

Tenure and Firm-Specific Human Capital

By

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JEL Class: J3, M2

Keywords: Worker flows, tenure, wages, profit, matched employer-employee panel data.

Abstract

New possibilities to study tenure in Denmark reveals that long-term worker-firm relationships are not common in Denmark. Average tenure is at the level of Anglo-Saxon countries. The long series of tenure reveals that the most important individual determinant for tenure is age. Gender differences disappear over the investigated period. Even more important is the firm-dimension. Following Kletzer (1989) and Farber (1999) we decompose the returns to tenure into that due to firm-specific human capital and worker heterogeneity, by exploiting exogenous worker displacement due to firm closures. We find that the proportion of tenure returns due to firm-specific human capital has risen from a stable 10% throughout the 1980's to 30% today. The increasing importance of firm-specific returns to tenure coincides with decentralisation of Danish wage negotiations. These numbers are still much lower than the 70% found for the US, but in contrast, the Danish results are robust to individuals moving industry. In other words, our returns to firm-specific human capital are not simply industry-specific human capital returns as was found by Neal (1995) for the US.

* Financial support from the Danish Social Science Research Council and the Research Foundation of Aarhus University is gratefully acknowledged. The usual disclaimer applies.

1. Introduction

In recent years there has been a growing interest in worker mobility and job stability in the labour market. OECD (1997) documents a growing sense of job insecurity in many member states and shows that tenure at the current employer has actually declined in some countries, while it is not found that it has increased in any country. Part of the decline is, however, due to a changed composition of workers and changed job change patterns for age groups and gender as summarized by Farber (1999).

Another strand of literature about worker-employer relationship stability is the literature on job turnover. Davis and Haltiwanger (1999) report worker turnover rates of about 19% for manufacturing industry in the US. Albæk and Sørensen (1998) show a similarly high turnover for Denmark. Other European countries seem to have lower turnover than Denmark, (see OECD, 1999). However, there is plenty of evidence that turnover is different between firms, industries, worker groups and in many other dimensions. Werwatz et al. (1999) have shown that manufacturing is not the only industry with high turnover rates, and that some industries have average turnover rates that are almost 30% higher than manufacturing, while others are lower. Turnover is in many of these studies shown to be cyclical. The time span in most studies have not allowed for determining if there has been a trend in turnover.

This paper uses a new data source to construct uncensored measures of firm tenure for the Danish population of private sector workers. Our statistics show that the average tenure for men in the age group 31-50 has fallen from 6.33 years in 1980 to 5.49 in 1998. For women in the same age group the average tenure has increased from 5.05 to 5.45. The remainder of the paper will analyse the composition of tenure by groups of workers. The paper is organised as follows. Section 2 describes the theoretical background, section 3 describes the data and presents the basic statistics, and section 4 attempts to see if the change in average tenure can be described by a reduction of the return to tenure over the investigated period.

2. Background

There are several reasons why tenure in Denmark may be lower than for other countries:

First, wage scales are probably among the most compressed among the OECD countries. Compressed wages make it more difficult for an employer to give a good worker a higher wage in order to retain him. The only way a person on an individual basis can get a higher wage will be to apply to a different employer with a higher mean wage. If this is a constraining factor, we will expect that returns to tenure are low and we will also expect that tenure is relatively short.

Second, employment protection is weak in Denmark, and similar to the level of the US.

Third, unemployment insurance benefits are relatively high for low wage earners. And benefits can be obtained for a long period. Furthermore, there is almost no experience rating in the system.

Fourth, pension rights are organised along union lines rather than by employers.

These factors all pull in the direction of short tenure. The consequences of low tenure are low benefit for firms of training their workers. The risk is of course that people leave for a better paid job in a different firm. The result is that the amount of specific capital is expected to be low. This gives lower returns to tenure compared with other countries. This is itself expected to have a negative effect on productivity. However, there are also benefits in the form of a more flexible work force in the sense that it is easy to hire and fire people according to shifts in demand. This increases productivity. Furthermore, greater flexibility gives faster accessibility to new human capital and to taking over technology from other firms. It remains an empirical question whether this high flexibility has a net contribution to productivity or not.

Of course this will have an impact on the types of firms operating in Denmark. Those, who cannot operate productively under these conditions will not thrive and those who can benefit will grow. Furthermore, if short tenure is not productive for some firms one should expect that these firms do more in order to extend tenure than others. A number of possibilities are open. Firms could increase the premium to longer tenure in monetary or career terms. They could also bundle monetary and career elements with different types of benefits.

