wages, and Job Mobility in Germany, ISER Working Paper 2006-4. Colchester: University of Essex.

For an on-line version of this working paper and others in the series, please visit the Institute's website at: http://www.iser.essex.ac.uk/pubs/workpaps/

Institute for Social and Economic Research
University of Essex
Wivenhoe Park
Colchester
Essex
CO4 3SQ UK
Telephone: +44 (0) 1206 872957
Fax: +44 (0) 1206 873151
E-mail: iser@essex.ac.uk
Website: http://www.iser.essex.ac.uk

ABSTRACT

In this paper I examine the effects of occupational pension coverage and measures of pension portability loss on voluntary job changes using a sample selection model with endogenous switching. The model estimates, derived from German panel data for 1995-1998, indicate that occupational pension coverage reduces worker mobility by imposing a capital loss on those leaving their job before retirement age. Moreover, pension-covered workers receive a higher compensation which discourages mobility. Making pensions portable significantly increases mobility, but from a low initial level.

Keywords: Labour mobility, occupational pensions, wages, endogenous switching

NON-TECHNICAL SUMMARY

The role of firm pensions both for 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 employer. According to the European Council these losses are an obstacle to mobility and they reduce retirement incomes of multiple job holders (Council of the European Union 2003, 889). These concerns have motivated reforms in occupational pension scheme legislation over the last years in many EU countries, including Germany. Further reforms are currently under way. They generally aim at reducing the portability loss associated with leaving a pension scheme before retirement.

Several decades of research on labour mobility have established that turnover in jobs covered by occupational pensions is lower than in other jobs. The reasons for this are less clear. Occupational pensions may reduce mobility by imposing a capital loss on those who change jobs. Likewise, pension-covered workers often receive wage premiums which discourage mobility. These premiums may indicate that pension-covered jobs attract more productive workers. Finally, workers who prefer stable employment may sort into jobs covered by pensions and are thus unlikely to change employer. Research into these hypotheses has so far been supplied for the United States and the United Kingdom. However, there are few empirical studies of other European countries. The German case differs from the Anglo-American situation in that occupational pensions contribute considerably less to the retirement income of pensioners and a smaller proportion of workers are covered. This raises the question of whether mobility is affected by the smaller capital loss in Germany and whether less generous pension schemes have productivity effects similar to those triggered by the more generous schemes in the US and UK.

The paper provides evidence that occupational pension coverage in Germany deters voluntary job transitions by imposing a capital loss on both vested and non-vested early leavers. Furthermore, workers in pension-covered jobs receive a compensation which is about 10-12 % higher than in jobs not covered by pensions. Compensation premiums make mobility from pension jobs less attractive, and workers face less outside opportunities for better jobs. Finally, sorting of stability oriented workers into pension-covered jobs also plays a role in reducing mobility. This paper thus shows that the effects of occupational pensions on mobility do not differ substantively between Germany and the Anglo-American countries, despite the considerable differences in pension generosity. If compensation premiums are taken as evidence of the productivity effects of pensions, it is remarkable that comparatively small employer contributions into pension plans seem to have considerable productivity effects.

Regarding reforms in pension regulation the results show that decreasing vesting periods could be an effective policy option if the political aim was to enhance mobility. I find that reductions of the vesting period from 10 to 5 years should increase mobility in Germany by 8%. An indexation of preserved benefits (for vested early leavers) would have a larger impact, increasing mobility by 22%. However, these increases are from low initial mobility rates. Both shorter vesting periods and an indexation of benefits would also reduce retirement income losses of multiple job holders on defined benefit schemes. On the other hand, these policy options would place a considerable financial burden on firms. Moreover, this paper provides indirect evidence of the productivity effect of pensions which may result, for example, from higher firm investment into pension-covered worker's training. In light of the positive effects of high firm attachment the overall welfare and efficiency implications of the current reforms at EU level are therefore not at all clear.

1 Introduction

This paper examines the effects of occupational pension coverage and pension portability loss on wages and voluntary job mobility. The role of firm pensions both for 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 employer. According to the European Council these losses are an obstacle to mobility and they reduce retirement incomes of multiple job holders (Council of the European Union 2003, 88-9). These concerns have motivated reforms in occupational pension scheme legislation over the last years in many EU countries, including Germany. Further reforms are currently under way. They generally aim at reducing the portability loss associated with leaving a pension scheme before retirement.

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. The reasons for this are less clear. 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 compensation premiums which discourage mobility. These wage premiums may indicate that pension-covered jobs attract more productive workers. Finally, workers who prefer stable employment may sort into jobs covered by pensions and are thus unlikely to change employer. Research into these hypotheses has so far been supplied for the United States and the United Kingdom. However, there are very few empirical studies of other European countries. This paper is a contribution to filling this gap. The German case differs from the Anglo-American situation in that occupational pensions contribute considerably less to the retirement income of pensioners and a smaller proportion of workers are covered. This allows us to further explore the sensitivity of mobility to capital loss. Moreover, assuming that wage premiums are indicative of workers' high productivity, I can examine whether less generous pension schemes have productivity effects similar to those triggered by the more generous schemes in the US and UK.

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. Here a real capital loss occurs in defined benefit plans, where the deferred retirement pension is commonly based on nominal earnings at the point of job change. If these benefits are not price or wage indexed, their value erodes over the time until workers are eligible for retirement benefits. Germany has only recently reduced the period until accrued pension benefits become vested from ten to five years to improve portability. Deferred benefits are not indexed, however, and since the vast majority of occupational pension plans are traditionally defined benefit, capital loss is an important issue in Germany.

This paper is the first to examine the relationship between occupational pensions, wages, and voluntary job mobility in Germany. Using the German Socio-Economic Panel (SOEP), waves 1995-1998, I estimate the effects of occupational pension coverage and different measures of pension portability loss on voluntary job changes using a sample selection model with endogenous switching. The indiviual mobility decision is modeled as a function of earnings differentials and mobility costs. In contrast to other studies I distinguish between capital loss of vested and non-vested benefits to account for the long vesting periods in Germany. The SOEP provides information on individual membership in a pension plan and on the length of the period of coverage under the pension. This allows me to derive the accurate vesting status for each pension-covered individual and to calculate pension capital loss according to actual coverage. Most other studies have to employ the assumption that coverage period is equal to tenure which is only correct if the pensions were started at the date of hire. I test the empirical specification by estimating a model using an alternative measure of capital loss and by performing several specification tests. Moreover, I examine the mobility effects of making pensions portable. I find that pension-covered workers receive a considerable wage premium and are less mobile than other workers. Portability loss discourages job changes both for workers with vested and non-vested benefits. Making pensions portable significantly increases mobility, but from a low initial level.

