

**WAGE STRUCTURE AND LABOR MOBILITY
IN SWEDEN, 1970-1990**

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Abstract

Using a matched employer-employee dataset that covers a large proportion of the Swedish private sector, including all industries except finance, I study the evolution of the labor market in Sweden during the 1970's and 1980's. Wage structures within and between firms change over this time due to changes in macroeconomic conditions and changes in wage bargaining norms. By the end of the period, wages are less egalitarian. Also, turnover is notably higher, which probably reflects increasing decentralization of bargaining and other changes in the labor market.

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I. Introduction

Sweden is often thought of as the quintessential social welfare economy. Due to public policies and labor market institutions, Sweden has historically had highly compressed wages and even more compressed after-tax income. Despite the common assumption that there is an equality/efficiency trade-off, Sweden has also had one of the highest average incomes in the world and, until recently, very low unemployment. The period 1970-1990 was an interesting time for the Swedish labor market as it generally prospered but faced several challenges. This paper uses a large matched employee-employer dataset to look at trends in the Swedish labor market during this period.

Several important factors affected the Swedish labor market system during the 1970's and 1980's. One important change was the breakdown in the traditionally centralized wage bargaining system. From the 1950's through the early 1980's, Swedish unions and employers negotiated wages at a highly centralized level. Individual firms and unions had little leeway to arrange specific wage agreements. However, in 1983, driven by a few firms' inability to find enough skilled labor at the negotiated rate, individual firms and unions began to break away from the collective agreement. Other important changes included a weakening of the Swedish economy in the early 1980's, a sharp increase in the use of temporary workers starting in the late 1980's, and an increase in merger and acquisition activity in the late 1980's.

As I show below, these factors (and possibly others) led to several important trends in the Swedish labor market. There was a distinct decrease in wage inequality from 1974 through 1982, but this decrease was almost exactly reversed by 1990. These changes in wage compression occurred both within firms and across firms. As wages became more compressed from 1974 through 1982, employee turnover became less common. But turnover rates rose sharply after that

and, by 1990, were significantly above the 1974 level. The decrease in turnover followed by an increase holds in virtually every group I analyze – blue-collar, white-collar, high pay, low pay, etc. There is little evidence that some firms were more affected by any of these trends than other firms.

Edin, Holmlund, and Skans (2004), in this volume, perform an analysis of the Swedish labor market that is similar in spirit to this paper. However, there are several important differences. I focus on the 1970's and 1980's, while their study covers 1985-2000. This enables them to look at the 1990's, which were another turbulent decade for the Swedish labor market as unemployment increased dramatically. Edin, Holmlund, and Skans (2004) use administrative data that is more comprehensive than the union/employers' federation dataset I use. However, I have more detailed information on the jobs and occupations of individual workers. So, while the papers both use employee-employer datasets to look at the Swedish labor market, differences in time frame and data details make it possible to gain different and complementary insights from the two studies.

The rest of this paper provides a few more details on the Swedish labor market and then conducts formal descriptive analyses to document these changes throughout the 1970's and 1980's. The next section provides some institutional background. Section III describes the matched employee-employer dataset that I use. Section IV contains the analysis of wage levels and wage changes. Trends in worker mobility are described in Section V. Section VI concludes and discusses how my findings might help motivate future research.

II. Institutional Background¹

During the period I study, Sweden experienced an unusually successful mix of very high standards of living, minimal income inequality, and low unemployment. Also during this period, the central bargaining system underwent important changes with wide-ranging ramifications.

As of 1950, wage negotiations in Sweden were similar to those in the United States. Many union groups were associated with the Swedish Trade Union Confederation, which represented blue-collar workers, and many employers were affiliated with the Swedish Employers Federation (“SAF” – the group that provided the data for this study.) However, most bargaining was done on a one employer/one union basis. Apparently at the urging of the SAF, which wanted to avoid pattern bargaining driving wages up as one group after another negotiated, negotiations in the 1950s became broader.

Though at first somewhat reluctant, the union groups agreed to more centralized bargaining by the mid-1950s as they began to more actively seek equality and solidarity among their members. The unions were inspired by the work of economists Gosta Rehn and Rudolf Meidner who argued that idiosyncrasies in wage negotiations led to pay differences between similar workers and, therefore, impede the reallocation of jobs. According to Edin and Topel (1997), Rehn and Meidner’s view promotes the belief that “there is no trade-off between equity and efficiency; instead, they are complements in producing greater social welfare.”

The form of bargaining is particularly important in Sweden, relative to other countries such as the United States, because union membership rates are very high throughout the economy. In 1960, about three quarters of Swedish workers belonged to unions, but that figure reached 90% in 1990. During the same time, labor force participation rose. While male

¹ This section draws heavily from Edin and Topel (1997). See that paper, Ekberg (2004), and Nilsson (1993) for further background.

participation dropped slightly from 1965-1990 (though it was always approximately 90%), female participation increased from just over half in the mid 1960s to over 80% by 1990. As a result of these two trends and some population growth, union membership in Sweden nearly doubled from 1960 to 1990. The trend towards bargaining at a higher level of aggregation therefore led to negotiations over much bigger groups of people.

Collective bargaining in Sweden entered a new era in 1983, however, when one large union (metal workers) and the engineering firms' employers' federation bargained outside the broader collective negotiations. The firms argued that the prior system underpaid skilled workers, making it difficult to recruit them. According to Edin and Topel (1997), "a tendency toward more bargaining at industry and company levels seems clear."

III. Years and Data

I study the Swedish labor market between 1970 and 1990. Most of the analysis looks at three points in time – 1974, 1982, and 1990. Table 1 provides basic information about the macroeconomic situation in Sweden in the period surrounding each of those years, while Figures 1-3 plot similar data for the entire 1970-1990 period. Figure 1 shows unemployment. As the graph makes clear, unemployment was quite low in Sweden during this period, peaking at approximately four percent. During the late 1980's unemployment dipped under two percent, suggesting this was a favorable period for employees. Figure 2 plots annual GDP growth and Figure 3 shows per capita GDP in constant dollar terms. These plots show that, though the annual growth rate varied considerably from year to year, there was no long boom or bust period during the 1970's or 1980's in Sweden and income grew fairly consistently. The low unemployment, steady growth, and increasing labor force participation in Sweden is quite

remarkable, especially given that tax rates (especially payroll taxes) increased significantly during the 1970's and 1980's (Edin and Topel, 1997.)

The employment data were provided by the Swedish Employers' Federation (SAF). The SAF assembles detailed and uniform data from establishment-level personnel records.² The firms span virtually every private sector industry (with the exception of financial services). The data are used for wage negotiations and are monitored by employers and labor unions, which insures a high level of accuracy. Ekberg (2004) discusses some potential measurement issues with the data that are driven by timing of negotiations and other issues. I chose 1974, 1982, and 1990 for the analysis partially because these problems are minimized in these years. For example, negotiations stalled in 1980, so data from that year did not reflect all raises agreed to during the year. If I used 1980 or 1981 as one of the key years, wages and/or wage changes would not properly reflect labor market conditions.

Some complication is created by the fact that white-collar and blue-collar workers are in separate datasets and there is no way to match firms across the two groups. As a result, if a firm has a group of white-collar workers and a group of blue-collar workers, I cannot join them together to analyze characteristics of the firm as a whole. It is clearly not perfectly accurate to treat groups of white-collar workers at a single firm or groups of blue-collar workers at a single firm as whole firms. However, due to the fact that firms are not matched across the data and that there are differences in the two datasets in how some variables are defined, I must redefine a "firm" as the white-collar workers within a company *or* the blue-collar workers in a firm.³

² See Meyersson Milgrom, Petersen, and Snartland (2001) and Ekberg (2004) for further details about the SAF data.

³ In an earlier version of this paper, I attempted to form groups approximating actual whole firms by merging firms from each of the two datasets. In each year, I ranked firms within an industry from largest to smallest in both the blue-collar and white-collar datasets. Then I assumed that the firm with the largest set of blue-collar workers in a given year and in a given industry is the same as the firm with the largest set of white-collar workers in that industry and year. I matched the second largest, the third largest, etc. I subsequently learned that, in order to insure data

There are far more blue-collar firms than white-collar firms in most industry/year combinations. One reason for this is that the white-collar data do not include the CEO and other members of the executive team who negotiate their own wages rather than letting a union negotiate on their behalf. At some firms, there is just a small set of such workers and the rest of the employees are blue-collar. The definition of a firm as the blue-collar workers at a firm is therefore approximately accurate for many of the blue-collar “firms.”

The two datasets contain a wealth of other information. The other variables that I use here include occupation, age, and wages. I use actual wages paid as the primary wage measure and then put this into monthly units. Though the data are generally highly accurate, I minimize the effect of data entry errors or other problems by dropping the highest and lowest 0.5% of wage observations each year for both the blue-collar and white-collar samples.

Firms enter and exit the dataset throughout the whole period studied. Tenure calculations are limited by the entry of individual firms. For example, some of the analyses look at workers who have been at their firm at least three years. These analyses in, for example, 1982 are limited to firms that had entered the data by 1979 because, for firms that entered the data after 1979, it is impossible to determine which workers had been at the firm for at least three years as of 1982.

Occupations in both datasets are determined by a detailed set of codes that are part of the Swedish occupational coding system. When I look at “levels” within firms, I look only at the white-collar employees and use the last digit of their occupation code (also known as the “BNT” code). This digit can take one of seven values, each of which indicates a different level of responsibility and skill. Within occupations, this precisely identifies the relative level of a job (see Lazear and Oyer, 2004, for examples of job classifications). While these levels are not

integrity, the SAF prohibits the merging of the two datasets. Note, however, that conclusions based on the “merged” dataset were similar to those I draw in this version of the paper.

meant to be comparable across occupations, I use the number of relative levels as a rough gauge for the range of the hierarchy of individual firms.

