Occupational Experience, Wages and Mobility: Patterns in the Danish data*

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Abstract

In this paper we present how occupational tenure relates to wage growth and occupational mobility in Danish data. We show that the Danish data produces qualitatively similar results as found in U.S. data with respect to an increase in average wages when experience in an occupation increases. In a sample of full time private employed, the first five years of experience in an occupation increases average wages with 8% to 15%, conditional on firm and industry tenure. We further show that the probability of switching occupation declines with experience in the occupation and that the declining hazard also is true for workers switching occupation and firm. After five years of experience in an occupation the average probability of switching any type of occupation, including occupation and firm switches, has fallen from 25% to 12%.

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1 Introduction

This paper analyzes the correlation between wage and occupational mobility of workers in Denmark. With the Danish data we reproduce findings from the U.S. about returns to occupational tenure and further present how hazard rates out of an occupation are declining when occupational tenure increases.

In the literature on return to occupation specific human capital it has been shown that tenure within an occupation generates wage growth, even after controlling for firm and industry tenure. The literature on the relation between tenure in an occupation and wage growth originated with Shaw (1984) and Shaw (1987) who argued that investment in occupation specific skills is important in determining earnings. The first to measure returns to occupation-specific human capital was Kambourov and Manovskii (2009). They notice that occupational-specific human capital is distinct from employer-specific human capital because it is transferable across employers and thus accumulation of the occupational specific capital cannot be financed by the employers and should be thought more of as a type of general human capital. In data from the PSID Kambourov and Manovskii (2009) find that wages on average grow by 12% to 20% due to the first 5 years of experience in an occupation and this is the case when controlling for tenure in the industry and general experience.

Following Kambourov and Manovskii (2009) more analyses have been done on the specificity of occupational human capital. Using Swedish data Kwon and Meyersson Milgrom (2004) find that firms prefer to hire workers with relevant occupational experience and they find that there is no return to firm tenure once tenure in an occupation is accounted for. Hagedorn, Kambourov, and Manovskii (2004) find substantial returns to occupational tenure in a large administrative German data set and using data from Canadian Adult Education and Training Survey, Kambourov, Manovskii, and Plesca (2005) find substantial losses in human capital when workers switch occupation. Sullivan (2006) supports the finding that human capital is primarily occupation specific using NLSY data however the results vary with the type of occupation a person has. Finally using British data, Zangelidis (2004) also finds support that occupational experience is a major contributor to wage growth whereas the evidence on industry specificity of wage growth is not supported. Zangelidis (2004) also finds lots of heterogeneity with respect to what occupations are analyzed. The specificity of occupational wage growth has not been analyzed using Danish data however, Bagger (2004) finds very low return to firm tenure in Danish data and high return to general human capital, which includes occupational human capital.

We also find that occupational tenure is more important for wage growth than firm and industry tenure however, our estimated returns are smaller than what is found for the U.S. We find wages grow on average 8% to 15% due to the first 5 years of experience in an occupation.

When we look at the hazard rates out of an occupation as a function of experience in that occupation, we find a negative correlation; The longer experience in an occupation the lower probability of switching out of that given occupation. Similar results on hazard rates out of an occupation have not been the main focus in analyses of U.S. data. The empirical work on occupational mobility of U.S. data has focussed on verifying models of occupational mobility or, more often, career mobility, defined as a subset of all occupational switches combined with industry switches. One exception from this is Pavan (2007) who estimates a multinomial logit

for the NLSY of career change, no change, or job change. He finds that conditional on firm tenure there is a decline in probabilities of switching career as career tenure increases, which is a similar pattern to what we find in the Danish data. In the following section we present a short review of existing models of occupational mobility, in order to understand where our estimated declining hazard rates belong in the literature.

One of the earliest models of occupational mobility is Miller (1984) who developed a model of how young people straight out of their education choose their occupation in an optimal order. The model's outcome is that young people should first undertake occupations where success is rare and if they fail, switch out and try an occupation with the next highest probability of success. However, as McCall (1991) points out, there are two not very attractive implications of Miller's (1984) model. The first implication is that workers would sample all jobs in the riskiest occupation first before they would switch occupation, because matching is independent between jobs within an occupation. The second possible unattractive feature is that it is costless to switch both jobs and occupations. Two articles by McCall (1990) and McCall (1991) try to address the two shortcomings of Miller's (1984) model.

Besides Miller (1984) most other models of occupational mobility show different versions of declining probability of switching out of an occupation, career, or job as tenure in the occupation, career, or job increases. McCall (1990) derives a theory for occupational matching and shows by estimating a proportional hazard function that given tenure in a firm, the probability of changing job is negatively related to tenure in an occupation. McCall (1990) further sets up a dynamic occupational choice model where information about the occupational match is revealed with time spent in the occupation and the model includes training cost or entry cost of switching occupations. He finds that workers only sample the occupations with the most match uncertainty first (straight after graduation) if the training/entry costs are low.

Building on McCall (1990), Neal (1999), (and an extension from Pavan (2007)), also introduces a model of employer and career choices with match uncertainty. Conceptually Neal (1999) defines a career as performing the same skill, which is closely related to occupational category. However in the empirical work, due to measurement error in the NLSY, a career switch (conditional on switching employer) relies primarily on changes in industry codes.

Neal (1999) builds on McCall's (1990) result, which predicted that the hazard rate of leaving a second job should be a decreasing function of tenure in the previous job, if a person did not change occupation in their first job transition. Neal (1999) develops a model with employer- and career matches and finds an optimal job search strategy where workers search over career first and then once they find their career they will search for an employer. This outcome relates to McCall (1990) in the sense that in McCall (1990) a worker will not change employer within an occupation if he has learned that the career match is not a good one. Neal (1999) tests his model empirically and finds no evidence that the model can be rejected.

Pavan (2007) and Sullivan (2006) extends Neal's (1999) model and estimate their models structurally. Pavan (2007) gives evidence of career specific matches by showing his model can reproduce reduced form findings. His model reproduces that conditional on firm tenure the probability of switching out of a career declines with tenure in the career. In section 4 we show that we also find declining hazard rates out of an occupation when we use a multinomial logit approach.

Borrowing from the literature on firm switching (i.e. Abraham and Farber (1987), Farber (1998), Parent (2000)), Munch (2006) uses Danish data and a competing risk hazard model to

show the relationship between probability of leaving an occupation and tenure in the occupation. He finds the probability of exiting a career is declining with tenure in the career however, the probability of exiting an occupation, conditional on the probability of exiting either their firms or their industries is flat and so does not decline with tenure in an occupation. Munch (2006) looks at the population (meaning not only people coming straight from school) and for people in all types of jobs. We look at people who we can follow straight from graduation and we look at people both in the private and public sector.

We show the patterns of wage growth and occupational mobility for two different samples of the Danish data. The data and the selection mechanism of the two samples are explained in section 2. In section 3 and in section 4 we present evidence of return to occupational tenure and declining probability of leaving an occupation with tenure in the occupation. Finally, in section 5 we conclude.

2 Data

We use the administrative Danish register data covering 100% of the population in the years 1980 to 2002. The first part of the data is from the Integrated Database for Labor Market Research (IDA), which contains annual information on socioeconomic variables (e.g., age, gender, education, etc.) and characteristics of employment (e.g., private sector or government, occupations, industries, etc.) of the population. Information on wages is extracted from the Income Registers and consists of the hourly wage in the job held in the last week in November of each year. Wage information is not available for workers who are not employed in the last week of November. The wages are deflated to the 1995 wage level using Statistics Denmark's consumer price index and trimmed from above and below at the 0.99 and 0.01 percentile for each year of the selected samples described below.

We use the Danish rather than the U.S. data because the administrative data minimizes the amount of measurement error in occupational coding that plagues the available US data (see Kambourov and Manovskii (2009)). Nevertheless, we find that the features of wage growth and occupational mobility, that can be compared between the U.S. and Denmark, are quite similar.

As is standard in the literature, the hourly wage variable is calculated as the sum of total labor market income and mandatory pension fund payments of the job held in the last week in November of a given year divided by the total number of hours worked in the job held in November of that year. The labor income and the pension contributions are from the tax authorities and are considered to be highly reliable. Wage structure is potentially affected by the presence of centralized wage bargaining in Denmark (see Dahl, Le Maire, and Munch (2009) for a detailed description of the system). However, only around 13% of workers are covered by industry-wide bargaining where wages cannot be modified at the firm level. In other cases wages are bargained at the firm level, potentially subject to the lower bound on wages of the very inexperienced workers set at the industry level.

The occupational affiliation is defined by the so-called DISCO code, which is the Danish version of the ISCO-88 classification (International Standard Classification of Occupations). In

the appendix section A2 we show the occupational classifications and how the occupations are grouped from the first to the forth digit level. The validity of the codes is considered to be high, in particular, because they are monitored by the employers and the unions and form the basis of the wage bargaining at the national level. We use the most disaggregated definition of the occupational classification available, i.e., the 4-digit code. This classification corresponds fairly closely to the 3-digit Standard Occupational Classification used by the US Census. We perform our analysis at this level of aggregation because it appears to better match the characteristics of the tasks performed by the workers than more aggregated classifications. For example, the following pairs of occupations have distinct 4-digit codes but the same 3-digit ones: economists and foreign language translators, hair-dressers and undertakers, radio-announcers and circus clowns, and plumbers and electricians.

2.1 Sample selection

While the Danish register data dates back to 1980, because information on firm tenure is available only after 1995 and because of a change in the occupational classification in 1995, we study the data spanning the 1995-2002 period (the latter cut-off was dictated by the data availability at the time we performed the analysis). We use the pre-1995 data in constructing some of the variables. For example, in 1995 the two occupational classifications used in the Danish register data are linked to the worker's job which allows us to construct measures of occupational tenure. For example, a worker will be considered to have 5 years of occupational experience in 1996 if he is observed in the same occupation in 1995 and 1996 according to the new occupational classification and at the same time has the same occupational classification from 1992 to 1995 according to the old occupational classification.

