Careers in Firm and Occupational Labor Markets

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Abstract
Using matched worker-firm personnel data the Swedish private sector (except for banking and insurance) from 1970-1990, we analyze the mobility pattern and wage effects of three types of career moves: changes in occupation, firm, and hierarchical level (the latter for moves both within and between firms). Workers change occupations less than they change firms, suggesting attachment to "occupational labor markets" is as important as attachment to internal labor markets. Career job search has a two-stage pattern: occupational changes tend to occur before firm changes. All three career moves have large effects on wage growth; promotions have the largest effect. The wage effects of simultaneous changes (e.g., firm and occupation together) are larger than the sum of individual effects. Larger firms operate more effective internal labor markets, providing better opportunities for occupational and hierarchical level change. There is evidence of fast tracking in both promotions and exits. We find little effect of gender on any of these phenomena.

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I. Introduction

There has been substantial work in labor economics and sociology describing the role of occupations, firms, and promotions in wages and careers. Promotions and career moves have been a theme of empirical work, from models of search, matching, and sorting to analyses of timing of career moves such as occupation, industry, and job changes (see, for example in economics, Shaw 1984, Neal 1999, Topel and Ward 1988, Topel 1991, and in sociology see, Spilerman, 1977 Baron and Bilby 1980, DePrete and Soule 1986, career paths see Rosenbaum 1984, 1980 Spilerman and Lunde 1991). Careers have also been an important element of the internal labor market literature, in which it is argued that many employees tend to spend significant fractions of their careers with the same employer or moving within occupation/craft boundaries (Doeringer and Piore 1971, 1985, Kwon 1998, Kwon and Meyersson Milgrom 2003). Finally, it has been argued that many workers take a two-pronged approach to job searches, first searching for an appropriate occupation, and then searching for the right employer at which to work in this occupation (Neal 1999). As shown in Kwon and Meyersson Milgrom 2003, and putting together the last two observations, if a typical worker first tends to gain attachment to an occupation and then stay with it while searching across firms, then many of the observations about internal labor markets may apply as well to *occupational* labor markets (OLMs).

Within the framework of a research program understanding the functioning of ILMs, OLMs and other social institutions for careers and earnings, our objective in this paper is to map the patterns, and consequences for wages of three types of job transitions: the interactions between promotion, demotion, occupation and firm changes, to identify the role of job changes both within and between firms.

We are particularly interested in the following three questions.

1. Who stays and who moves within the occupation, the firm and along career ladders?

2. How do employees move along careers ladders, by move to other occupations, firms through promotions or a combination of the three?

3. what are the pay offs from the different movementsstrategies?

We expand the notion of career moves from promotion to firm and occupation changes partly for theoretical reasons, partly because changes in occupations seem to generate wage growth somewhat in the way promotions do (McCue 1996), and partly because promotion is relatively rare in Sweden – almost half of the workers we observe from the beginning of the panel receive no promotion at all, and about 84% receive one or less. This led us to inquire whether firm and occupational change are important career components in Sweden.[1]

Take a simple example: a worker has two promotion offers, from their current firm and from an outside firm. We expect an accepted offer from an outside firm to carry a higher wage, due to mobility costs, match-specific capital, etc. The current firm's offer seems generally weakly preferred, since empirically most promotions occur within the firm (seven-eighths of all promotions are internal, in our data). If the outside offer is accepted, higher wages than at the current firm should be attached. A valuable and novel feature of our data is that we can document changes of this type, and quantify the effects of different types of career changes. Ranks within occupations are carefully documented and identical across firms, making promotion and demotion, within occupations, comparable across firms. We can also be more exact about job changes than is typically possible: we can separate promotions and demotions from firm changes and occupational changes, as well as identify interactions between them.

Our results are consistent with the job change literature, and extend its findings. Promotions quadruple the average raise. Changing firm more than doubles the raise, holding occupation and rank constant. Changing occupation without changing firm also more than doubles the raise. Moreover, having any two of these changes simultaneously has a stronger effect than the sum of the individual effects. It is

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[1] Lazear and Oyer 2002 and Kwon Meyersson Milgrom 2003 uses the same data studying across-firm and within firm transition. Lazear and Oyer 2002 consider the hierarchies and sources of workers from the firm's perspective, Kwon and Meyersson Milgrom focus their study on the boundaries for internal labor markets. The authors in this paper focuses on the workers' career path and the effect on wages. Jeremy Fox 2002 also uses the Swedish firm matched data for a study on compensation schemes and in particular how it effects turnover. The results show that firms cannot cost effectively reduce turnover by altering their compensation schemes.

clear that job changes are a very important source of earnings growth in Sweden (see, for example, le Grand and Tahlin 2001).

As suggested by the ILM literature, we find that most workers rarely change employers. Similarly, workers tend to change occupations at most once or twice in their careers. Both types of moves are more frequent at earlier stages of careers, consistent with job search models. Finally, perhaps surprisingly, we find little difference in patterns between men and women. This might be explained by the fact that our sample is limited to full time white-collar workers.

II. Literature (incomplete)

The literature on occupation, firm, and rank changes has not been completely tied together. It is a fairly recent finding that occupational changes generate short-term wage growth (McCue 1996), although the fact that promotions do so is obvious and well documented. Topel and Ward (1988) found that firm changes are a large component of short-term wage growth for young men in U.S. data. Rates of return on occupation-specific human capital vary, yielding occupation effects on wages (Shaw 1984). The theoretical models that deal with careers include general and specific human capital (Becker 1975), job search (Neal 1999), matching models (Jovanovic 1978), and the hierarchy / tournaments literature (e.g., Lazear & Rosen 1981). Most of these models predict that more career changes occur with younger workers, and that regardless of the mechanism that generates mobility (informational asymmetries, match-specific capital, sorting, or incentives) mobility generally raises wage growth.