As the kernel density estimates in the top of Figure 4 suggest, most firms and plants are quite small (though most employees work in fairly large plants and firms). For the rest of this paper, I restrict the sample to firm-years observations with at least 25 employees. As the bottom of Figure 4 shows, most of these firms are near the 25-employee cut-off. However, the average firm in the sample has roughly 100 employees. Much of the analysis further restricts the sample to firms with 100 or more workers. Keep in mind that, in this restriction and throughout the whole paper, the term “firm” actually means the white-collar workers at a company or the blue-collar workers at a company.

IV. Wage Structure

Table 2 provides numerous details about wages at Swedish firm in 1974, 1982, and 1990. Panel A provides these details for blue-collar firms and Panel B provides analogous information for white-collar firms. Before getting to the wage changes, note the changes in composition of the labor force. The number of blue-collar workers at firms with at least 25 workers who meet the hours restriction fell throughout the period, with a particularly large drop from 1974 to 1982. The number of workers in the blue-collar sample shrank by about one-sixth from 1974 to 1982. Some of this reduction is because workers move to the white-collar sector, but that only explains a small fraction of the blue-collar reduction. Given that the total number of workers rose steadily in Sweden, this reduction suggests some combination of firms getting smaller (and falling below the 25 person floor), people moving to part-time work, and movement to the public sector (and therefore out of the SAF data.)

The first line of both panels shows that real wages dropped between 1974 and 1982 in this sample and then rose during the next decade. From 1974-1982, as bargaining remained highly centralized, wages continued to become more compressed. As a result, the accompanying reduction in real wages was felt largely by higher income workers. This compressing of wages can be seen looking both between the two sectors and within each sector. Average white-collar wages dropped 8.5% while blue-collar wages dropped only 3.4%, making blue and white-collar wages less differentiated from one another. The wage drops were larger at the 90th percentile of each group (6.2% for blue-collar and 10.0% for white-collar) and smaller at the 10th percentile (an *increase* of 0.6% for blue-collar and a decrease of 2.4% for white-collar.) The compression in this period can also be seen in the reduction in standard deviation of log wages in both samples.

It appears that the relatively slow growth in the 1970's demonstrated in Figures 2 and 3 actually led to lower real wages. Per capita wages conditional on working went down while country-wide per capita income went up slightly. The difference is due to the increase in women's labor participation rates during this period from about 60% to nearly 80%.

The period between 1982 and 1990 is somewhat different, however, as the centralized bargaining system broke down. Economic growth was fairly consistent in this period and average wages increased considerably (by 11% for blue-collar workers and nearly 8% for white-collar workers.) As would be expected given the more localized bargaining, wage variation increased slightly, as evidenced by the mild increase in the variance of log wages and by the fact that the wage growth at the 90th percentile of the distribution was stronger than at the 10th percentile. The bottom two rows of Table 2 show that these conclusions largely hold for younger workers

(between ages 25 and 30) and older workers (45 to 55). One age-specific result worth noting is that the drop in wages during the 1970s was particularly large for younger workers.

The second set of entries shows that most of the same trends that hold at the individual level hold when using a firm and its average wages as an observation. Average wages decreased from 1974 to 1982 and increased after that through 1990. Wages became more compressed within firms during the first period and less compressed during the 1980s. Average firm wages also became more compressed initially and then less compressed. This suggests that the decrease in wage variation during the 1970s and the increase in the 1980s were due to increased variation of wages *within* firms and increased variation *across* firms. Both the standard deviation of wages within firms and firm's coefficients of variation decreased during the 1970s and then increased during the 1980s. This was true for the average firm, as well as firms at the high and low end of the distributions of these measures.

Figures 4 and 5, each of which has a blue-collar and a white-collar portion, capture these changes in wage policies across firms graphically. Figure 4 shows kernel density estimates of firm average wages in each of the three years captured in Table 2. That is, it maps an estimate of the probability density function of average wage for a firm. The distribution moves to the left (as wages decrease) and gets more compressed between 1974 and 1982. However, the pattern is exactly reversed by 1990. In fact the 1974 and 1990 densities look remarkably similar, though the 1990 density is shifted considerably to the right due to the wage growth of the 1980s.

Figure 5 shows a similar pattern for firm standard deviation of wages. The distribution moves to the left and compresses from 1974 to 1982 as wages get more compressed within most firms. Then the distribution reverts to roughly its 1974 shape by 1990.

Table 2A shows that high wage blue-collar firms have high variance. In levels, this relationship is strong in 1974, but gets weaker as wages compress by 1982. By 1990, wages and variance are once again highly correlated. This is to be expected as similar proportional differences in pay would lead to larger pay variance at higher pay levels. The fact that there is some positive correlation between log wages and variation of log wages by 1990 suggests that high wage firms really are high variance firms and that this relationship got stronger throughout the period. These correlations average a similar magnitude in the white-collar data, but there is no clear trend or connection to wage compression.

Finally, Table 2 includes a summary of plant-level wages and wage variation. Similar to firms, a “plant” is actually the blue-collar workers in an establishment or the white-collar workers in an establishment. I only include plants with at least 25 employees. The results suggest that basically all firm-level conclusions hold for plants as well, so it appears that much of the change in variation over the sample period took place within individual plants. In fact, the results are so similar for the plant-level and firm-level analyses that it seems each plant (or at least the blue or white-collar group in the plant) is a microcosm of the firm as a whole. There is as much variation within a typical plant as there is in a whole firm.

Figure 7 provides some basic information on what determines the variation between workers in wages. The figure displays the results of analyses-of-variance (ANOVA) for each type of worker (that is, blue-collar or white-collar) in each of the three years. The analysis runs a regression of log wage on indicator variables for individual firms, industry, occupation, age, and city. The graph displays the portion of the variance that the ANOVA attributes to each set of indicator variables.

For blue-collar workers, the firm effects are quite important, explaining 9-14% of the cross-sectional variation in wages. Occupation effects are somewhat more important than firm effects, explaining as much as 19% of the variation in wages. Age effects explain a small amount of the variation while industry and location do not have any economically meaningful effect on blue-collar wages. The total r-square statistics of the blue-collar regressions are generally about 40%.⁴ However, the r-square increases to about 60% when using hourly wage because a considerable amount of the monthly wage variation is due to differences in hours worked. It appears that, despite the centralized bargaining system, there is considerable variation in blue-collar pay rates across firms.

The lower graph in Figure 7 suggests that centralized bargaining is more important in determining white collar wages, however. While firm effects are also important for white-collar workers, the magnitude of the occupation effects is quite dramatic. Roughly half the cross-sectional variation in white-collar wages can be explained by the 285 occupation classifications. Even though the collective bargaining system became more decentralized in the late 1980's, these occupation effects were still very strong in 1990.

Table 3 looks at wage changes in 1974, 1982, and 1990, with Panel A again covering blue-collar workers and Panel B covering white collar. This table is based on calculating each individual worker's wage in the appropriate year minus his/her wage in the preceding year. The first row of Panel B shows that a substantial portion of the reduction in white-collar wages from 1974 to 1982 was due to a drop in the last year of this period. There were some significant real wage reductions in 1982. As wages got more variable after 1982, there continued to be greater variance in wage changes and there were many real wage cuts again in 1990. This reflects the

⁴ Note that the r-square is not simply one minus the variance not assigned to any specific variable because the ANOVA model does not necessarily assign all the variance that can be explained by a combination of the variables to individual variables.

fact that the Swedish economy began a recession during 1990. The similarity between individual and firm-average wage changes suggests that there is a significant firm-specific component in short-term wage changes. This is consistent with the findings in Oyer and Lazear, 2004, who used the white-collar SAF data to show that firm fixed effects can explain a substantial portion of year-to-year wage changes, but do not have a large effect on overall wage levels.

In both the blue-collar and white-collar panels, wage changes are different for the sample of people who change firms (and who I am able to follow between firms.) They have higher wage change, on average, suggesting that these changes are typically voluntary movement to increase wages. They are more extreme than the wage changes of stayers on the high end of the distribution and somewhat higher throughout the rest of the distribution. This suggests, as one might expect under this compressed system where it is difficult to fire unproductive workers, that some very productive workers get hired away at considerably higher wages.

The difference in wage changes by age work in the direction one might expect, but the age differences are surprisingly small. Young workers (age 25 to 30) get larger wage increases than other workers, but not by much. For blue collar workers, the differences in wage changes for young workers, older workers (age 45 to 50), and all others are trivial. Though somewhat larger than the blue-collar age differences, the differences among white-collar workers are also small. For example, in 1990, the average real wage change for the sample as a whole and for older workers is negative (though very small). The average change for young workers is about 2%.

Differences in wage changes are also surprisingly small when looking at short-tenured and long-tenured workers. Higher tenured workers generally get slightly smaller wage increases than low tenured workers. As expected, relatively new workers seem to have larger productivity

gains and, therefore, get larger pay increases. But these differences are not particularly large. The average raise for people with at least three years of tenure is generally within two percentage points of the average raise for people with less than three years of tenure.

V. Worker Mobility

Table 4 details employee entry and exit patterns. The table is broken into three parts. Again, Panel A provides data for blue-collar workers and Panel B details white-collar mobility. Both panels include columns for 1974, 1982, and 1990 that summarize firms with at least 25 employees and then three columns limiting the sample to firms with at least 100 employees. The first row of the table shows the declining sample firm size. The standard deviation of firm size is substantial, reflecting the fact that there are a number of very large firms.

The blue-collar data have 1402 possible occupations. The typical blue-collar firm only has people in ten of these occupations (about 20 for firms with 100 or more employees.) As firm size drops throughout the sample period, so does the average number of occupations within a firm. There are a total of 51 white-collar occupation groups and, once the various levels within each of these groups is added, 285 distinct occupation classifications in the white collar data. The average white-collar firm in the data has employees in 30 of these occupations, again dropping as average firm size drops. The average larger firm (100+ employees) employs people in about 60 occupations.

The third row of Panel B of Table 4 shows the number of levels (out of a possible seven) of white-collar jobs represented. There is not a blue-collar equivalent to the white-collar level. There are up to seven levels within an occupation group. As mentioned above, high-level employees in one occupation may not be comparable (in terms of skill and wages) to high level

employees in another occupation. So the average number of levels within a firm, which can include numerous occupation groups, is at best a proxy of the number of true “levels” within any given firm. An average white-collar firm has almost four levels and the average large firm has almost four and a half. This suggests that most firms do not have a full hierarchy that covers all possible levels. Firms tend to have workers concentrated in a few levels.