During the investigated period, a big change in the organisation of wage bargaining took place. Until 1987 wage bargaining was characterised as central, though there was a locally negotiated wage element. The system prior to 1987 was characterised by fixed wage scales where experience in the trade or age and education were important parameters. However, wages have always been different across firms..The first step towards decentralizing wage bargaining was taken in 1987. Bargaining was here shifted down to the industry and firm level. The system has been characterised as coordinated wage bargaining within strict guidelines (Andersen et al, 2001). These guidelines were finally abandoned in 1993 and wages were then negotiated at the firm level. This has started a process whereby more and more wages are individualized and more and more employees negotiate their wages directly with their employer.

This development is partly described in Table 1. Central bargaining means here that a wage has been fixed in the industry wise wage contract. In other cases the wage contract makes it possible to negotiate wages at the firm level, but it is not known to what extend it is actually done. Nevertheless, the Table shows increasing popularity until 1993, where a new category, Wage setting personalized takes over. This covers decentralized bargaining, where there is neither a minimum standard or a general level, which means that all wage has to be bargained directly between employer and employee.

Table 1. The development in bargaining, 1989-2000, private sector. Source: Employers Federation, DA, Arbejdsmarkedsrapport, 2001.

	1989	1991	1993	1995	1997	2000
Central Bargaining	34	19	16	16	16	15
De-central bargaining possible	62	77	80	73	67	65
Wage setting personalized	4	4	4	11	17	20
Total	100	100	100	100	100	100

If specific capital plays a role we will expect that firms after 1987 and especially after 1993 get a new opportunity to reward tenure or firm specific human capital

The remainder of the paper is organised as follows. First we describe the distribution of tenure in the raw and according to age and gender. The relative importance of firm characteristics is shown to increase as wage bargaining decentralised. At the same time the returns to firm-specific human capital are shown to increase.

OECD, 1997 presents a comparison of ongoing tenure for its member countries. Data are based on labour force surveys and are thus individually self-reported tenure. These statistics show that Denmark with its average tenure of 7.9 years is placed together with the Anglo-Saxon countries. The OECD numbers show that Denmark is in the group of countries with the lowest fraction of those with more than 10 years of tenure. It is also seen that the number for short tenure is very large in Denmark. Both features bring Denmark on par with Australia, Czech Republic, Korea and the US.

Table 2. OECD statistics on tenure (Upper panel) and our measures (lower panel).

	1 and under 2 years	2 and under 5 years	Under 5 years	5 and under 10 years	10 years and over	Average tenure
Australia	37.8	21.6	59.4	19.5	21.1	6.4
Austria	21.5	21.2	42.7	19	38.3	10
Belgium	19.3	17.5	36.8	19.6	43.6	11.2
Canada	22.7	28	50.8	19.8	29.4	7.9
Czech Republic	43.6	12.3	55.8	12	32.2	9
Denmark	36.5	16.2	52.7	18.2	29.1	7.9
Finland	23.8	13.4	37.2	23.1	39.7	10.5
France	23	17.7	40.6	17.4	42	10.7
Germany	25.5	22	47.5	17.2	35.3	9.7
Greece	21.1	18.5	39.6	20.6	39.8	9.9
Ireland	28.7	20.1	48.8	18.1	33.1	8.7
Italy	15.5	18.1	33.6	20.8	45.6	11.6
Japan	22.6	13.9	36.5	20.7	42.8	11.3
Korea	35.2	19.7	54.9	15.9	29.2	8.7
Luxembourg	20	20.7	40.7	21.4	37.9	10.2
Netherlands	27.7	20.4	48.1	20.3	31.6	8.7
Poland	5.7	7.1	12.8	12.5	74.7	17.5
Portugal	22.4	17.5	39.9	18.5	41.6	11
Spain	40.3	11.1	51.4	14.4	34.2	8.9
Sweden	22.2	15.1	37.3	23	39.7	10.5
Switzerland	24.7	20.8	45.5	22.9	31.6	9
UK	30.3	19.5	49.8	23.5	26.7	7.8
US	34.5	20	54.5	19.8	25.7	7.4
Private sector, based on ATP-P&P data						
Denmark, all labour force	29.8	37.4	67.2	16.8	16.0	4.81
Denmark, 30-60 years old	19.6	18.6	38.2	38.2	23.5	6.20
Source: OECD Employment Outlook, 1997, table 5.5						
Based on EC-LFS for EC.						