We only select male workers in order to minimize the impact of the fertility decision on labor market transitions. The sample is restricted to employees because we do not observe earnings for the self employed. Since we study occupational mobility between consecutive years, the sample only includes workers with valid occupation data in the year after we use them in the analysis (e.g., we use information from 2002 for this purpose). To construct experience and tenure variables we need to observe each individual's entire labor market history. Thus, our sample includes all individuals completing their education in or after 1980 if they remain in the sample at least until 1995. The sample includes graduates from all types of education from 7th grade to a graduate degree conditional on observing the individual not going back to school for at least three years after graduation. Thus, a worker who completed high school, worked for three years, then obtained a college degree and went back to full time work will have two spells in our sample: first, the three years between high school and college, and second, after graduating from college. If he worked for less than three years between high school and college, he joins our sample only after graduating from college.

We conduct our analysis using two samples that differ in additional restrictions that we impose. We label these samples a *Small sample* and a *Large sample*. Their construction is as follows.

The Small sample is restricted to full time workers in the private sector. The restriction to the private sector workers is due to the concern that wage setting and mobility patterns in the government sector may be partially affected by non-market considerations. Moreover, in the period 1995 to 1998 we do not observe the workplace of public employees which makes

it difficult to condition on employer tenure if these workers are included in the sample. The part-time workers are excluded because they do not have as dependable wage information and do not have any occupational codes. Our overriding concern in constructing this sample is the reliability and consistency of the data. Thus, we truncate the workers' labor market histories the first time we observe them in part-time employment, public employment, self employment, or at the first observation with missing wage data or missing firm or occupational codes.[1] In order to have the same distribution of experience in the period 1995 to 2002 we truncate worker histories 15 years after graduation.

Our main objective in constructing the Large sample is to maximize the size of the sample. Consequently, it is much less restrictive. It includes public sector workers and includes workers who have spells of part time work and non-employment.[2] It also includes workers who re-enter the sample after having a missing firm, industry, or occupational spell.[3]

The results reported in the body of the paper are mainly based on the Small sample that contains approximately $400,000$ observations. The results based on the Large sample that includes approximately 1.3 million observations are reported in the Appendix.

Descriptive statistics of the main samples used in the analysis are provided in Appendix Table A-1.

3 Returns to Occupational Tenure

In this section we show that the return to occupational tenure is higher than the return to firm or industry tenure, when controlling for other explanatory factors.

3.1 Econometric Model for Wage Regression

We show the return to occupational tenure for our two samples following the approach by Kambourov and Manovskii (2009) who show that there exist return to occupational tenure in the U.S. data. The returns to tenure can be measured from the linear estimation model:

$$\begin{aligned}\ln w_{ijmnt} =& \beta_0 Emp\_Ten_{ijt} + \beta_1 OJ_{ijt} + \beta_2 OCC\_Ten_{imt} + \beta_3 OCC\_Spell\_nb_{imt} \\ &+ \beta_4 Ind\_Ten_{int} + \beta_5 Work\_Exp_{it} + \gamma X_{it} + \theta_{ijmnt}\end{aligned} \tag{1}$$

where w_{ijmnt} is the real hourly wage of person i working in period t with employer j in occupation m and industry n. Emp_Ten_{ijt}, OCC_Ten_{imt}, and Ind_Ten are tenure with an employer, an occupation, and the industry and all three terms are included linearly, squared,

[1] Workers are allowed to be either unemployed or out of the labor force up to two years after graduation without being dropped from the sample.

[2] We treat part time work as non-employment.

[3] If a worker has missing occupational data we cannot calculate his occupational tenure. We therefore exclude the workers observations while he has missing occupation-codes or missing firm-codes. It is possible for the worker to re-enter the sample if he is observed switching occupation or firm after his spell of missing data. When a worker switches occupation, firm, or industry his tenure will be reset to zero in the new occupation. This means that a worker who is a cook in period t, has missing occupation in period t+1, is a cook in period t+2, and a truck driver in period t+3, will be included in the sample in period t and again in period t+3 where his tenure as a truck driver is 1.

and cubed for occupation and industry tenure. The term $OCC\_Spell\_nb_{imt}$ are dummy variables indicating occupational what spell the individual is in. We are able to include the spell number because we follow individuals from the time they graduate from school. $Work\_Exp_{it}$ denotes overall work experience and is also included with a linear, square, and cubed term. OJ_{ijt} is a dummy variable, which equals one if the worker is past his first year at a firm. Other covariates in the regression model are a dummy variable if the workers in member of a union, number of children of the worker, a dummy variable if the worker is married, lagged unemployment rate in county of residence, year dummies, dummies for 1-digit occupations, and dummies for 1-digit industries.

Following the literature on measuring return to tenure we use an estimation model by Altonji and Shakotko (1987). The estimates on tenure are likely to be biased from unobserved individual and match heterogeneity. This is because workers with a better employer match would be expected to have higher employer tenure and receive higher wages. Also, a worker in a good match is more likely to receive higher wages and accumulate more tenure in that occupation. This will bias the estimate on tenure from the OLS regression upward.

The OLS can be biased because the error component can be decomposed as:

$$\theta_{ijmnt} = \mu_i + \lambda_{ij} + \xi_{im} + \upsilon_{in} + \varepsilon_{it} \tag{2}$$

where μ_i is a fixed individual specific error component, λ_{ij} is a fixed job match-specific error component, ξ_{im} is a fixed occupation match-specific error component, υ_{in} is a fixed industry match-specific error component, and ε_{it} is a time-varying person specific error term in the wage, which affects wages of all employees.

To deal with this problem we follow the literature started by Altonji and Shakotko (1987) and used by Parent (2000) and Kambourov and Manovskii (2009) and use an instrumental variable procedure. This is done by instrumenting the three types of tenure, general experience, and OJ with deviations from their sample means. If X_{imt} is occupational tenure of individual i who is working in occupation m in period t, then $\overline{X_{im}}$ denotes the sample mean of tenure period individual i worked in occupation m and the instrumental variable is $\widetilde{X}_{imt} = X_{imt} - \overline{X_{im}}$. The squared and cubed terms are similarly $\left(\widetilde{X}_{imt}\right)^2 = (X_{imt})^2 - \left(\overline{X_{im}^2}\right)$ and $\left(\widetilde{X}_{imt}\right)^3 = (X_{imt})^3 - \left(\overline{X_{im}^3}\right)$.

Furthermore, since the analysis is done by panel data we also follow the literature and estimate the instrumented model using generalized least squares (here called IV-GLS). We show results for regression 1 by OLS, Random effects GLS, IV-OLS, and IV-GLS.

3.2 Wage Regression Results

The first estimates from the wage regression are from the sample of full time privately employed workers. Table 1 below shows the returns to 2, 5, and 8 years of occupational tenure, industry tenure, and firm tenure estimated by OLS and IV-GLS of model 1. The returns are somewhat lower than they are for the U.S. reported in Kambourov and Manovskii (2009), who have 20 % return for 5 years of occupational tenure estimated by OLS and 12 % return to tenure estimated by IV-GLS on a random sample of the US population. Also Sullivan (2006) has high returns for young people after they graduate from school. The coefficients of the three tenure variables

and general experience from model 1 of the OLS and IV-GLS (and the GLS and IV-OLS) are reported in the appendix, table A-2 .

Table 1: Returns to 2, 5, and 8 years of tenure, private worker sample graduating in years 1980-1999.

	2 years	5 years	8 years
OLS			
Occupation	0.048	0.079	0.074
	(0.0015)	(0.002)	(0.002)
Industry	0.009	0.005	-0.014
	(0.002)	(0.002)	(0.002)
Employer	0.014	0.013	-0.015
	(0.003)	(0.004)	(0.004)
IV_GLS			
Occupation	0.043	0.086	0.108
	(0.002)	(0.003)	(0.004)
Industry	0.002	0.002	-0.001
	(0.002)	(0.002)	(0.003)
Employer	-0.023	-0.051	-0.067
	(0.003)	(0.004)	(0.003)

Note: Standard errors in parentheses

Table 1 shows that for the sample of full time privately employed workers, there are higher returns to occupational tenure than there are to industry or firm tenure in both the OLS and the IV random effects estimation. This matches the findings in both Kambourov and Manovskii (2009) and Sullivan (2006) who found the same patterns for the U.S. Both their samples were also privately employed workers and in Sullivan (2006) the workers are also observed since they leave school. However, there is a problem in our dataset with firm tenure because we only observe firms from 1995. In table 2 we show the returns on a subsample of people who graduated after 1994 and who did not have more than 3 years of general experience by the time they graduated.

Table 2 shows that for the smaller sample of graduates after 1994 the results are qualitatively similar but the return to firm tenure is relatively higher than in the sample of graduates from 1980 to 2000. The coefficients of the four estimations on the smaller sample is presented in the appendix, table A-3.

As a robustness analysis we show in the appendix table A-5 that if we include full time public sector workers and allow the workers to have spells of unemployment, non-employment, and part time work the results on the returns to tenure become smaller. Table A-4 shows the coefficients for the four regressions, OLS, GLS, IV-OLS, and IV-GLS for our larger sample including public sector employees and table A-5 shows the returns to 2, 5, and 8 years of tenure when including public sector employees.