Studies of careers on US data have not always focused on wages (Osterman 1979 Rosenbaum 1984, Rosenfeld 1992, Bruderl et al 1991). In contrast both career and wages for the period is focused in the seminal papers by Baker, Gibbs and Holmstrom 1994ab)

We postulate that by revealed preference changes in occupation, firm, or level are Pareto-improving, and benefit either the worker or the firm, or both. Since the worker can only be made less well off when he is fired, and firings are uncommon in Sweden, we expect that nearly all changes will make

the worker better off (though not necessarily better paid). It is a strong commonality of the empirical literature that all job transitions, whether occupation, firm, or level, generate large raises.

However, most of the empirical work in this area has not had the data to explore whether all these changes affect longer-term wage paths and careers. Thus one goal of this paper is to examine longer-term causes and effects of various types of job changes. Prior work has also not generally disentangle the relative individual and joint effects of various job changes. It is, after all, perfectly possible to change occupation, firm, and level at once, or any two of the three. Indeed, data from many previous papers on promotions and firm changes may have had simultaneous changes of this type that could not be separately identified. An advantage of the Swedish data is that all these job changes are documented, and that occupations and levels are comparable across firms. Equally important, we can estimate interaction of two simultaneous changes and decompose the effects.

III. Data

The data were collected and compiled by the Swedish Employers' Confederation (SAF) from their database on wage statistics, assembled from establishment-level personnel records. These data are extensive and detailed, and contain information for blue- and white-collar workers in every industry (except insurance and banking) in the private sector within the SAF domain (we use the white collar data in this paper). Member firms provided information from 1970 to 1990. The data were used as inputs in the central wage negotiations and monitored by both SAF and the labor unions. The data is based on firm personnel records reported yearly. Hence the data are of exceptionally high quality. They should be very reliable compared to standard sample surveys with self-reported pay and hours worked.

For each employee, information was provided on method of wage payment, education (incomplete, provided in situations where education mattered for setting occupation codes and wages), age, gender, hours worked, part-time or full-time, union status and if unionized the name of the union, and four-digit occupation code. The white-collar data cover practically the entire occupational spectrum,

6

including managers and professionals. Chief executive officers and members of executive teams are excluded.

The Swedish Occupational System

Sweden had an occupation system labeled the BNT coding system during the period of 1970-1990. BNT codes had four digits, where the first digit was based on similarity in functions such as secretaries and keypunchers. The second and third digits narrowed this down to families of occupations, one type of function, such as "Administration, or production and management within logging, floating and measuring timber" (BNT code 160). The fourth digit indicated the level/ rank of occupation and hence the responsibility and the degree of difficulty of a set of tasks. For example, for the BNT code 1606, the last digit indicated that the tasks contained "Management of subordinates, responsibility for the supply of relevant work force equipment, control and evaluation of quantity and quality, including choice of methods and measurement to be taken at disruption at work bottlenecks."

The system was designed to support central wage negotiations statistics. The occupation coding system was to be as accurate as possible in order to reflect the level of pay at the plant levels and in order to compare wage developments for different groups within the labor force.

Although the employer had the right to lead and allocate work to workers, assignment of BNT codes to individuals and the labeling of a set of tasks to jobs assigned to BNT codes were monitored by labor unions. The local labor union at the firm and plant level would oversee that a person with a certain BNT code was actually paid in accordance with what that particular occupation was to be paid, and that the person actually carried out the tasks assigned to that occupational code. Furthermore the labor union played an important role in monitoring the system both within and between firms. Hence, the representatives of the labor union at the industry, firm, and plant level oversaw that the system worked. Thus, the occupational code data are of high quality and consistent across firms.

Importantly, the occupation codes are *not* designed to ratify pay levels.[2] Instead, they are designed to describe job duties without reference to pay. They then *constrain* pay for employees in that occupation. Because the unions monitor them, it is difficult for employers to assign workers to occupation codes that do not match their job duties, in order to alter their pay. For example, labor unions on a national basis oversaw that an employee in Stockholm in a certain four-digit occupation was paid approximately the same as a person working in the same 4 digit occupation at another firm in Gothenburg, *and* that the tasks they fulfilled were comparable. If there was a conflict or disagreement at the local level about assigning tasks and wages to certain BNT codes, there was a well developed conflict resolution mechanism, where representatives from the central wage negotiating parties met locally to resolve the conflict the timing of these negotiations were always separate from the central or local wage negotiations.

Thus, we can measure functions at a very detailed three-digit level (about 55 codes in all), or at a more general one-digit level (10 in all) that is more comparable to previous studies that used occupation codes. In this paper, we present results based on one-digit occupations. We do so because we feel that these broader definitions of occupation are more consistent with the usual theoretical idea of an occupation. However, we also ran all analyses using three-digit codes. Doing so increased the number of occupational changes by about one third, but did not change any of our general conclusions. The Appendix lists the 10 occupational functions (1-digit level).

The fourth digit of the BNT occupational code is the rank, or hierarchical level, of an employee in that 3-digit occupation. A unique feature of the dataset is that we have a measure of level that is comparable for workers across *firms.* We define a promotion as a change to a higher rank (highest rank is 8 and lowest 2), and a demotion similarly. Strictly speaking, SAF fourth digit codes are defined relative to 3 digit codes. However, our exploration of the data, as well as reading of SAF publications on changes in BNT codes from 1974-75, strongly suggests that the fourth (rank) code is comparable across 3 digit

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[2] Regressions of wage level on occupation and level dummies in any given year explain about three fourths of the variance. See also a more elaborate discussion on the wage dispersion on the 4 digit code level in Meyersson Milgrom et al 2001.

occupations within each 1 digit occupational function. And, as with analyses of occupational changes, we also ran all relevant analyses defining promotions only within relevant three-digit occupations, with no change in conclusions. Thus, we can explore promotions within and across firms, within occupational functions.