Measuring returns to tenure is in principle not straightforward, because the periods workers will remain employed depend upon the wage in the current job compared to the alternative wage. The theory of firm specific human capital predicts that workers build up firm specific capital in the current job, which they will lose if they leave the current job. The theory also predicts that the wage will reflect the returns to tenure. Employers will be forced to give their employees a wage that is between the alternative wage and the value of their marginal product. If they give a wage below that, the worker will leave. This means that tenure will reflect the level of wages. If wages

do not grow sufficiently compared to alternative jobs, the person will quit and tenure will become shorter. And workers with more tenure are more likely to have more specific capital than workers with less tenure. Farber (1999) adds to this that firms with more specific capital involved will adapt more aggressive techniques in retaining their workers. The result will be that workers who have a comparative advantage of accumulating specific capital will tend to become employed in those firms. Neal (1995) brings this a step further and shows that people with higher educations actually accumulate more specific capital. Lazear (1979 and 1998) suggests that firms relying more on specific capital will have steeper wage profiles than firms relying less. This means that there will be a firm specific element in the relation between wage and tenure. In our context, this should mean that the individualizing of wage scales should result in the increasing importance of the firm element. This is our first hypothesis.

Following a search approach gives almost the same predictions. Here workers with relatively high wages are less likely to quit (Mortensen, 1986 and 1999), because the probability finding a job with a wage above the current level is smaller the higher wage in the current job.

Part of the literature tends to ignore some of these problems and estimate returns to tenure using OLS on experience since the start of the working career and education among other factors. According to Farber, 1999, the usual OLS estimate is a 2% higher wage for each year with the same employer. But this is most likely upward biased because individual and job specific elements are positively correlated with tenure. Alternatively, Altonji and Shakotko use an IV estimator and find very small returns to tenure.

The literature now takes two approaches. One is based on data on those who continue their jobs. And another uses displaced workers. Both have their deficiencies. Topel (1991) estimates the return to tenure on stayers and takes that as an unbiased estimate of wage growth for all workers had they not changed jobs. He finds a return to tenure between 0.025 and 0.03. The problem of using stayers is that these will tend to have higher returns than the average person. On the other hand, using displaced workers will introduce a negative bias, because those ending their jobs will possess, all else equal, less specific capital because firms will want to retain as much of their specific capital as possible.

Given that the worker receives at least part of the return to firm specific human capital in the form of higher wages, he will lose this when leaving his job and the salary in the subsequent job will be

accordingly lower. Furthermore, it will be lowest for workers with high tenure, because they will lose the most. Addison and Portugal (1989) finds support for this using the 1984 US Displaced Workers Survey. Estimating using displaced workers introduces the problem that their employers may have selected them because they were low productivity individuals as pointed out by Gibbons and Katz, 1991. Furthermore, individual heterogeneity may influence the wage level of the subsequent job. If tenure in the old job is correlated with individual productivity, then a job loser with high tenure in the previous job will receive higher wages in the subsequent job. Kletzer, 1989 finds a positive but insignificant relationship between pre-displacement tenure and wage level in new job. This indicates the importance of individual heterogeneity. Kletzer uses DWS data with workers whose employment is involuntarily terminated and who are not recalled. Regressing post-displacement log real earnings on pre-displacement tenure (and controlling for age, gender, race, education and year) gives a small but significantly positive coefficient on past tenure. Thus, Farber finds that 10 years of tenure in the lost job is associated with about 6% higher subsequent wage.

In order to distinguish between unobserved individual heterogeneity from the rate of return to firm specific human capital, we run two regressions: First, sampling workers employed in a firm which closes who were subsequently hired elsewhere, Farber finds that regressing pre-displacement log real earnings on pre-displacement tenure, controlling additionally for survey year, education, age, gender and part time status yields a significant coefficient on tenure of 0.021 (0.00006). This coefficient on pre-displacement tenure in the post-displacement earnings function is interpreted as reflecting worker heterogeneity only. The coefficient on tenure in the first step is interpreted as reflecting the sum of individual heterogeneity and returns to firm specific human capital. So the difference in coefficients represents the contribution to purely firm specific human capital. Farber finds, as already reported, that individual heterogeneity is responsible for a mere 0.006 of the wage. This means that 6/21~30% of the estimated returns to tenure is due to heterogeneity and 70% or 0.15 is due to firm specific human capital.

Neal (1995) finds that displaced workers who are re-hired in their pre-displacement industry earn substantial returns to their pre-displacement tenure. He also finds that the wage loss due to a switch is significantly higher for those workers who find their next job outside their pre-displacement industry. Neal suggests that firm-specific factors may contribute little to the observed slope of wage tenure profiles. His findings are based on DWS data and his method does not take unobserved heterogeneity into account. However, this does not matter as long as the

unobserved heterogeneity does not affect the probability landing the post-displacement job in the same industry as the pre-displacement job. The sample is restricted to displaced workers who lost their jobs because of establishment closure.

In the remainder of the paper, we will first describe the data; second, we will briefly investigate which factors determine tenure to see if the firm element becomes more or less dominant over time; third, we will estimate the returns to firm-specific human capital using the Farber approach. Fourth, we will investigate possible changes over time that could be consistent with the development in wage bargaining. Fifth, we will investigate the findings of Neal on Danish data.