Table 2: Returns to 2, 5, and 8 years of tenure, private worker sample graduating in years 1994-1999

	2 years	5 years	8 years
OLS			
Occupation	0.0917	0.151	0.230
	(0.009)	(0.008)	(0.022)
Industry	-0.019	-0.014	0.020
	(0.011)	(0.009)	(0.023)
Employer	0.051	0.059	-0.013
	(0.010)	(0.014)	(0.013)
IV_GLS			
Occupation	0.066	0.077	0.112
	(0.010)	(0.012)	(0.022)
Industry	-0.026	-0.012	-0.007
	(0.011)	(0.010)	(0.022)
Employer	0.005	-0.006	-0.041
	(0.013)	(0.018)	(0.012)

Note: Standard errors in parentheses

4 Occupational mobility and tenure - duration

Our aim when analyzing the tenure and occupational mobility relationship is to analyze the sign of this relationship. Furthermore, we are also interested in reproducing results related to Pavan (2007) in order to understand whether the Danish data shows similar characteristics in term of the relationship between tenure and occupational mobility as is found in the U.S. data.

4.1 Econometric model of occupational mobility and tenure

With the duration models we want to show the correlation between tenure in an occupation and probability of separating from the given occupation. This section draws on literature from Wooldridge (2002), Cameron and Trivedi (2005), Jenkins (2005), and Chen and Manatunga (2007).

The observed transition times from one occupation to another are grouped in years and it is assumed that the hazard within the yearly interval is constant. This means the duration in an occupation is measured as an interval and we have to take account of this by estimating a discrete-time hazard function. The probability of transition at discrete time t_j of a person i, given survival up to time t_j, is defined as the discrete-time hazard function, where the hazard h_{ij} is given as:

$$\lambda(t) = \Pr\left[T = t | T \geq t\right] \tag{3}$$

In the first part of the duration analysis we specify a proportional hazard model (Cox (1972)), which is given by

$$\lambda(t;x) = \exp(\beta' x)\lambda_0(t) \tag{4}$$

where $\lambda_0(t)$ is an unspecified baseline hazard function and β is a vector of regression coefficients associated with x and together $\exp(\beta' x)$ serves as a scaling function. Because the survival is discrete we use a proportional odds model (Cox (1972)). The proportional odds model assumes that the relative odds of making a transition in year t, given survival up to the end of the previous year is summarized by the expression:

$$\frac{\lambda_t(x)}{1-\lambda_t(x)} = \left[\frac{\lambda_t(x_0)}{1-\lambda_t(x_0)}\right] \exp(\beta'(x-x_0)) \tag{5}$$

where $\lambda_t(x)$ is the discrete time hazard rate for year t and $\lambda_t(x_0)$ is the discrete time hazard rate where x_0 is some arbitrary known baseline covariate value (most often this is taken where $x_0 = 0$). By taking logs on both sides of the equation it follows that:

$$logit[\lambda_t(x)] = \log\left[\frac{\lambda_t(x)}{1-\lambda_t(x)}\right] = \alpha_t + \beta'(x-x_0) \tag{6}$$

where $\alpha_t = \log it\left[\lambda_t(x_0)\right]$.

The hazard of switching occupation in period t can alternatively be written as:

$$\lambda_t(x) = \frac{1}{1+\exp\left(-\alpha_j - \beta'(x-x_0)\right)} \tag{7}$$

which has a proportional odds interpretation of its derivatives.

In our analysis we set the baseline hazard to be piece-wise constant and we do this by defining $\alpha_j = \gamma_1 D_1 + \gamma_2 D_2 + ... + \gamma_J D_J$, where D_J is a binary variable equal to 1 if $t = l$ and equal to zero otherwise. When estimating the model we will not include an intercept in the hazard of switching occupation β.

Occupational spells that do not end within the eight years of the sample period are treated as right censored. These spells all have occupational transition equal to zero for all periods of the spell and their contribution to the likelihood function is the probability of having worked in the same occupation for at least the observed number of years.

The literature on occupational and career mobility often tries to separate between an occupational transition, which happens at the same time as a firm transition, or at the same time as an industry transition. To address this issue we have also estimated a multinomial logit model, which can be seen as a proportional odds model in a competing risk framework.

Rather than having two states (observed switching occupation or not) as above in the logit regression, we allow for five states in our multinomial logit model. The hazard of transiting into state k in this model is now defined as:

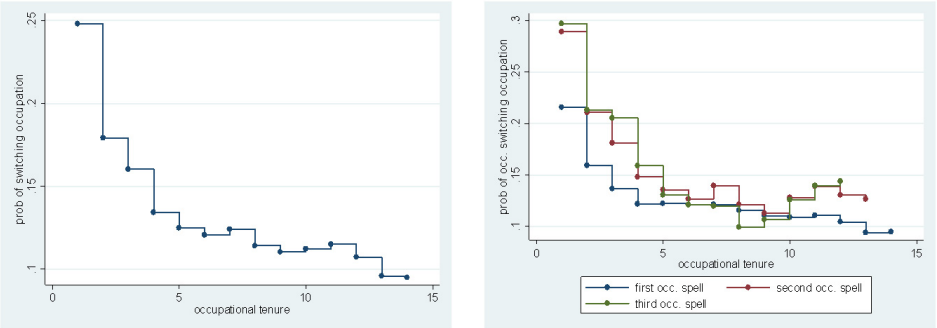
$$\lambda_{k,t}(x) = \frac{\exp\left(-\alpha_{k,t} - \beta_k'(x-x_0)\right)}{1+\exp\left(-\alpha_{k,t} - \beta_k'(x-x_0)\right)} \tag{8}$$

where k takes on the values (0) no observed transition, (1) transition into new occupation within same firm and industry, (2) transition into new occupation and new firm, but stay in

the same industry, (4) transition into a new occupation and a new industry, but staying at the same firm, and (5) transition into new occupation, new firm, and new industry.

4.2 Duration Results

Figure 1(a) shows the pointwise estimates of the hazard rate form model 7 at the mean of the fulltime privately working sample and table A-6 column 1 in the appendix shows the coefficients from the regression. Figure 1(a) shows the probability of switching occupation decreases over the first 15 years of occupational tenure. The decrease in probability of switching occupation is largest in the first 4 years whereafter it flattens out. A second feature of the data is shown in table 1(b), where the hazard rate out of an occupation is given for different occupational spell number. Figure 1(b) shows that the probability of leaving an occupation is lowest if it is the first occupation the worker has ever been in and the probability of switching occupation is higher for the second and third occupation the worker is in. This means that conditional on switching occupation, the probability of switching again is higher than if the workers never switch occupation.



(a) Probability of switching occupation by occupational tenure

(b) Probability of switching occupation by occupational spell number and occupational tenure

Figure 1: Hazard rate out of occupations by occupational tenure, over all and by occupational spell number.

If there is return to occupational tenure then we should expect a negative duration dependence like the one we observe. However, in the literature it has been argued that the negative duration dependence should be with respect to career changes (both occupation and industry change) and not purely with respect to occupation. I test this by estimating model 8, which is a multinomial logit. The point estimates are given in table A-7 and the predicted hazard rates at the mean of the sample are shown in figure 2. For table A-7 the reference category is to stay in the occupation. Column 1 gives point estimates of switching only occupation, column 2 is switching occupation and firm, column 3 is switching occupation and industry, and column 4 is switching occupation, firm, and industry.

Figure 2 shows that the hazard rate of occupational switches occurring alone, with firm-switches, and with firm and industry switches all exhibit a declining hazard. The highest probability of switching occupation is occurring for people switching occupation but not firm

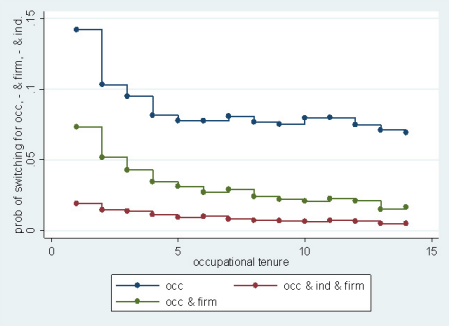


Figure 2: Hazard rate out of occupations by occupational tenure, over all and by occupational spell number.

or industry. These have around 14 % probability of switching occupation after 1 year of work compared to firm and occupation switches, which happens with 7 % and occupation, firm, and industry switches, which happens for 2 % of the sample with 1 year of occupational tenure. All three types of occupational switches fall with tenure in the occupation.

The probability of switching occupation alone falls more in, absolute terms, in the first couple of years than the probability of switching firm and occupation, or firm, industry, and occupation. This can be taken as a sign that the workers try out more occupations than occupation-firm pairs. This is opposite to the occupation, firm, and industry switching, which only falls very little with occupational tenure.

Pavan (2007) shows declining hazard rates out of a career as a function of tenure in the career. Since occupational codes are more reliable in the Danish data than in the NLSY, we can define a change in career as a change in occupation and firm (and unconditional on industry change). Figure 2 shows that the Danish data shows declining hazards both in occupational changes as well as in "career" changes as a function of occupational tenure. These results are not directly comparable to Pavan (2007) but the results do not show any indication that the Danish data produces qualitatively different results from what is found in the NLSY data. In the appendix we show in figure A-1 and A-2 similar to figure 1 and 2, only for our larger sample where we include public employees and allow people to return to the sample after spells of non-employment and part-time work. Table A-6 column 2 shows the coefficient from the regression behind figure 1(a) and table A-8 in the appendix shows the regression coefficients behind figure 2. As was the case for the return to occupational tenure, figure 1(a) shows, that the decrease in hazard rate with occupational tenure is also slightly lower for the first few years of tenure than for the sample of full time private employees. The workers' probability of changing occupation decreases from 25 % one year after graduation to 12 % five years after graduation. Figure 1(b) shows that the difference in effect on switching occupations from different occupational spells is also smaller for the sample including all workers, than it is for the sample including only full time private employees. Finally figure 2 shows that it is still occupational switching alone, which has the highest hazard, followed by firm and occupational switching. Switching occupation, firm, and industry is again for this larger sample changing very little over the years of occupational tenure.[4]

[4]We should keep in mind that in this sample we artificially lower the firm transition rates because we classify

5 Conclusion

In this paper we present how occupational tenure relates to wage growth and occupational mobility in Danish data. We show that the Danish data produces qualitatively similar results as found in U.S. data with respect to an increase in average wages when experience in an occupation increases. In a sample of full time private employed, the first five years of experience in an occupation increases average wages with 8% to 15%, conditional on firm and industry tenure. We further show that the probability of switching occupation declines with experience in the occupation and that the declining hazard also is true for workers switching occupation and firm. After five years of experience in an occupation the average probability of switching any type of occupation, including occupation and firm switches, has fallen from 25% to 12% and the probability of switching occupation and firm, conditional on not switching only occupation and not switching industry has fallen from 7% to 3%.