The paper is structured as follows. Section 2 discusses the findings in the literature about occupational pensions and mobility, briefly describes the pension system in Germany and presents the framework for the calculation of pension portability loss. Section 3 develops the estimation approach taken in this study. Section 4 describes the data used. Section 5 presents descriptive evidence, the estimation results, and policy simulations. Section 6 concludes, and the appendix provides descriptive statistics.

2 Occupational pensions, wages, and mobility

2.1 Literature

Most studies on job mobility have as a starting point the assumption that differences between wages in current and alternative jobs are the driving force behind job change, and 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 binary variables capturing pension information as well as variables approximating potential wages and/or pension benefits in current and alternative jobs as regressors, e.g. Schiller and Weiss (1979), Mitchell (1982). These early studies for the US 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. Two German studies in this vein come to somewhat differing results. They find no effect of pension plans on voluntary quits (Frick et al. 1999), but a negative effect on voluntary and involuntary firm exits (Schnabel and Wagner 1999).

Some 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 and thus supplementing the binary variable approach. This extension of the analysis is often based on the work of Ippolito (1985) who models pension portability loss in the framework of an implicit pension contract. I also adopt this approach which I develop below. In contrast to this paper, most authors concentrate on the capital loss of vested workers. I extend the analysis to non-vested workers to account for the long vesting period in Germany.

The studies including measures of capital loss come to differing results. For the US, Allen et al. (1993) find a sizable effect of capital loss for layoffs rather than quits, Gustman and Steinmeier (1993) find the effect to be significant but small for job separations. For the UK, McCormick and Hughes (1984) find a considerable effect of their proxies for capital loss on job separations, while no such effect is apparent in Andrietti (2001 and 2004). A possible explanation is that inflation indexation of deferred benefits - having a huge impact on the magnitude of capital loss - was introduced after the early UK study was carried out. However, another post-indexation study does find significant effects (Henley et al. 1994). A comparative European study (Andrietti 2001) shows significant effects of portability loss only for Ireland. It was the only country with no indexation of benefits of early leavers at the time studied.

Many of the more recent papers have looked deeper into the possible causal relationships between pension coverage and mobility and can further account for these somewhat inconclusive results. In addition to portability losses which may cause workers to refrain from changing jobs, two further explanations for the negative relationship between pensions and mobility are being discussed. The first argues that pension covered workers may receive a compensation premium which discourages mobility. Thus it may not be the portability loss (alone) which lowers the mobility rate of pension covered workers. 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. Thus there is no trade-off between cash wages and pensions but rather pensions are granted in addition to wages which are on average higher than those of workers without pensions. Higher compensation in pension-covered jobs arguably results from higher worker productivity in such jobs, which can be explained, for example, by self-selection or higher firm investment into pension-covered worker's training. Thus the observation of a compensation premium for pension-covered workers can be taken as indirect evidence of the productivity effects of pensions (Dorsey 1995). In this paper I also find clear evidence of the existence of a wage premium for pension-covered workers.

The second argument centers on the possibility that workers who prefer stable employment sort into jobs covered by pensions. These individuals may have a low rate of subjective time discounting and a preference towards provision for old age. Allen et al. (1993) find evidence for sorting on observables: men, whites, union members and those who are married are more likely to sort into pension covered jobs. Based on US data they do not find evidence for sorting on unobservable characteristics. Likewise, the study of UK data by Mealli and Pudney (1996) which analyses transitions between pension-covered and non pension-covered jobs find little evidence of sorting due to unobservable characteristics. There is recent evidence of sorting into pension scheme types depending on mobility characteristics in the UK (Disney and Emmerson 2002). The results of this study support the sorting argument.

Methodologically, some studies have made attempts to explicitly incorporate wages in alternative jobs into the analysis of the mobility decision. Since wages in alternative jobs can only be observed for movers, and wages in current jobs can only be observed for stayers, ideally two counterfactual outcomes have to be estimated. A solution to the selection problem commonly used in mobility studies is to employ a sample selection correction with endogenous switching (Heckman 1979; Maddala 1983). This approach uses a two-stage procedure to produce consistent wage estimates which then enter structural probit equations explaining the mobility choice. I use this approach too.

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 workers. 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 which may be offered by employers to supplement the first tier. The third tier includes all forms of private provision like personal pension plans.

In 1999, 21% of German pensioners received a public or private occupational pension which made up approximately 25% of their total monthly income (Euro 319 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. Until some legislative changes were implemented in 2001, the typical occupational pension plan in Germany was defined benefit. In most plans workers gain a benefit worth a proportion of their final salary with each year of coverage. According to information contained in different surveys it seems reasonable to assume 0.35% as an average accrual rate, where values can range from as low as 0.2% up to 10% in some cases. An accrual rate of 0.35% is about one fourth the generosity often reported for the US and UK (e.g. Andrietti 2001). Several surveys also reveal that accrual rates in occupational pensions clearly increase with firm size (Deutsche Bundesbank 2001).

Pension portability in Germany is rather restrictive compared to the US and to other EU countries. Until recently, the Law to Improve Occupational Pensions (BetrAVG, 1974), stipulated that employee pension benefits had to be vested only after a period of 10 years and a minimum age of 35 for early leavers or, alternatively, after 12 years of firm tenure and 3 years of contributions to a scheme with a minimum age of 35. Since the beginning of 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 (UK 2 years, Netherlands 1 year). Firms offering occupational pensions in Germany as a rule apply the legal vesting requirements as there are no incentives to voluntarily vest workers earlier.

In contrast to the US, many EU countries have introduced a price or wage indexation of preserved benefits. In Germany, however, 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.

Arrangements which allow a transfer of accrued pension rights to new employers' pension schemes are another important portability issue. Again, the German case is comparatively restrictive. Before the 2001 reform portability of accrued benefits was only possible for life insurance retirement bonds (*Direktversicherung*), and for industry-wide pension plans when changing employer within the same industry. However, the latter existed only in parts of the public sector and the construction industry. The vast majority of German workers covered in a scheme were members of a company pension plan and had no possibility of transfer. Some recent changes in the legal regulation aim at facilitating a transfer of benefits in the future. This endeavor may be supported by the recent creation of more industry-wide pension plans and more defined contribution plans.

In summary, capital loss due to lack of indexation of pension rights - the major source of portability loss in the US - is currently also relevant in Germany. Moreover, in the time period studied in this paper, I can assume considerable portability loss due to the long vesting period of ten years.