IV. Job Transition Patterns

Table 1 provides some summary statistics for the panel drawn from the population of individuals in the white-collar group. The data are based on full-time workers; 23% are females. The distribution of firm size in Sweden is right-skewed (see Ekberg and Salabasis 2001). The mean is 160 white-collar employees, with median 46. The hierarchical levels listed in Table 1 correspond to the fourth BNT digit. They range from 2 to 8, where 2 is the highest level and 8 the lowest. Our first question of interest is whether the concepts of occupations and internal labor markets seem relevant for the Swedish labor market. Table 2 describes the cumulative number of various kinds of job transitions observed in the data through 1990, by entry cohort and gender. Panel a shows that, of employees in the 1971 cohort, about half stayed in the same occupation over the 20-year period, and about half changed at least once. Almost a quarter changed occupations twice or more. Thus, there is a strong attachment to occupations for most workers.

Panel b exhibits firm changes. It shows lower, but similar, attachment to firms as exhibited for occupations in Panel a. For example, in the 1971 cohort, 45.5% had the same employer throughout the period, 78% changed only once or less, and 22% changed employer twice or more.

Panel c reveals that promotions are not very frequent. Of the 1971 cohort, 45.8% never got promoted. 26% were promoted twice or more. The one-year promotion rate for the 1989 cohort was 5.6%, about the same as the sample as a whole (Table 1) at 5.8%. Thus, promotion does not appear to be as important among Swedish white-collar workers as it is in the United States (McCue 1996).

Table 3 describes yearly transition rates for different types of job moves. Most job search models (e.g., Neal 1999) predict that both occupational and firm changes are more likely to occur early in the

career, since the benefits of the search can accrue for longer. It is also possible that transition rates might differ by gender. For example, if women are more likely to have interrupted careers, they might optimally invest less in firm-specific human capital, so their rate of change between firms might be higher. On the other hand, women might tend to be employed in a limited number of occupations (perhaps ones where skills depreciate more slowly, or where firm-specific human capital might be less important) to accommodate interruptions in their careers (Rosen and Flyer 1997). Thus, Table 3 presents statistics stratified by age and gender.

Indeed, Table 3 indicates that younger people change occupation more than older employees. The highest rates of occupational change are for workers under 25 years of age, and decline monotonically across age groups. Firm changes peak later, around ages 26-30 for men, but are roughly flat for women of ages 26-40. Thereafter, they do tend to decline with age. These results are consistent with Neal (1999), who found that occupational changes tend to occur earlier than firm changes.[3] Most occupational or firm changes do not involve a simultaneous change in the other; such dual changes also decline with age.

Promotion rates also peak at the youngest age group, and decline monotonically with age for both men and women. Promotion rates are very high at the beginning of careers. This might reflect something like probationary jobs at the beginning of the career, with rapid and highly likely advancement for most new hires.

Overall, Table 3 suggests that patterns of job transitions are similar for men and women (except for the age at which firm changes peak). Overall rates of movement are similar for both, but the composition is a little different. However, the magnitudes differ somewhat. 6% of women change occupations in a given year, compared to about 5% of men. In contrast, women change firms less than men (4.4% compared to 4.9%). These overall patterns are consistent with the view that women tend to segregate in certain occupations (see Meyersson et al 2001) but given their occupation category they are

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[3] Neal's occupational changes were measured by combining information on crude measures of occupation with changes in industry. Our measures are presumably cleaner.

as likely or unlikely as men to invest in firm-specific human capital. Bare in mind, however, we are conditioning on full-time, white-collar workers, which may affect such predictions.

V. Effects of Mobility on Pay

Since a primary focus of this paper is the effect of occupation, firm, and rank changes on pay, it is instructive to compare the effects by themselves and then jointly. In the regressions in Table 4, the dependent variable is the percentage raise. We control for year, industry, currency devaluation measured in percent, gender, age, age squared, change in firm size, and level within occupation. In these regressions we see the effect of changing occupation, firm, occupation and firm; and promotion, demotion, and promotion and firm changing together.

We find the following results. First, the largest rate of increase in raise (7.4%), is associated with changing firm and getting a promotion; the second largest with promotion only (without firm change) (3.4%); the third with changing occupation (1.7%); and the fourth with changing firm only (1.1%). Second, the interaction effects of changing firm and changing occupation, or changing firm and promotion, are larger than the sum of the individual effects, and the differences are statistically significant.

Similarly, all internal and external mobility – with the exception of demotions - generates wage increases. This is consistent with McCue's (1996) finding that internal mobility, apart from promotions, generates a wage premium.

Further, we can decompose the effect of job change on careers (Topel and Ward 1988) into occupational changes, firm changes, and level changes, and with a consistent measure of jobs and levels across firms. This allows attribution of the overall effect into its separate components and their interaction effects. It is interesting that the interaction effects are the largest, implying that mobility is a disproportionate factor in career wage growth. There is no consistent pattern to the gender coefficient, and it is not always significant. The effect of age is negative and generally significant.

VI. Determinants of Job Mobility

Occupational Mobility

Some summary statistics of stayers and workers who are promoted, demoted, change occupation, or change firm are presented in Table 5. All types of changes (save demotions), especially promotions, had higher annualized wage growth over the prior three years than did stayers, not changed firms (the 4th year). Given that you have not changed firm the last 4 years the likelihood that you will be promoted given that you have been promoted sometime during the last 3 years is .14 compared to those who have changed firms been promoted during the last 3 years.10 demotion.11 Tenure at company is also lower for all types of changes than for stayers, 5.29 years for the latter and between 3.53-4.58 for any of the other group, though typically only a one-year difference. This may be related to the age of changers, which is three to six years less than for stayers, with the exception of those demoted, who are about one year older than stayers. The changers are on average younger than the stayers.