The fourth row shows the exit rate using an individual-year as an observation. In order to be included in this calculation, a firm had to appear in the data in the year shown and the previous year. It also had to have at least 25 workers in each of those two years. I define an exit as a person who is working in a firm in year t-1 but not working at that firm in year t. The sample sizes are based on year t-1, while the employee cut-off that determines if the firm has at least 100 employees is based on year t. The exit rate for blue and white-collar employees in 1974 was 14.8% and 10.1%, respectively. This suggests that, though the Swedish labor market is thought to be fairly stable, about one worker in seven left their firm in 1974. The exit rate drops to 10.7% (blue-collar) and 9.6% (white-collar) in 1982 and then jumps to over 22% and 18% in 1990. The exit rate is quite similar for the sample with 100+ employees.

The next row of the table shows that the average firm-level exit rate (that is, the average across all firms of the firms’ exit rates) is similar to the person-level exit rate. This is to be expected because, given that there is no apparent relationship between exit rates and firm size, there is no reason to think weighting by firm would lead to a difference relative to weighting by individuals.

The standard deviation of firm exit rate, which is 10-11% in 1974 and 1982, grows to nearly 13-15% in 1990. This suggests that many firms have exit rates over 20% in each year while some firms have very low exit rates. This variation in exit rates can be seen graphically in

Figure 7, which presents kernel density estimates of firm-average exit rates by year for the blue-collar and white-collar samples.

The next several rows of the table examine exit rates within wage groups at each firm. Specifically, I break each firm into quartiles and deciles by wage and then look at exit rates in the upper or lower extreme. As one might expect, exit rates are much higher in the bottom wage quartile (decile) than in the top quartile (decile). The difference is particularly stark in the blue-collar sample, where bottom quartile exit rates are more than double top quartile exit rates. Further, exit is particularly high in the bottom decile, which has a somewhat higher exit rate than the bottom quartile (of which, obviously, it is a subset.) On the other hand, the top decile does not have a noticeably different exit rate than the top quartile. Two other things worth noting are that all of these patterns hold both in larger firms and the sample as a whole and that turnover increased between 1982 and 1990 for every subgroup.

These results suggest that people in the low part of the wage distribution have the least to lose by changing jobs and that this relationship gets stronger all the way to the bottom of the wage distribution within firms. However, there appears to be a difference in the upper end of firms' wage distributions. While high-paid workers are less likely to leave their jobs than other workers, the very highest paid workers are no less likely to leave (and maybe even a bit more likely to leave) than employees who are near, but not quite at, the top of their firms' wage distributions. This is consistent with there being a relatively fluid market for top performers who sometimes have to move firms to have their talents used efficiently.

The drop in exit rates between 1974 and 1982, as well as the increase from 1982 through 1990, are substantial. These two trends were likely driven by several factors. First, the Swedish economy was recovering from a significant recession in 1984 and this may have hindered the

opportunity to move jobs. Second, there was a significant increase in the use of temporary workers in Sweden starting around 1990.⁵ While the bulk of this increase came after 1990, temporary arrangements likely had a positive effect on turnover rates in the late 1980s. Third, as wages became more compressed in the 1970's, the gains to be had by switching firms were reduced. One of the reasons the centralized bargaining system broke down in 1983 is that firms had difficulty recruiting highly skilled workers. The resulting decentralized bargaining system led to the less compressed wage system that can be seen in Table 2, which led at least some employees to seek out the new better-paid opportunities.

Finally, the late 1980's and 1990 saw significant activity in mergers, acquisition, and other ownership changes. The SAF data, therefore, show many people changing "firms" even when most of their co-workers are unchanged. These workers have changed jobs in that their employer, as defined as the owner of the business for which they work, has changed even if their daily job has not. However, for at least two reasons, this seems unlikely to be a primary driver of the trends in turnover. First, if a firm is taken over and all its employees go to work for another firm, that firm disappears from the data and is not included in the turnover calculations. Second, the kernel density estimates in Figure 7 suggest that the increase in turnover in 1990 was due to a fairly consistent increase in turnover at most firms rather than a subset of firms having a dramatic increase in turnover. Thus, it appears that the 1990 increase in turnover was widespread, rather than being concentrated in firms that merged.

The next several rows of the table measure the average firm entry rate. An entry is defined as someone who works in the firm in year t but did not work in the firm in year $t-1$. The sample for this calculation is firms that are in the sample in both year $t-1$ and year t . The entry rates shown are firm averages. For example, the 19.6% entry rate in 1974 for the blue-collar

⁵ See Holmlund and Storrie (2002).

sample indicates that 19.6% of the 1974 workers at an average firm were not employed by the firm in 1973. Not surprisingly, the entry rate is similar to the exit rate, though a bit higher as a result of the fact that surviving firms are, on average, growing.

While the exit and entry rates are quite similar, they are not as similar when looking at smaller portions of the distribution within firms. For the most part, the entry rates are noticeably higher than the exit rates at the lower end of the distribution and lower at the higher end of the distribution. This is, again, quite natural. Many of the employees who “enter” higher paid jobs do so internally. As a result, the entry rate from outside the firm is relatively low for these jobs.

Several rows near the bottom of the table show the correlation between entry (or exit) and various firm-level wage variables. It seems reasonable to expect that firms with higher pay would have lower exit and entry rates. This tends to be true, though the results are inconsistent for white-collar workers. For white-collar workers, firm pay levels and exit rates are negatively correlated, but the level of correlation is not particularly high. In addition, for white-collar firms, those firms that provide relatively large raises actually have higher exit rates. This may reflect the fact that firms with the highest risk of losing workers give relatively large raises. This could make the exit rate lower than it otherwise would be, though still high at these firms. The final rows of the table show that entry and exit rates are very similar when measured at a plant level as at a firm level. This means that movement between plants at the same firm is not an important part of total movement between jobs in the Swedish labor market.

In addition to these findings within each sample, there are some differences between the Panel A blue-collar sample and the Panel B white-collar sample. In general, there is more movement (that is, higher entry and exit rates) for white-collar workers than for blue collar workers. Blue-collar workers change jobs somewhat less frequently than white-collar workers.

At least two explanations are consistent with this difference. First, there may be more competition for relatively skilled workers. Second, productivity in managerial jobs could be driven more by general human capital, so the value of long-term relationships between firms and workers may be lower.

VI. Conclusion

Using a matched employer-employee dataset, I have shown that the Swedish labor market underwent fairly dramatic changes during the 1970's and 1980's. From 1974 through 1982, wages in the already relatively egalitarian Swedish labor market became even more compressed. Wage variation decreased both within firms and across firms. However, in 1983, the highly centralized wage bargaining system that had been in place for several decades began to break down. Several unions began to negotiate wages in a more fragmented manner. As a result of this change (and possibly other changes), Swedish wages became more variable by 1990.

I also showed that, probably due to the bargaining changes, the state of the Swedish economy, and an increase in merger and acquisition activity in the late 1980's, job change became less common in Sweden between 1974 and 1982 and then became dramatically more common by 1990. Both the job turnover and wage compression trends are strong for blue-collar and white-collar workers.

The analyses in this paper have been largely descriptive. However, they suggest numerous potential economic questions that can be posed and answered using the matched employer-employee dataset employed here. Future work can help determine how different Swedish firms changed their personnel policies in reaction to changes in the bargaining process, macroeconomic conditions, and increased merger and acquisition activity.

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Figure 1: Swedish Unemployment