2.3 Capital 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 work lives in exchange for a pension at retirement. The workers' implicit pension contributions are equal to the present value of expected pension benefits ("stay pension"). Assume for simplicity that worker i survives to retirement age R with certainty and that his pension benefit is already vested and given in the form of a lump sum (PB_i). The benefit is based on the pension formula $PB_i = bC_iY_i(t)$, where b is a constant reflecting the annual accrual rate of the pension plan, C_i is the coverage period, and $Y_i(t)$ are the individual earnings at time t. The stay pension at $t < R$ is

$$SP_i = bC_iY_i(R)e^{-r(R-t)}, \tag{1}$$

where $Y_i(R)$ is expected final earnings and r is the inflation rate. The coverage period is equal to firm tenure only if the pensions were started at the date of hire. If the worker expects his level of compensation to increase with time at the rate g, one can equivalently formulate the stay pension as a function of current earnings:

$$SP_i = bC_iY_i(t)e^{(g-r)(R-t)}. \tag{1'}$$

A worker leaving the firm prior to his pension age R receives only the present value of his "leave pension" based on his current earnings, $Y_i(t)$:

$$LP_i = bC_iY_i(t)e^{-r(R-t)}. \tag{2}$$

The capital loss is the difference between the stay and the leave pension (1')-(2) for vested workers,

$$CL_i^v = bC_iY_i(t)e^{-r(R-t)}\left(e^{g(R-t)} - 1\right). \tag{3}$$

According to the implicit contract the worker pays for a pension which is indexed with an expected wage path. If he quits, he receives only a nominal pension.

Now consider the case of a worker who leaves the firm at time t^l before the time his accrued benefits are vested ($t^l < t^v < R$). This individual loses the present value of the entire pension capital accumulated up to date. The impact can be assessed by assuming the leave pension to be zero because the mobile worker can expect no pension benefit upon retirement in this case. Thus

$$CL_i^{nv}|t^l < t^v = bC_iY_i(t^l)e^{(g-r)(R-t^l)}. \tag{4}$$

CL_i^{nv} increases with years of coverage. If wages grow at the same rate as the interest rate ($g = r$), the function increases linearly with years of service, if $g > r$, it is a concave function. CL_i^v is a concave function which is zero at $C_i = 0$ and reaches zero again as the worker approaches retirement age ($R - t = 0$). For the empirical analysis I represent the capital loss of vested and non-vested workers by two alternative variables. For the first, I directly compute the capital loss functions for vested and non-vested workers, (3) and (4), using the available wage, coverage, and age data, and average wage and price growth rates over the 8 years preceding the mobility decision. As exact infomation about b is neither available in my data set nor in other sources, I use the close correlation bewteen firm size and accrual rates (Deutsche Bundesbank 2001) to approximate the variation of pension plan generosity around an average of 0.35%. As an alternative representation of capital loss of vested benefits I use an approximation introduced by McCormick and Hughes (1984) who employ the interaction of tenure, S_i, and years to retirement, $R - t$. The data allow me to employ coverage period instead of tenure to obtain a more precise measure. Coverage period, C_i, is used as an approximation for capital loss of non-vested benefits. These approximations capture the functional forms of CL_i^v and CL_i^{nv} and impose less assumptions about pension plan type and generosity than direct computation. Furthermore they measure capital loss independently of the wage.

3 Model and econometric methods

The individual mobility decision is modeled as a function of earnings differentials and mobility costs such as pension portability losses. A worker will change jobs if the life time earnings gain from moving into a new job exceeds the mobility costs, i.e. if

$$I_i^* \equiv (Y_{mi} - Y_{si}) - C_i > 0, \qquad i = 1, \ldots, n \tag{5}$$

where Y_{mi} is the expected present value of lifetime earnings in a best alternative job, Y_{si} is the expected present value of lifetime earnings in the current job, and C_i is the present value of mobility costs.

In the empirical specification of this model I assume for simplicity that the log of current wages is the best predictor of the log of lifetime earnings. 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 I define as

$$I_i = \begin{cases} 1 & \text{if } I_i^* \geq 0 \\ 0 & \text{otherwise} \end{cases} \tag{6}$$

Assuming that mobility costs are determined by a vector of exogenous personal and job specific variables, Z_i, and interactions of these variables, one can describe (5) as a structural probit model such that:

$$I_i^* = \gamma(\ln w_{mi} - \ln w_{si}) + \delta' Z_i + u_i \tag{7}$$

and

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

To complete the model, it is necessary to estimate the wage differential. The wage differential can be predicted by estimating separate wage equations for movers and stayers

$$\ln w_{mi} = \beta_m' X_i + \varepsilon_{mi} \tag{8}$$

$$\ln w_{si} = \beta_s' X_i + \varepsilon_{si} \tag{9}$$

where X_i is a vector of human capital and personal variables, and an indicator variable coding occupational pensions controls for a wage premium in pension-covered jobs. I derive heteroskedasticity-robust standard errors for clustered data to account for the panel structure of the data (Wooldridge 2002).

Separate estimates of the wage equations yield inconsistent parameter estimates if stayers differ in observed and unobserved characteristics from movers. One conventional way of dealing with selectivity bias is by using an endogenous switching regime. 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. Inserting equations (8) and (9) into (7) yields:

$$\begin{aligned} I_i^* &= \gamma(\beta_m' X_i - \beta_s' X_i) + \delta' Z_i + u_i \\ &= \vartheta' W_i + \nu_i \end{aligned} \tag{10}$$

where $\vartheta' = [\gamma(\beta_m' - \beta_s'), \delta']$, $W_i = [X_i, Z_i]$, and $\nu_i = (\gamma(\varepsilon_{mi} - \varepsilon_{si}) + u_i)$. This can be used to calculate the values for the selectivity terms which are the inverse Mills ratios, namely:

$$\begin{aligned} \lambda_{mi} &= \frac{-\phi(\hat{\vartheta}' W_i)}{\Phi(\hat{\vartheta}' W_i)} \qquad \text{if } I_i = 1 \\ \lambda_{si} &= \frac{\phi(\hat{\vartheta}' W_i)}{1 - \Phi(\hat{\vartheta}' W_i)} \qquad \text{if } I_i = 0 \end{aligned} \tag{11}$$

$\phi(.)$ being the standard normal density function and $\Phi(.)$ the corresponding cumulative distribution function. This method assumes that the errors in (8), (9), and (10) are not correlated with X_i and Z_i and have a trivariate normal distribution. 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 (7) using maximum likelihood. I use bootstrapping to derive confidence intervals which account for the two-stage procedure, resampling individuals.

