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TRANSFERABILITY OF HUMAN CAPITAL AND JOB SWITCHES**

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ABSTRACT: This paper uses a job duration model based on linked employer-employee data over the period 1989-1998 with an emphasis on the job mobility of the highly educated. It is shown that the job mobility of all prime age workers is sensitive to pecuniary incentives. However, wages as a whole include offsetting elements. It is shown that compensations for transferable human capital raise and compensations for firm-specific human capital decrease job switches. It also appears that, in technology firms and for highly educated, firm-level payments, especially rent sharing, are most important in inhibiting unwanted job seeking. High firm-level wages tend to decrease job-to-job switches but also to increase withdrawals from the workforce. Job switches in all firms also show a positive relation to age. However, the 49-64 age group is in a considerably worse labour market position.

Theme: Compensation policy

Keywords: wages, compensation policy, unemployment, worker mobility, linked employer-employee data

JEL Classification numbers: J21, J31, J50, C22, C41

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TIIVISTELMÄ: Tutkimus tarkastelee työsuhteiden kestoa duraatiomallilla käyttäen otosta yhdistetystä työnantaja- ja yritysaineistosta Suomesta vuosilta 1989-1996, jossa on painotettu erityisesti korkeasti koulutettuja. Tutkimuksen mukaan palkkaus vaikuttaa merkittävästi parhaassa työiässä olevien työpaikkojen vaihtoon. Kuitenkin palkkauksessa on vastakkaisia elementtejä. Koulutuksesta ja työkokemuksesta maksettavat korvaukset ovat positiivisessa suhteessa työpaikan vaihtoon, kun taas yrityskohtainen palkkaus vähentää liikkuvuutta. Tutkimuksen mukaan erityisesti tulospalkkaus vähentää työntekijöiden työpaikkaliikkuvuutta. Korkeat palkat yrityksessä mm. tulospalkkauksen johdosta tosin myös lisäävät todennäköisyyttä työmarkkinoilta poistumiselle. Työpaikan vaihdon todennäköisyys ei vähene iän myötä. Poikkeuksen muodostavat kuitenkin ikääntyneet yli 49 vuotiaat, joiden työmarkkina-asema on huono.

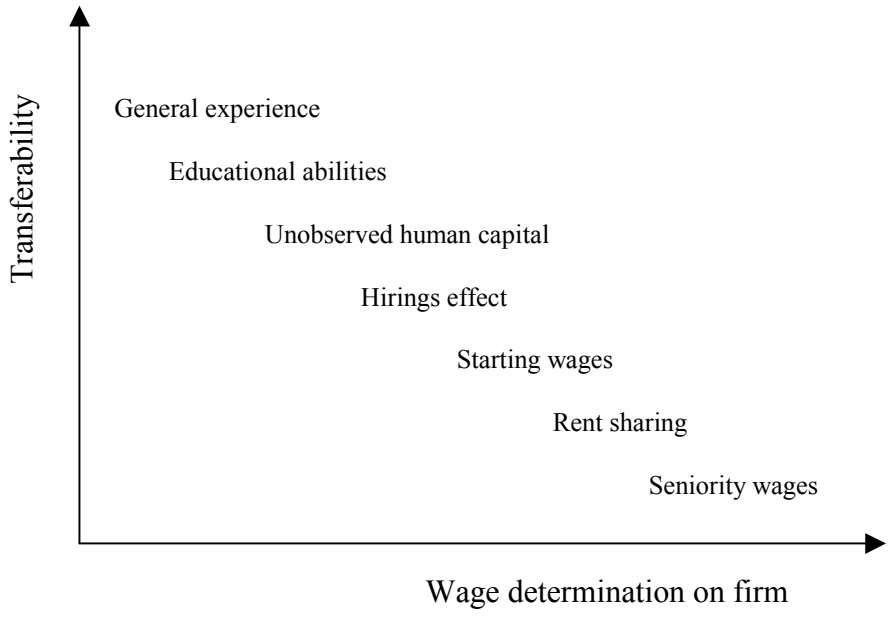
1. Introduction

The two main alternative explanations for job switches are human capital and job search models (for an empirical application of the former, Mincer, 1974, of the latter, Topel and Ward, 1992). In the human capital model, returns to age are interpreted as returns to general human capital, while returns to job tenure show firm-specific human capital. In the job search model, the returns to work experience are also explained by the longer time spent in searching and finding a good match. Returns to tenure, in turn, shows evidence of good match.

Both theories predict that general human capital gained in a career and voluntary job-to-job mobility are positively related. Lazear (1992) indeed argues that job switches are the key to increasing wages. This is easy to amend by a labour market equilibrium in job search models. Manning (1998) shows that the relative size of unemployed workers and their propensity to accept new jobs crucially affects the returns to job-to-job switches. High job destruction and the propensity of the unemployed to accept new jobs deteriorates the labour market position of employed workers and the returns to tenure.

The linked employer-employee data gives an important contribution to the analysis of job switches and human capital. Wages can, hence, be decomposed into compensations for experience, education, unobserved human capital and firm-specific wages. The returns to age (general experience) and educational abilities are here argued to be the main forms of transferable human capital. Compensations for (less transferable) unobserved human capital are referred to as high wages of the individual throughout his work career that are not explained by experience, sex or education. Following figure shows the compensations in two axes:

Figure 1. Compensations for work and transferability



General experience is accumulated as work experience is gained. *Educational abilities* are also transferable, since the return on education appears the same irrespective of the size of the firm or other firm characteristics, see Piekkola (2001). Intensive job search can explain why worker mobility such as churning is high for the educated in Finland. *Unobserved human capital* is less transferable and contains elements of firm-specific capital. It gives the firm an option value of risky workers with unobserved abilities, see Lazear (1998). The reason is that workers suffer from mobility costs when moving to another firm. Firms that expect to live for a long time and grow fast may more easily hire high-wage workers at some risk. Following Burdett and Mortensen (1998), higher compensations for unobserved human capital also leads to a large firm size as the quit rate is lower. The employee has a higher reservation wage than the unemployed and has a smaller chance of finding a firm offering even higher wages. Mobility costs may explain why quits are involuntary and concentrate more on the lay-offs of bad performers. On the other hand, unobserved human capital is not related to the present job but also explained by higher wages gained in future jobs. Frequent job switches ease the chances to raise the relative wage premium.

The human capital model predicts that the accumulation of firm-specific human capital reduces the likelihood of turnover, as the wage reflects productivity based on firm-specific knowledge. Becker (1964) discusses specific training and, hence, firm-specific ability, that may give rise to a bilateral monopoly situation and the returns from this are shared between the firm and the worker.[1] In Piekkola and Kauhanen (2002) firm-specific wages also show the relative position of the firm in the wage offer curve in job searching. This is important in rent hopping, i.e. in searching for new jobs with even higher wages, see Teulings and Hartog (1998). In this study, firm effects are further divided into compensations from seniority, hirings and quasi rent (rent sharing), see figure 1.

Finally, the aged workers had a considerably higher propensity to lose their jobs than Finnish employees in general in the deep recession in the beginning of the 1990s. Approximately 50 per cent of the jobs held by people aged 55-59 vanished in the first half of the 90s (see Huovinen and Piekkola, 2001). This is because the withdrawal rate from employment was more than 16 per cent in 1991-1993 for individuals aged 55-64.