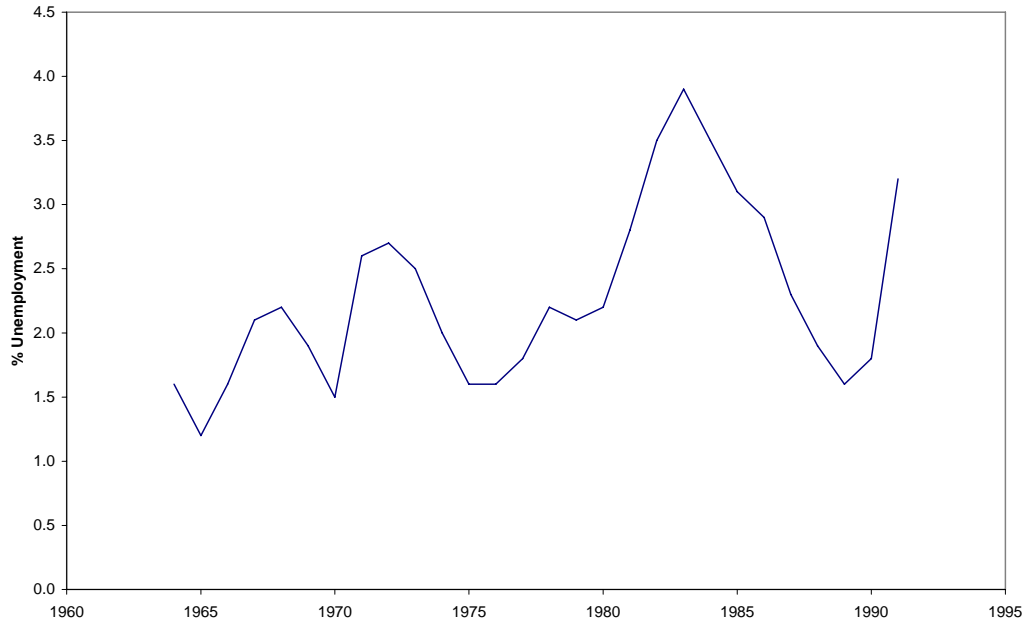


Figure 2: Swedish GDP Growth

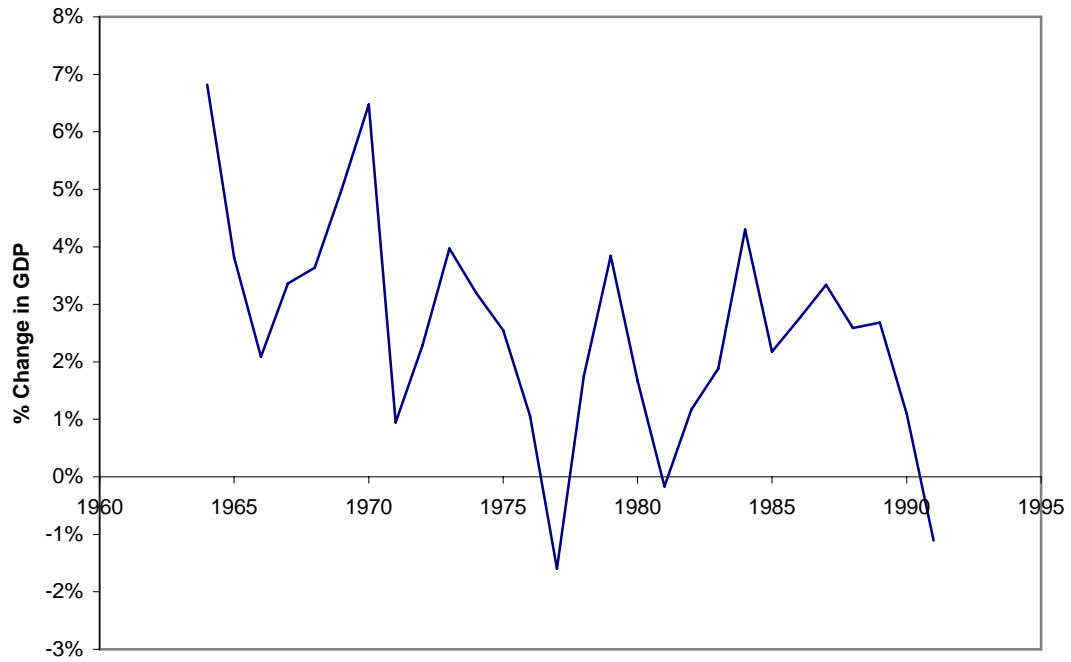


Figure 3: Swedish Per Capita GDP

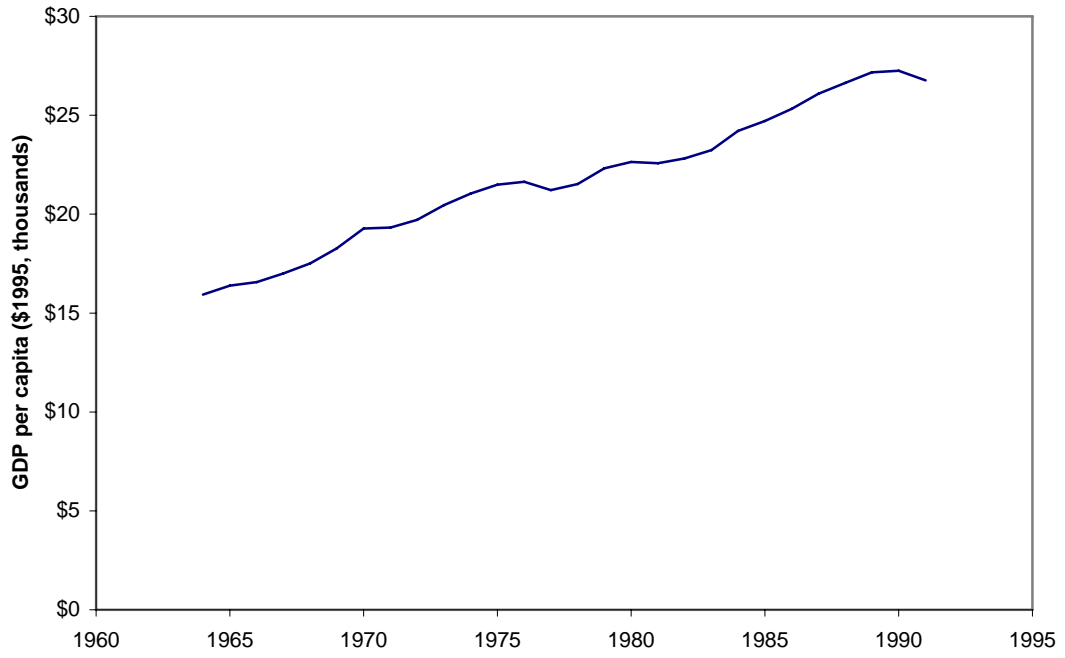
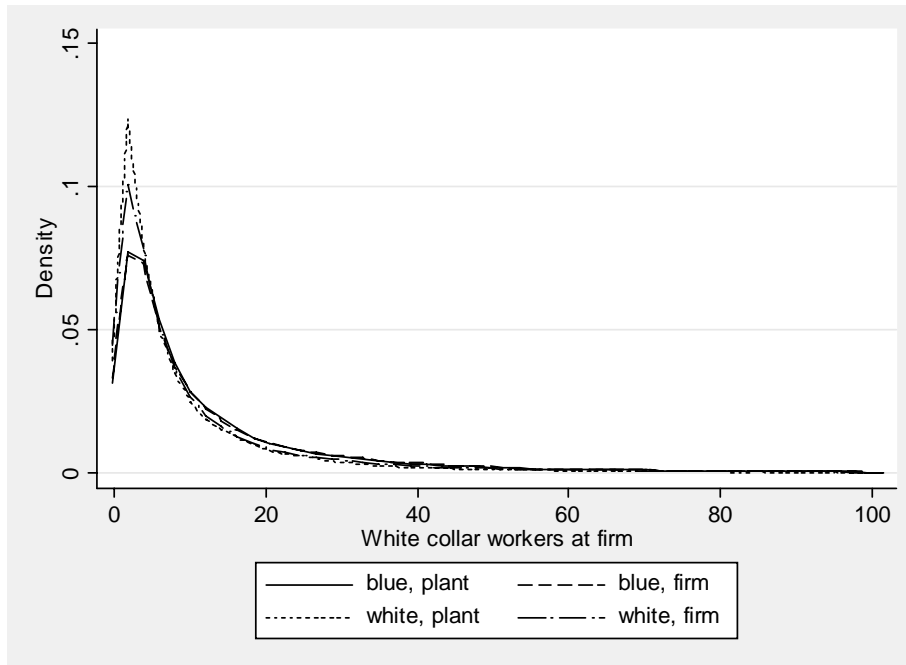


Figure 4: Kernel Density of Firm and Plant Size

All Firms



Firms/Plants with 25+ Employees

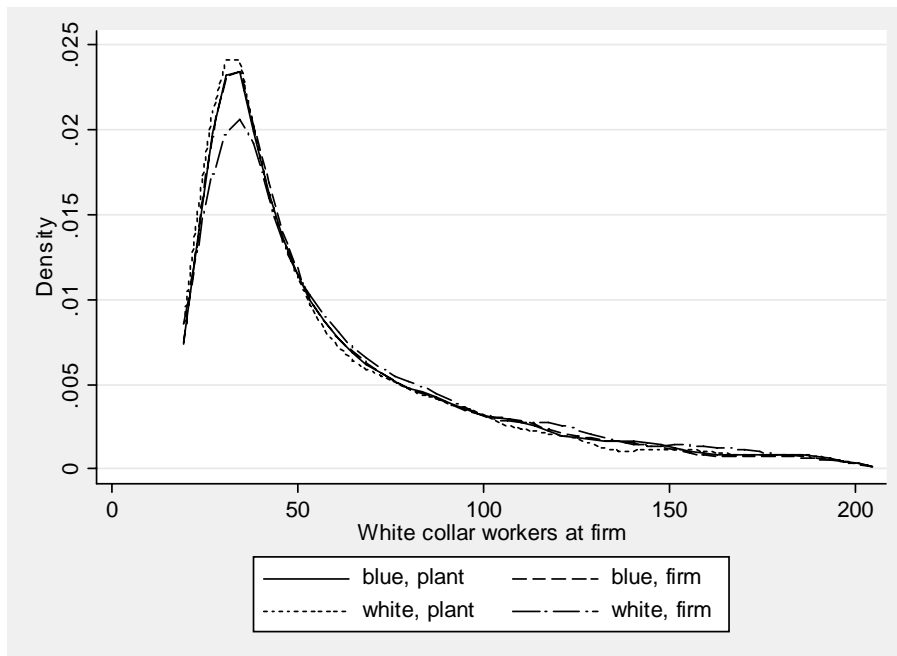
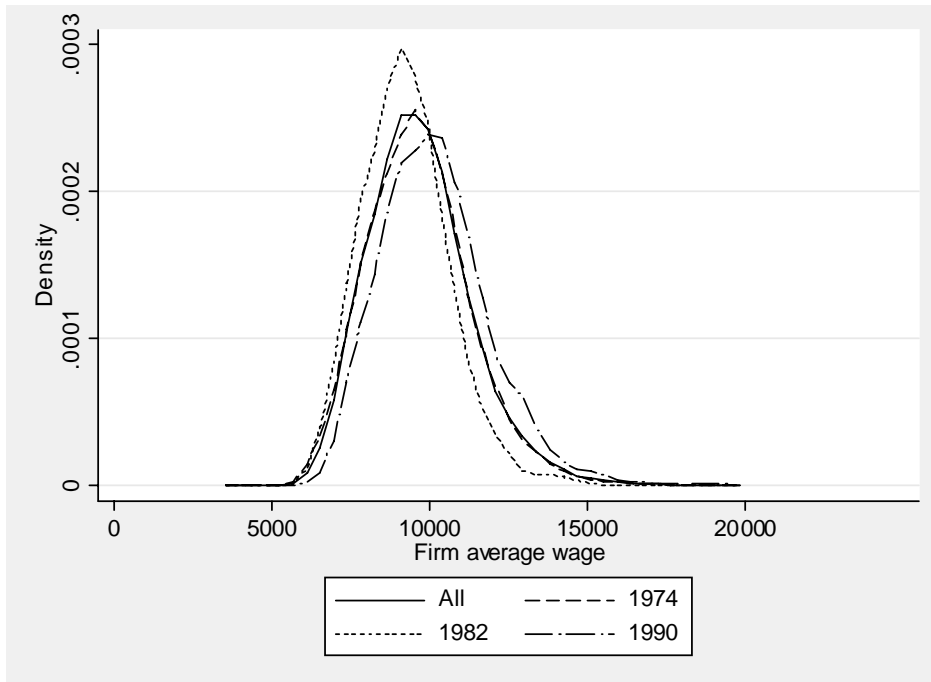