Identification of the model depends on selection of an exclusion restriction, i.e. a variable or set of variables that are assumed to affect mobility but not to have a direct impact on wages and vice versa. The distinction between the content of X_i and Z_i is debatable, and the previous literature has relied on a variety of different instruments for identification. In this paper I use home ownership as exclusion restriction. Home ownership is not related to wages, but will arguably affect moving costs if job change is associated with a residential move. Residential moves provoke transaction costs for home owners, such as taxes and fees on the purchasing price of property, which are considerably higher in Germany than in the UK (7% vs. 2%, Maclennan et al. 1998). Moreover, regional disparities in house prices may inhibit some moves. As individuals will take account of these constraints in their choice of housing tenure, home ownership arguably proxies high preferences for a stable job. Home ownership could also provide individuals with the means to finance off-the-job search, thus enhancing mobility, but this depends on the house equity value and empirical evidence for this is weak (Henley et al. 1994).[1] Wages are modeled as a function of personal characteristics, industry, and pension status.[2] Mobility costs are modeled as a function of a binary variable representing the pension status (model 1) as well as of the measures of capital loss described in subsection 2.3 (models 2 and 3). Other variables well known to influence mobility costs include, for example, age and gender. Further account and theoretical motivation of the choice of variables is given in the section about data that follows.

4 Data

The analysis is based on the Socio-Economic Panel (SOEP), an annual longitudinal survey of private households in Germany. The SOEP started in 1984 with interviews in 5,921 households with residence in western Germany. In 1990, another 2,179 households with 4,453 persons from East Germany were added to the panel. My sample includes the West and East German subsamples.

I concentrate on the mobility decisions of full-time employees ($\geq$ 35 hours per week), excluding civil servants, self employed, and apprentices. Workers are dropped from the sample after their first job change or when they exit full-time employment.[3] Mobility is defined as the first voluntary quit of job

[1] The variable proves to be a good instrument, yielding a $\chi^2(1)$ statistic of 8.49 (9.07, 7.72) in the first-stage mobility probit of model 1 (2, 3). Furthermore, when entered into the wage equations the variable proves to be insignificant with a p-value of 0.57 in the mover's and of 0.23 in the stayer's wage equation, model 1.

[2] I omit job-specific characteristics which I consider choice variables from the wage equations because I cannot assume these characteristics to be identical in an alternative job that individuals might consider. I assume, however, that individuals are restricted by education, training, or previous work experience to concentrate on opportunities in a given industrial sector when making a mobility decision. Including a pension dummy in the wage equations to test for a wage premium also assumes a constant pension status across jobs. This seems realistic for pension holders who are unlikely to move to non-pensionable jobs, sacrificing pension benefits and presumably a wage premium. Individuals without pensions might seek to gain pension coverage when changing jobs. However, if pension benefits and wage premiums are selectively awarded to more productive workers, their opportunities to improve pension status by changing jobs should be restricted.

[3] Individuals exiting full-time employment may have different moving probabilities than those not exiting. I have estimated a model including a correction for selectivity in exits,

and take-up of a new full-time job between annual interviews with or without intervening unemployment. I assume that intervening unemployment after a quit decision is voluntary. In the GSOEP information about employers' provision of occupational pension schemes was asked in 1985, 1988 and again in 1995. The respondents were asked whether their company offered an occupational pension plan, and - if yes - whether the respondent personally accumulates pension benefits. Furthermore the respondents were asked in which year pension coverage started. This allows me to derive the exact vesting status for each individual. This study makes use of the most recent pension information, looking at the mobility decisions of 1995 job holders with and without occupational pensions. I construct a pooled sample which covers the mobility between 1995-6, 1996-7, and 1997-8. The sample consists of 8,979 observations of which 3,615 are 1996 job holders, 2,937 are 1997 job holders and 2,427 are 1998 job holders. In the whole time span 1995-8 I observe 193 voluntary job changes.

In the longitudinal dataset, all variables except pension status, sex, and occupational degree 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 wage, human capital and personal 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 implausible cases (13 cases of monthly wages below 1.000 DM, 3 cases of unlikely high wages, 1 case of pension coverage = 63 years) as well as cases with missing values on any of the explanatory variables are deleted. Descriptive statistics are supplied in the appendix.

The dependent variable in the wage equations is the log of monthly gross wages in the last month before the interview. This variable includes overtime compensation but no other extra payments such as leave pay. Since I look at full-time employees only, there is no need to compute hourly wages where the choice of denominator (hours actually worked vs. hours according to contract) strongly influences the results. Regressors are years of tenure and a dummy for sex. Labor market experience and its square refers to real rather than potential experience. The variables are constructed using spell data, where experience is defined as time spent in full- or part-time employment. I construct 3 indicator variables for the highest formal educational degree. The reference category codes workers without a completed educational degree, *vocational degree* stands for workers with a completed apprenticeship

employing regional unemployment rates, years to retirement, gender, and its interaction with the number of dependent children in the household as instruments. I found that the results of the model remained the same. Hence I interpret exits from full-time employment as censored responses.

or vocational training, and *college/university* codes persons holding a university or technical college degree. I also include binary variables coding the occupational status (*blue collar, white collar, manager*) and 8 different industries into the wage equations. A binary variable for pension-covered workers (*occupational pension*) is entered into the wage equations to test for a wage premium in their jobs. Furthermore I include an indicator variable for residents in East Germany to account for the considerable East-West wage differentials. Finally, I use separate binary variables for each period of observation to control for time-varying factors such as wage rises of persons who change jobs later.

Mobility costs are modeled as a function of the pension variables. I employ a pension coverage dummy (model 1) and the capital loss variables described in subsection 2.3 (models 2 and 3). For model 2, firm size is used to approximate the variation of accrual rates around the average of 0.35%. Firms with 200-1999 employees are assumed to have average accrual rates; 1-19 employees: 0.15%; 20-199 employees: 0.25%; 2000 and more employees: 0.45%. I perform several specification tests to examine the robustness of the results to these assumptions. Using the data on pension coverage, I code the pensions of persons aged 35 years and older with either a minimum coverage period of 10 years, or a coverage of at least 3 years in combination with at least 12 years tenure as vested. Otherwise pension benefits are not vested.

The choice of further variables modeling mobility costs is guided by the standard results of the mobility literature. Among job-specific variables I include occupational status and industry to capture job-specific mobility costs over and above the estimated wage differentials. The mobility literature usually assumes that career opportunities differ by industry. The occupational status proxies the ability to perform efficient job search, a higher status implying lower transaction costs.