We show our results hold for two different samples of workers whom we follow after they graduate from school. The first sample is workers who always only worked full time in the private sector and the second sample includes both public and private sector workers who are allowed to have spells on non-employment and part time work.

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all public sector employment as working for the same firm.

References

Abraham, K., and H. Farber (1987): "Job Duration, Seniority and Earnings," *American Economic Review*, 77(3), 278–97.

Altonji, J. G., and R. Shakotko (1987): "Do Wages Rise with Job Seniority," *Review of Economic Studies*, 54, 437–459.

Bagger, J. (2004): "The Return to Seniority for Danish Male Labour Market Entrants," *WORK*.

Cameron, A., and P. Trivedi (2005): *Microeconometrics: methods and applications*. Cambridge Univ Pr.

Chen, S., and A. Manatunga (2007): "A note on proportional hazards and proportional odds models," *Statistics and Probability Letters*, 77(10), 981–988.

Cox, D. (1972): "Regression models and life-tables," *Journal of the Royal Statistical Society. Series B (Methodological)*, pp. 187–220.

Dahl, C., D. Le Maire, and J. Munch (2009): "Wage Dispersion and Decentralization of Wage Bargaining," *Discussion Papers*.

Farber, H. S. (1998): "Mobility and Stability: The Dynamics of Job Change in Labor Markets," Working Paper 400, Princeton University, Industrial Relations Section.

Hagedorn, M., G. Kambourov, and I. Manovskii (2004): "Worker Mobility in the United States and Germany: a Primer," mimeo, University of Pennsylvania.

Jenkins, S. (2005): "Survival Analysis," *www.iser.essex.ac.uk/teaching/degree/stephenj/ec986*.

Kambourov, G., and I. Manovskii (2009): "Occupational Specificity of Human Capital," *International Economic Review*, 50(1), 63–115.

Kambourov, G., I. Manovskii, and M. Plesca (2005): "Returns to Government Sponsored Training," mimeo, University of Pennsylvania.

Kwon, I., and E. Meyersson Milgrom (2004): "Boundaries of Internal Labor Markets: The Relative Importance of Firms and Occupations," mimeo, Stanford University Graduate School of Business.

McCall, B. (1991): "A dynamic model of occupational choice.," *Journal of Economic Dynamics and Control*, 15(2), 387–408.

McCall, B. P. (1990): "Occupational Matching: A Test of Sorts," *Journal of Political Economy*, 98(1), 45–69.

Miller, R. A. (1984): "Job Matching and Occupational Choice," *Journal of Political Economy*, 92(6), 1086–1120.

Munch, J. (2006): "Career Changes and the Loss of Human Capital," Discussion paper, Working Paper.

Neal, D. (1999): "The Complexity of Job Mobility Among Young Men," *Journal of Labor Economics*, 17(2), 237–261.

Parent, D. (2000): "Industry-Specific Capital and the Wage Profile: Evidence from the National Longitudinal Survey of Youth and the Panel Study of Income Dynamics," *Journal of Labor Economics*, 18(2), 306–323.

Pavan, R. (2007): "The role of career choice in understanding job mobility," Discussion paper, mimeo.

Shaw, K. (1984): "A Formulation of the Earnings Function Using the Concept of Occupational Investment," *Journal of Human Resources*, 14, 319–40.

——— (1987): "Occupational Change, Employer Change, and the Transferability of Skills," *Southern Economic Journal*, 53, 702–19.

Sullivan, P. (2006): "Empirical evidence on occupation and industry specific human capital," *Unpublished manuscript. US Bureau of Labor Statistics*.

Wooldridge, J. (2002): *Econometric analysis of cross section and panel data*. The MIT press.

Zangelidis, A. (2004): "Profitable Career Paths: The Importance of Occupational and Industry Expertise," Research Paper No. 2004-10, Center for European Labor Market.

APPENDICES

A1 Appendix Tables

Table A-1: Summary statistics for the Large and Small samples and subsamples

	Small Sample	Large Sample
Number of observations	402,136	1,292,932
Number of occupations	229	324
Age	29.66	33.25
Occupational tenure	4.41	4.54
Occupational spell number	1.69	2.30
Occupational switchers	0.18	0.19
Employer tenure	2.36	2.78
Employer Switchers	0.18	0.15
Industry tenure	3.38	3.78
Years after graduation	6.49	9.56
12 years of school or less	0.73	0.65
13 years of school or more	0.27	0.35
Hourly wage in DKK in 1995	170.13	172.66
Married	0.30	0.42
Union	0.94	0.90
Number of children	0.71	0.94

Note - The table contains the descriptive summary statistics of the Large and Small samples defined in the main text.

A2 Appendix Occupational Classification

A2.1 1, 2, 3, and 4-digit Occupational Classification

MAJOR GROUP 1
LEGISLATORS, SENIOR OFFICIALS AND MANAGERS
11 LEGISLATORS AND SENIOR OFFICIALS
111 LEGISLATORS
1110 Legislators
114 SENIOR OFFICIALS OF SPECIAL-INTEREST ORGANISATIONS
1141 Senior officials of political-party organisations
1142 Senior officials of employers', workers' and other economic-interest organisations
1143 Senior officials of humanitarian and other special-interest organisations
12 CORPORATE MANAGERS (This group is intended to include persons who - as directors, chief executives or department managers - manage enterprises or organisations, or departments, requiring a total of three or more managers.)
121 DIRECTORS AND CHIEF EXECUTIVES
1210 Directors and chief executives
122 PRODUCTION AND OPERATIONS DEPARTMENT MANAGERS
1221 Production and operations department managers in agriculture, hunting, forestry and fishing
1222 Production and operations department managers in manufacturing
1223 Production and operations department managers in construction
1224 Production and operations department managers in wholesale and retail trade
1225 Production and operations department managers in restaurants and hotels
1226 Production and operations department managers in transport, storage and communications
1227 Production and operations department managers in business services
1228 Production and operations department managers in personal care, cleaning and related services
1229 Production and operations department managers not elsewhere classified
123 OTHER DEPARTMENT MANAGERS
1231 Finance and administration department managers
1232 Personnel and industrial relations department managers
1233 Sales and marketing department managers
1234 Advertising and public relations department managers
1235 Supply and distribution department managers
1236 Computing services department managers
1237 Research and development department managers
1239 Other department managers not elsewhere classified
13 GENERAL MANAGERS (This group is intended to include persons who manage enterprises, or in some cases organisations, on their own behalf, or on behalf of the proprietor, with some non-managerial help and the assistance of no more than one other manager who should also be classified in this sub- major group as, in most cases, the tasks will be broader than those of a specialised manager in a larger enterpriseor organisation. Non-managerial staff should be classified according to their specific tasks.
131 GENERAL MANAGERS
1311 General managers in agriculture, hunting, forestry/ and fishing
1312 General managers in manufacturing
1313 General managers in construction
1314 General managers in wholesale and retail trade
1315 General managers of restaurants and hotels
1316 General managers in transport, storage and communications
1317 General managers of business services
1318 General managers in personal care, cleaning and related services
1319 General managers not elsewhere classified

MAJOR GROUP 2
PROFESSIONALS
21 PHYSICAL, MATHEMATICAL AND ENGINEERING SCIENCE PROFESSIONALS
211 PHYSICISTS, CHEMISTS AND RELATED PROFESSIONALS
2111 Physicists and astronomers
2112 Meteorologists
2113 Chemists
2114 Geologists and geophysicists
212 MATHEMATICIANS, STATISTICIANS AND RELATED PROFESSIONALS
2121 Mathematicians and related professionals
2122 Statisticians
213 COMPUTING PROFESSIONALS
2131 Computer systems designers and analysts
2132 Computer programmers
2139 Computing professionals not elsewhere classified
214 ARCHITECTS, ENGINEERS AND RELATED PROFESSIONALS
2141 Architects, town and traffic planners
2142 Civil engineers
2143 Electrical engineers
2144 Electronics and telecommunications engineers
2145 Mechanical engineers
2146 Chemical engineers
2147 Mining engineers, metallurgists and related professionals
2148 Cartographers and surveyors
2149 Architects, engineers and related professionals not elsewhere classified
22 LIFE SCIENCE AND HEALTH PROFESSIONALS
221 LIFE SCIENCE PROFESSIONALS
2211 Biologists, botanists, zoologists and related professionals
2212 Pharmacologists, pathologists and related professionals
2213 Agronomists and related professionals
222 HEALTH PROFESSIONALS (except nursing)
2221 Medical doctors
2222 Dentists
2223 Veterinarians
2224 Pharmacists
2229 Health professionals (except nursing) not elsewhere classified
223 NURSING AND MIDWIFERY PROFESSIONALS
2230 Nursing and midwifery professionals
23 TEACHING PROFESSIONALS
231 COLLEGE, UNIVERSITY AND HIGHER EDUCATION TEACHING PROFESSIONALS
2310 College, university and higher education teaching professionals
232 SECONDARY EDUCATION TEACHING PROFESSIONALS
2320 Secondary education teaching professionals
233 PRIMARY AND PRE-PRIMARY EDUCATION TEACHING PROFESSIONALS
2331 Primary education teaching professionals
234 SPECIAL EDUCATION TEACHING PROFESSIONALS
2340 Special education teaching professionals
235 OTHER TEACHING PROFESSIONALS
2351 Education methods specialists
2352 School inspectors
2359 Other teaching professionals not elsewhere classified
24 OTHER PROFESSIONALS
241 BUSINESS PROFESSIONALS
2411 Accountants
2412 Personnel and careers professionals
2419 Business professionals not elsewhere classified
242 LEGAL PROFESSIONALS
2421 Lawyers
2422 Judges
2429 Legal professionals not elsewhere classified
243 ARCHIVISTS, LIBRARIANS AND RELATED INFORMATION PROFESSIONALS
2431 Archivists and curators
2432 Librarians and related information professionals
244 SOCIAL SCIENCE AND RELATED PROFESSIONALS
2441 Economists
2442 Sociologists, anthropologists and related professionals
2443 Philosophers, historians and political scientists
2444 Philologists, translators and interpreters
2445 Psychologists
2446 Social work professionals
245 WRITERS AND CREATIVE OR PERFORMING ARTISTS
2451 Authors, journalists and other writers
2452 Sculptors, painters and related artists
2453 Composers, musicians and singers
2454 Choreographers and dancers
2455 Film, stage and related actors and directors
246 RELIGIOUS PROFESSIONALS
2460 Religious professionals
2470: working with administration of legislation in the public sector