Figure 5: Kernel Density of Firm Average Wage

Blue Collar Firms



White Collar Firms

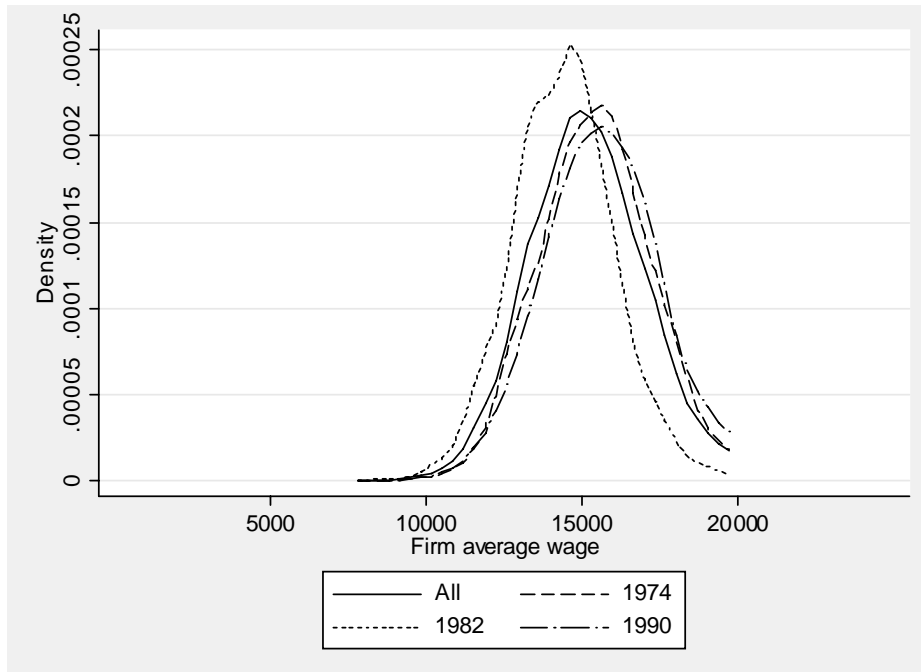
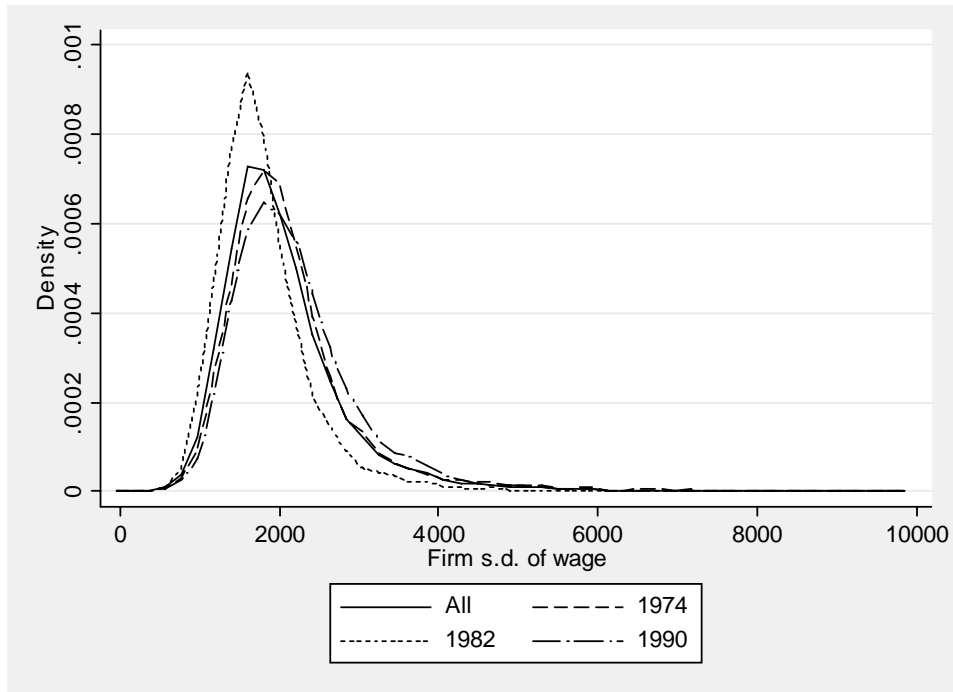


Figure 6: Kernel Density of Firm Standard Deviation of Wage

Blue Collar Firms



White Collar Firms

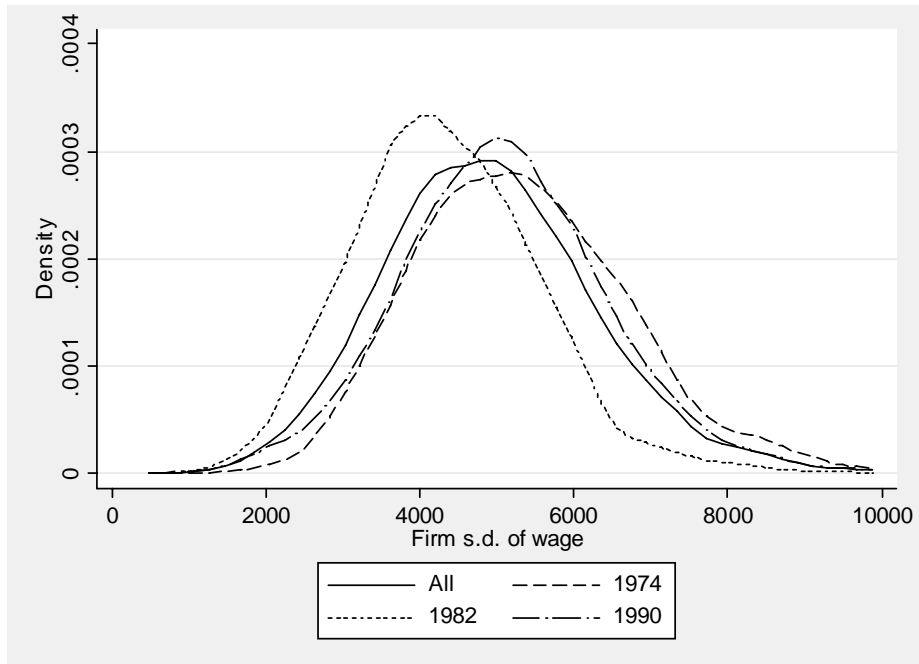
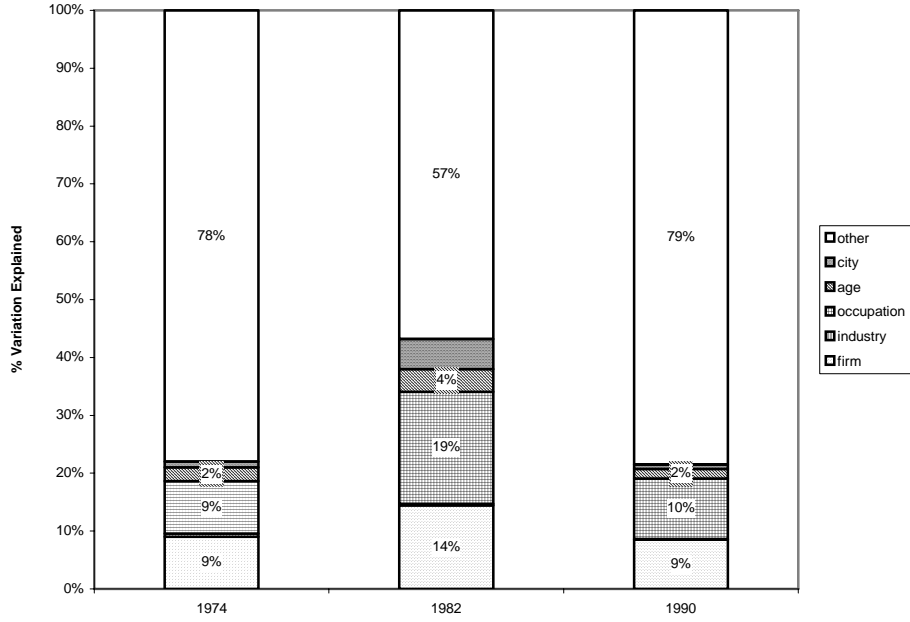