Among the personal variables I include age, home ownership, marital status, and number of children under the age of 16 in the household. Older workers are usually less mobile than younger workers. A possible explanation is that younger workers benefit from wage increases for a longer time. Thus I include age to capture differences in the pay-off period from mobility between older and younger workers. Marital status and the number of children can potentially influence mobility in both directions. Men usually seek better career opportunities once they have become fathers. On the other hand geographical mobility with children may be perceived as costly. Likewise, being married can both motivate and constrain mobility. I also include binary variables coding the period of observation to control for possible time-varying effects. Finally, I use a gender indicator variable to represent the differing mobility behavior of men and women. The ideal solution, estimation of separate models for men and women, is not feasible because there are too few cases of mobility in the data set.

5 Empirical results

5.1 Descriptive evidence

Before presenting the estimation results I discuss descriptive evidence on occupational pensions, job mobility, and wages. Table 1 shows that mobility among 1995 job holders is low independent of occupational pension status. The average mobility rate over the three year period between 1995 and 1998 is 2.2%. Individuals without pension-covered jobs in 1995 (3/4 of the sample) are more than two times more likely to change jobs than are individuals on jobs covered by pensions (2.5% vs. 1.2%). This result confirms the findings of studies for other countries that turnover is lower in pension-covered jobs. The table also displays the number of individuals with vested pension benefits among persons covered by pensions. The data show that mobility is twice as high among holders of non-vested pensions than among those with pension benefits already vested.

The wage data displays averages of CPI-deflated wages observed in 1996, 1997, and 1998 as well as the average wages in the respective prior year. I find considerable wage differences between jobs covered and not covered by pensions. Those who were not a member of an occupational pension scheme in 1995 have far lower earnings than those who were scheme members. In fact, the gross monthly wages in non-pension jobs (deflated to values of 1995) were about 26% lower than in pension-covered jobs. While individuals leaving jobs not covered by pensions earn about average wages in this group, mobility out of pension-covered jobs concentrates among workers with earnings clearly below the average. The table also shows that movers realize larger wage increases than stayers, irrespective of pension status. However, movers from pension-covered jobs can not compensate the initial wage differentials that separate them from the stayers. Conversely, movers from non-pension jobs can realize a wage advantage over the group of stayers in such jobs.

- Table 1 about here -

These results suggest that workers on pension-covered jobs receive a considerable wage premium which makes it more difficult for these individuals to find a better alternative job. This would provide one explanation for the lower mobility among these workers. It would also explain why among pension scheme members those with below-average earnings are more mobile: possibly they face more outside opportunities for better jobs than those already earning above-average wages. The wage relationship of movers and stayers on non-pension jobs seems to be in line with the standard results of mobility studies. These studies usually find better educated, young males with higher occupational status to be more mobile than other workers. According to these findings it comes as no surprise that mobile workers can realize relatively high post-mobility wages. Of course I can only confirm these inferences when controlling for personal and job characteristics which I do next.

5.2 Estimation results

Table 2 presents the results of the reduced-form mobility probit and the wage equations estimates for model 1. Reduced-form and wage equations for models 2 and 3 - not displayed - do not differ substantially from model 1. The first column displays 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 coefficient of the pension status has the expected sign but is statistically significant at the 10% level only. However, the results from the reduced probit cannot be directly interpreted because their effect on mobility depends partly on their influence on the wage differential. The role of this regression in the estimation procedure is to obtain estimates of the selectivity terms which allow consistent estimation of the mover's and stayer's wage equations.

- Table 2 about here -

Columns two and three of Table 2 display the wage equations of movers and stayers using the log of monthly gross wages in values of 1995 as dependent variable. The coefficients of the variables follow standard expectations. Low levels of statistical significance in the mover's wage equations can be attributed to the relatively low number of observations. Females and individuals with residence in eastern Germany earn significantly less than males or west German residents. There is a non-linear relationship between earnings and experience in the labour market. The firm tenure variable is not statistically significant for movers which is in line with the expectation that new employers do not reward tenure at the last employer. After controlling for tenure and experience, age is not an statistically significant determinant of wages. Having higher educational degrees and higher occupational status are associated with higher earnings.

The effect of unmeasured characteristics on wages is captured by the selectivity terms λ_m and λ_s. The coefficient of λ_s for stayers is statistically significant, giving evidence of selection bias. The negative coefficient implies a positive selection into the stayers' group: stayers possess unobserved characteristics which grant them higher wages than movers would receive in case of immobility. The coefficient of λ_m is also negative - implying positive selection of movers - but statistically insignificant.

The wage equations also include a dummy for pension status. These test for the existence of a wage premium for pension-covered workers after controlling for personal characteristics. The regression results confirm the descriptive evidence of table 1: workers in pension-covered jobs seem to receive considerably higher wages, although the coefficient is not statistically significant in the mover's wage equation, presumably because the number of observations is small. The coefficients are fairly stable over different model specifications and show that pension-covered workers receive a wage premium in the magnitude of about 10-12%.[4] Thus pension-covered workers arguably have (unobserved) characteristics which make them more productive. According to the estimates, the compensation premium is roughly the same for movers and stayers on pension-covered jobs.

In order to calculate a mover's and a stayer's wage the coefficients of the wage equations are applied to each individual's characteristics. Coefficients on the selection correction terms are set to zero because I cannot assume the relative advantage of an individual in the observed state to be equally useful in the counterfactual situation. Thus I measure wage differentials due to observed factors only. The predicted difference in log wages is then used to estimate the structural probit mobility equation (7) using maximum likelihood.

Table 3 displays the results of the structural probit mobility equations for models 1-3. The table reports the marginal effects which were calculated for binary variables as the effect implied by a unit change in the characteristic. Bootstrapping was used to derive confidence intervals in order to derive significance levels for the two-stage estimation procedure (1000 replications). If the bias-corrected confidence interval did not include zero, the effect was taken to be significant at the level indicated by the size of the confidence interval.

The coefficients of the non-pension variables are quite insensitive to variations in the pension variables. Across all specifications the results for the non-pension variables confirm most of the standard expectations about job change behavior. In particular, worker mobility significantly increases with growing wage gains. 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, possibly because they tend to work in occupations with less outside career opportunities

[4] The effect was derived using premium = (exp(coeff.)-1) * 100.

and face more restrictions in their household backgrounds. At sample means of the other variables being female reduces the probability of changing employer by about 0.7-1.0 percentage points in all models. This is a relative change in mobility probability of roughly 70-80%.