Older workers and the unskilled have undoubtedly had a worse labour market position. The persistence of the job destruction of the aged shows that the phenomenon was not only an outcome of the deep recession in 1991-1993 but has continued throughout the decade. In Finland, the employment share of the age group of 55 to 59 years fell from 67 per cent in 1970 to 48.5 per cent in 1996 and the fall in the labour market participation has been even stronger for the age group of 60 to 64 years before the age of 65, the old-age pension limit. Dustmann and Meghir (1998) consider a model of wage growth based on learning by doing in which different firms offer different career structures in terms of the rate of human capital accumulation. Separations occur more frequently early in a career since workers are then more likely to receive a better wage offer than their current one, reflecting higher returns from on-the-job search, and at the same time lower forgone returns from job-specific investments. Azfar and Danninger (2001) also argue that

[1] Firm-specific and general human capital can also be complements or technologically complementary (see Acemoglu and Pischke, 1999). Kessler and Lulfesmann (2000) argue that incentive complementarity gives rise to situations where returns from transferable human capital are also shared. The first reason is that high firm-specific training makes outside options non-binding.

one reason for a wage premium for prime age workers is the expected long tenure of the employer that extends the amortization period for firm-specific human capital investments.

Section 2 presents empirical approaches to estimate human capital and the propensity to job search. Section 3 describes the duration model and gives the results of the model. The analysis includes the early exit channels such as part-time retirement. The final section concludes.

2. The Model

Human capital model: person and firm characteristics

The linked data allow us to separate compensations based on education/sex, unobserved human capital (person effect) and firm-specific payments (firm effect). Abowd and Kramarz (2000) find that in the US the person and firm component of wages receive equal importance in explaining industry differences. Empirical formulation follows Abowd, Kramarz and Margolis (1999) in the way that the person-effects are estimated before the firm-effects. The two-stage approach can be justified by the low correlation of the person and firm effects (below 0.006, not shown). The basic model for the log of wage of a person *i* working in firm *j* at time *t* is

$$\ln(\mathrm{w}_{\mathrm{ijt}}) = \theta_i + \psi_{J(i,t)} + \beta x_{it} + e_{ijt}. \qquad (1)$$

βx_{it} shows time-varying person characteristics: experience and time dummies; hence it contains time dummies, a dummy indicating whether person *i* has switched jobs and experience up to the fourth power. θ_i is the time invariant individual fixed effect. ψ_j captures the effect of unmeasured employer heterogeneity, where $J(i,t)$ indicates the employer of *i* at date *t*. e_{ijt} represents a statistical error term. The first stage wage model includes only time varying characteristics βx_{it} and $\overline{x}_i \overline{y}_j$ showing interactions of person average $\overline{x}_i$ and firm characteristics $\overline{y}_j$ (interactions of average experience with the average number of workers and its second power, with the average number of workers times seniority and its second power and with 35 industry dummies, with 35 industry dummies times seniority). The estimation uses 12,824,574 observations and is done in two periods, years 1987-1992 and 1993-1998, and in each period using deviations from the individual means to purge the person-fixed effects (see Appendix B for the description of the data). The subsequent error term includes, in addition to the original error e_{ijt}, the projection of the firm effects on the interaction variables. The person effect is the person average of the original error: $\theta_i = mean_i(\ln(w_{it}) - \hat{\beta}_1 x_{it} - \hat{\beta}_2 \overline{x}_i \overline{y}_j)$, where $\hat{\beta}_1$ and $\hat{\beta}_2$ are the estimated values of the coefficients.

The firm effect $\psi_{j(i,t)}$ is the difference between $\ln(w_{it}) - \hat{\beta}_1 x_{it} - \hat{\beta}_2 \overline{x}_i \overline{y}_j$ and person effect θ_i. The decomposition of the person effect θ_i uses the weighted least square estimates of:

$$\theta_i = \alpha_i + u_1 \eta_i + u_2 d_i + \varepsilon_i , \tag{2}$$

using the variance $\mathrm{var}_i[\ln(w_{it}) - \hat{\beta}_1 x_{it} - \hat{\beta}_2 \overline{x}_i \overline{y}_j]$ as the weight. α_i is the intercept (unobserved person effect), η_i is the education level, d_i is the sex dummy and ε_i is the statistical error. Seven education grades are separated according to five fields ((i) general education, humanities, aesthetics, medical and health, field unknown, (ii) commercial and clerical work, law, social science, (iii) technology and natural science, (iv) transport and communication, (v) agriculture and forestry. Furthermore, until 1993 those less than 34 years of age and others are separated and in 1993-1998 those less than 37 years of age are separated from others using dummies. The reason is the reforms in the education system that took place especially in the 1980s so that the same educational degree for young and old may not be comparable. This leads to 45 education dummies. The decomposition of the firm effect uses 10,851,754 observations (year 1989 dropped since hirings rate is not obtainable) to estimate

$$\psi_{jt} = \phi_j + \gamma_j seniority_t + \gamma_{2j} seniority_t^2 + \gamma_{3j} HRR_t + \gamma_{4j} QR_t + \varepsilon_{jt} , \tag{3}$$

where ϕ_j is a firm intercept, γ_j is seniority slope, γ_{2j} is seniority squared slope, γ_{3j} is hirings slope, γ_{4j} is quasi rent slope, HRR_t is hirings rate and ε_{jt} is the statistical error term. Let $HR_{(j,\,t)}$ denote the number of workers in firm *j* at time *t* who did not work at the firm at time *t-1* in Employee Statistics. The hirings rate can be defined as follows:

$$HRR_{(j,\,t)} = \sum HR_{(j,\,t)} / ((\sum_i E_{it} + \sum_i E_{i,\,t-1}) /2), \tag{4}$$

where E_t is employment at date *t*. The quasi rent is obtained by

$$QR_{it} = v_{jt} - 0.03 k_{jt} - (1 + \theta_i - \overline{\theta})\overline{w} , \tag{5}$$

where v_{jt} is value added per worker, k_{jt} is real capital per worker, θ_i is the person effect and $\overline{\theta}$ and $\overline{w}$ are the grand average person effect and wages, respectively. Transferable human capital, as captured in person effect θ_{it}, determines the opportunity income of the individual i. Value added per worker is value added divided by the producer price index at the two-digit level. Note that quasi rent receives a negative value if value added is not obtainable. Real capital is accumulated investment with 15 per cent depreciation for machinery and 7 per cent for other capital using initial stock values from 1987 in Financial Statistics.

Job search model

The job search model follows the Burdett and Mortensen (1998) type job search equilibrium in the labour market, as analysed by Barth and Dale-Olsen (2001). This model is used to control for the labour supply effects in the model presented above. Let all separations of workers be voluntary and proportional to employment at a given level of firm-level wages, and let respective hirings follow random matching and be independent of firm employment. In a steady state, hirings equal separations and employment follows $H(w) = HR(w)/SRR(w)$ with the usual properties for hirings $\partial HR/\partial w > 0$ and separation rate $\partial SRR/\partial w < 0$ (the separation rate SRR is defined as the hirings rate in eq. 4). Let σ the probability of all workers to receive a job offer and $F(w)$ to show wage offer distribution. Employed workers accept the wage offer if the wage level is from $1-F(w)$. The probability for separations is given by $SRR(w) = \sigma_0 + \sigma[1-F(w)]$, where σ_0 shows the exogenous separation. Since the wage premium is zero for non-employed workers $F(w)$=0, all unemployed workers accept the wage offer. The firm hires employed workers who receive less than w. Barth and Dale-Olsen (2001) show that the elasticity of labour supply to each establishment with respect to firm-level wages is given by

$$\varepsilon(w) = \frac{\partial H}{\partial w}\frac{w}{H} = 2\sigma\frac{f(w)}{\sigma_0 + \sigma[1-F(w)]}w \ , \tag{6}$$

where $f(w)$ is the density function of the cumulative wage offer distribution. This may also be written as

$$\varepsilon(w) = -2\frac{\partial SRR}{\partial w}\frac{w}{SRR} = -2\frac{\partial SRR}{\partial \psi}\frac{1}{SRR}. \tag{7}$$