Figure 7: Analysis-of-Variance of Log Wages

Blue Collar Workers



White Collar Workers

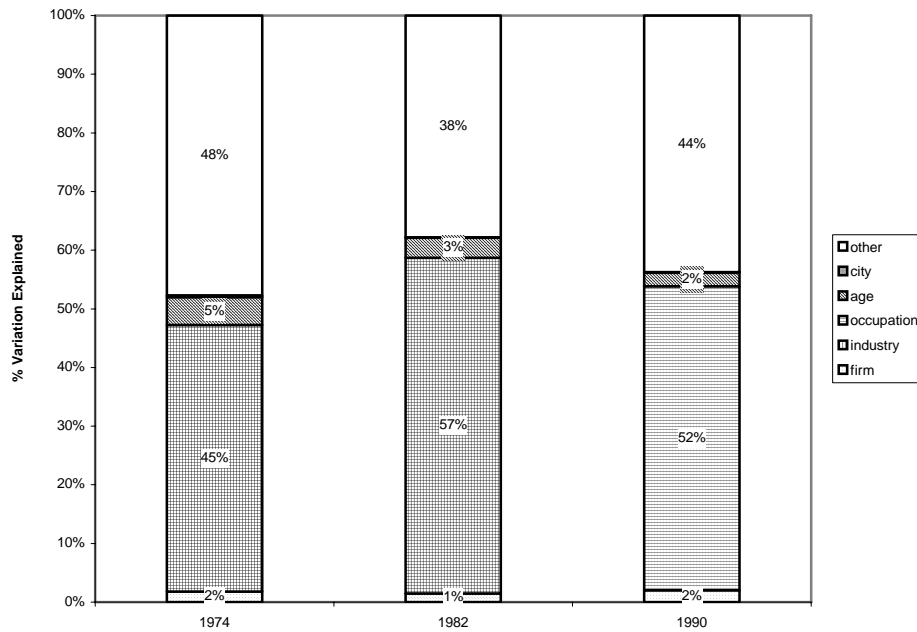
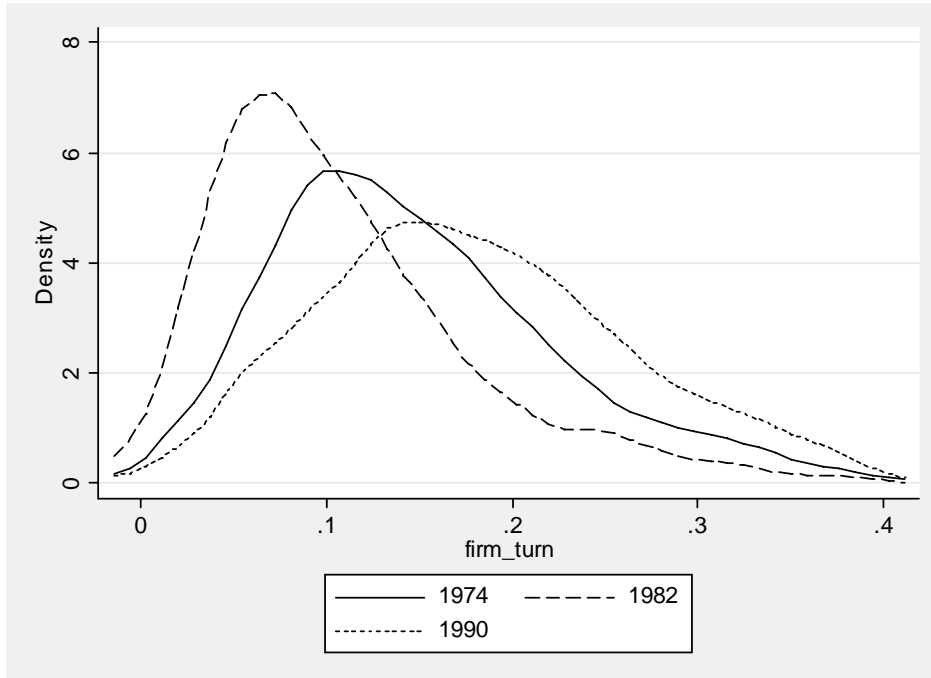


Figure 8: Kernel Density of Firm Turnover

Blue Collar Firms



White Collar Firms

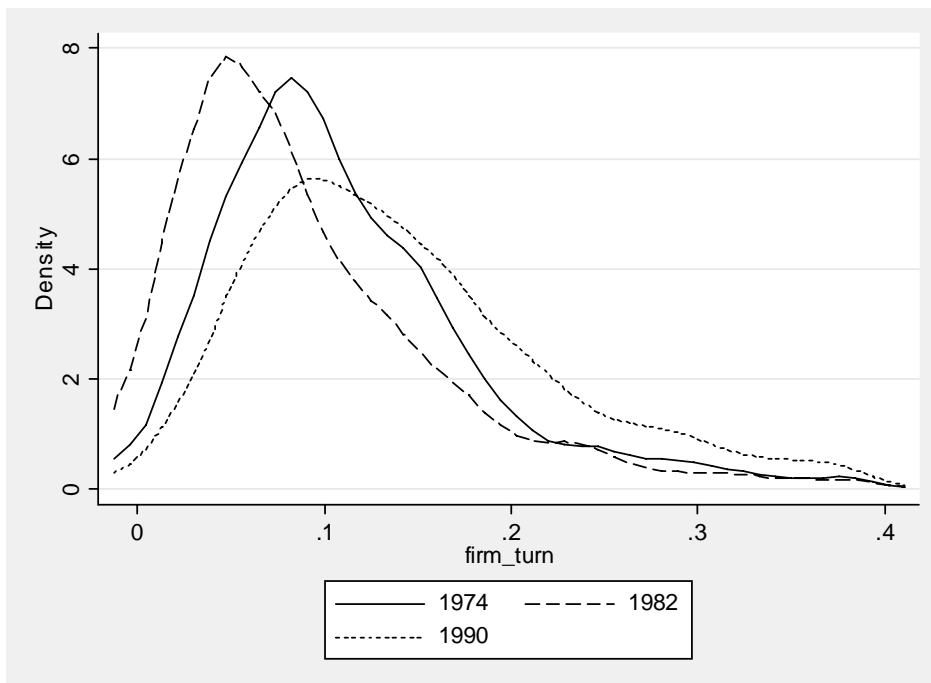


Table 1: Macroeconomic Conditions

Year	1970	1973	1974	1981	1982	1989	1990
Unemployment	1.5	2.5	2.0	2.8	3.5	1.6	1.8
GDP per person (1995 US\$)	\$19,269	\$20,446	\$21,038	\$22,570	\$22,820	\$27,166	\$27,252
Change in GDP							
1 Year (total)	6.47%	3.97%	3.20%	-0.17%	1.17%	2.69%	1.10%
2 Year (total)	11.81%	6.35%	7.29%	1.50%	1.00%	5.34%	3.81%
5 Year (total)	22.28%	20.03%	17.96%	5.53%	8.50%	14.29%	13.08%
1 Year (per capita)	5.48%	3.78%	2.89%	-0.29%	1.11%	2.00%	0.32%
2 Year (per capita)	10.01%	5.84%	6.78%	1.18%	0.82%	4.18%	2.32%
5 Year (per capita)	17.58%	16.74%	15.17%	4.29%	7.55%	12.19%	10.32%

Table 2
Panel A: Blue Collar Workers
Structure of Wages Within and Between Firms

	Wages in 1990 kroner			Log monthly wages in 1990 kroner		
	1974	1982	1990	1974	1982	1990
Average Wage, observation = a person	9,860	9,526	10,571	9.16	9.13	9.23
(s.d.)	(2,546)	(2,184)	(2,690)	(0.27)	(0.24)	(0.26)
(90%-ile)	(13,088)	(12,281)	(14,041)	(9.48)	(9.42)	(9.55)
(10%-ile)	(6,589)	(6,628)	(7,223)	(8.79)	(8.80)	(8.88)
[N – workers]	[474,857]	[396,701]	[372,623]			
Average of firm average wage, observ = a firm (weights observations differently from previous row)	9,636	9,221	10,176	9.14	9.10	9.19
(s.d.)	(1,514)	(1,310)	(1,664)	(0.16)	(0.14)	(0.16)
(90%-ile)	(11,619)	(10,908)	(12,400)	(9.33)	(9.28)	(9.40)
(10%-ile)	(7,686)	(7,552)	(8,140)	(8.92)	(8.91)	(8.98)
[N – firms]	[3,708]	[3,546]	[3,931]			
Average of s.d. of wage, observ = a firm	1,988	1,723	2,112	0.22	0.20	0.21
(s.d.)	(587)	(465)	(656)	(0.053)	(0.044)	(0.051)
(90%-ile)	(2,785)	(2,339)	(3,012)	(0.28)	(0.25)	(0.28)
(10%-ile)	(1,306)	(1,171)	(1,366)	(0.15)	(0.14)	(0.15)
[N – firms]	[3,705]	[3,546]	[3,930]			
Average Coefficient of variation of wages, observ = a firm	0.207	0.188	0.207	0.024	0.021	0.023
(s.d.)	(0.052)	(0.046)	(0.054)	(0.006)	(0.005)	(0.006)
(90%-ile)	(0.273)	(0.247)	(0.276)	(0.031)	(0.028)	(0.030)
(10%-ile)	(0.144)	(0.133)	(0.145)	(0.017)	(0.015)	(0.017)
[N – firms]	[3,705]	[3,546]	[3,930]			
Correlation(average wage, s.d. of wage), observ = a firm	0.523	0.443	0.561	-0.004	-0.066	0.082
Average of firm average wage, observ = a plant	9,636	9,227	10,192	9.14	9.10	9.19
(s.d.)	(1,632)	(1,381)	(1,706)	(0.17)	(0.15)	(0.16)
(90%-ile)	(11,881)	(11,105)	(12,558)	(9.35)	(9.29)	(9.41)
(10%-ile)	(7,432)	(7,371)	(8,059)	(8.89)	(8.88)	(8.97)

[N – plants]	[4,832]	[4,526]	[4,866]			
Average of s.d. of wage, observ = a plant	1,969	1,717	2,103		0.22	0.19
(s.d.)	(597)	(471)	(663)		(0.052)	(0.044)
(90%-ile)	(3,044)	(2,538)	(3,163)		(0.31)	(0.27)
(10%-ile)	(1,308)	(1,173)	(1,373)		(0.16)	(0.14)
[N – plants]	[4,826]	[4,526]	[4,865]			
Average Coefficient of variation of wages, observ = a plant	0.20	0.19	0.21		0.024	0.021
(s.d.)	(0.05)	(0.05)	(0.053)		(0.006)	(0.005)
(90%-ile)	(0.29)	(0.26)	(0.29)		(0.034)	(0.029)
(10%-ile)	(0.15)	(0.14)	(0.15)		(0.017)	(0.016)
[N – plants]	[4,826]	[4,526]	[4,865]			
Correlation(average wage, s.d. of wage), observ = a plant	0.562	0.485	0.582		0.035	-0.022
Average Wage for workers between 25 and 30, observation = a person	10,129	9,587	10,642		9.19	9.14
(s.d.)	(2,474)	(2,086)	(2,671)		(0.25)	(0.22)
(90%-ile)	(13,261)	(12,235)	(14,143)		(9.49)	(9.41)
(10%-ile)	(7,010)	(6,901)	(7,373)		(8.86)	(8.84)
[N – workers]	[67,765]	[55,204]	[54,590]			
Average Wage for workers between 45 and 50, observation = a person	10,065	9,797	11,020		9.18	9.16
(s.d.)	(2,583)	(2,207)	(2,707)		(0.26)	(0.23)
(90%-ile)	(13,334)	(12,545)	(14,511)		(9.50)	(9.44)
(10%-ile)	(6,721)	(6,817)	(7,639)		(8.81)	(8.83)
[N – workers]	[43,599]	[35,964]	[39,175]			

All values are kroners per month, set to 1990 values using the Swedish CPI. Data include full time and part time, men and women, no age restrictions. Only firms with 25 or more employees in the relevant year are included.