Being a home owner significantly reduces job changes, but to a slightly lesser extent (60-70%). This may be because stability-oriented persons select into property which is costly to transfer. The data show that only about 1/3 of workers on non-pension jobs are home owners and roughly 1/2 of workers on pension jobs own property. Marital status has no statistically significant effect on mobility, probably because it influences job transitions in both directions and the overall effect is undetermined. The existence of children aged under 16 in the household does enhance job canges. The results further confirm that mobility is higher for managers and white collar workers than for blue-collar workers. Furthermore, mobility costs vary by industry (not displayed).

- Table 3 about here -

Of particular interest are the estimates for the occupational pension and capital loss variables. Model 1 only uses an occupational pension indicator variable to measure the effect of pensions on mobility. The coefficient is negative and statistically significant, showing that pension coverage deters mobility. Thus, having or not having an occupational pension influences mobility behavior over and above the effect of wage premiums on expected wage gains. Introducing measures of capital loss for vested and non-vested workers into the analysis further differentiates the results. Coefficients on both measures of capital loss - the equations derived for the wage-related pension formula (model 2) and their more general approximations (model 3) - are negative and significant both for vested and non-vested workers, although in model 3 capital loss for vested workers is significant at the 10 % level only. The larger the capital loss gets for both vested and non-vested workers, the less likely it is that they will change employer. The results show that pension coverage and, in particular the size of capital loss, determines (among the other factors) who changes jobs and who does not. The coefficients on the pension dummy change to a positive value in models 2 and 3. This suggests that the pension status may act as a proxy for non-pecuniary job attributes not captured in the model.

Comparing models 2 and 3, I find that in both estimations the negative coefficients reflect a mobility-deterring effect of pension capital losses. Thus the approximations of capital loss introduced by McCormick and Hughes (1984) provide consistent results in my framework. Higher significance of the coefficients on the more structured pension variables (model 2) suggest that these variables capture capital loss more precisely and thus serve as a confirmation of the basic assumptions. I performed several specification tests varying the values of accrual rates by firm size as well as the time-period over which price and wage growth data entering the capital loss variable of model 2 was averaged. Furthermore, I also tested restricting the sample to individuals aged 29 and over in order to eliminate the cases of initial job-shopping characteristic of young workers. The results proved to be very robust to these variations both in terms of coefficients and standard errors.

The values of the coefficients on the capital loss variables of model 3 can not be directly interpreted because the approximations merely represent functional forms. The capital loss variables in model 2 do capture real capital loss assuming values for expected wage growth, expected inflation rate, and the annual accrual rates. The results show that the mobility-deterring effect of non-vested pension benefits is larger than that of vested benefits. This may be because workers are more aware of the immediate capital loss which occurs with non-vested pensions than of the loss due to non-indexation of benefits taking place in vested pensions. Evaluated at the means of the other variables, in model 2 the marginal probability of job change for vested workers declines by 1.5 percentage points for a 1,000 DM (511 Euro) real loss of pension benefits. This is a relative change in mobility probability of more than 100%. For non-vested workers the mobility probability declines by 2.4 percentage points for a 1,000 DM real pension loss.

5.3 Effects of alternative portability rules

The estimates allow me to explore the effects on mobility of making pensions portable by deriving predicted mobility probabilities for individuals with different combinations of pension characteristics. As the predicted mobility probabilities show some degree of variation between different model specifications these figures should be read as rough illustrations of the magnitude of the effect. First I examine the effects of different vesting rules. These predictions are summarised in the 3 upper panels of Table 5. The top panel shows average capital loss of vested and non-vested workers under the 10-year vesting rule relevant during the time-period studied in this paper (vesting rule 1). The predicted mobility probability at sample means of all variables is 1.1%. For an individual who accumulates pension benefits and whose capital loss is set at the sample means in the group of pension-covered workers the average mobility rate is about half of this rate (0.50%) at sample means of the non-pension variables. In the second panel I apply a 5-year vesting rule to the individuals in the estimating subsample of model 2. This rule is valid in Germany for individuals starting occupational pensions from 2002 onwards. If it had been applied to all individuals in the sample, 342 more persons would have had vested rather than non-vested benefits, decreasing mean capital loss of non-vested workers. These shifts in pension loss increase predicted mobility probability among the average pension holders by 38%, and increase overall mobility by 8%. Panel 3 examines the effects of a 2-year vesting period. This rule would further increase the proportion of individuals with vested rather than non-vested pension benefits to 96% of pension holders. Compared to rule 1 predicted mobility probability among pension holders increases by 60%, and overall mobility by 11%. The relative mobility effect of reducing the years required to vest pension benefits is thus sizeable. However, it is an increase from a very low level, so that in absolute terms the effect should be modest.

- Table 5 about here -

The final panel reports the effect of indexing deferred pensions. A full indexation reduces capital loss of vested workers to zero if the index is equal to the personal discount rate. Compared to the *status quo* this would increase sample mobility probability by 22%, and more than double mobility among pension holders according to the estimates. In summary, making pensions portable should result in a significant relative increase in mobility probability, but from a low initial level.

6 Conclusions

This paper provides evidence that occupational pension coverage in Germany reduces worker mobility through the mechanisms discussed in earlier papers for the US and UK. Although pensions are far less generous, I find that pension coverage deters voluntary job transitions by imposing a capital loss on both vested and non-vested early leavers. Furthermore, workers in pension-covered jobs receive a compensation which is about 10-12 % higher than in jobs not covered by pensions. Compensation premiums make mobility from pension jobs less attractive, and workers face less outside opportunities for better jobs. Finally, sorting of stability oriented workers - proxied by home ownership - into pension-covered jobs also plays a role in reducing mobility. This paper thus shows that the effects of occupational pensions on mobility do not differ substantively between Germany and the Anglo-American countries studied to date, despite the considerable differences in pension generosity. If compensation premiums are taken as evidence of the productivity effects of pensions, it is remarkable that comparatively small employer contributions into pension plans seem to have considerable productivity effects. Likewise, there is a fairly strong sensitivity of mobility to capital loss even when capital loss is not very large.

Distinguishing between capital loss of pension benefits which are vested and those which are not yet vested, I find that both sources of capital loss pose an obstacle to job changes. This result holds both for a model where capital loss is computed on the basis of a wage-related benefit formula and for an alternative more general model where capital loss is approximated by interaction terms. According to the estimations, loss of benefits which are not vested deter worker mobility to a larger extent than loss due to erosion of real capital value over time of vested benefits. Workers may be more aware of the former kind of loss.