In related work we focus on firm characteristics and careers (Gibbs, Ierulli, and Meyersson-Milgrom, 2003) to evaluate the effect of firm characteristics on careers and wages. We see some evidence on the effects of firm characteristics approach in Table 5. Looking at the proportion of workers who are in a firm that will disappear from the data in the next period (either bankruptcy or merger) we find more demotions in firms that are about to die. Whether this indicates that workers with better opportunities had already left, or that various internal reorganizations are attempted in the death throes, it does suggest that there is an effect of the firm's future prospects on an employee's future prospects for advancement.

The data confirm previous findings about job change and wage growth, and suggest a pattern. Promotions cause the biggest increase, then firm change, then occupation change, with demotions doing worse than stayers do. If, as Neal (1999) suggests, workers search over occupations and then firms, the occupation change premium an improvement increase in occupation-specific match, and the firm change premium reflects the increase in firm-specific match. The data are also somewhat consistent with Neal's findings on job-change sequencing, with occupation changers somewhat younger than firm changers. The

data also suggest that promotions and occupation changes are more common in larger firms (consistent with Kwon and Milgrom and Meyersson 2003).

In Table 6 we examine the determinants of occupation, firm, and joint mobility by age. Using multinomial logits, we estimate three sets of coefficients relative to the base state of no occupation or firm mobility: (1) change occupation and stay at current firm; (2) change firm and stay in current occupation; (3) change both. A few hypotheses underlie this table: first, that more occupation and firm change occurs when young; second, that 'fast-track exits' imply promotion increases propensity to change firms (Baker, Gibbs, and Holmstrom, 1994a); and third, that larger firms offer more internal job reassignment and promotion opportunities and hence are better internal labor markets (see Kwon and Meyersson Milgrom 2003).

The coefficient on lagged promotion for changing occupation is larger in magnitude and more significant for young workers than the two older groups, suggesting the effects of past promotion on propensity to change occupation is greater for younger workers. Demotions are much smaller in magnitude and generally insignificant; this holds for the rest of the results in this table as well.

In the second panel, promotion is negative and significant for younger workers in propensity to change firms. This implies that 'fast-track exits' are not seen in this data. However, there is no statistically significant effect on the other two age groups, so this result may not carry much weight.

In the third panel, lagged promotion has a negative and significant effect for the two younger age groups. This is consistent with the finding that younger workers have greater career effects of past promotion, and is also consistent with the third theory, that larger firms are more effective ILMs, with more opportunities for occupational change within the firm. To see this, compare the coefficient on firm size in the first and third panels. Firm size increases propensity to change occupation, but decreases propensity to change occupation and firm, which is consistent with larger firms being better at sorting workers into jobs over time.

In Table 7 we compare men and women and find no real differences in occupation and firm change. However, the pattern of coefficients of firm size on occupational change is seen again, reinforcing the story of firm size and effectiveness at internal sorting.

Level Mobility

We now turn to whether the same set of variables – lagged cumulative promotions and demotion, gender, and firm size – affect promotion and firm change. In Table 8a, the outcomes are promotion only (i.e., promotion in current firm), change firm only, and promotion and change firm simultaneously. It is important to distinguish the effects of one-period lagged and total prior promotions on current promotion. Since promotion in two adjacent years is extremely unlikely, the former is too short-term a measure of career success. Therefore we use the latter.

We find positive and significant effects of past promotion on current promotion for promotion only, change firm only, and promotion with firm change. Demotions are now positive and significant for all age groups in both the first and third panels. Taken together, this indicates that promotion and demotion histories have strong effects in level changes.

Finally, for younger workers lagged firm size is positive and significant for promotion and change firm only, and negative and significant for promotion and change firm. Lagged firm size is also positive and significant for changing firm. These results are similar to the results in Table 6, indicating larger firms retain workers at promotion better, and retain workers who do not get promoted less. Speculatively, it may be that large firms slot workers more successfully into occupations and ranks, and also successfully get rid of those they do not promote or re-assign. This would be consistent with the worker's increased raise upon changing firms – if the firm was a bad match, and large firms figure this out sooner, when the worker re-matched to another firm his pay would rise.

Table 8b. looks at changes in level and firm, but now with lagged raise as the independent variable. Raises predict promotion for all age groups, but have no consistent relationship to change firms or to promotion and change firms. Since other empirical work has found that raises predict subsequent

14

promotion, but there is no strong prediction about the effects of past raises on propensity to change firm, this table seems in line with previous studies.

Finally, Tables 9a-b present analyses similar to those in Tables 8a-b, run separately for men and women, to check for differences between genders. Overall, of course, the results are similar to those in Table 8. As above, we find little substantive difference between men and women.

VII. Conclusions

In this paper we have compared several types of job transitions at once: occupational changes, firm changes, and level changes (promotions). All appear to be important to careers and pay, and in similar ways. Any of these job changes results on average in a large relative increase in the annual raise. Since it is difficult to fire employees in Sweden, it should not be surprising that employees who change firms have large wage increases, but we find similar effects on pay from occupational changes both across and inside firms. Larger effects on pay arise from changing occupation and firm together. Since we are conditioning on two changes at once in that case, simple search theory would predict that this is the case.

The most important source of wage growth is promotions. A change in level has twice the effect of a change in firm or occupation. Moreover, interaction effects of earning a promotion when changing firm are very large. One interpretation of this finding is that promotions mean that the employee has been found to be more productive in the new position (by the old or a new employer), whereas job or occupational changes just imply that search is ongoing. A change would not occur, *ceteris paribus,* if the employee did not believe that this would improve earnings. However, it is more uncertain than the acknowledgement of higher ability implied by a promotion.