3. Data Description

The data used in this study originates from two sources: The first is the Statistics Denmark IDA (Integrated Database for Labour Market Research) Register. IDA contains information on labour market conditions for persons and workplaces in Denmark over the years 1980-1998. The IDA data originates from various administrative registers. The important feature of IDA is that it is possible to associate workplaces with the identity of all employees at a specific day in November (see Leth-Sørensen, 1998). Employment histories in IDA are censored in 1980. We have augmented this data with information from contribution histories to a mandatory pension programme, ATP. ATP was established in 1964 and is a comprehensive pension system, where all employees have to pay contributions that are related to total hours of work. The employee pays 1/3 of the contributions, and 2/3 are paid by the employer. As a result, the ATP system has records for the total contribution for each employee at each employer. These records are subsequently used to construct continuous spells of tenure with each employer. Spells are *not* transformed to a full-time equivalent basis. This means that a part time spell that has lasted 4 years is counted as 4 years irrespective of hours of work. Employers are defined by their employer identification number, which is changed if ownership in a strict legal sense changes. We have corrected for those cases where more than 50% of all employees are taken over by the new legal employer. In these cases, tenure is said to be continuing. Similarly, if there are short breaks in the employment spell due to temporary lay-offs and maternity leaves. As long as the person continues at the old employer their spell is considered to be ongoing. Even after having taken these precautions in dealing with the administrative records we will expect that survey based data tend to display longer spells of employment than register based data simply because people with high tenure will tend to

exaggerate the real length of the spell and because our ID-filter after all will not catch all apparent but fictive changes of firm identity.

The joining of IDA and ATP data sets enables us to construct tenure for all employees since 1964. However, we only have the full set of background characteristics after 1980, so we have limited the data set to those who were employed after 1980 but the ATP data enables us to observe all ongoing employment spells in 1980 and to follow them from the start. As a result tenure is censored at 17 years for this first group. Since there are only 2.9 % of all women and 7.1 % of all men affected by the censoring in 1980, this problem is considered minor.

The total data set consists of 850000 individual private sector employees and descriptive statistics are reported in Table 3. Table 2, second panel shows numbers from our data that are comparable with the OECD statistics. In general, we find fewer observations with short tenure but also fewer with long tenure. This point is strengthened when limiting the analysis to the core age groups. Unfortunately, OECD does not state which age groups are in the table. Most likely it is the age group 18 to 59 year as in the EC-LFS. The main reason for the difference is probably due to the fact that the OECD-table is based on self reported data, whereas our statistics are based on register data, where we will neglect the very short spells. For the long spells, respondents might exaggerate the duration, where register data will be fairly accurate. The two types of data may also treat changes of firm identity differently, since respondents are more likely to discard changes of identity that were caused only by formal changes in ownership for example. Register data may be more prone to such changes, though much care has been taken to eliminate this as far as possible. Figure 1 presents the distribution of tenure at the current employer for selected years, where all observations with tenure above 17 years are top-coded at 17. The years are selected so as to be representative of different points in the business cycle. The number with tenure equal to one comprises those who terminate their employment before the second year and those who will have an ongoing spell of employment. Consequently, years with many hires will have more persons with tenure equal 1 than other years.

Table 3. Descriptive statistics.

	1980		1998	
	mean	std.dev	mean	std.dev
log wage	4.607	0.527	4.792	0.546
tenure	3.522	3.761	3.793	4.628
male*age	21.376	18.117	21.222	19.218
male*age2	784.000	925.000	819.000	974.000
female*age	10.766	17.222	11.808	17.054
female*age2	412.000	819.000	430.000	776.000
educ7	0.204		0.074	
8	0.052		0.044	
9	0.113		0.117	
10	0.164		0.165	
11	0.076		0.050	
12	0.312		0.269	
14	0.023		0.068	
15	0.023		0.033	
16	0.003		0.013	
17	0.006		0.022	
18	0.002		0.008	
Number of obs				

Figure 1. Tenure distribution for men, selected years, top coded at 17.