3 Results

Appendix A describes the variable used and the mean values of the variables. The elasticity of labour supply is estimated using (6) and (7) following Barth and Dale-Olsen (2001). Churning, equal to separations when jobs are created and to hirings when jobs are lost, measures excess worker mobility instead of separations and is explained by the position of the firm in the wage offer curve $1-F(w)$. (See Davis, Haltiwanger and Schuh, 1996, for evaluation of churning.) It is seen from table A.1 that the exogenous separation rate σ_0 for prime age workers is 3.2 percentage points for the lower educated and 3.4 percentage points for the highly educated. These figures are overestimates of exogenous separations into unemployment, since they also include job-to-job flows. The exogenous separation rates for the 49-64 age group show similarly a lower rate for the low educated (2.4) and higher for more highly educated (3.9). The probability of job offers σ is of the same magnitude except the negative value for older highly educated workers. This implies that older more highly educated have a higher probability to

switch to firms that pay on average less than the previous job pays. Overall, labour supply elasticities are decreasing at the education level. The mobility of highly educated is explained more by exogenous separations and is less sensitive to the position of the firm in the distribution of firm-level payments. (Although the standard deviation is of around 0.4 for all workers and only somewhat lower for highly educated). Labour supply elasticities are low or even negative for older highly educated workers.

Following table summarizes some of the other important variables in the sample data used in four education categories.

Table 1. Summary Statistics by Education

Variable	Elementary	Vocational	Lower University	Higher University
Seniority, Prime Age Workers	18.7	16.9	15.5	13.5
Seniority, Older Workers	29.9	30.8	30.2	28.8
Compensation for				
Experience, Prime Age Workers	0.35	0.40	0.40	0.41
Experience, Older Workers	0.07	0.09	0.08	0.08
Unobserved Human Capital, Prime Age	2.17	1.92	1.39	0.93
Unobserved Human Capital, Older	2.89	2.85	2.34	2.04
Education, Prime Age Workers	9.79	9.98	10.71	11.50
Education, Older Workers	10.13	10.21	11.03	11.80
Firm-Level Payments, Prime Age Workers	-0.07	-0.06	-0.05	-0.06
Firm-Level Payments, Older Workers	-0.10	-0.09	-0.09	-0.13
Seniority Effect (seniority*γ+seniority*γ^2), Prime Age	0.02	0.03	0.03	0.04
Seniority Effect (seniority*γ+seniority*γ^2), Older Workers	0.03	0.05	0.04	0.03
Rent Sharing, Prime Age Workers	-0.09	-0.09	-0.10	-0.11
Rent Sharing, Older Workers	-0.12	-0.13	-0.14	-0.17
Firm Intercept, Prime Age	-0.01	0.00	0.01	0.01
Firm Intercept, Older Workers	0.00	-0.01	0.02	0.01

Farber (1999) finds that the relationship between seniority and education is not monotonic in the US. Employees with high school or higher university education are likely to have longer employment relations than those with an education degree in between. Table 1 shows that in Finland seniority decreases monotonically with education for prime age workers, but not for older workers. Highly educated prime age workers have, on average, a four years shorter tenure than those with elementary education. Another finding is the long tenures of older workers. Older workers with short tenures (and with periods of unemployment) are in a considerably different labour market position.

Table 1 also shows the percentual effect of the various compensation components on wages. One year's more experience yields, on average, 0.4 percentage points higher wages. Compensations for experience are increasing on the education level. The wage profile is substantially flatter for older workers. It is seen that educational compensations are higher for older workers. (Note that an average age dummy was used to divide the education effect of young and old workers.) Older workers are better rewarded than younger workers of the same education level. The unexplained part of wages is also higher for older workers.

It is seen that on average firm-level payments are negative. An important part of deviations from market wages are based on fixed-term contracts that do not yield higher wages. This is clear when the aim is to replace absent person or to recruit personnel for seasonal peaks. Fixed-term contracts are also concentrated in small establishments with less than 20 employees (Dale and Bamford, 1988). In Finland, almost half of fixed-term contracts are made in small firms (Nätti and Väisänen, 2001). Finally, the estimation for firm-level payments include educational dummy for university education and firm-level intercept is higher for highly educated.

3.1 Duration Model Results Using Proportional Hazards

The hazard function gives the probability of retirement for some short interval of time after time t, $t+\Delta$, given that the duration lasts at least until t (for duration models, see Heckman, and Singer, 1984,, Kiefer, 1988, and Florens, Fougere and Mouchart, 1996). The hazard function in continuous time t for the next short interval of time, Δ, can be defined as follows:

$$h(t) = \lim_{dt \to 0} \frac{P(t < T < t + dt \mid T \geq t)}{dt} \tag{8}$$

$$= \lim_{dt \to 0} \frac{F(t+\Delta) - F(t)}{\Delta S(t)} \ ,$$

where T is a random realisation, $F(t)$ is the cumulative distribution function and $S(t) = 1 - F(t) = \Pr(T \geq t)$ is the survival function. Explanatory variables can be included in duration models in many ways. Cox's (1972) semi-parametric proportional hazards model is a popular method of analysing the effect of covariates on the hazard rate since it is a compromise between the Kaplan-Meier estimator and the structured parametric models. In addition, it corrects for the problem of censored data. The hazard model is given by

$$h(t; x) = h_0(t) \exp(\beta x') \ , \tag{9}$$

where β is a vector of unknown regression coefficients, x' is a covariate vector of an explanatory variable and $h_0(t)$ is an unknown non-negative baseline hazard rate (for x' set to zero). Let $t_1 < t_2 < t_k$ show distinct times of seniority when exit occurs. The proportional hazards specification means that the effect of regressors is to multiply the hazard function itself by a scale factor. The conditional probability that the ith employee exits at time t_i with a covariate vector x' in a risk set $R_i(t), t_i \geq T_i,$ given that a single exit has occurred at t_i is given by

$$\Pr[t_i = T_i \mid R_i] = \frac{e^{\beta x'}}{\sum_{j \in R_i} e^{\beta x'}} \ , \tag{10}$$

where $j \in R_i$ corresponds to those employees that are just at risk prior to time t_i. The baseline hazard function is assumed to be the same for all observations and is cancelled

out. This limits the effects of unobserved heterogeneity that vary among individuals. The partial likelihood function is obtained by multiplying these probabilities for each of the k incidences of exit with exogenous explanatory variables for each of the observed survival times. Breslow (1974) method is used for ties among the time until exit. A negative (positive) coefficient indicates that this baseline risk of failure at a moment in time is reduced (increased).

Kaplan-Meier survivor function graphs below first show the proportion of those who stay at work during prime age (18-39) and older workers (49-64). All the shares are considered yearly because of the data.