Table 2
Panel B: White Collar Workers
Structure of Wages Within and Between Firms

	Wages in 1990 kroner			Log monthly wages in 1990 kroner		
	1974	1982	1990	1974	1982	1990
Average Wage, observation = a person	16,199	14,828	15,990	9.64	9.56	9.63
(s.d.)	(5,735)	(4,739)	(5,435)	(0.33)	(0.29)	(0.31)
(90%-ile)	(23,935)	(21,302)	(23,475)	(10.08)	(9.97)	(10.06)
(10%-ile)	(10,145)	(9,903)	(10,400)	(9.22)	(9.20)	(9.25)
[N – workers]	[267,293]	[277,491]	[296,778]			
Average of firm average wage, observ = a firm (weights observations differently from previous row)	15,445	14,374	15,660	9.59	9.53	9.61
(s.d.)	(1,787)	(1,581)	(1,908)	(0.11)	(0.11)	(0.12)
(90%-ile)	(17,654)	(16,288)	(17,970)	(9.73)	(9.66)	(9.75)
(10%-ile)	(13,187)	(12,407)	(13,329)	(9.44)	(9.39)	(9.46)
[N – firms]	[1,701]	[2,069]	[2,493]			
Average of s.d. of wage, observ = a firm	5,066	4,161	4,895	0.31	0.27	0.29
(s.d.)	(1,141)	(1,035)	(1,164)	(0.050)	(0.048)	(0.049)
(90%-ile)	(6,516)	(5,469)	(6,335)	(0.37)	(0.30)	(0.35)
(10%-ile)	(3,584)	(2,809)	(3,393)	(0.25)	(0.20)	(0.23)
[N – firms]	[1,701]	[2,069]	[2,493]			
Average Coefficient of variation of wages, observ = a firm	0.327	0.287	0.311	0.032	0.028	0.030
(s.d.)	(0.058)	(0.056)	(0.058)	(0.005)	(0.005)	(0.005)
(90%-ile)	(0.400)	(0.357)	(0.382)	(0.039)	(0.034)	(0.036)
(10%-ile)	(0.253)	(0.211)	(0.235)	(0.026)	(0.021)	(0.024)
[N – firms]	[1,701]	[2,069]	[2,493]			
Correlation(average wage, s.d. of wage), observ = a firm	0.641	0.689	0.657	0.136	0.360	0.308
Average of firm average wage, observ = a plant	15,701	14,500	15,714	9.60	9.54	9.61
(s.d.)	(2,017)	(1,675)	(2,020)	(0.12)	(0.11)	(0.12)
(90%-ile)	(18,358)	(16,810)	(18,611)	(9.76)	(9.68)	(9.77)
(10%-ile)	(13,132)	(12,305)	(13,187)	(9.43)	(9.38)	(9.44)

[N – plants]	[2,358]	[2,752]	[2,956]			
Average of s.d. of wage, observ = a plant	5,142	4,184	4,926		0.31	0.27
(s.d.)	(1,167)	(1,079)	(1,205)		(0.052)	(0.051)
(90%-ile)	(7,314)	(6,026)	(7,061)		(0.40)	(0.34)
(10%-ile)	(3,699)	(2,828)	(3,365)		(0.25)	(0.20)
[N – plants]	[2,358]	[2,751]	[2,956]			
Average Coefficient of variation of wages, observ = a plant	0.33	0.29	0.31		0.032	0.028
(s.d.)	(0.06)	(0.06)	(0.061)		(0.005)	(0.005)
(90%-ile)	(0.43)	(0.38)	(0.42)		(0.041)	(0.036)
(10%-ile)	(0.26)	(0.21)	(0.24)		(0.026)	(0.021)
[N – plants]	[2,358]	[2,751]	[2,956]			
Correlation(average wage, s.d. of wage), observ = a plant	0.610	0.646	0.623		0.059	0.277
Average Wage for workers between 25 and 30, observation = a person	13,060	11,897	13,244		9.46	9.37
(s.d.)	(2,750)	(2,233)	(2,813)		(0.20)	(0.18)
(90%-ile)	(16,533)	(14,599)	(16,787)		(9.71)	(9.59)
(10%-ile)	(9,957)	(9,391)	(10,100)		(9.21)	(9.15)
[N – workers]	[41,574]	[28,552]	[37,423]			
Average Wage for workers between 45 and 50, observation = a person	18,244	16,183	17,699		9.76	9.65
(s.d.)	(6,155)	(5,059)	(5,948)		(0.31)	(0.29)
(90%-ile)	(27,053)	(23,393)	(26,395)		(10.21)	(10.06)
(10%-ile)	(11,986)	(11,014)	(11,500)		(9.39)	(9.31)
[N – workers]	[29,679]	[31,861]	[46,722]			

All values are kroners per month, set to 1990 values using the Swedish CPI. Data include full time and part time, men and women, no age restrictions. Only firms with 25 or more employees in the relevant year are included.

Table 3
Panel A: Blue Collar Workers
Wage Dynamics

	Change in Wages in 1990 kroner (defined as wage in year t – wage in year t-1)			Change in Log monthly wages in 1990 kroner (defined as log wage in year t – log wage in year t-1)		
	1974	1982	1990	1974	1982	1990
Average change in wage observation = a person (s.d.) 90%-ile 10%-ile [N – workers]	7 (2,198) (2,492) (-1,104) [294,978]	-42 (1,881) (2,148) (-2,234) [306,686]	-151 (2,446) (2,721) (-2,883) [237,178]	0.004 (0.22) (0.25) (-0.25)	-0.002 (0.19) (0.23) (-0.23)	-0.011 (0.22) (0.26) (-0.27)
Average of firm average change in wage, observ = a firm (s.d.) 90%-ile 10%-ile [N – firms]	26 (1,118) (1,206) (-1,250) [3,222]	-97 (977) (992) (-1,148) [3,350]	-147 (1,371) (1,301) (-1,552) [3,509]	0.010 (0.11) (0.126) (-0.115)	-0.007 (0.098) (0.108) (-0.115)	-0.011 (0.12) (0.124) (-0.139)
Average of s.d. of change in wage, observ = a firm (s.d.) 90%-ile 10%-ile [N – firms]	1,814 (975) (2,729) (1,049) [3,219]	1,538 (644) (2,217) (922) [3,343]	1,983 (865) (2,990) (1,161) [3,503]	0.19 (0.069) (0.26) (0.12)	0.17 (0.053) (0.23) (0.11)	0.19 (0.061) (0.27) (0.12)
Average of firm average change in wage, observ = a plant (s.d.) 90%-ile 10%-ile [N – plants]	17 (1,134) (1,307) (-1,220) [4,099]	-110 (981) (1,036) (-1,152) [4,232]	-164 (1,409) (1,395) (-1,551) [4,204]	0.007 (0.107) (0.130) (-0.117)	-0.008 (0.097) (0.109) (-0.116)	-0.012 (0.125) (0.126) (-0.140)
Average of s.d. of change in wage, observ = a plant (s.d.) 90%-ile 10%-ile	1,806 (986) (2,801) (1,034)	1,554 (668) (2,308) (926)	1,999 (900) (3,118) (1,160)	0.187 (0.068) (0.262) (0.123)	0.169 (0.053) (0.232) (0.114)	0.191 (0.061) (0.274) (0.124)

[N – plants]	[4,096]	[4,226]	[4,195]				
Avg change in wage for people who change firms, observ = a person	320	148	-77		0.04	0.02	-0.003
(s.d.)	(3,060)	(2,626)	(2,960)		(0.311)	(0.26)	(0.267)
90%-ile	(3,869)	(3,119)	(3,254)		(0.43)	(0.34)	(0.32)
10%-ile	(-3,121)	(-2,731)	(-3,273)		(-0.33)	(-0.29)	(-0.32)
[N – workers]	[18,737]	[10,713]	[33,302]				
Avg change in wage for workers between 25 and 30, observation = a person	-53	-31	-154		-0.0038	-0.0013	-0.013
(s.d.)	(2,319)	(1,952)	(2,616)		(0.216)	(0.201)	(0.233)
(90%-ile)	(2,526)	(2,261)	(2,920)		(0.247)	(0.241)	(0.273)
(10%-ile)	(-2,669)	(-2,354)	(-3,149)		(-0.263)	(-0.246)	(-0.292)
[N – workers]	[41,542]	[42,963]	[33,349]				
Avg change in wage for workers between 45 and 50, observation = a person	-73	-55	-199		-0.006	-0.003	-0.016
(s.d.)	(2,162)	(1,822)	(2,367)		(0.202)	(0.183)	(0.204)
(90%-ile)	(2,238)	(2,033)	(2,548)		(0.221)	(0.213)	(0.230)
(10%-ile)	(-2,463)	(-2,166)	(-2,773)		(-0.243)	(-0.218)	(-0.249)
[N – workers]	[30,154]	[30,205]	[28,742]				
Avg change in wage for people with tenure < 3 years, observ = a person	243	35	48		0.035	0.008	0.010
(s.d.)	(2,314)	(1,933)	(2,490)		(0.257)	(0.222)	(0.250)
90%-ile	(3,098)	(2,309)	(3,070)		(0.370)	(0.280)	(0.320)
10%-ile	(-2,455)	(-2,269)	(-2,809)		(-0.263)	(-0.260)	(-0.283)
[N – workers]	[14,712]	[17,615]	[34,431]				
Avg change in wage for people with tenure ≥ 3 years, observ = a person	-9	-36	-179		0.002	-0.002	-0.015
(s.d.)	(2,187)	(1,869)	(2,432)		(0.213)	(0.192)	(0.214)
90%-ile	(2,451)	(2,141)	(2,670)		(0.246)	(0.227)	(0.246)
10%-ile	(-2,486)	(-2,214)	(-2,898)		(-0.247)	(-0.229)	(-0.265)
[N – workers]	[273,070]	[272,085]	[178,334]				