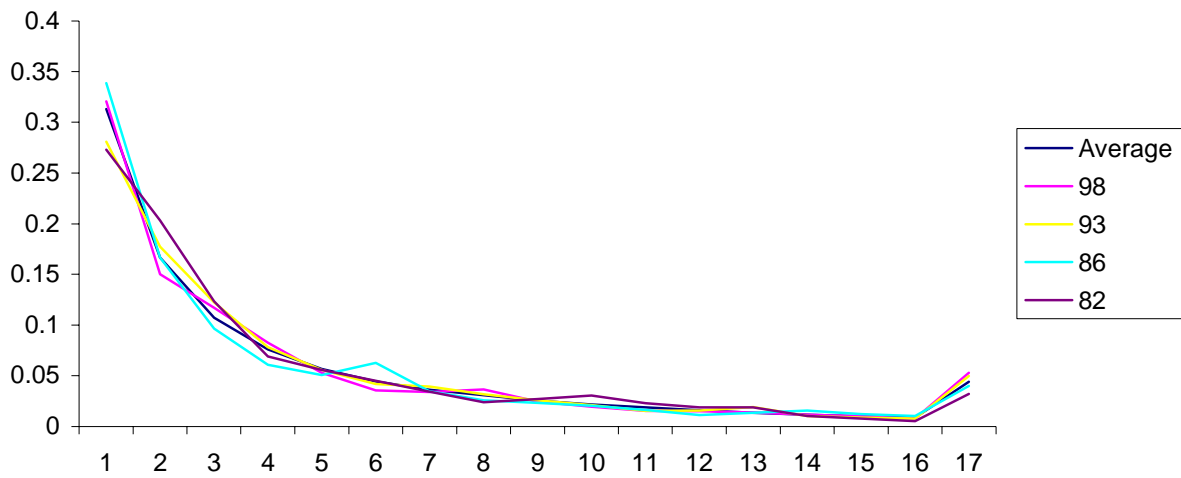


Figure 2. Tenure distribution for women, selected years, top coded at 17.

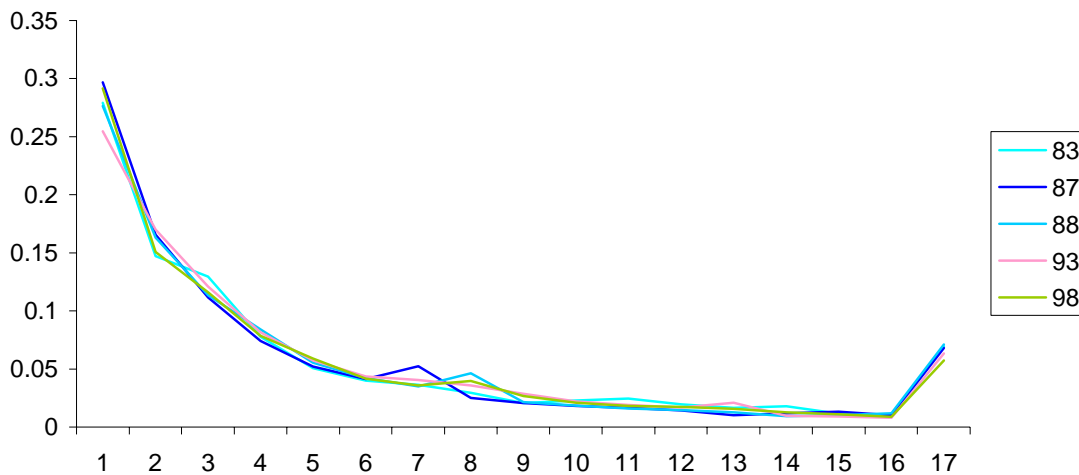
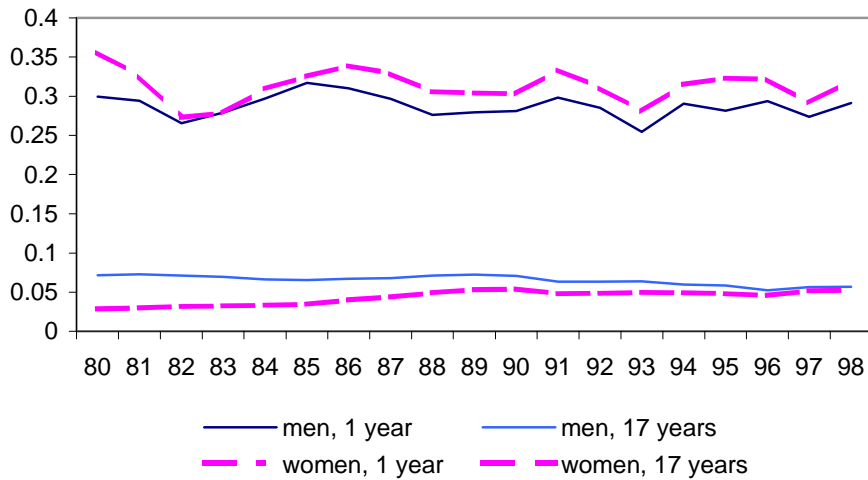


Figure 1 and 2 shows that the tenure distribution for men and women have the same profile and that the five selected tenure distributions are almost identical. The five curves do not differ much between different points of the cycle.