MAJOR GROUP 3
TECHNICIANS AND ASSOCIATE PROFESSIONALS
31 PHYSICAL AND ENGINEERING SCIENCE ASSOCIATE PROFESSIONALS
311 PHYSICAL AND ENGINEERING SCIENCE TECHNICIANS
3111 Chemical and physical science technicians
3112 Civil engineering technicians
3113 Electrical engineering technicians
3114 Electronics and telecommunications engineering technicians
3115 Mechanical engineering technicians
3116 Chemical engineering technicians
3117 Mining and metallurgical technicians
3118 Draughtspersons
3119 Physical and engineering science technicians not elsewhere classified
312 COMPUTER ASSOCIATE PROFESSIONALS

3121 Computer assistants
3122 Computer equipment operators
3123 Industrial robot controllers
313 OPTICAL AND ELECTRONIC EQUIPMENT OPERATORS
3131 Photographers and image and sound recording equipment operators
3132 Broadcasting and telecommunications equipment operators
3133 Medical equipment operators
3139 Optical and electronic equipment operators not elsewhere classified
314 SHIP AND AIRCRAFT CONTROLLERS AND TECHNICIANS
3141 Ships' engineers
3142 Ships' deck officers and pilots
3143 Aircraft pilots and related associate professionals
3144 Air traffic controllers
3145 Air traffic safety technicians
315 SAFETY AND QUALITY INSPECTORS
3151 Building and fire inspectors 3152 Safety, health and quality inspectors
32 LIFE SCIENCE AND HEALTH ASSOCIATE PROFESSIONALS
321 LIFE SCIENCE TECHNICIANS AND RELATED ASSOCIATE PROFESSIONALS
3211 Life science technicians
3212 Agronomy and forestry technicians
3213 Farming and forestry advisers
322 MODERN HEALTH ASSOCIATE PROFESSIONALS (except nursing)
3221 Medical assistants
3222 Sanitarians
3223 Dieticians and nutritionists
3224 Optometrists and opticians
3225 Dental assistants
3226 Physiotherapists and related associate professionals
3227 Veterinary assistants
3228 Pharmaceutical assistants
3229 Modern health associate professionals (except nursing) not elsewhere classified
323 NURSING AND MIDWIFERY ASSOCIATE PROFESSIONALS
3231 Nursing associate professionals
33 TEACHING ASSOCIATE PROFESSIONALS
331 PRIMARY EDUCATION TEACHING ASSOCIATE PROFESSIONALS
3310 Primary education teaching associate professionals
332 PRE-PRIMARY EDUCATION TEACHING ASSOCIATE PROFESSIONALS
3320 Pre-primary education teaching associate professionals
333 SPECIAL EDUCATION TEACHING ASSOCIATE PROFESSIONALS
3330 Special education teaching associate professionals
334 OTHER TEACHING ASSOCIATE PROFESSIONALS
3340 Other teaching associate professionals
34 OTHER ASSOCIATE PROFESSIONALS
341 FINANCE AND SALES ASSOCIATE PROFESSIONALS
3411 Securities and finance dealers and brokers
3412 Insurance representatives
3413 Estate agents
3414 Travel consultants and organizers
3415 Technical and commercial sales representatives
3416 Buyers
3417 Appraisers, valuers and auctioneers
3419 Finance and sales associate professionals not elsewhere classified
342 BUSINESS SERVICES AGENTS AND TRADE BROKERS
3421 Trade brokers
3422 Clearing and forwarding agents
3423 Employment agents and labor contractors
3429 Business services agents and trade brokers not elsewhere classified
343 ADMINISTRATIVE ASSOCIATE PROFESSIONALS
3431 Administrative secretaries and related associate professionals
3432 Legal and related business associate professionals
3433 Bookkeepers
3434 Statistical, mathematical and related associate professionals
3439 Administrative associate professionals not elsewhere classified
344 CUSTOMS, TAX AND RELATED GOVERNMENT ASSOCIATE PROFESSIONALS
3441 Customs and border inspectors
3442 Government tax and excise officials
3443 Government social benefits officials
3444 Government licensing officials
3449 Customs, tax and related government associate professionals not elsewhere classified
345 POLICE INSPECTORS AND DETECTIVES
3450 Police inspectors and detectives
346 SOCIAL WORK ASSOCIATE PROFESSIONALS
3460 Social work associate professionals
347 ARTISTIC, ENTERTAINMENT AND SPORTS ASSOCIATE PROFESSIONALS
3471 Decorators and commercial designers
3472 Radio, television and other announcers
3473 Street, night-club and related musicians, singers and dancers
3474 Clowns, magicians, acrobats and related associate professionals
3475 Athletes, sportspersons and related associate professionals
348 RELIGIOUS ASSOCIATE PROFESSIONALS
3480 Religious associate professionals

MAJOR GROUP 4
CLERKS
41 OFFICE CLERKS
411 SECRETARIES AND KEYBOARD-OPERATING CLERKS
4111 Stenographers and typists
4112 Word-processor and related operators
4113 Data entry operators
4114 Calculating-machine operators
4115 Secretaries
412 NUMERICAL CLERKS
4121 Accounting and bookkeeping clerks
4122 Statistical and finance clerks
413 MATERIAL-RECORDING AND TRANSPORT CLERKS
4131 Stock clerks
4132 Production clerks
4133 Transport clerks
414 LIBRARY, MAIL AND RELATED CLERKS
4141 Library and filing clerks
4142 Mail carriers and sorting clerks
4143 Coding, proof-reading and related clerks
419 OTHER OFFICE CLERKS
4190 Other office clerks
42 CUSTOMER SERVICES CLERKS
421 CASHIERS, TELLERS AND RELATED CLERKS
4211 Cashiers and ticket clerks
4212 Tellers and other counter clerks
4213 Bookmakers and croupiers
4214 Pawnbrokers and money-lenders
4215 Debt-collectors and related workers
422 CLIENT INFORMATION CLERKS
4221 Travel agency and related clerks
4222 Receptionists and information clerks
4223 Telephone switchboard operators

MAJOR GROUP 5
SERVICE WORKERS AND SHOP AND MARKET SALES WORKERS
51 PERSONAL AND PROTECTIVE SERVICES WORKERS
511 TRAVEL ATTENDANTS AND RELATED WORKERS
5111 Travel attendants and travel stewards
5112 Transport conductors
5113 Travel guides
512 HOUSEKEEPING AND RESTAURANT SERVICES WORKERS
5121 Housekeepers and related workers
5122 Cooks
5123 Waiters, waitresses and bartenders
513 PERSONAL CARE AND RELATED WORKERS
5131 Child-care workers
5132 Institution-based personal care workers
5133 Home-based personal care workers
5139 Personal care and related workers not elsewhere classified
514 OTHER PERSONAL SERVICES WORKERS
5141 Hairdressers, barbers, beauticians and related workers
5142 Companions and valets
5143 Undertakers and embalmers
5149 Other personal services workers not elsewhere classified
515 ASTROLOGERS, FORTUNE-TELLERS AND RELATED WORKERS
5151 Astrologers and related workers
5152 Fortune-tellers, palmists and related workers
516 PROTECTIVE SERVICES WORKERS
5161 Fire-fighters
5162 Police officers
5163 Prison guards
5169 Protective services workers not elsewhere classified
52 MODELS, SALESPERSONS AND DEMONSTRATORS
521 FASHION AND OTHER MODELS
5210 Fashion and other models
522 SHOP SALESPERSONS AND DEMONSTRATORS
5220 Shop salespersons and demonstrators
523 STALL AND MARKET SALESPERSONS
5230 Stall and market salespersons

MAJOR GROUP 6
SKILLED AGRICULTURAL AND FISHERY WORKERS
61 MARKET-ORIENTED SKILLED AGRICULTURAL AND FISHERY WORKERS
611 MARKET GARDENERS AND CROP GROWERS
6111 Field crop and vegetable growers
6112 Tree and shrub crop growers
612 MARKET-ORIENTED ANIMAL PRODUCERS AND RELATED WORKERS
6121 Dairy and livestock producers
6122 Poultry producers
6129 Market-oriented animal producers and related workers not elsewhere classified
613 MARKET-ORIENTED CROP AND ANIMAL PRODUCERS
6130 Market-oriented crop and animal producers
614 FORESTRY AND RELATED WORKERS
6141 Forestry workers and loggers
6142 Charcoal burners and related workers
615 FISHERY WORKERS, HUNTERS AND TRAPPERS
6151 Aquatic-life cultivation workers