Figure 1. Kaplan-Meier Survival Estimates: Job Switches of Prime Age Workers

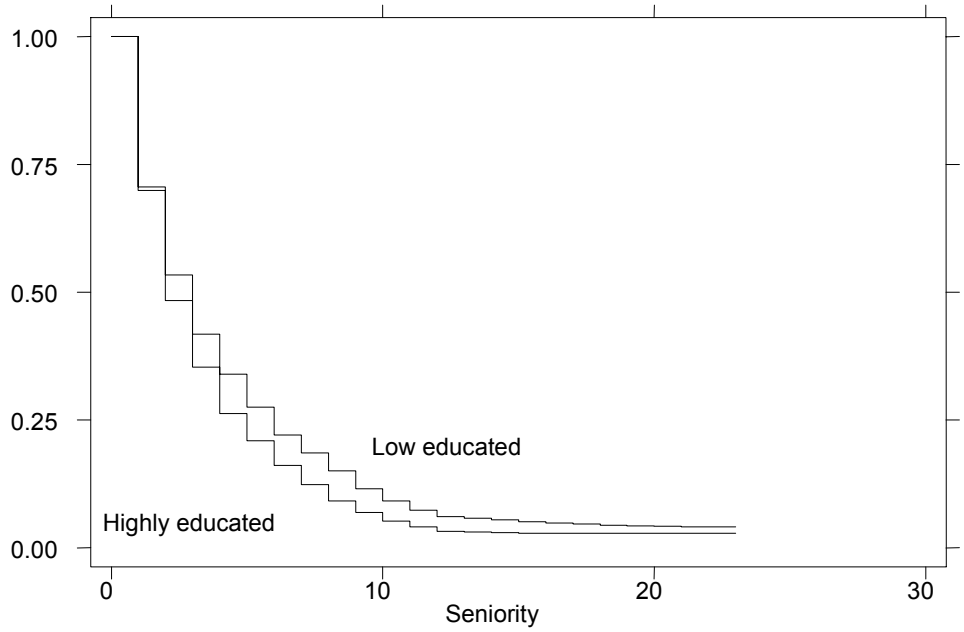
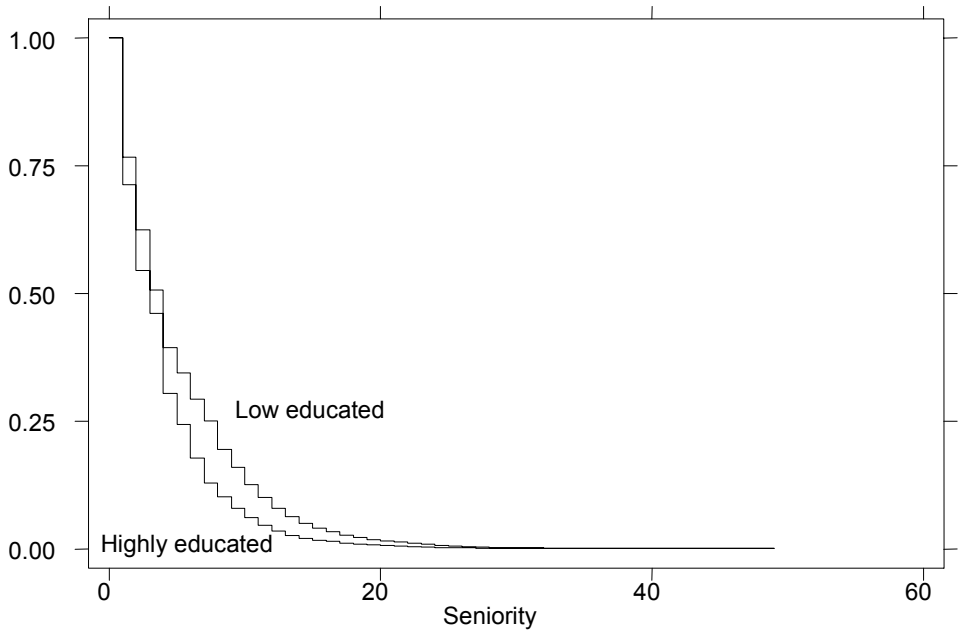


Figure 2. Kaplan-Meier Survival Estimates: Job Switches for Older Workers



The figure for job switches shows separate hazard rates for low and highly educated. It is seen that job switches are more frequent for prime age workers, and for highly educated although not significantly different in a log-rank test for the equality of survivor function. For prime age workers, one-half of the jobs end in two years. For older workers the respective figure is four to five years. After five years, around 25 per cent of prime age workers continue to work at the same firms.

The survival probabilities are similar to those found for US in Farber (1994) for the entire labour force. Farber (1999), in his overview of the factors relevant in job switches, shows that the probability of job change decreases in tenure, but at a decreasing rate. Employment relationships end up either early or concentrate on long durations. The average seniority is 11.6 years in the sample data so that long-term employment relations are also frequent in our data. In Burgess (1998) short tenures are much more common in the US than in other nine OECD countries. One explanation for similarity of Finnish to US figures is the extensive job switches of uneducated workers in the recession period. Another reason is the high mobility of the educated.

It is, on the other hand, likely that older workers with long and short tenures are in a different labour market position. The average seniority is much longer for older workers but short tenures have also become prevalent after the heavy recession in Finland in the early 1990s. One alternative way for older workers to partly continue to work is to enter a part-time retirement scheme.

The results of a Cox-Regression model for withdrawals are below. The failure is defined as 1) a switch of firm, 2) withdrawal from employment into part-time retirement or to retirement through unemployment and unemployment pension. Job-to-job switches also include periods of unemployment if the new job is found within the next year following the quit. All jobs after job switches are considered as new jobs (even if in the same firm). The highly educated are oversampled with two-thirds of all workers (37 931 out of 55 943). Results for part-time retirement are provided separately for women and men. Exits through other channels are censored in each column. In all the models baselines and coefficients are allowed to vary according to the exit channel.

Consider first the duration model results in table 2 for the sample of prime-age workers consisting of 47,654 persons and 104,552 observations. In one-ninth of the years (12,306 out of 104,552) there is a change in the labour market position, ending up in a job in new firms. The equivalent figure for older workers is one-eleventh of the years (1,582 out of 18,253).