Our analyses should be extended in several ways. First, we examined primarily (but not completely) short-term effects. Of equal or greater interest are the long-term impacts. It is important to understand to what extent changes in wage growth upon transition persist, or grow weaker or stronger. Second, we analyzed net effects. However, one might expect that poor performers are more likely to leave a firm, but one might also expect that good performers are more likely to leave, since their abilities may

be higher than optimal for their current position or firm. Indeed, we found some evidence of the latter effect, as did BGH (1994a). In future drafts, we will explore these extensions to the effects that we have captured so far.

A somewhat surprising finding is that there are few differences across genders in our analyses. This may be because we are looking at a sample of full time, white-collar workers. It may also have something to do with Swedish social policies, which encourage men to take time off for child rearing as well as women. In related work, we explore these issues more (Ierulli and Meyersson Milgrom 2002), (see also Meyersson Milgrom et al 2001, Meyersson Milgrom and Petersen 2003).

We do find systematic differences in job transitions across age groups. All types of transitions are more common for younger workers (see consistent results in Fox 2002). Most interestingly, both occupational and firm changes are much more common for workers under the age of 35. This is consistent with prior work emphasizing the optimality of intensive search early in the career. Furthermore, we find preliminary evidence consistent with the idea that search often involves two stages: an emphasis on occupations first, and firms second. At a first glance in Sweden, a fair amount of occupational change occurs within firms.

Not only are transitions more common for younger workers, but in most cases workers then appear to settle into relatively stable careers. Overall, roughly half of the workers in our sample never change either occupation or employer; roughly two-thirds to three-fourths change only once. Thus, for many white-collar Swedish workers, much or the entire career is spent with a single employer in a single occupation. On the other hand looking at the data from another perspective, where are the boundaries of ILM, around the firm or around other social institutions such as occupations, craft?, Kwon and Meyersson Milgrom 2003 shows that contrary to conventional assumption of ILM occupation specific factors such as occupation specific human capital are more responsible for internal lobar market than firms specific factors. In order to make a career in Sweden occupation human capital predicts promotions and wage increases rather than firm specific human capital. And that this effect is more important higher up in the ranks and in smaller firms. Their results also show that controlling for labor market experience and

occupation tenure firm tenure does not have positive effects on wages. Our study and the Kwon and Meyersson Milgrom study complement each other in shedding some light on the functioning of the Swedish labor market during the period 1970-1990.

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19

1. Summary Statistics

Age	mean	40.3
% Female		23
Wage (monthly 1990)	mean	19,695
% Raise		1.96
Firm Size (full time	mean	160
white collar empl.)	median	46
	2	0.9
	3	4.4
	4	14.5
% in Hierarchical Level	5	29.9
	6	30.3
	7	16.2
	8	4.2
	Occupation	6.3
% Job Transition	Firm	6.1
Rates	Promotion	5.8
	Demotion	1.2
N		672,659

2. Cumulative Transitions by Cohort, 1990

a. # of Occupational Changes

Cohort	0	1	2	3	4	5+
1971	48.8	27.9	14.3	5.2	2.8	1.2
1975	57.5	25.5	11.6	4.1	1.1	0.2
1980	62.4	25.4	9.4	2.3	0.6	0.1
1985	74.1	21.0	4.3	0.5	0.1	
1989	95.3	4.7				

b. # of Firm Changes

	0	1	2	3	4	5+
1971	45.5	32.4	13.4	6.2	1.9	0.6
1975	49.8	30.4	14.4	3.7	1.3	0.5
1980	51.3	31.8	12.7	3.0	1.1	0.2
1985	67.1	26.4	5.8	0.7		
1989	88.1	12.0				

c. # of Promotions

	0	1	2	3	4	5+
1971	45.8	38.0	12.9	2.9	0.4	0.1
1975	42.6	42.8	12.0	2.5	0.1	0.1
1980	47.3	38.8	12.4	1.4	0.1	
1985	62.6	32.9	4.4	0.1		
1989	94.4	5.6				

Notes: Cells show the percentage of each entry cohort who had that # of transitions by 1990. Thus rows sum to 100%. Promotions are defined as moves to higher levels within 1-digit occupations.

3. Yearly Transition Rates: Occupations, Firms, & Promotions

	i. Men				ii. Women			

a. Occupational or Firm Changes

Age	Stay	Occup. Only	Firm Only	Change Both	Stay	Occup. Only	Firm Only	Change Both
to 25	84.4	7.4	5.7	2.4	83.3	9.5	4.6	2.6
26-30	84.6	7.0	5.8	2.5	86.4	6.8	4.8	2.0
31-35	86.7	5.8	5.5	2.0	87.8	6.1	4.7	1.5
36-40	88.5	4.7	5.4	1.5	88.7	5.3	4.8	1.1
41-45	89.7	4.2	5.0	1.1	89.7	4.8	4.6	0.9
46-50	90.6	4.0	4.6	0.8	90.5	4.7	4.0	0.8
51-55	91.4	3.9	4.1	0.6	90.9	4.5	3.9	0.6
56-60	92.3	3.4	3.9	0.4	92.4	3.9	3.4	0.3
61 +	93.3	3.0	3.5	0.3	92.8	3.2	3.6	0.4
Total	89.0	4.8	4.9	1.3	88.1	6.0	4.4	1.4

b. Promotions or Firm Changes

Age	Stay	Prom. Only	Firm Only	Change Both	Stay	Prom. Only	Firm Only	Change Both
to 25	80.6	13.0	4.8	1.6	84.0	10.4	4.1	1.6
26-30	83.2	10.7	4.7	1.4	86.7	8.1	4.2	1.1
31-35	86.8	7.6	4.5	1.2	89.1	6.1	4.0	0.9
36-40	89.3	5.3	4.6	0.8	89.6	5.4	4.2	0.7
41-45	90.8	4.1	4.5	0.6	90.3	4.9	4.2	0.6
46-50	92.2	3.2	4.3	0.3	91.9	3.9	3.7	0.4
51-55	93.4	2.5	3.9	0.2	92.7	3.2	3.9	0.2
56-60	94.0	2.0	3.8	0.2	93.7	2.6	3.5	0.2
61 +	94.9	1.5	3.5	0.1	94.3	2.2	3.3	0.2
Total	89.8	5.2	4.3	0.7	89.3	5.9	4.0	0.8

Notes: Cells show the percentage of each gender / age group who had that type of transition. Thus rows sum to 100% by gender. Occupations are held constant in panel b.