6152 Inland and coastal waters fishery workers
6153 Deep-sea fishery workers
6154 Hunters and trappers

MAJOR GROUP 7
CRAFT AND RELATED TRADES WORKERS
71 EXTRACTION AND BUILDING TRADES WORKERS
711 MINERS, SHOTFIRERS, STONE CUTTERS AND CARVERS
7111 Miners and quarry workers
7112 Shotfirers and blasters
7113 Stone splitters, cutters and carvers
712 BUILDING FRAME AND RELATED TRADES WORKERS
7121 Builders, traditional materials
7122 Bricklayers and stonemasons
7123 Concrete placers, concrete finishers and related workers
7124 Carpenters and joiners
7129 Building frame and related trades workers not elsewhere classified
713 BUILDING FINISHERS AND RELATED TRADES WORKERS
7131 Roofers
7132 Floor layers and tile setters
7133 Plasterers
7134 Insulation workers
7135 Glaziers
7136 Plumbers and pipe fitters
7137 Building and related electricians
7139: buildingswork elsewhere
714 PAINTERS, BUILDING STRUCTURE CLEANERS AND RELATED TRADES WORKERS
7141 Painters and related workers
7142 Varnishers and related painters
7143 Building structure cleaners
72 METAL, MACHINERY AND RELATED TRADES WORKERS
721 METAL MOULDERS, WELDERS, SHEET-METAL WORKERS, STRUCTURAL- METAL PREPARERS, ANDRELATED TRADES WORKERS
7211 Metal moulders and coremakers
7212 Welders and flamecutters
7213 Sheet metal workers
7214 Structural-metal preparers and erectors
7215 Riggers and cable splicers
7216 Underwater workers
722 BLACKSMITHS, TOOL-MAKERS AND RELATED TRADES WORKERS
7221 Blacksmiths, hammer-smiths and forging-press workers
7222 Tool-makers and related workers
7223 Machine-tool setters and setter-operators
7224 Metal wheel-grinders, polishers and tool sharpeners
723 MACHINERY MECHANICS AND FITTERS
7231 Motor vehicle mechanics and fitters
7232 Aircraft engine mechanics and fitters
7233 Agricultural- or industrial-machinery mechanics and fitters
724 ELECTRICAL AND ELECTRONIC EQUIPMENT MECHANICS AND FITTERS
7241 Electrical mechanics and fitters
7242 Electronics fitters
7243 Electronics mechanics and servicers
7244 Telegraph and telephone installers and servicers
7245 Electrical line installers, repairers and cable jointers
73 PRECISION, HANDICRAFT, PRINTING AND RELATED TRADES WORKERS
731 PRECISION WORKERS IN METAL AND RELATED MATERIALS
7311 Precision-instrument makers and repairers
7312 Musical instrument makers and tuners
7313 Jewellery and precious-metal workers
732 POTTERS, GLASS-MAKERS AND RELATED TRADES WORKERS
7321 Abrasive wheel formers, potters and related workers
7322 Glass makers, cutters, grinders and finishers
7323 Glass engravers and etchers
7324 Glass, ceramics and related decorative painters
733 HANDICRAFT WORKERS IN WOOD,TEXTILE, LEATHER AND RELATED MATERIALS
7331 Handicraft workers in wood and related materials
7332 Handicraft workers in textile, leather and related materials
734 PRINTING AND RELATED TRADES WORKERS
7341 Compositors, typesetters and related workers
7342 Stereotypers and electrotypers
7343 Printing engravers and etchers
7344 Photographic and related workers
7345 Bookbinders and related workers
7346 Silk-screen, block and textile printers
74 OTHER CRAFT AND RELATED TRADES WORKERS
741 FOOD PROCESSING AND RELATED TRADES WORKERS
7411 Butchers, fishmongers and related food preparers
7412 Bakers, pastry-cooks and confectionery makers
7413 Dairy-products makers
7414 Fruit, vegetable and related preservers
7415 Food and beverage tasters and graders
7416 Tobacco preparers and tobacco products makers
742 WOOD TREATERS, CABINET-MAKERS AND RELATED TRADES WORKERS
7421 Wood treaters
7422 Cabinet makers and related workers
7423 Woodworking machine setters and setter-operators
7424 Basketry weavers, brush makers and related workers
743 TEXTILE, GARMENT AND RELATED TRADES WORKERS
7431 Fibre preparers
7432 Weavers, knitters and related workers
7433 Tailors, dressmakers and hatters
7434 Furriers and related workers
7435 Textile, leather and related pattern-makers and cutters
7436 Sewers, embroiderers and related workers
7437 Upholsterers and related workers
744 PELT, LEATHER AND SHOEMAKING TRADES WORKERS
7441 Pelt dressers, tanners and fellmongers
7442 Shoe-makers and related workers

MAJOR GROUP 8
PLANT AND MACHINE OPERATORS AND ASSEMBLERS
81 STATIONARY-PLANT AND RELATED OPERATORS
811 MINING- AND MINERAL-PROCESSING-PLANT OPERATORS
8111 Mining-plant operators
8112 Mineral-ore- and stone-processing-plant operators
8113 Well drillers and borers and related workers
812 METAL-PROCESSING-PLANT OPERATORS
8121 Ore and metal furnace operators
8122 Metal melters, casters and rolling-mill operators
8123 Metal-heat-treating-plant operators
8124 Metal drawers and extruders
813 GLASS, CERAMICS AND RELATED PLANT OPERATORS
8131 Glass and ceramics kiln and related machine operators
8139 Glass, ceramics and related plant operators not elsewhere classified
814 WOOD-PROCESSING- AND PAPERMAKING-PLANT OPERATORS
8141 Wood-processing-plant operators
8142 Paper-pulp plant operators
8143 Papermaking-plant operators
815 CHEMICAL-PROCESSING-PLANT OPERATORS
8151 Crushing-, grinding- and chemical-mixing-machinery operators
8152 Chemical-heat-treating-plant operators
8153 Chemical-filtering- and separating-equipment operators
8154 Chemical-still and reactor operators (except petroleum and natural gas)
8155 Petroleum- and natural-gas-refining-plant operators
8159 Chemical-processing-plant operators not elsewhere classified
816 POWER-PRODUCTION AND RELATED PLANT OPERATORS
8161 Power-production plant operators
8162 Steam-engine and boiler operators
8163 Incinerator, water-treatment and related plant operators
817 AUTOMATED-ASSEMBLY-LINE AND INDUSTRIAL-ROBOT OPERATORS
82 MACHINE OPERATORS AND ASSEMBLERS
821 METAL- AND MINERAL-PRODUCTS MACHINE OPERATORS
8211 Machine-tool operators
8212 Cement and other mineral products machine operators
822 CHEMICAL-PRODUCTS MACHINE OPERATORS
8221 Pharmaceutical- and toiletry-products machine operators
8222 Ammunition- and explosive-products machine operators
8223 Metal finishing-, plating- and coating-machine operators
8224 Photographic-products machine operators
8229 Chemical-products machine operators not elsewhere classified
823 RUBBER- AND PLASTIC-PRODUCTS MACHINE OPERATORS
8231 Rubber-products machine operators
8232 Plastic-products machine operators
824 WOOD-PRODUCTS MACHINE OPERATORS
8240 Wood-products machine operators
825 PRINTING-, BINDING- AND PAPER-PRODUCTS MACHINE OPERATORS
8251 Printing-machine operators
8252 Bookbinding-machine operators
8253 Paper-products machine operators
826 TEXTILE-, FUR- AND LEATHER-PRODUCTS MACHINE OPERATORS
8261 Fibre-preparing-, spinning- and winding-machine operators
8262 Weaving- and knitting-machine operators
8263 Sewing-machine operators
8264 Bleaching-, dyeing- and cleaning-machine operators
8265 Fur and leather-preparing-machine operators
8266 Shoemaking- and related machine operators
8269 Textile-, fur- and leather-products machine operators not elsewhere classified
827 FOOD AND RELATED PRODUCTS MACHINE OPERATORS
8271 Meat- and fish-processing-machine operators
8272 Dairy-products machine operators
8273 Grain- and spice-milling-machine operators
8274 Baked-goods, cereal and chocolate-products machine operators
8275 Fruit-, vegetable- and nut-processing-machine operators
8276 Sugar production machine operators
8277 Tea-, coffee-, and cocoa-processing-machine operators
8278 Brewers, wine and other beverage machine operators
8279 Tobacco production machine operators
828 ASSEMBLERS
8281 Mechanical-machinery assemblers
8282 Electrical-equipment assemblers

8283 Electronic-equipment assemblers
8284 Metal-, rubber- and plastic-products assemblers
8285 Wood and related products assemblers
8286 Paperboard, textile and related products assemblers
8287: Assembly line and assembler elsewhere
829 OTHER MACHINE OPERATORS AND ASSEMBLERS
8290 Other machine operators and assemblers
83 DRIVERS AND MOBILE-PLANT OPERATORS
831 LOCOMOTIVE-ENGINE DRIVERS AND RELATED WORKERS
8311 Locomotive-engine drivers
8312 Railway brakers, signallers and shunters
832 MOTOR-VEHICLE DRIVERS
8321 Motor-cycle drivers
8322 Car, taxi and van drivers
8323 Bus and tram drivers
8324 Heavy-truck and lorry drivers
833 AGRICULTURAL AND OTHER MOBILE-PLANT OPERATORS
8331 Motorized farm and forestry plant operators
8332 Earth-moving- and related plant operators
8333 Crane, hoist and related plant operators
8334 Lifting-truck operators
834 SHIPS' DECK CREWS AND RELATED WORKERS
8340 Ships' deck crews and related workers