Table 2. Estimates of the Job Switches and Compensation Policies

Dependent Variable	Prime Age Employees		Low Educated Prime Age Employees		Highly Educated Prime Age Employees		Older Employees		Older Employees Low Educated		Older Employees Highly Educated	
Variable	**Coefficient**	**z-value**	**Coefficient**	**z-value**	**Coefficient**	**z-value**	**Coefficient**	**z-value**	**Coefficient**	**z-value**	**Coefficient**	**z-value**
Age	1.032	**(15.2)**	1.027	**(6.8)**	1.036	**(14.6)**	-1.000	(0.0)	1.015	(1.0)	-0.996	(0.3)
Unobserved Human Capital (α)	1.082	**(3.9)**	1.194	**(3.7)**	1.066	**(2.8)**	-0.969	(0.7)	-0.824	(1.7)	-0.996	(0.1)
Education Effect ($u\eta$)	1.149	**(5.2)**	1.215	**(3.1)**	1.048	(1.5)	-0.944	(0.8)	-0.761	(1.1)	-0.906	(1.2)
Hirings Effect of Low Educated	-0.820	(1.2)	1.118	(0.3)	-0.715	(1.7)	11.058	**(4.2)**	44.266	**(4.2)**	2.991	(1.4)
Hirings Effect of Highly Educated	1.027	(0.2)	1.193	(0.6)	-0.963	(0.2)	16.016	**(5.1)**	38.033	**(4.2)**	8.401	**(2.9)**
Firm Effect Intercept (ϕ)	-0.138	**(23.0)**	-0.047	**(15.5)**	-0.173	**(18.6)**	-0.225	**(4.1)**	-0.278	**(2.6)**	-0.115	**(8.1)**
Rent Sharing	-0.203	**(17.6)**	-0.080	**(11.7)**	-0.243	**(14.0)**	-0.647	(1.3)	1.422	(0.7)	-0.343	**(3.9)**
Seniority Effect ($seniority*\gamma+seniority*\gamma^2$)	-0.020	**(20.8)**	-0.009	**(16.9)**	-0.027	**(14.9)**	-0.085	**(7.1)**	-0.095	**(4.6)**	-0.061	**(6.7)**
Vocational Education	-0.887	**(3.6)**	-0.930	**(2.0)**			1.008	(0.1)	1.024	(0.3)		
Lower University	-0.873	**(3.9)**			-0.989	(0.4)	1.033	(0.5)			-0.980	(0.3)
Higher University	-0.814	**(4.5)**					1.045	(0.4)				
Highly Educated/Employees	1.358	**(7.8)**	1.509	**(3.9)**	1.302	**(6.2)**	1.082	(0.7)	1.028	(0.1)	1.127	(0.9)
Labour Supply Elasticity η_{Lt}	-0.966	(1.4)	1.146	**(3.0)**	-0.910	**(3.4)**	-0.917	(1.7)	-0.977	(0.3)	-0.884	**(1.9)**
Labour Supply Elasticity η_{Ht}	-0.055	**(3.6)**	-0.012	**(2.7)**	-0.060	**(3.1)**	-0.863	**(2.4)**	-0.825	**(2.1)**	-0.899	(1.4)
Borrowing Ratio	1.112	**(18.9)**	1.122	**(9.6)**	1.110	**(16.4)**	1.062	**(3.2)**	1.049	(1.3)	1.055	**(2.4)**
Net profits/Current Cost Investment	1.000	**(5.2)**	-0.998	(0.9)	1.000	**(5.3)**	1.000	(1.4)	1.001	**(2.2)**	1.000	(0.6)
R&D Intensity 0-1%	-0.914	**(3.9)**	-0.985	(0.3)	-0.892	**(4.3)**	1.167	**(2.2)**	-0.957	(0.4)	1.383	**(3.5)**
R&D Intensity 1-4%	-0.746	**(11.0)**	-0.752	**(4.8)**	-0.748	**(9.7)**	-0.882	(1.6)	-0.664	**(3.2)**	1.067	(0.7)
R&D Intensity 4- %	-0.751	**(9.0)**	-0.741	**(3.4)**	-0.756	**(8.1)**	1.049	(0.5)	-0.818	(1.1)	1.214	(1.5)
Average employees 50-99	1.160	**(4.9)**	1.048	(0.8)	1.201	**(5.3)**	1.382	**(2.8)**	1.138	(0.6)	1.565	**(3.2)**
Average employees 100-499	1.565	**(17.0)**	1.600	**(8.6)**	1.558	**(14.6)**	1.955	**(6.2)**	1.992	**(3.7)**	1.976	**(5.1)**
Average employees 500-	2.034	**(25.2)**	2.160	**(13.5)**	1.962	**(20.7)**	2.500	**(8.2)**	2.638	**(5.1)**	2.410	**(6.3)**
IT industry	-0.762	**(10.3)**	-0.793	**(3.2)**	-0.759	**(9.6)**	-0.933	(0.8)	-0.920	(0.4)	-0.952	(0.4)
Energy Industry	-0.749	**(4.5)**	-0.652	**(2.7)**	-0.775	**(3.6)**	-0.691	**(2.7)**	-0.705	(1.5)	-0.738	**(2.0)**
Construction	-0.580	**(16.9)**	-0.560	**(9.1)**	-0.606	**(13.3)**	-0.684	**(3.8)**	-0.603	**(2.6)**	-0.720	**(2.7)**
Trade	-0.725	**(12.3)**	-0.673	**(7.7)**	-0.747	**(9.5)**	-0.870	(1.6)	-0.765	**(1.9)**	-0.939	(0.5)
Services	-0.487	**(21.2)**	-0.414	**(13.1)**	-0.520	**(16.6)**	-0.516	**(6.3)**	-0.472	**(4.9)**	-0.508	**(5.0)**
Sample size	104552		33618		70934		18253		7286		10967	
Subjects	47654		14706		32949		8289		3307		4982	
Failures	12306		3222		9084		1582		591		991	
Wald Test Chi (38-40)	5958		1406		5086		1573		513		1124	
Probability Chi (38-40) > 0	0		0		0		0		0		0	

Notes: Regressions are done for those under the age of 18-38 and 49-65. The regressions also include yearly dummies and six region dummies (the groups are: (i) ahvenanmaa, varsinais-suomi, länsi-uusimaa, satakunta, (ii) kanta-häme, pirkanmaa, päijät häme, (iii) keski-suomi, pohjanmaa, pohjois-savo, (iv) etelä-savo, lappi, pohjois-karjala oulu kainuu, (v) itä-uusimaa kymenlaakso, eteläkarjala, (vi) helsingin seutu). Standard errors are corrected for heterogeneity and clustering for each person group.

Individual Human Capital

Column two shows that, for prime age workers, the failure rate is 13 per cent for the highly educated (job switches divided by observation years, 9084 out of 70934), which exceeds the 9.5 per cent for the low educated in column three. The extensive mobility of the highly educated holds especially in the boom period. Year dummies indicate that the probability of job switches is 100-200 per cent higher in the years of the boom period, 1996-1997, compared with the years following the recession 1994-1996 (not shown). Job switches of low educated workers are somewhat less sensitive to the economic cycles (see also Dohmen and Pfann, 2000). One piece of evidence of the less cyclic nature of uneducated worker mobility is also the zero relation in column 2 to the firm profitability (net profits per current cost of investment). It is also seen from column 1 that, after all the controlling factors, the hazard rate of a worker with higher education remains about 90% higher than for an employee with basic education, the reference group.

It is seen that job-to-job switches increase with age. This positive age effect of the prime age workers is evidently more important factor than the decreasing returns on one year's more work experience (compensations for experience are insignificant and dropped from the model). It can be argued that the learning by doing effects of Dustmann and Meghir (1998) are more apparent after some experience has already been gained in the labour market.

It is seen that transferable human capital including compensations for education are important factors affecting job switches (first column). The effects are stronger for the low educated workers (second column) than for the highly educated (third column). For the same education level the jobs in the highest paying fields are subject to the biggest job switches. (Remember that 45 education dummies were used in the calculation of the education effect.) Another interpretation is that the higher returns in the period 1993-1998 have been conducive for job switches, given that educational compensations are separately assessed in the period 1989-1992 and in the high growth period 1993-1998. It is seen that workers with unobserved human capital also switch jobs.

It is seen that transferable human capital loses its significance for older workers. Compensations for unobserved human capital and education over a lifetime have unimportant effects for workers of over 49 years of age. Older workers have a limited chance of finding another high-wage job after separation. Older workers, in turn, change jobs for exogenous reasons not related to the relative compensation levels. There is clear evidence of greater job destruction, which explains the changes in the labour market position. (See the discussion in the introductionary section.) It is also striking that older workers have a substantially lower propensity to leave the job in firms that face an elastic labour supply. Evidently, good job opportunities for the rest of the workforce does not induce older workers to switch jobs.