Regarding reforms in pension regulation the results show that decreasing vesting periods could be an effective policy option if the political aim was to enhance mobility. I find that the reduction of the vesting period from 10 to 5 years performed in 2001 should foster mobility in Germany. Once fully implemented, mobility could increase by 8% (38% among pension holders) judging from my estimating sample. However, these increases are from low initial mobility rates, and the reforms will take a long time to be implemented as they only concern new entrants into pension plans. An indexation of preserved benefits (for vested early leavers) would have a large impact, doubling mobility among pension-covered workers and increasing it by 22% overall. The recent creation of more defined contribution plans in Germany should work in the same direction. Both shorter vesting periods and indexation of benefits would reduce retirement income losses of multiple job holders on defined benefit schemes. On the other hand these policy options would place a considerable financial burden on firms. Moreover, this paper provides indirect evidence of the productivity effect of pensions which may result, for example, from higher firm investment into pension-covered worker's training. In light of the positive effects of high firm attachment the overall welfare and efficiency implications of the current reforms at EU level are therefore not at all clear.

References

[1] Allen, S. G., Clark, R. L. and McDermed, A. A. (1993). 'Pensions, Bonding, and Lifetime Jobs', *Journal of Human Resources*, Vol 28, pp. 502-517.

[2] Andrietti, V. (2001). *Occupational Pensions and Interfirm Job Mobility in the European Union. Evidence from the ECHP Survey*, CeRP Working Paper No. 5.

[3] Andrietti, V. (2004). *Pension Choices and Job Mobility in the UK*, Economics Working Papers, Universidad Carlos III, Madrid.

[4] Council of the European Union (2003). *Joint Report by the Commission and the Council on Adequate and Sustainable Pensions*, 6527/2/03 REV 2, Brussels.

[5] Deutsche Bundesbank (2001). *Die betriebliche Altersversorgung in Deutschland*, Monatsbericht März.

[6] Deutscher Bundestag (2001). *Alterssicherungsbericht 2001*, BT Drucksache 14/7640, Berlin.

[7] Disney, R. and Emmerson, C. (2002). *Choice of Pension Scheme and Job Mobility in Britain*, IFS Working Paper No. 9.

[8] Dorsey, S. (1995). 'Pension Portability and Labor Market Efficiency: A Survey of the Literature', *Industrial and Labor Relations Review*, vol. 48, pp. 276-292.

[9] Frick, B., Frick, J., and Schwarze, J. (1999). 'Zusatzleistungen, Arbeitszufriedenheit und Fluktuationsneigung: Empirische Analysen mit dem Sozio-ökonomischen Panel', in Frick, B., Neubäumer, R. and Sesselmeier, W. (eds.), *Die Anreizwirkungen betrieblicher Zusatzleistungen*, Rainer Hampp, München, pp. 9-31.

[10] Gustman, A. L. and Steinmeier, T. L. (1993). 'Pension Portability and Labor Mobility. Evidence from the Survey of Income and Program Participation', *Journal of Public Economics*, vol. 50, pp. 299-323.

[11] Heckman, J. J. (1979). 'Sample Selection Bias as a Specification Error', *Econometrica*, Vol. 47, pp. 153-161.

[12] Henley, A., Disney, R. and Carruth, A. (1994). 'Job Tenure and Asset Holdings', *Economic Journal*, vol. 104, pp. 338-349.

[13] Ippolito, R. A. (1985). 'The Labour Contract and True Economic Pension Liabilities', *American Economic Review*, vol. 75, pp. 1031-1043.

[14] Maclennan, D., Muellbauer, J., and Stephens, M. (1998). 'Asymmetries in housing and financial market institutions and EMU', *Oxford Review of Economic Policy*, vol. 14, pp. 54-80.

[15] Maddala, G. S. (1983). *Limited-dependent and qualitative variables in econometrics*, Cambridge University Press, Cambridge.

[16] McCormick, B. and Hughes, G. (1984). 'The Influence of Pensions on Job Mobility', *Journal of Public Economics*, vol. 23, pp. 183-206.

[17] Mealli, F. and Pudney, S. (1996). 'Occupational Pensions and Job Mobility in Britain', *Journal of Applied Econometrics*, vol. 11, pp. 293-320.

[18] Mitchell, O. S. (1983). 'Fringe Benefits and the Cost of Changing Jobs', *Industrial and Labor Relations Review*, Vol. 37, pp. 70-78.

[19] Schiller, B. R. and Weiss, R. D. (1979). 'The Impact of Private Pensions on Firm Attachment', *Review of Economics and Statistics*, Vol. 61, pp. 369-380.

[20] Schnabel, C. and Wagner, J. (1999). 'Betriebliche Altersversorgung: Verbreitung, Bestimmungsgründe und Auswirkungen auf die Personalfluktuation', in Frick, B., Neubäumer, R. and Sesselmeier, W. (eds.), *Die Anreizwirkungen betrieblicher Zusatzleistungen*, Rainer Hampp, München, pp. 69-93.

[21] Wooldridge, J. M. (2002). *Econometric Analysis of Cross Section and Panel Data*, MIT Press, Cambridge.

TABLE 1

Job Mobility, Occupational Pensions, and Wages, SOEP 1995-1998

	No occupational pension in 1995 job		Occupational pension in 1995 job	
	Stayer	Mover	Stayer	Mover
Number of observations	6,147	158	2,127	26
Mobility rate (%)		2.5		1.2
Pension benefits vested	-	-	1,146	6
Pension benefits vested (%)	-	-	60	23
Mean monthly wage t-1 (DM)	3,787	3,833	5,133	4,515
Mean monthly wage t (DM)	3,874	4,165	5,243	4,868
Mean wage increase betw. t-1 and t (%)	2.3	8.7	2.1	7.8

Notes: The observations are from the pooled sample and consist of those full-time employed individuals observed in t=1996, 1997, and 1998 respectively without missings on the relevant variables. Gross monthly wages deflated to 1995 prices by the Consumer Price Index.