4. Effects of Job Transitions on Raises

Dep. Var.: % Raise		i. Occupational Change		i. Firm Change		iii. Occupational & Firm Change		iv. Promotion		v. Promotion & Firm Change	
		Coef.	s.e.	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Intercept		18.127	0.12 ***	19.235	0.11 ***	17.927	0.11 ***	16.662	0.33 ***	15.992	0.32 ***
Transitions	Occupation	1.714	0.03 ***								
	Firm			2.104	0.03 ***						
	Occupation Only					1.307	0.04 ***				
	Firm Only					1.917	0.03 ***			1.058	0.03 ***
	Occupation & Firm					3.804	0.07 ***				
	Promotion Only							3.199	0.03 ***	3.364	0.03 ***
	Promotion & Firm									7.397	0.09 ***
	Demotion Only							-1.065	0.07 ***	-0.981	0.07 ***
Female		0.032	0.02	0.141	0.02 ***	0.041	0.02 *	-0.087	0.02 ***	0.938	0.31 ***
Age		-0.622	0.01 ***	-0.656	0.00 ***	-0.617	0.01 ***	-0.549	0.01 ***	0.690	0.31 ***
Age²		0.005	0.00 ***	0.006	0.00 ***	0.005	0.00 ***	0.005	0.00 ***	0.331	0.31 ***
% Change in Firm Size		0.000	0.00 ***	0.000	0.00 ***	0.000	0.00 ***	0.000	0.00 ***	0.143	0.31
Level Before Transition	2-3	1.450	0.06 ***	1.118	0.05 ***	1.408	0.05 ***	0.861	0.31 ***	-0.039	0.31 ***
	4	1.107	0.05 ***	0.771	0.05 ***	1.062	0.05 ***	0.582	0.31 *	1.048	0.31 *
	5	0.533	0.05 ***	0.178	0.04 ***	0.490	0.05 ***	0.186	0.31	0.657	0.31
	6	0.098	0.05 **	-0.278	0.04 ***	0.070	0.05	-0.058	0.31	0.429	0.31
	7	-0.380	0.05 ***	-0.698	0.04 ***	-0.392	0.05 ***	-0.305	0.31	0.206	0.31
N		533,591		553,977		533,591		480,872		480,872	
Adj. R²		0.37		0.38		0.38		0.38		0.38	

Notes: All regressions include controls for years, industries, and % currency devaluations. Firm size measured as number of full time white collar employees. ***=significance at 1%; **=5%; *=10%.

Table 5. Characteristics of Employees and Firms by Type of Job Change

	a. Stay		b. Promotion		c. Demotion		d. Change Occ.		e. Change Firm	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Annualized % wage growth, last 3 yrs.	1.03%	0.05	2.57%	0.05	0.20%	0.05	1.29%	0.05	1.74%	0.05
# of Promotions, last 3 years	0.14	0.35	0.10	0.29	0.25	0.43	0.11	0.31	0.16	0.36
# of Demotions, last 3 years	0.03	0.17	0.06	0.25	0.03	0.17	0.03	0.16	0.03	0.18
Tenure at Company	5.29	4.24	4.13	3.53	4.48	3.87	4.37	3.63	4.58	3.74
% Female	18.6%	0.39	20.7%	0.41	14.0%	0.35	23.6%	0.42	20.3%	0.40
Age	42.38	10.74	36.13	9.68	43.17	10.90	38.05	10.73	39.14	10.59
% in Firms that will die at t+1	2.4%	0.15	2.4%	0.15	3.3%	0.18	2.7%	0.16	2.5%	0.16
Firm Size	1,195	2.16	1,415	2.33	1,049	2.03	1,349	2.30	1,184	2.18

Notes: Statistics are calculated for the employee and the employer in period t-1, just before observed job changes or stays in period t. Since more than one kind of job change is possible at the same time, samples overlap in some columns b-e.

6. Occupational & Firm Changes as Competing Risks, by Age

	i. Age < 35				ii. Age 35-49				iii. Age 50+			
	Coef.	Odds Ratio	s.e.		Coef.	Odds Ratio	s.e.		Coef.	Odds Ratio	s.e.	
Change Occupation Only												
Lag Promotion	-0.692	0.50	0.06	***	-0.557	0.57	0.07	***	-0.201	0.82	0.12	*
Lag Demotion	-0.284	0.75	0.14	*	-0.018	0.98	0.12		-0.048	0.95	0.14	
Female	0.063	1.06	0.04		0.079	1.08	0.04	*	-0.203	0.82	0.06	***
Lag Firm Size	0.025	1.03	0.01	***	0.023	1.02	0.01	***	0.001	1.00	0.01	
Intercept	-3.136	0.04	0.10	***	-3.053	0.05	0.10	***	-2.822	0.06	0.13	***
Change Firm Only												
Lag Promotion	-0.111	0.90	0.04	**	0.066	1.07	0.04		0.028	1.03	0.09	
Lag Demotion	0.213	1.24	0.12	*	0.167	1.18	0.10	*	0.446	1.56	0.11	***
Female	-0.144	0.87	0.04	***	-0.048	0.95	0.04		-0.004	1.00	0.05	
Lag Firm Size	0.008	1.01	0.01		0.018	1.02	0.01	***	0.032	1.03	0.01	***
Intercept	-2.736	0.06	0.09	***	-3.353	0.03	0.10	***	-3.971	0.02	0.14	***
Change Occupation & Firm												
Lag Promotion	-0.344	0.71	0.08	***	-0.347	0.71	0.11	***	-0.187	0.83	0.31	
Lag Demotion	-0.281	0.76	0.25		0.338	1.40	0.19	*	-0.403	0.67	0.45	
Female	-0.097	0.91	0.07		-0.290	0.75	0.09	***	-0.060	0.94	0.15	
Lag Firm Size	-0.072	0.93	0.01	***	-0.088	0.92	0.01	***	-0.086	0.92	0.03	***
Intercept	-3.510	0.03	0.14	***	-4.824	0.01	0.22	***	-4.996	0.01	0.35	***
N	100,200				182,916				120,280			
Log Likelihood	-52,332				-75,741				-38,714			