Firm-Level Human Capital and Job-Related Characteristics

It is seen that firm-level payments generally inhibit job switches. It is not, hence, surprising that studies considering wages as a whole obtain mixed results, since compensations on transferable and firm-specific human capital have opposite effects. The hirings effect measures changes in firm-level compensations when the firm hires new workers.

Hirings have, on the average, a negative effect on the wage premium, see table 1. This implies that a decrease in hirings raises firm-level wages. It is argued that the greater the effect, the less elastic labour demand is. For older workers, particularly for the uneducated, the exit probability strongly increases with the hirings effect. Hence, job switches of older workers increase when it is difficult to adjust the workforce and labour demand is inelastic. To put it in other words, older employees in firms paying a high premium on new recruitment are more likely to experience quits. It is seen that for prime age workers the job switch probability is, on the other hand, independent of the hirings effect.

It is seen that starting wages, captured in the firm effect intercept, and seniority payments postpone the job switches of all workers. In seniority payments, benefits from back loading of pay to give incentives to stay in the firm are apparent (see Lazear, 1979, 1981). Rent sharing also lowers the job switch probability, albeit not for older and less educated workers. Rent sharing is particularly important factor for highly educated.

Profitability is measured by the net profits per current cost of investment. It is seen that firms with a good economic performance experience a higher number of job switches. This can also relate to the higher worker mobility in boom periods.

The industrial fields were controlled by six dummies: manufacturing, energy and water, construction, trade and services, with work in a manufacturing industry as the reference group. It can be seen that the job switches of prime age workers are most common in manufacturing (the reference industry) and least common in the service sector, IT industry, trade, energy and water power industries. This gives evidence of a division of industries into service and manufacturing sectors. In the service sector, workers usually continue to work at the same firm for a longer period. In manufacturing industry prime age employees look for new job opportunities. Regional differences are also notable with the concentration of job switches in some southern or south-east regions of Finland (Kanta-Häme, Pirkanmaa, Päijät-Häme, Itä-Uusimaa, Kymenlaakso, Etelä-Karjala).

Job Switches of the Highly Educated in Technology Firms

Firms are divided into four categories depending on the average R&D expenditure per sales: Firms that report R&D in a certain year are around 25% of all firms included in the sample of Financial Data but cover 60 per cent of employees in the sample. In Table 2 the firms with no R&D in any year were used as the reference. The other categories are between 0-1%- 1-4% and over 4%. Technology firms are those which have an average of over 4% of R&D investment expenditures per sales. It is seen from table 2 that job switches are less frequent in firms that are doing a lot of R&D investment. Technology firms in the IT industry also experience fewer job switches. It is important to note that without any controls the average job mobility is, on the other hand, relatively high. Table 3 concentrates to job switches in firms with R&D investment including high technology firms.

Table 3. Estimates of the Job Switches of Highly Educated and Compensation Policies in R&D Intensive Firms

Dependent Variable	Prime Age Workers R&D-intensity > 0%		Prime Age Workers R&D-intensity >1%		Prime Age Workers R&D-intensity >4%		Older Workers R&D-intensity > 0%	
Variable	**Coefficient**	**z-value**	**Coefficient**	**z-value**	**Coefficient**	**z-value**	**Coefficient**	**z-value**
Age	1.040	**(12.1)**	1.029	**(5.5)**	1.024	**(3.0)**	1.025	(1.5)
Unobserved Human Capital (α)	1.051	(1.5)	1.031	(0.6)	1.013	(0.2)	-0.940	(0.7)
Education Effect ($u\eta$)	1.030	(0.7)	1.049	(0.8)	1.042	(0.4)	-0.964	(0.4)
Hirings Effect of Low Educated	1.739	**(1.8)**	-0.663	(1.0)	-0.495	(0.9)	9.327	**(1.8)**
Hirings Effect of Highly Educated	1.713	**(1.8)**	-0.662	(1.0)	-0.633	(0.6)	35.964	**(2.6)**
Firm Effect Intercept (ϕ)	-0.051	**(19.3)**	-0.082	**(11.6)**	-0.036	**(8.2)**	-0.117	**(6.3)**
Rent Sharing	-0.100	**(13.6)**	-0.089	**(9.4)**	-0.061	**(6.8)**	-0.413	**(2.4)**
Seniority Effect (seniority*γ+seniority*γ^2)	0.000	**(22.4)**	-0.005	**(11.0)**	-0.002	**(8.7)**	-0.013	**(6.3)**
Lower University	-0.979	(0.6)	-0.981	(0.4)	1.138	(1.7)	1.078	(0.7)
Highly Educated/Employees	1.103	(1.7)	1.653	**(5.7)**	1.554	**(3.1)**	1.018	(0.1)
Labour Supply Elasticity η_{Lt}	1.032	(0.9)	1.059	(1.1)	1.510	**(3.6)**	-0.841	**(1.8)**
Labour Supply Elasticity η_{Ht}	-0.030	**(2.7)**	0.000	**(4.2)**	0.000	**(5.0)**	-0.843	(1.7)
Borrowing Ratio	1.139	**(14.2)**	1.126	**(9.5)**	1.028	(1.3)	1.037	(1.2)
Net profits/Current Cost Investment	1.002	**(11.8)**	1.001	**(10.5)**	-0.992	**(7.3)**	1.000	(0.6)
R&D Intensity 1-4%	-0.897	**(3.8)**					-0.753	**(3.2)**
R&D Intensity 4- %	1.001	(0.1)	-0.940	(1.6)			-0.945	(0.5)
Average employees 50-99	1.049	(0.7)	-0.955	(0.6)	-0.850	(1.3)	1.044	(0.2)
Average employees 100-499	1.405	**(5.8)**	1.390	**(5.3)**	1.364	**(3.0)**	1.111	(0.4)
Average employees 500-	2.086	**(12.6)**	1.713	**(8.6)**	2.006	**(6.5)**	1.573	**(1.8)**
IT industry	-0.598	**(12.2)**	-0.549	**(12.0)**	-0.582	**(6.3)**	-0.506	**(2.6)**
Energy Industry	-0.846	**(1.9)**	-0.153	**(4.5)**	0.000	**(77.6)**	-0.827	(1.1)
Construction	-0.613	**(9.2)**	-0.569	**(3.4)**	-0.655	(1.7)	-0.692	**(2.4)**
Trade	-0.881	(1.5)	-0.744	**(1.8)**	-0.570	(0.8)	-0.846	(0.6)
Services	-0.303	**(16.2)**	-0.292	**(3.6)**	1.003	(0.0)	-0.140	**(4.0)**
Sample size	42994		21354		7762		7135	
Subjects	18743		9399		3535		3048	
Failures	5408		2588		990		640	
Wald Test Chi (30-32)	3152		1681		7232		760	
Probability Chi (30-32) > 0	0		0		0		0	

Notes: Regressions are done for those under the age of 18-38 and 49-65. The regressions also include yearly dummies and six region dummies (see note for table 1). Standard errors are corrected for heterogeneity and clustering for each person group.

In high technology firms in almost one half of the years there is a change in the labour market position, ending up in new employment. This is surprising, given the negative effect that R&D intensity had in the earlier table 2 on the probability of a job switch. One can argue that, despite extensive worker/job mobility, R&D investments are, however, an irreversible investment and require continuity of employment relations. The extensive job mobility is especially explained by the young composition of the workforce.