TABLE 2

Reduced Form Mobility and Selection-corrected Wage Equations, Model 1, SOEP 1995-1998

	(1) reduced form mobility probit		(2) mover's wage equation		(3) stayer's wage equation	
Age	-0.019	(0.00)	0.0041	(0.58)	-0.00096	(0.95)
Female	-0.181	(2.16)*	-0.160	(2.65)**	-0.189	(18.04)**
Married	0.037	(0.46)	0.057	(1.04)	0.027	(2.73)**
Number of children<16	0.056	(1.42)	-0.0074	(0.19)	0.015	(3.17)**
East	-0.180	(2.14)*	-0.283	(3.54)**	-0.262	(25.06)**
Experience	-0.028	(1.69)+	0.014	(0.82)	0.013	(5.96)**
Experience squared/100	0.015	(0.43)	-0.064	(1.93)+	-0.028	(7.20)**
Tenure	-0.035	(4.25)**	0.0036	(0.42)	0.0031	(5.17)**
College/university	0.420	(2.62)**	0.442	(2.51)*	0.236	(10.52)**
Vocational degree	0.240	(1.96)*	0.215	(1.75)+	0.078	(6.62)**
White collar	0.228	(2.42)*	0.148	(1.78)+	0.182	(16.88)**
Manager	0.170	(1.47)	0.395	(4.78)**	0.447	(28.92)**
Occupational pension	-0.163	(1.63)+	0.104	(1.41)	0.094	(9.43)**
Industry	yes		yes		yes	
Time period	yes		yes		yes	
Home owner	-0.224	(2.91)**				
λ_m			-0.278	(1.03)		
λ_s					-0.437	(2.74)**
Constant	-1.48	(5.13)**	7.23	(12.65)**	8.10	(207.71)**
Observations	8,475		184		8,291	
log likelihood	-774.96					
R-squared			0.55		0.57	

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. Wage equations (2) and (3): dependent variable is log of monthly gross wages, deflated to 1995 values by Consumer Price Index. Reference categories are not married, residence in west, no completed degree, blue collar, rented accommodation. Absolute values of t-statistics (in parentheses) derived from heteroskedasticity-robust standard errors. Results for models 2 and 3 available on request.

TABLE 3
Structural Probit Mobility Equations, Models 1-3, SOEP 1995-1998

	Model		
	1	2	3
ln(predicted wage diffferenential)	0.067**	0.063**	0.062**
Age	-0.00036	-0.00084**	-0.00086**
Female	-0.0065**	-0.0087**	-0.0095**
Married	-0.0020	-0.0012	-0.0022
Number of children<16	0.0023*	0.0029**	0.0029*
Home owner	-0.0062**	-0.0073**	-0.0071**
White collar	0.0092*	0.012**	0.013**
Manager	0.010*	0.019*	0.019**
Occupational pension	-0.0052*	0.0086	0.0025
CL_i^v (equation 3/1000)		-0.015**	
CL_i^{nv} (equation 4/1000)		-0.024**	
CL_i^v (pension^v*C_i*$R-t$)			-0.000042+
CL_i^{nv} (pension^{nv}*C_i)			-0.0019*
Industry	yes	yes	yes
Time period	yes	yes	yes
Observations	8.475	8,140	8,283
log likelihood	-783.34	-754.09	-777.02
Observed P	0.022	0.022	0.022
Predicted P (at sample means)	0.010	0.011	0.012

Notes: + significant at 10%; * significant at 5%; ** significant at 1%. Dependent variable is binary, equalling 1 if mobile and 0 if not. Table shows marginal probabilities. CL_i^v, CL_i^{nv}: Capital loss of vested and non-vested workers respectively. C_i: years covered by pension plan. $R-t$: years until retirement age. Reference categories are not married, rented accommodation, blue collar. Bootstrapping (1000 replications, sampling individuals) was used to derive confidence intervals. Significance of the effect was inferred if the bias-corrected confidence interval failed to include zero.

TABLE 4
Predicted Mobility Probabilities with Alternative Portability Rules

	ϕCL_i^v (DM)	indivi- duals	ϕCL_i^{nv} (DM)	indivi- duals	Pred. mobil.	Δ Pred. mobil.
vesting rule 1: 10 yr. coverage, age≥35 or: 3 yr. coverage, 12 yr. tenure, age≥35						
entire sample	356	8,140	203	8,140	1.07%	
pension holders only	1,504	1,136	859	789	0.50%	
vesting rule 2: 5 yr. coverage, age≥30						
entire sample	453	8,140	66	8,140	1.15%	+8%
pension holders only	1,917	1,478	280	447	0.69%	+38%
vesting rule 3: 2 yr. coverage						
entire sample	500	8,140	2	8,140	1.19%	+11%
pension holders only	2,114	1,864	8	61	0.80%	+60%
vesting rule 1 + full indexation of vested benefits						
entire sample	0	8,140	203	8,140	1.30%	+22%
pension holders only	0	1,136	859	789	1.20%	+140%

Notes: Capital loss figures are means of the entire sample and of pensions holders respectively. Capital loss and counts of individuals vested/non-vested derived by applying alternative vesting rules to the estimating subsample of model 2. Rule 1 is *status quo* in the model, rule 2 valid from 2002 in Germany, rule 3 for comparison. Mobility rates are predicted mobility probabilities derived at sample means of the variables, occupational pension was set to the sample mean (one) for mobility rates of the entire sample (sample of pension holders), and capital loss was set to values displayed in the table.

TABLE A1
Descriptive Statistics, SOEP 1995-1998

	Movers		Stayers	
Variable	Obs.	Mean	Obs.	Mean
College/university	192	0.20	8,717	0.10
Vocational degree	192	0.72	8,717	0.74
Female	193	0.31	8,786	0.34
Experience	193	11.43	8,786	19.58
Experience squared	193	186.98	8.786	498.06
Tenure	193	4.92	8,763	11.27
East	193	0.24	8,786	0.30
Age	193	33.57	8,786	40.86
Home owner	193	0.23	8,786	0.39
Married	193	0.54	8,786	0.69
Number of children<16	193	0.75	8,786	0.68
Agriculture	193	0.031	8,786	0.013
Energy	193	0.005	8,786	0.028
Metal	193	0.15	8,786	0.23
Construction	193	0.15	8,786	0.11
Trade	193	0.22	8,786	0.16
Social	193	0.13	8,786	0.20
Bank	193	0.18	8,786	0.087
Other industry	193	0.11	8,786	0.16
Manager	193	0.20	8,786	0.15
White collar	193	0.42	8,786	0.35
Blue collar	193	0.38	8,786	0.50
Capital loss, vested benefits, model 2	183	61.05	8,283	361.49
Capital loss, non-vested benefits, model 2	183	86.44	8,283	203.69
Capital loss, vested benefits, model 3	189	7.04	8,581	33.60
Capital loss, non-vested benefits, model 3	189	0.37	8,581	0.57
Occupational pension	193	0.13	8,778	0.26
Pension coverage (years)	183	0.84	8,291	3.23
Period 1995-6	193	0.51	8,786	0.40
Period 1996-7	193	0.30	8,786	0.33
Period 1997-8	193	0.19	8,786	0.27
Gross monthly wage (DM) in 1995 prices	188	4,268	8,427	4,225