Notes: All multinomial logits are estimated against a base state of no change, and include controls for levels, occupations, industries, years, and % currency devaluations. Odds ratios indicate the change in probability going from the base state to that variable's state. Firm size measured as number of full time white collar employees

7. Occupational & Firm Changes as Competing Risks, by Gender

	i. Men			ii. Women		
	Coef.	Odds Ratio	s.e.	Coef.	Odds Ratio	s.e.
Change Occupation Only						
Lag Promotion	-0.601	0.55	0.04 ***	-0.528	0.59	0.10 ***
Lag Demotion	-0.074	0.93	0.08	-0.187	0.83	0.22
Age	-0.075	0.93	0.01 ***	-0.060	0.94	0.01 ***
Age²	0.001	1.00	0.00 ***	0.000	1.00	0.00 **
Lag Firm Size	0.018	1.02	0.00 ***	0.017	1.02	0.01 *
Intercept	-0.708	0.49	0.16 ***	-2.852	0.06	0.39 ***
Change Firm Only						
Lag Promotion	-0.023	0.98	0.03	-0.036	0.96	0.08
Lag Demotion	0.268	1.31	0.07 ***	0.308	1.36	0.17 *
Age	-0.049	0.95	0.01 ***	-0.021	0.98	0.01
Age²	0.000	1.00	0.00 ***	0.000	1.00	0.00
Lag Firm Size	0.015	1.02	0.00 ***	0.040	1.04	0.01 ***
Intercept	-2.042	0.13	0.16 ***	-2.701	0.07	0.30 ***
Change Occupation & Firm						
Lag Promotion	-0.394	0.67	0.07 ***	-0.219	0.80	0.17
Lag Demotion	0.008	1.01	0.16	0.214	1.24	0.36
Age	-0.083	0.92	0.01 ***	-0.093	0.91	0.03 ***
Age²	0.000	1.00	0.00	0.000	1.00	0.00
Lag Firm Size	-0.079	0.92	0.01 ***	-0.102	0.90	0.03 ***
Intercept	-1.742	0.18	0.31 ***	-3.672	0.03	0.88 ***
N		334,490			68,906	
Log Likelihood		-138,396			-27,581	

See Notes for Table 5.

8. Promotions & Firm Changes as Competing Risks, by Age
a. Effects of Prior Promotions and Demotions

	Age < 35			Age 35-39			Age 50+		
	Coef.	Odds Ratio	s.e.	Coef.	Odds Ratio	s.e.	Coef.	Odds Ratio	s.e.
Promotion Only									
Cumulative Promotions	2.239	9.38	0.02 ***	1.762	5.82	0.02 ***	2.569	13.05	0.04 ***
Cumulative Demotions	-0.967	0.38	0.06 ***	-0.614	0.54	0.04 ***	-0.716	0.49	0.06 ***
Female	0.265	1.30	0.03 ***	0.788	2.20	0.04 ***	0.430	1.54	0.07 ***
Lag Firm Size	0.015	1.02	0.00 ***	0.003	1.00	0.01	0.013	1.01	0.01
Intercept	-4.553	0.01	0.08 ***	-4.417	0.01	0.10 ***	-4.203	0.01	0.17 ***
Change Firm Only									
Cumulative Promotions	0.052	1.05	0.03 **	0.057	1.06	0.02 ***	0.107	1.11	0.03 ***
Cumulative Demotions	1.282	3.60	0.04 ***	0.583	1.79	0.03 ***	0.192	1.21	0.04 ***
Female	-0.144	0.87	0.04 ***	-0.070	0.93	0.04 *	-0.014	0.99	0.05
Lag Firm Size	0.014	1.01	0.01 **	0.024	1.02	0.01 ***	0.024	1.02	0.01 ***
Intercept	-2.909	0.05	0.08 ***	-3.313	0.04	0.09 ***	-3.478	0.03	0.13 ***
Promotion & Change Firm									
Cumulative Promotions	2.010	7.46	0.04 ***	1.611	5.01	0.04 ***	2.231	9.31	0.10 ***
Cumulative Demotions	-0.633	0.53	0.12 ***	-0.555	0.57	0.09 ***	-0.343	0.71	0.15 **
Female	0.251	1.28	0.07 ***	0.808	2.24	0.09 ***	0.506	1.66	0.21 **
Lag Firm Size	-0.059	0.94	0.01 ***	-0.132	0.88	0.02 ***	-0.091	0.91	0.04 **
Intercept	-6.790	0.00	0.19 ***	-7.803	0.00	0.37 ***	-7.152	0.00	0.58 ***
N	142,441			212,914			134,950		

See Notes for Table 5.