It is also seen that job-to-job switches are unrelated to human capital payments such as compensations for education and unobserved human capital. Firm-specific human capital, on the other hand, plays an important role in job switches. It is seen that rent sharing is the most important factor in inhibiting job switches. This supports Becker's (1964) idea of a bilateral monopoly situation where the returns from profits are shared between the firm and the worker. (See the discussion in the introductionary section.) There is instead less support for a claim that employees choosing an "R&D-intensive" career accept a wage discount so that seniority payments compensate for this at the end of a career. This is because seniority payments have relatively little influence on job switches. Starting wages do not, on the other hand, have a negative effect on job switches (as in non-R&D-intensive firms). The human capital models of Pakes and Nitzan (1983) imply that if workers in R&D-intensive firms get access to valuable knowledge in the firm, they accept lower starting wages since they can expect high wages in the future, supported by findings in Moen (2000) using Norwegian data.

Withdrawal into Unemployment or Part-Time Retirement

Withdrawal into non-employment occurs for 138 prime age employees and for 36 older employees in the sample. The limited number of withdrawals is explained by the fact that we have information on withdrawals only for the years 1995-1998.

All exits in the first two columns relate either to unemployment or to unemployment pensions. Hence, disability pensions are excluded. (For description of Finnish early retirement schemes, see Huovinen and Piekkola, 2001.) Unemployment is less likely when the performance of the firm is good. But educational compensations and unobserved human capital increase withdrawals into unemployment. This gives some tentative evidence that high-wage older workers also suffer from firings, especially when the firm is not performing well.

High wages are also conducive to part-time retirement. All firm-level payments increase the probability of part-time retirement and also partly unemployment (or an unemployment pension). It is evident that high firm-level wages tend to decrease job-to-job switches but to increase withdrawals from the workforce. Part-time retirement is a particularly attractive alternative in firms with inelastic labour demand (strong hirings effect).

It is seen that employees with elementary education or with a higher university degree withdraw in part-time retirement more than those with a lower university degree or vocational education. The relationship between part-time retirement and education is, hence, not monothonic. One reason is that part-time pension is generous and tax progressivity leads the real benefit level to be close to 90% of the net wages of the regular full-time job for high-wage workers.

Table 4. Estimates of the Withdrawal into Unemployment and Part-Time Retirement and Compensation Policies

Dependent Variable	Unemployment		Unemployment Older Employees		Part-Time Retirement Older Emloyees		Part-Time Retirement Older Low Educated		Part-Time Retirement Older Highly Educated	
Variable	**Coefficient**	**z-value**	**Coefficient**	**z-value**	**Coefficient**	**z-value**	**Coefficient**	**z-value**	**Coefficient**	**z-value**
Age	1.071	**(2.2)**	1.197	**(2.2)**	1.070	(1.7)	1.070	(1.3)	1.083	(1.5)
Unobserved Human Capital (α)	2.515	**(4.6)**	-0.261	**(3.9)**	1.321	**(1.8)**	1.019	(0.1)	1.560	**(2.0)**
Education Effect ($u\eta$)	3.424	**(7.5)**	1.684	(1.4)	2.688	**(6.2)**	5.802	**(5.4)**	2.731	**(4.3)**
Hirings Effect of Low Educated	-0.480	(0.4)	18.593	(0.7)	110	**(2.5)**	57.160	(1.3)	86.266	(1.7)
Hirings Effect of Highly Educated	-0.803	(0.1)	2.202	(0.2)	363	**(3.1)**	844.297	**(2.3)**	375.831	**(2.0)**
Firm Effect Intercept (ϕ)	2.176	(0.9)	2.220	(0.3)	4.087	(1.7)	6.034	(1.6)	1.555	(0.4)
Rent Sharing	2.916	(1.2)	15.746	(1.0)	5.835	**(2.2)**	3.963	(1.2)	3.943	(1.3)
Seniority Effect (seniority*γ+seniority*γ^2)	8.783	**(2.5)**	24.621	(1.3)	10.014	**(2.5)**	4.031	(1.0)	14.627	**(2.5)**
Vocational Education	-0.734	(1.2)	-0.513	(1.2)	-0.785	(1.1)	-0.621	**(1.8)**		
Lower University	-0.481	**(2.6)**	-0.126	**(2.6)**	-0.431	**(3.0)**			-0.572	(1.7)
Higher University	-0.151	**(4.2)**	-0.025	**(3.2)**	-0.208	**(3.7)**				
Highly Educated/Employees	1.133	(0.2)	1.379	(0.5)	-0.188	**(3.4)**	-0.641	(0.6)	-0.063	**(4.4)**
Labour Supply Elasticity η_{Lt}	-0.789	(0.9)	1.413	(1.0)	-0.955	(0.2)	-0.638	(1.4)	1.132	(0.5)
Labour Supply Elasticity η_{Ht}	-0.007	(0.5)	1.628	(0.8)	1.974	**(2.3)**	1.637	(1.3)	2.514	**(1.8)**
Borrowing Ratio	1.009	(0.1)	-0.642	(1.3)	-0.975	(0.3)	1.014	(0.1)	-0.939	(0.5)
Net profits/Current Cost Investment	-0.996	**(4.1)**	-0.965	**(2.3)**	-0.999	(0.1)	-0.996	(0.2)	-0.999	(0.4)
R&D Intensity 0-1%	-0.881	(0.5)	-0.646	(0.8)	1.190	(0.8)	1.509	(1.4)	-0.873	(0.4)
R&D Intensity 1-4%	1.008	(0.0)	-0.645	(0.7)	1.158	(0.6)	1.444	(0.9)	-0.842	(0.4)
R&D Intensity 4- %	-0.462	(1.4)	-0.565	(0.5)	-0.649	(0.8)	-0.270	(1.2)	1.059	(0.1)
Average employees 50-99	1.102	(0.3)	-0.902	(0.2)	1.360	(0.9)	1.017	(0.0)	1.963	(1.5)
Average employees 100-499	1.155	(0.5)	-0.742	(0.5)	1.408	(1.0)	1.505	(0.9)	1.535	(0.9)
Average employees 500-	1.594	(1.4)	1.087	(0.1)	1.623	(1.5)	1.474	(0.8)	2.472	(1.9)
IT industry	1.152	(0.4)	1.983	(1.0)	1.444	(1.2)	1.881	(1.4)	1.190	(0.4)
Energy Industry	-0.826	(0.3)	1.511	(0.5)	1.199	(0.3)	1.673	(0.7)	-0.506	(0.5)
Construction	-0.887	(0.2)	1.196	(0.2)	1.382	(0.6)	2.308	(1.2)	2.635	**(2.4)**
Trade	1.453	(1.3)	1.096	(0.1)	1.849	**(2.5)**	1.492	(1.1)	-0.816	(0.5)
Services	1.996	**(2.3)**	2.715	(1.5)	1.304	(1.0)	1.879	**(2.0)**	-0.963	(0.1)
Sample size	104452		18233		18120		7203		10917	
Subjects	47654		8288		8289		3308		4982	
Failures	138		36		179		97		82	
Wald Test Chi (30-34)	259		164		153		80		129	
Probability Chi (30-34) > 0	0		0		0		0		0	

Notes: Regressions are done for those under the age of 18-38 and 49-65. Unemployed includes unemployment pensioners. The regressions also include yearly dummies and six region dummies (see note for table 1). Standard errors are corrected for heterogeneity and clustering for each person group.