The other dimension is the fraction of workers experiencing long terms of tenure. We have first chosen to show how many have experienced at least 17 years of tenure, because 17 years is the longest uncensored spell that can be shown in the data consistently over the period. Figure 3 shows that the proportion of people who stay 17 years and more at the same workplace is only about 5% for men and women together. The proportion of long tenure has actually risen for men and fallen for women. Thus, real long term employment relationships are not very common. Only 15% of the workforce experience employment spells 10 years and longer. It is also remarkable, that we see that men have increasing tenure, while women experience decreasing tenure and that the two curves seems to meet around 15%.

The upper lines in Figures 3 display the fraction with only one year of tenure measured as ongoing spells. The average levels are 31% for men and 29% for women. The time pattern shows relatively weak cycles that reflect hiring patterns over the business cycle.

Figure 3. The proportion of men and women with low and high tenure, 1980-1998.



However, there appears to be large differences between age groups and the decline seen in long tenure may partly be explained by a different age and gender composition of the work force.

Table 4. Tenure at current employer for age groups and gender, 1980 and 1998.

	15-18	19-30	31-50	51-60	61-70	Total
Men						
1980	1.2711643	2.9781886	6.3352639	8.3807672	7.6680602	5.1349223
1998	1.4691011	2.7784228	5.4937816	7.4333489	7.1661701	4.8717035
Women						
1980	1.1665116	3.0316365	5.0497255	6.5983206	6.1432136	4.2270197
1998	1.4617183	2.4601168	5.449223	7.5404453	7.9468085	4.5912738

Table 4 shows different tenure levels for age groups. The longest tenure is found for the group of 51-60 year olds. They have had the longest time to find a good match. Comparable figures are found among those 61-70, which at first may appear strange given the growing tendency to early retirement. The same age pattern is found among women. It is remarkable that tenure for women looks very much like tenure for men by 1998.

Furthermore, it is noticeable that there has been a pronounced decline in tenure at the current employer for men of all ages except the youngest. The decline has been largest for the two “core” age groups of 31-50 and 51-60 year olds. Different early retirement programs have undoubtedly affected the latter group, but the decline for this group does not differ from those aged 31-50. The opposite effect has been dominating for women. Women above age 30 have increased their tenure,

so that it is on par with men in 1998. Women are still working more part time, but they stay equally long with the same employer. The age interval 19-30 is affected by extended maternity leaves. (The maternity leave itself will probably not affect our measure of tenure but a program for extended maternity leave, that took effect in 1993 might have had some effect on tenure for this age group).

These tables show that long tenure and a large proportion of observations are found in the age groups between 30 and 60.

Thus, we can conclude that the share of long run tenure went down in the beginning of the 1980s with a slightly growing proportion of males staying between 2 and 5 years. The fraction having 1 year of tenure does not change much over the entire period. The difference between men and women disappears in the 1980s. The apparent decline in tenure for men is partly masked by an increase of tenure for women as labour market participation increased. This happened to a large extent during the 1980s. Other differences over time must therefore be the result of different composition of the work force.

So far we have looked at demographic determinants of tenure. In the next section we will look at the influence of firm related factors on tenure.

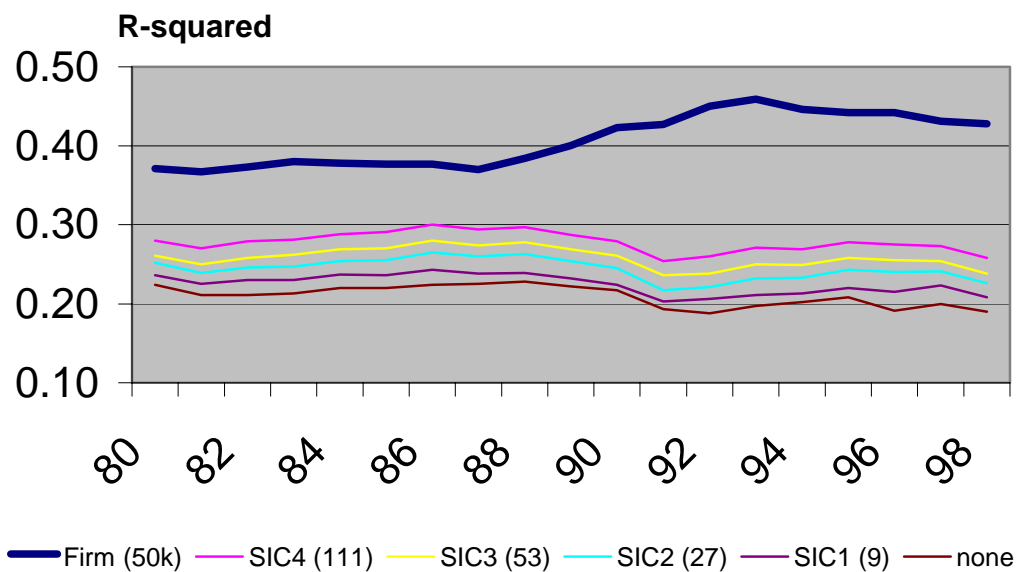
The firm element in tenure

We have estimated the following equation for each person using OLS.