8. Promotions & Firm Changes as Competing Risks, by Age
b. Effects of Prior Raise

	i. Age < 35			ii. Age 35-49			iii. Age 50+		
	Coef.	Odds Ratio	s.e.	Coef.	Odds Ratio	s.e.	Coef.	Odds Ratio	s.e.
Promotion Only									
Lag Raise	0.008	1.01	0.00 ***	0.008	1.01	0.00 ***	0.010	1.01	0.00 ***
Female	0.462	1.59	0.03 ***	0.873	2.39	0.04 ***	0.916	2.50	0.07 ***
Lag Firm Size	0.023	1.02	0.01 ***	0.011	1.01	0.01 **	0.025	1.03	0.01 ***
Intercept	-23.793	0.00	0.09 ***	-23.830	0.00	0.11 ***	-7.369	0.00	0.60 ***
Change Firm Only									
Lag Raise	-0.006	0.99	0.00 ***	-0.001	1.00	0.00	-0.003	1.00	0.00
Female	-0.186	0.83	0.04 ***	-0.086	0.92	0.04 **	-0.006	0.99	0.05
Lag Firm Size	0.019	1.02	0.01 ***	0.029	1.03	0.01 ***	0.031	1.03	0.01 ***
Intercept	-2.776	0.06	0.12 ***	-3.348	0.04	0.15 ***	-3.488	0.03	0.17 ***
Promotion & Change Firm									
Lag Raise	-0.013	0.99	0.00 ***	0.002	1.00	0.00	-0.011	0.99	0.01
Female	0.380	1.46	0.08 ***	0.835	2.30	0.10 ***	0.766	2.15	0.23 ***
Lag Firm Size	-0.040	0.96	0.02 ***	-0.093	0.91	0.02 ***	-0.061	0.94	0.04
Intercept	-26.358	0.00	0.23 ***	-27.049	0.00	0.38 ***	-9.420	0.00	1.67 ***
N	109,641			186,911			124,269		
Log Likelihood	-56,190			-71,708			.		

See Notes for Table 5.

9. Promotions & Firm Changes as Competing Risks, by Gender
a. Effects of Prior Promotions or Demotions

	Men			Women		
	Coef.	Odds Ratio	s.e.	Coef.	Odds Ratio	s.e.
Promotion Only						
Cumulative Promotions	1.932	6.90	0.01 ***	2.284	9.81	0.03 ***
Cumulative Demotions	-0.620	0.54	0.03 ***	-0.959	0.38	0.08 ***
Age	-0.370	0.69	0.01 ***	-0.201	0.82	0.01 ***
Age²	0.004	1.00	0.00 ***	0.002	1.00	0.00 ***
Lag Firm Size	0.009	1.01	0.00 **	0.000	1.00	0.01
Intercept	3.580	35.89	0.14 ***	0.844	2.33	0.23 ***
Firm Change Only						
Cumulative Promotions	0.070	1.07	0.01 ***	0.047	1.05	0.03
Cumulative Demotions	0.533	1.70	0.02 ***	0.891	2.44	0.05 ***
Age	-0.024	0.98	0.01 ***	0.000	1.00	0.01
Age²	0.000	1.00	0.00	0.000	1.00	0.00
Lag Firm Size	0.016	1.02	0.00 ***	0.044	1.05	0.01 ***
Intercept	-2.510	0.08	0.14 ***	-2.790	0.06	0.24 ***
Promotion & Firm Change						
Cumulative Promotions	1.708	5.52	0.03 ***	2.083	8.03	0.06 ***
Cumulative Demotions	-0.415	0.66	0.07 ***	-0.776	0.46	0.18 ***
Age	-0.378	0.69	0.02 ***	-0.228	0.80	0.03 ***
Age²	0.003	1.00	0.00 ***	0.002	1.00	0.00 ***
Lag Firm Size	-0.087	0.92	0.01 ***	-0.092	0.91	0.03 ***
Intercept	-0.020	0.98	0.42	-0.389	0.68	0.57
N	395,940			94,383		

See Notes for Table 5.

9. Promotions & Firm Changes as Competing Risks, by Gender
b. Effects of Prior Raise

	i. Men			ii. Women		
	Coef.	Odds Ratio	s.e.	Coef.	Odds Ratio	s.e.
Promotion Only						
Lag Raise	0.004	1.00	0.00 ***	0.013	1.01	0.00 ***
Age	-0.314	0.73	0.01 ***	-0.194	0.82	0.01 ***
Age²	0.003	1.00	0.00 ***	0.002	1.00	0.00 ***
Lag Firm Size	0.010	1.01	0.00 ***	0.050	1.05	0.01 ***
Intercept	-12.726	0.00	.	-18.753	0.00	.
Firm Change Only						
Lag Raise	-0.004	1.00	0.00 ***	-0.002	1.00	0.00
Age	-0.033	0.97	0.01 ***	-0.005	1.00	0.01
Age²	0.000	1.00	0.00 **	0.000	1.00	0.00
Lag Firm Size	0.024	1.02	0.00 ***	0.045	1.05	0.01 ***
Intercept	-2.776	0.06	0.20 ***	-3.429	0.03	0.30 ***
Promotion & Firm Change						
Lag Raise	-0.014	0.99	0.00 ***	-0.019	0.98	0.01 **
Age	-0.318	0.73	0.02 ***	-0.251	0.78	0.04 ***
Age²	0.002	1.00	0.00 ***	0.002	1.00	0.00 ***
Lag Firm Size	-0.064	0.94	0.01 ***	-0.056	0.95	0.03 *
Intercept	-14.943	0.00	. ***	-18.895	0.00	. ***
N	340,286			80,535		
Log Likelihood	-130,280			-30,013		

See Notes for Table 5.

Appendix. Occupational Functions

Occupational Function	Rough description	%
Administrative Work	Secretarial & data processing	8.5
Production Management	Plant supervision & management	17.8
Research & Development	Self explanatory	4.3
Construction & Design	Architecture & construction	11.2
Technical Methdology, etc.	Production engineering & quality control	11.0
Communication, Library & Archival	Editors & librarians	0.7
Personnel	Self explanatory	2.4
Services	Restaurants	0.2
Business & Trade	Advertising, sales, marketing & buying	26.6
Financial Work & Office Services	Auditing & financial administration	17.3