4. Conclusions

Wages as a whole include offsetting elements. It is shown that among the 18-48 age group workers with transferable human capital switch jobs more often. It is also shown that firm-level wage compensations, in contrast, lower job search intensity, and especially so for highly educated and in technology firms. The 49-64-years-old age group is in a considerably worse labour market position, accentuated by the high earnings level. The job switches of older workers also relate negatively to the presence of job opportunities, as captured in the elasticity of the labour supply. Older workers have to accept lower wage offers in new jobs.

The study suggests that human capital accumulation, such as high wages in large firms, result not only from long-term employment relationships more typical of the aged but also from the allocation of able workers to better paying firms. This reallocation takes place before the age of 49 and at an increasing rate with age. High earnings are associated with job switches that improve the quality of the employer-employee match. Firm responds to good match by paying higher wages, rent sharing especially, and this effectively lowers job seeking.

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Appendix A. The Linked Employee-Employer Data and Mean Values

Employment Statistics is a large data base that combines various registers kept by Statistics Finland and other authorities. The original data cover 23 776 631 observations from individuals that, during 1989-1998, worked at least one year in the private sector (for a description of the data, see Korkeamäki and Kyyrä, 2000). The plant level job and worker flows are based on 20,909,731 person-year observations after deleting (i) 71 073 observations with missing establishment or firm code, (ii) 47 194 with missing observation years, (iii) 1 838 647 with missing industry code, (iv) 62 648 with no sex code and (v) 697 995 observations when wages deviate more than five standard deviations from predicted value. (The OLS regression was similar to Abowd, Kramarz and Margolis, 1999, p. 326, with explanatory variables work experience up to the fourth potency, six education class dummies and sex.) The individual was dropped from the data if there was missing data in one or more year(s).

Following the method by Baldwin, Dupuy and Penner (1992), the births and deaths of firms are considered as mere transfers of the firm, when persons employed either at the old firm at date t-1 or at the new firm at date t amount to more than 60 per cent of all persons working in these firms at dates t-1 and t. Using this criterion, unreal deaths and births are less than two per cent of all firm births and deaths and these firms are linked (even though the firm code differs). The worker reallocation rate (the sum of hirings and separation rates) is around 0.5 per cent lower after this correction.

Person and firm effect calculations are based on 12 824 574 observations (firm code non-zero). It is important to note that the time span of 10 years is sufficiently long to separate person and firm effects, requiring in every firm at least one person to experience a job switch. 556,835 observations out of the 6,136,985 observations of the first year an individual is recorded in the firm had a missing seniority starting date. For these observations, seniority is set at 1 based on the observed firm switches. Seniority also receives the value of one if the missing date is from 1987. Therefore, since 1989 (the record starts at year 1987 but employer statistics start at year 1989) 117,572 individuals have a seniority of 3 in the year 1989, 86,557 have a seniority of 2 in the year 1990, 63,538 in the year 1991 etc. The estimated equations include 47 industry dummies at the two-digit level or at the three-digit level used in construction and services (see above). Finally, in the calculation of the firm effects, we pooled 172 796 firms (659 708 observations) that had fewer than 10 observations into a single firm in the 8 main industries. Firm effects were then estimated in 65,643 firms, of which 13,530 had no workers with higher education.

The general sampling rate in data from employee statistics is 10 per cent but 50 per cent for employees with a bachelor's degree (lower university and non-university degrees) and 100 per cent for employees with a higher university degree. 50 per cent of firms with average size of 100-500 and 30 per cent of firms with an average size of over 500 enter the sample. This results in 1,101,553 person-year observations from 133,371 individuals in the years 1989-1997 (after deleting the year 1998).

The total data of employees in this data is matched with the firm sample of Financial Statistics held by Statistics Finland. The 9,553 firms in the original linked employer-employee data are from the following industries: mining (nace 10-14) 23, consumer

goods (nace 15, 17-19) 481, other manufacturing (nace 20-25) 605, non metallic mineral products (nace 26, 36-37) 605, metals and machinery (nace 27-29) 807, energy and water (nace 40-43) 99, construction (nace 44-45) 670, trade (50-55) 1594, transport, not telecommunications (nace) ICT and business services (nace 30, 71-72, 741-745, 642) 684, household services (nace 746-747, 93-99) 194, the transport (except telecommunications) 44, educational and health. In the sample from employee statistics, 125,341 observations have non-zero firm code that matches to firm code in financial statistics. Of these 71,421 are of the ages of 18-39 and 27,554 of the ages of 49-65 that enter the study.

The variables used in the analysis for person i and firm j at time t from the data are (besides those discussed in the text):

Annual employment L_{jt}: Average number of salaried and hourly employees in firm *j* over the course of the calendar year in Financial Statistics.
Employment E_{kt}: Employment in establishment *k* in period *t*, determined by the employment at the end of December in each year in Employee Statistics.
Annual wages W_{it}: Real compensation (wage) for person i divided by months worked and multiplied by 12, and deflated by the consumer price index (1990=1.00) in Employee Statistics.
Years of Experience: Age minus years of education and age when school started.
Education: Highest education degree obtained in 8 grades.
Highly educated workers/Employees: The share of employees with bachelor's degree (lower university and non-university degrees) or higher.
Seniority: Duration of a job measured in years.
Net profits / Current Cost Investment: Net profits are gross profits (sales less wages, salaries, rents etc.) minus interest on loans and depreciation. Current cost investment are the sum of inventories and working capital.

Table A.1 Summary Statistics: Mean, Standard Deviation

Variable	Mean Age 28-48	Standard Deviation	Mean Low Educated Age 28-48	Mean Highly Educated Age 28-48	Mean Age 49-64	Standard Deviation	Mean Low Educated Age 49-64	Mean Highly Educated Age 49-64
Real Annual Wages	153927	85150	115959	169264	183644	129363	120167	223234
Unobserved Human Capital (α)	1.473	0.733	2.013	1.255	2.497	0.652	2.873	2.262
Education Effect ($u\eta$)	10.651	0.951	9.908	10.951	10.825	0.859	10.161	11.239
Work Experience effect (βx)	0.398	0.104	0.382	0.405	0.079	0.106	0.077	0.080
Hirings Effect of Lower Educated	0.003	0.228	0.003	0.003	0.002	0.183	0.002	0.002
Hirings Effect of Higher Educated	-0.006	0.232	-0.006	-0.006	-0.003	0.195	-0.003	-0.004
Firm Effect Intercept (ϕ)	-0.059	0.144	-0.067	-0.056	-0.097	0.145	-0.096	-0.097
Rent Sharing	-0.097	0.213	-0.088	-0.101	-0.140	0.232	-0.125	-0.150
Seniority Effect ($seniority*\gamma+seniority*\gamma^2$)	0.034	0.169	0.026	0.037	0.037	0.246	0.035	0.037
0.5*Churning	0.045	0.114	0.042	0.050	0.040	0.104	0.038	0.052
Exogenous separation rate ρ_0	0.032		0.032	0.034	0.024		0.024	0.039
Probability for Job Offer ρ	0.006		0.006	0.0002	0.007		0.007	-0.006
Probability for Separation $\rho_0+\rho[1-F(w)]$	0.038	0.000	0.038	0.034	0.031	0.000	0.031	0.033
Labour Supply Elasticity	0.136	0.330	0.132	0.004	0.197	0.431	0.179	-0.158
Borrowing Ratio	0.870	1.390	0.818	0.818	0.805	1.363	0.691	0.691
Net profits/Current Cost Investment	2.334	43.246	1.138	1.138	1.625	34.618	0.892	0.892

Wages, opportunity income, valued added, net profits and exports per labour and quasi rent in thousands of 1990FIM.

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