MAJOR GROUP 9
ELEMENTARY OCCUPATIONS
91 SALES AND SERVICES ELEMENTARY OCCUPATIONS
911 STREET VENDORS AND RELATED WORKERS
9113 Door-to-door and telephone salespersons
912 SHOE CLEANING AND OTHER STREET SERVICES ELEMENTARY OCCUPATIONS
9120 Shoe cleaning and other street services elementary occupations
913 DOMESTIC AND RELATED HELPERS, CLEANERS AND LAUNDERERS
9131 Domestic helpers and cleaners
9132 Helpers and cleaners in offices, hotels and other establishments
9133 Hand-launderers and pressers
914 BUILDING CARETAKERS, WINDOW AND RELATED CLEANERS
9141 Building caretakers
9142 Vehicle, window and related cleaners
915 MESSENGERS, PORTERS, DOORKEEPERS AND RELATED WORKERS
9151 Messengers, package and luggage porters and deliverers
9152 Doorkeepers, watchpersons and related workers
9153 Vending-machine money collectors, meter readers and related workers
916 GARBAGE COLLECTORS AND RELATED LABOURERS
9161 Garbage collectors
9162 Sweepers and related labourers
92 AGRICULTURAL, FISHERY AND RELATED LABOURERS
921 AGRICULTURAL, FISHERY AND RELATED LABOURERS
9211 Farm-hands and labourers
9212 Forestry labourers
9213 Fishery, hunting and trapping labourers
93 LABOURERS IN MINING, CONSTRUCTION, MANUFACTURING AND TRANSPORT
931 MINING AND CONSTRUCTION LABOURERS
9311 Mining and quarrying labourers
9312 Construction and maintenance labourers: roads, dams and similar constructions
9313 Building construction labourers
932 MANUFACTURING LABOURERS
933 TRANSPORT LABOURERS AND FREIGHT HANDLERS

MAJOR GROUP 0
ARMED FORCES
01 ARMED FORCES
011 ARMED FORCES
0110 Armed forces

A3 Appendix on Wage Regressions

Table A-2: Wage regressions for fulltime privately employed workers

	OLS	GLS/RE	IV-OLS	IV-GLS/RE
	(1)	(2)	(3)	(4)
occ. ten.	0.0309***	0.0154***	-0.0016	0.0246***
	(29.22)	(20.30)	(-0.622)	(20.24)
occ. ten. sq	-0.0036***	-0.0014***	0.0037***	-0.0017***
	(-20.78)	(-11.62)	-7.410	(-10.39)
occ. ten. cub	0.0001***	0.0000***	-0.0002***	0.0000***
	(13.63)	-5.595	(-9.151)	-5.105
ind. ten.	0.0078***	0.0066***	-0.0130***	0.0012
	-6.133	-7.665	(-4.714)	-1.152
ind. ten. sq	-0.0017***	-0.0013***	0.0024***	-0.0002
	(-7.325)	(-8.553)	-4.792	(-0.901)
ind. ten. cub	0.0001***	0.0000***	-0.0001***	-0.0000
	-5.413	-6.304	(-5.335)	(-0.148)
firm ten.	0.0100***	0.0062***	-0.0315***	-0.0124***
	-4.966	-5.022	(-5.548)	(-6.385)
firm ten. sq	-0.0015***	-0.0013***	0.0026***	0.0005**
	(-6.032)	(-9.032)	-3.927	-2.155
gen. exp.	0.0276***	0.0357***	0.0430***	0.0231***
	(22.90)	(39.47)	(13.99)	(16.01)
gen. exp. sq	-0.0013***	-0.0020***	-0.0057***	-0.0015***
	(-7.735)	(-16.35)	(-11.43)	(-9.592)
gen. exp. cub	0.0000***	0.0001***	0.0002***	0.0000***
	-5.014	(10.54)	(11.01)	-7.477
Constant	5.3416***	5.2180***	5.6013***	5.3875***
	(741.8)	(701.3)	(505.6)	(600.2)
Occ. Spell dummies	yes	yes	yes	yes
5 education dummies	yes	yes	yes	yes
OJ	yes	yes	yes	yes
Number of children	yes	yes	yes	yes
Marriage and Union dummies	yes	yes	yes	yes
County unemployment rate	yes	yes	yes	yes
Time and regional dummies	yes	yes	yes	yes
1 digit ind. and occ. dummies	yes	yes	yes	yes
Observations	426164	426164	426164	426164
R-squared	0.439	.	0.427	.

*** p<0.01, ** p<0.05, * p<0.1, and t statistics in parentheses

Table A-3: Wage regressions for fulltime privately employed workers, who graduated from 1994-1999 and had at most 3 years of general experience at time of graduation

	OLS	GLS/RE	IV-OLS	IV-GLS/RE
	(1)	(2)	(3)	(4)
occ. ten.	0.0644***	0.0505***	0.0635***	0.0542***
	-7.477	-7.671	-4.775	-6.547
occ. ten. sq	-0.0109***	-0.0097***	-0.0159***	-0.0124***
	(-4.012)	(-4.737)	(-4.196)	(-5.408)
occ. ten. cub	0.0008***	0.0007***	0.0013***	0.0009***
	-3.275	-3.833	-4.041	-4.645
ind. ten.	-0.0153	-0.0024	0.0032	-0.0250**
	(-1.501)	(-0.308)	(0.166)	(-2.403)
ind. ten. sq	0.0030	0.0003	-0.0012	0.0071**
	(0.966)	(0.111)	(-0.201)	-2.288
ind. ten. cub	-0.0001	0.0001	0.0001	-0.0005*
	(-0.351)	(0.412)	(0.291)	(-1.900)
firm ten.	0.0345***	0.0275***	0.0096	0.0055
	-5.137	-5.321	(0.571)	(0.666)
firm ten. sq	-0.0045***	-0.0038***	-0.0015	-0.0013
	(-5.265)	(-5.689)	(-0.763)	(-1.352)
gen. exp.	0.0402***	0.0379***	0.0188***	0.0422***
	-9.953	(11.45)	-3.498	(11.95)
gen. exp. sq	-0.0028***	-0.0005	0.0083***	0.0006
	(-2.818)	(-0.639)	-4.999	(0.753)
gen. exp. cub	0.0001	-0.0001**	-0.0008***	-0.0002***
	(0.835)	(-2.161)	(-6.496)	(-4.083)
Constant	4.9924***	4.9504***	5.0002***	0.0000
	(333.5)	(349.8)	(195.2)	()
Occ. Spell dummies	yes	yes	yes	yes
5 education dummies	yes	yes	yes	yes
OJ	yes	yes	yes	yes
Number of children	yes	yes	yes	yes
Union dummy	yes	yes	yes	yes
Marriage dummy	yes	yes	yes	yes
County unemployment rate	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
1 digit industry dummies	yes	yes	yes	yes
1 digit occupation dummies	yes	yes	yes	yes
Regional dummies	yes	yes	yes	yes
Observations	57584	57584	57584	57584
R-squared	0.562	.	0.558	.
Number of pnr		15172		15172
R-squared overall		0.558		0.552

*** p<0.01, ** p<0.05, * p<0.1, and t statistics in parentheses

Table A-4: Wage regressions for fulltime public and private employees allowing for spells of non-employment and part-time work

	OLS	GLS	IV-OLS	IV-GLS
	(1)	(2)	(3)	(4)
occ. ten.	0.0180***	0.0056***	-0.0078***	0.0056***
	(42.33)	(18.58)	(-7.595)	(13.72)
occ. ten. sq	-0.0019***	-0.0005***	0.0028***	-0.0003***
	(-33.32)	(-12.20)	(15.74)	(-6.161)
occ. ten. cub	0.0000***	0.0000***	-0.0001***	0.0000**
	(22.11)	-6.776	(-16.62)	-2.472
ind. ten.	0.0049***	0.0032***	0.0069***	-0.0014***
	-8.150	-7.993	-7.654	(-3.016)
ind. ten. sq	-0.0005***	-0.0006***	-0.0008***	0.0000
	(-5.929)	(-9.214)	(-6.309)	(0.613)
ind. ten. cub	0.0000***	0.0000***	0.0000***	0.0000
	-9.194	-9.687	-7.348	(0.446)
firm ten.	-0.0023**	0.0045***	-0.0583***	-0.0184***
	(-2.025)	-6.673	(-17.87)	(-18.22)
firm ten. sq	-0.0009***	-0.0010***	0.0046***	0.0014***
	(-6.894)	(-13.00)	(13.28)	(12.30)
gen. exp.	0.0332***	0.0356***	0.0293***	0.0359***
	(69.10)	(92.53)	(38.49)	(69.28)
gen. exp. sq	-0.0016***	-0.0015***	-0.0024***	-0.0017***
	(-30.11)	(-39.21)	(-32.98)	(-37.49)
gen. exp. cub	0.0000***	0.0000***	0.0001***	0.0000***
	(18.58)	(20.75)	(26.85)	(22.42)
Constant	5.3325***	5.0052***	5.1812***	5.0364***
	(978.8)	(935.5)	(696.5)	(897.9)
Occ. Spell dummies	yes	yes	yes	yes
5 education dummies	yes	yes	yes	yes
OJ	yes	yes	yes	yes
Number of children	yes	yes	yes	yes
Union dummy	yes	yes	yes	yes
Marriage dummy	yes	yes	yes	yes
County unemployment rate	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
1 digit industry dummies	yes	yes	yes	yes
1 digit occupation dummies	yes	yes	yes	yes
Regional dummies	yes	yes	yes	yes
Observations	1266782	1266782	1266782	1266782
R-squared	0.419	.	0.402	.
Number of pnr		310127		310127

*** p<0.01, ** p<0.05, * p<0.1, and t statistics in parentheses

Table A-5: Returns to 2, 5, and 8 years of tenure, public and private worker sample

	2 years	5 years	8 years
OLS			
Occupation	0.029	0.048	0.045
	(0.001)	(0.001)	(0.001)
Industry	0.008	0.015	0.022
	(0.001)	(0.001)	(0.001)
Employer	-0.008	-0.035	-0.078
	(0.002)	(0.003)	(0.002)
IV_GLS			
Occupation	0.010	0.021	0.027
	(0.001)	(0.001)	(0.002)
Industry	-0.003	-0.005	-0.008
	(0.001)	(0.001)	(0.001)
Employer	-0.031	-0.058	-0.060
	(0.002)	(0.002)	(0.002)