$$Tenure_i = age_i * gender_i + industry_i + \varepsilon_i$$

where $industri_i$ are ISIC-codes at different levels (9, 27, 53 and 111 categories) and ε_i is an error term. Furthermore, we have added one regression without industry dummy and one with a dummy variable for each of the 50,000 firms covered by the data. This is estimated on all employees. Estimation is repeated for each of the 19 years, 1980-1998. Estimation results for the first and last year are reported in Appendix 1. Figure 4 summarizes the importance of heterogeneity in individual worker ongoing firm tenure over the business cycle. Each point is a R-bar-squared measure of goodness of fit from a separate and independent regression. Each line corresponds to a

Fig 4. Tenure Heterogeneity



different grouping over the years (none, firm and various industry classifications). It is evident that all industry groupings follow a similar pattern with a small increase in heterogeneity starting in 1989. This is in contrast to the firm-wise grouping which shows markedly increased explanatory power over the 1990's and starting in 1988. Our main finding is that the firm element has a much stronger explanatory power than industry (at any level). This supports the general viewpoint in Lazear, 1979 and 1998. We also find that the firm element is strengthened in the years 1989-1993 and that the industry element is weakened in the same years. This finding is consistent with our priors concerning the decentralisation of the wage bargaining process.

Returns to tenure

The next step is to estimate returns to tenure following the strategy lined out in Farber (1999).

This comprises two equations:

$$1. \quad wage_{i,pre-displ} = \beta X_i + \gamma * tenure_{i,pre-displ} + \mu_i$$

$$2. \quad wage_{i,pos-displ} = \beta X_i + \dot{\gamma} * tenure_{i,pre-displ} + \dot{\mu}_i$$

$$3. \quad wage - diff_i = (\gamma - \dot{\gamma}) * tenure_i$$

where X_i are gender and age groups interacted and education. The first equation contains return to tenure and heterogeneity, while the second equation contains possible returns to pre-displacement tenure (i.e. comprising returns to human capital acquired in the pre-displacement job) and returns to heterogeneity. Equation 1 and 2 have been estimated on about 21000 persons who have all been involved in firm closures and who have got a new job within 1 year from losing the previous job.

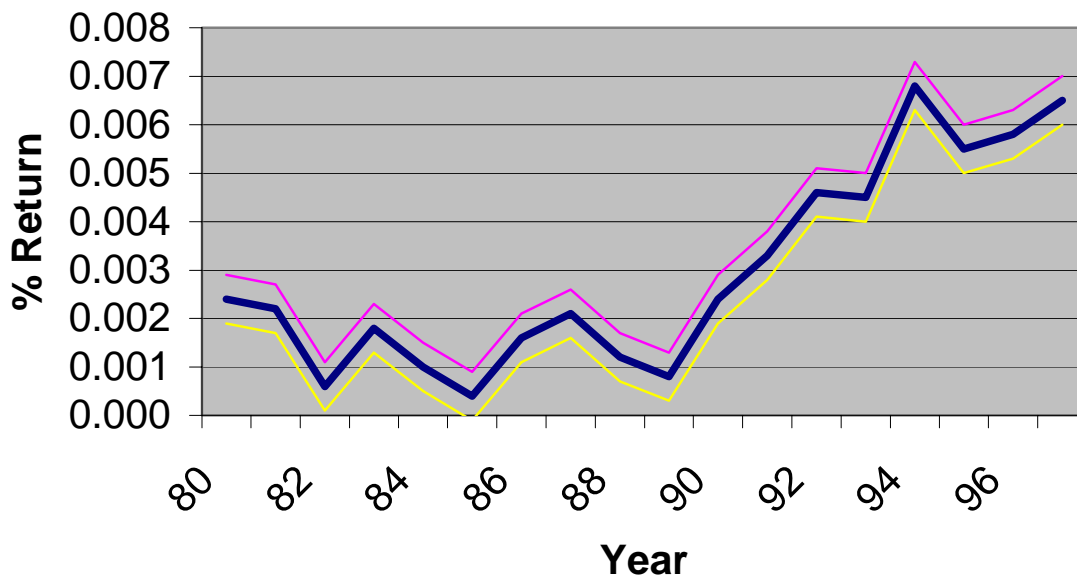
Estimations have been done separately for each of the 19 years. We have reported estimates in Table 5 for 1980 and 1998. The difference between the two estimates measures the return to firm-specific human capital, and the remainder, which is persistent, is attributed to unobserved individual worker heterogeneity. While the returns to tenure average 2% and are close to those found using similarly simple techniques on US data, the returns to firm-specific human-capital in the later part of the period constitute only about 30% of those overall returns, compared to the US figure of 70%. The estimated return to specific capital appears to be even smaller in 1980.

Figure 5 reports the estimated returns to firm-specific capital for all years. It is remarkable that the return to firm-specific capital is very low until the beginning of the 1990's. It rises from 1991/92 and becomes about 30% of the annual wage growth from the mid-1990's. This coincides with the decentralization and individualization of wage bargaining. The interpretation is that wages become less compressed and to a higher extent are the result of economic forces than previously.

Table 5. Returns to firm specific capital, 1980 and 1998.

	1980				1998			
	pre-displacement Coeff.	std.err.	post-displacement Coeff.	std.err.	pre-displacement Coeff.	std.err.	post-displacement Coeff.	std.err.
log wage								
tenure	0.028	0.003	0.026	0.003	0.030	0.002	0.023	0.002
male*age	0.060	0.008	0.056	0.007	0.068	0.006	0.064	0.006
male*age2	-0.001	0.000	-0.001	0.000	-0.001	0.000	-0.001	0.000
female*age	0.045	0.008	0.043	0.007	0.058	0.007	0.057	0.006
female*age2	-0.001	0.000	-0.010	0.000	-0.001	0.000	-0.001	0.000
educ7	-0.157	0.069	-0.108	0.058	-0.222	0.039	-0.209	0.037
8	-0.142	0.096	0.001	0.084	-0.270	0.065	-0.136	0.061
9	-0.095	0.081	-0.015	0.068	-0.121	0.043	-0.111	0.041
10	-0.191	0.074	-0.112	0.061	-0.161	0.032	-0.151	0.030
11	-0.009	0.074	0.028	0.061	-0.064	0.043	-0.128	0.055
12	-0.063	0.089	-0.028	0.055	-0.127	0.027	-0.098	0.024
14	-0.017	0.091	0.083	0.075	-0.047	0.037	0.044	0.034
15	0.169	0.170	0.156	0.077	0.095	0.048	0.170	0.046
16	-0.002	0.138	-0.102	0.152	0.109	0.073	0.115	0.067
17	0.411	0.279	0.231	0.114	0.153	0.057	0.292	0.053
18	-0.009	0.147	-0.144	0.253	0.092	0.088	0.310	0.105
constant	3.713	0.147	3.847	0.127	3.694	0.147	3.755	0.107

Figure 6. Returns to Firm-Specific Human Capital



Finally, we have tested if our results are robust to whether the post-displacement job is within the

same industry, measured at different levels. Our results show very little difference in total returns to pre-displacement tenure due to industry. What matters is the loss of firm-specific capital independently of the industry of the next job. This finding sharply contrasts the results of Neal (1995). His conclusion is that as long as displaced workers find new jobs within their pre-displacement industry, they get a substantial return to their pre-displacement tenure. This is not the case, if they shift industry. Neal effectively ended the debate on firm specific human capital by concluding that it was not really firm specific but rather industry specific. Our findings contrast with his result, whereby we find evidence of a tenure effect on wages independently of a shift in industry at any level of industry coding. Furthermore, we find that our measured loss in returns to firm specific capital is really based on firm-specific and not industry-specific capital.

5. Summary and Conclusions

Average tenure in Denmark is similar to that of the Anglo-Saxon countries and among the shortest in Europe. Nevertheless, there is a substantial dispersion in tenure across workers, and there are still about 15% who will stay more than 10 years in a firm. Age and gender are the most important supply side factors while the firm dimension seems to be much more important than industry (measured at any level). We find that the firm dimension grows significantly in importance consistent with recent decentralization of wage bargaining.

A small empirical literature has tried to measure the relative contributions of worker heterogeneity and firm-specific human capital. Here we apply the ideas from this literature and obtain results in stark contrast to those found in the US. While the (OLS) economic returns to tenure are similar at around 2%, of that, at most 30% is due to firm-specific human-capital in Denmark. This is in contrast with the 70% reported in Farber (1999) using US Displaced Workers Surveys. In further contrast to the US studies, where the firm-specific human-capital results were found not to be robust to workers switching industry, for Denmark our measures of firm-specific human capital are robust, even between narrowly defined industries. We have therefore new evidence for the concept of firm specific human capital in contrast with the findings in Neal (1995).

The Danish result of increasing importance of firm-specific human capital during the 1990's is consistent with the decentralisation of wage bargaining and increasing importance in tenure-heterogeneity between firms, that took place in these years.

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