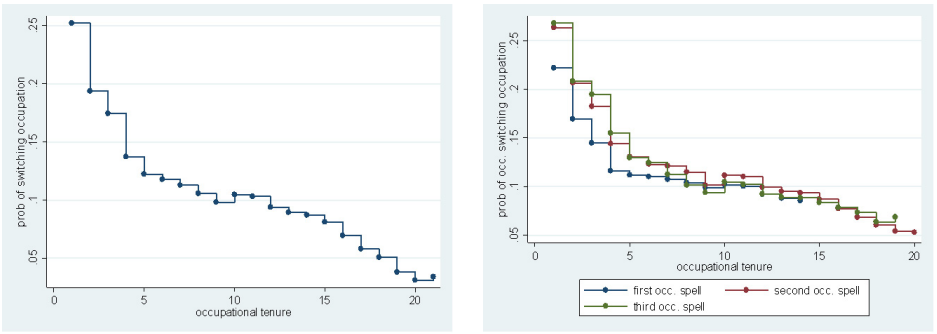
Note: Standard errors in parentheses

A4 Appendix on Hazard rates

Table A-6: Returns to 2, 5, and 8 years of tenure, public and private worker sample

	Private	public and private
	Column 1	Column 2
occ.ten.1	-2,520	-
	(-1.60)	-
occ.ten.2	-2,820	-
	(-1.79)	-
occ.ten.3	-3,019	1,623
	(-1.92)	(17,140)
occ.ten.4	-3,215	1,444
	(-2.04)	(15,250)
occ.ten.5	-3,294	1,323
	(-2.09)	(13,970)
occ.ten.6	-3,395	1,079
	(-2.16)	(11,380)
occ.ten.7	-3,416	1,000
	(-2.17)	(10,530)
ind.ten.	-0,478	-0,341
	(-25.94)	(-44,030)
ind.ten.sq	0,076	0,041
	(19.90)	(30,440)
ind.ten.cub	-0,004	-0,002
	(-17.35)	(-24,750)
firm.ten.	-0,490	-0,336
	(-30.15)	(-39,750)
firm.ten.sq	0,056	0,037
	(23.58)	(31,880)
gen.exp.	0,625	0,283
	(43.14)	(57,280)
gen.exp.sq	-0,078	-0,025
	(-33.69)	(-42,650)
gen.exp.cub	0,003	0,001
	(27.72)	(33,940)
occ. ten. 8-21 dummies other	yes	yes
other explanatory variables	yes	yes
total obs.	404800	1266756
log likelihood	-178720,66	-559774,41

z statistics in parentheses



(a) Probability of switching occupation by occupational tenure

(b) Probability of switching occupation by occupational spell number and occupational tenure

Figure A-1: Hazard rate out of occupations by occupational tenure, over all and by occupational spell number for large sample including public sector workers and allowing for spells of non-employment and part-time work.

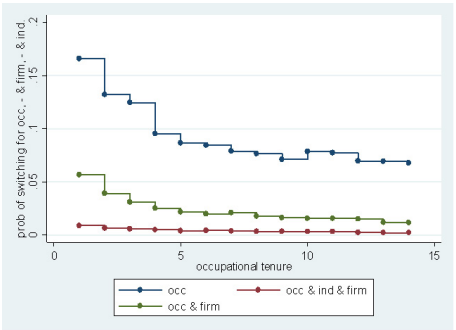


Figure A-2: Hazard rate out of occupations by occupational tenure, over all and by occupational spell number for large sample including public sector workers and allowing for spells of non-employment and part-time work.

Table A-7: Multinomial Logit for fulltime private sample

	Occ.	occ. and firm	Occ. and ind.	Occ., firm, and ind.
	Column 1	Column 2	Column 3	Column 4
occ.ten.1	-2,183	-4,111	-4,411	-1,675
	(-20,080)	(-13,850)	(-10,230)	(-13,420)
occ.ten.2	-2,531	-4,329	-4,569	-1,897
	(-22,960)	(-14,400)	(-10,400)	(-14,810)
occ.ten.3	-2,770	-4,484	-4,647	-2,026
	(-25,010)	(-14,850)	(-10,540)	(-15,660)
occ.ten.4	-2,981	-4,651	-4,943	-2,175
	(-26,670)	(-15,280)	(-11,090)	(-16,590)
occ.ten.5	-3,057	-4,819	-4,931	-2,230
	(-27,160)	(-15,720)	(-10,970)	(-16,840)
occ.ten.6	-3,165	-4,789	-5,091	-2,358
	(-28,010)	(-15,590)	(-11,230)	(-17,600)
occ.ten.7	-3,179	-5,009	-5,164	-2,313
	(-28,150)	(-16,210)	(-11,430)	(-17,290)
occ.ten.8	-3,176	-5,016	-5,042	-2,394
	(-27,990)	(-16,090)	(-11,150)	(-17,580)
occ.ten.9	-3,170	-4,975	-4,904	-2,395
	(-27,850)	(-15,880)	(-10,830)	(-17,360)
occ.ten.10	-3,091	-4,984	-4,999	-2,379
	(-27,120)	(-15,760)	(-10,970)	(-17,000)
occ.ten.11	-3,034	-4,776	-5,061	-2,211
	(-26,530)	(-15,120)	(-11,030)	(-15,790)
occ.ten.12	-3,071	-4,798	-5,146	-2,204
	(-26,630)	(-15,010)	(-11,060)	(-15,460)
occ.ten.13	-3,139	-5,068	-5,068	-2,501
	(-26,810)	(-15,320)	(-10,800)	(-16,490)
occ.ten.14	-3,194	-5,117	-5,307	-2,386
	(-26,450)	(-14,910)	(-10,750)	(-15,040)
occ.ten.15	-35,506	-35,419	-32,576	2,913
	(-0,000)	(-0,000)	(-0,000)	(1,860)
ind.ten.	-0,430	0,110	-1,047	-0,682
	(-19,460)	(1,950)	(-9,560)	(-19,270)
ind.ten.sq	0,073	0,001	0,123	0,091
	(16,020)	(0,110)	(4,470)	(11,660)
ind.ten.cub	-0,004	-0,001	-0,005	-0,004
	(-14,470)	(-1,280)	(-2,840)	(-8,710)
firm.ten.	-0,463	-1,054	-0,091	-0,369
	(-23,600)	(-21,270)	(-1,010)	(-12,090)
firm.ten.sq	0,055	0,105	0,030	0,041
	(19,440)	(13,670)	(2,240)	(8,950)
gen.exp.	0,680	0,524	0,693	0,541
	(38,660)	(11,930)	(9,240)	(21,560)
gen.exp.sq	-0,082	-0,072	-0,080	-0,074
	(-29,380)	(-10,010)	(-6,680)	(-17,570)
gen.exp.cub	0,003	0,003	0,003	0,003
	(24,070)	(8,410)	(5,330)	(14,170)
other explanatory variables	yes	yes	yes	yes
total obs.			404800	
log likelihood			-245066,19	

z statistics in parentheses

Table A-8: Multinomial Logit for fulltime private and public sample

	Occ.	occ. and firm	Occ. and ind.	Occ, firm, and ind
	Column 1	Column 2	Column 3	Column 4
occ.ten.3	1,456	1,291	14,788	0,699
	(13,500)	(3,090)	(46,920)	(3,170)
occ.ten.4	1,279	1,183	14,720	0,585
	(11,870)	(2,830)	(45,930)	(2,650)
occ.ten.5	1,169	1,061	14,520	0,501
	(10,850)	(2,540)	(44,800)	(2,270)
occ.ten.6	0,898	0,942	14,353	0,386
	(8,330)	(2,250)	(43,690)	(1,750)
occ.ten.7	0,844	0,751	14,347	0,350
	(7,820)	(1,790)	(43,150)	(1,580)
occ.ten.8	0,749	0,733	14,050	0,266
	(6,930)	(1,750)	(41,260)	(1,200)
occ.ten.9	0,649	0,551	14,230	0,265
	(5,990)	(1,310)	(41,920)	(1,190)
occ.ten.10	0,628	0,531	14,137	0,169
	(5,780)	(1,260)	(40,950)	(0,760)
ind.ten.	-0,318	0,193	-0,695	-0,520
	(-36,040)	(6,820)	(-9,790)	(-31,080)
ind.ten.sq	0,039	-0,015	0,076	0,056
	(25,920)	(-2,980)	(4,600)	(17,440)
ind.ten.cub	-0,002	0,000	-0,003	-0,002
	(-21,480)	(0,310)	(-3,240)	(-12,380)
firm.ten.	-0,207	-1,041	-0,165	-0,381
	(-20,980)	(-34,760)	(-2,690)	(-22,280)
firm.ten.sq	0,026	0,095	0,026	0,033
	(19,590)	(21,200)	(2,970)	(13,180)
gen.exp.	0,226	0,208	0,323	0,205
	(34,960)	(10,880)	(8,710)	(20,100)
gen.exp.sq	-0,019	-0,023	-0,027	-0,024
	(-26,820)	(-10,890)	(-6,440)	(-20,070)
gen.exp.cub	0,001	0,001	0,001	0,001
	(21,360)	(10,220)	(5,070)	(17,130)
education	yes	yes	yes	yes
number of children	yes	yes	yes	yes
union,marriage	yes	yes	yes	yes
county unempl.rate	yes	yes	yes	yes
time dummies	yes	yes	yes	yes
1 digit industry dummies	yes	yes	yes	yes
1 digit occupation dummies	yes	yes	yes	yes
regional dummies	yes	yes	yes	yes
total obs.			1266783	
log likelihood			-733982,97	

z statistics in parentheses