Table 3
Panel B: White Collar Workers
Wage Dynamics

	Change in Wages in 1990 kroner (defined as wage in year t – wage in year t-1)			Change in Log monthly wages in 1990 kroner (defined as log wage in year t – log wage in year t-1)		
	1974	1982	1990	1974	1982	1990
Average change in wage observation = a person (s.d.) 90%-ile 10%-ile [N – workers]	590 (862) (1,307) (-27) [224,499]	-255 (890) (436) (-805) [242,410]	-45 (1,257) (1,162) (-943) [226,755]	0.041 (0.53) (0.090) (-0.002)	-0.016 (0.053) (0.030) (-0.050)	-0.004 (0.700) (0.070) (-0.060)
Average of firm average change in wage, observ = a firm (s.d.) 90%-ile 10%-ile [N – firms]	551 (344) (930) (219) [1,615]	-260 (320) (66) (-545) [1,955]	54 (529) (684) (-470) [2,282]	0.041 (0.021) (0.064) (0.019)	-0.018 (0.020) (0.003) (-0.036)	0.001 (0.031) (0.040) (-0.031)
Average of s.d. of change in wage, observ = a firm (s.d.) 90%-ile 10%-ile [N – firms]	851 (552) (1,509) (405) [1,615]	791 (514) (1,334) (335) [1,954]	1,138 (606) (1,843) (561) [2,280]	0.056 (0.027) (0.090) (0.030)	0.049 (0.027) (0.079) (0.021)	0.066 (0.029) (0.100) (0.036)
Average of firm average change in wage, observ = a plant (s.d.) 90%-ile 10%-ile [N – plants]	566 (316) (934) (252) [2,204]	-269 (274) (25) (-544) [2,550]	31 (542) (684) (-480) [2,627]	0.041 (0.020) (0.064) (0.020)	-0.018 (0.017) (0.001) (-0.036)	-0.0002 (0.032) (0.037) (-0.032)
Average of s.d. of change in wage, observ = a plant (s.d.) 90%-ile 10%-ile	752 (514) (1,358) (361)	723 (451) (1,239) (301)	1,075 (602) (1,860) (525)	0.050 (0.026) (0.083) (0.027)	0.045 (0.024) (0.076) (0.019)	0.062 (0.029) (0.098) (0.033)

[N – plants]	[2,203]	[2,546]	[2,627]				
Avg change in wage for people who change firms, observ = a person	744	117	342		0.050	0.008	0.02
(s.d.)	(1,782)	(1,684)	(1,737)		(0.106)	(0.098)	(0.097)
90%-ile	(2,486)	(1,950)	(2,330)		(0.172)	(0.126)	(0.140)
10%-ile	(-552)	(-1,044)	(-867)		(-0.032)	(-0.061)	(-0.055)
[N – workers]	[9,279]	[9,192]	[29,629]				
Avg change in wage for workers between 25 and 30, observation = a person	834	123	305		0.065	0.008	0.019
(s.d.)	(761)	(756)	(1,225)		(0.052)	(0.058)	(0.082)
(90%-ile)	(1,565)	(832)	(1,520)		(0.119)	(0.067)	(0.109)
(10%-ile)	(250)	(-378)	(-597)		(0.020)	(-0.033)	(-0.049)
[N – workers]	[31,183]	[22,744]	[24,639]				
Avg change in wage for workers between 45 and 50, observation = a person	455	-368	-135		0.027	-0.023	-0.010
(s.d.)	(851)	(780)	(1,265)		(0.042)	(0.042)	(0.063)
(90%-ile)	(1,060)	(126)	(1,036)		(0.063)	(0.008)	(0.054)
(10%-ile)	(-104)	(-866)	(1,006)		(-0.006)	(-0.049)	(-0.058)
[N – workers]	[26,743]	[29,086]	[38,044]				
Avg change in wage for people with tenure < 3 years, observ = a person	680	30	246		0.064	0.003	0.017
(s.d.)	(999)	(943)	(1,232)		(0.085)	(0.065)	(0.080)
90%-ile	(1,617)	(807)	(1,438)		(0.160)	(0.070)	(0.110)
10%-ile	(-140)	(-588)	(-691)		(-0.008)	(-0.044)	(-0.051)
[N – workers]	[8,639]	[10,624]	[33,449]				
Avg change in wage for people with tenure \geq 3 years, observ = a person	590	-267	-94		0.040	-0.017	-0.008
(s.d.)	(843)	(884)	(1,270)		(0.050)	(0.052)	(0.068)
90%-ile	(1,294)	(408)	(1,118)		(0.090)	(0.029)	(0.064)
10%-ile	(-15)	(-813)	(-986)		(-0.001)	(-0.048)	(-0.060)
[N – workers]	[205,773]	[218,746]	[165,669]				

Table 4
Panel A: Blue Collar Workers
Mobility

	All firms (# firms)			Firms with 100+ employees (# firms)		
	1974	1982	1990	1974	1982	1990
Employees (s.d.)	128.1 (532.3)	111.9 (511.2)	94.8 (331.9)	444.0 (1090.3)	448.3 (1160.0)	374.9 (745.1)
Number of occupations (s.d.)	10.4 (11.2)	9.2 (10.1)	8.3 (9.7)	20.0 (18.1)	19.5 (17.4)	18.8 (16.9)
Employment growth (s.d.)	6.9% (24.4%)	-1.9% (37.5%)	2.8% (24.7%)	8.2% (19.7%)	-4.6% (13.3%)	-0.1% (22.8%)
Exit rate, <i>observ = person</i> [observations]	14.8% [265,717]	10.7% [351,132]	22.6% [320,778]	14.3% [204,754]	10.3% [269,992]	23.5% [235,531]
Exit rate (s.d.) [N – firms]	16.1% (11.0%) [1,777]	12.1% (10.9%) [2,258]	20.2% (13.1%) [2,368]	15.2% (9.3%) [502]	11.8% (11.7%) [587]	20.5% (14.6%) [581]
Exit rate, top quartile of firm wages (s.d.)	10.4% (12.5%)	8.1% (12.3%)	14.3% (15.3%)	9.8% (10.1%)	8.1% (12.6%)	14.8% (16.1%)
Exit rate, bottom quartile of firm wages (s.d.)	25.3% (16.7%)	18.9% (15.9%)	29.7% (17.8%)	24.2% (12.5%)	18.3% (14.0%)	30.1% (16.1%)
Exit rate, top decile of firm wages (s.d.)	9.9% (15.8%)	8.1% (15.0%)	14.3% (19.4%)	9.5% (12.1%)	8.2% (14.0%)	14.9% (17.9%)
Exit rate, bottom decile of firm wages (s.d.)	29.9% (22.2%)	22.7% (21.2%)	34.0% (23.5%)	29.6% (15.9%)	22.2% (16.5%)	34.6% (18.3%)
Entry rate (s.d.)	19.6% (12.2%)	10.7% (11.8%)	20.3% (13.3%)	20.0% (11.3%)	9.6% (11.1%)	19.1% (13.0%)
Entry rate, top quartile of firm wages (s.d.)	10.4% (12.8%)	7.0% (12.3%)	12.4% (14.7%)	11.3% (11.9%)	6.6% (11.6%)	11.9% (13.7%)
Entry rate, bottom quartile of firm wages (s.d.)	34.3% (19.6%)	16.0% (16.5%)	31.0% (19.7%)	34.1% (15.3%)	14.0% (13.4%)	28.3% (16.2%)
Entry rate, top decile of firm wages (s.d.)	9.5% (15.8%)	6.6% (14.6%)	11.4% (18.0%)	10.1% (13.1%)	6.5% (13.0%)	11.2% (15.2%)
Entry rate, bottom decile of firm wages (s.d.)	43.1% (25.6%)	18.4% (21.5%)	36.2% (25.4%)	42.7% (18.6%)	16.4% (16.0%)	33.2% (18.1%)
% of employees who switch jobs internally	13.1%	12.9%	14.0%	12.9%	13.4%	13.6%

(s.d.)	(13.8%)	(19.5%)	(19.9%)		(12.6%)	(19.5%)	(18.4%)
% of new jobs filled internally (s.d.)	33.0% (23.2%)	47.0% (32.5%)	31.6% (26.1%)		33.1% (20.2%)	52.6% (28.4%)	34.4% (24.6%)
% of workers who have been at firm 3+ years (s.d.)	88.3% (9.1%)	89.3% (9.7%)	72.0% (13.8%)		88.3% (7.9%)	90.9% (6.7%)	73.0% (12.5%)
Correlation (exit rate, average wage), observ = a firm	-0.105	-0.052	-0.151		-0.068	-0.049	-0.157
Correlation(exit rate, average wage change), observ = a firm	0.031	-0.030	-0.064		-0.059	0.021	-0.056
Correlation(exit rate, s.d. of wage), observ = a firm	0.059	0.074	-0.017		0.098	0.033	0.014
Correlation (entry rate, average wage), observ = a firm	-0.094	0.006	-0.048		-0.079	0.062	-0.035
Correlation(entry rate, average wage change), observ = a firm	0.076	0.066	0.058		0.120	0.042	0.127
Correlation(entry rate, s.d. of wage), observ = a firm	0.048	0.170	0.080		0.039	0.243	0.151
Exit rate, observ = a plant (s.d.) [N – plants]	0.153 (0.108) [2,334]	0.116 (0.108) [3,040]	0.197 (0.135) [2,823]		0.139 (0.084) [596]	0.106 (0.103) [729]	0.194 (0.139) [602]
Entry rate, observ = a plant (s.d.)	0.186 (0.120)	0.103 (0.113)	0.195 (0.133)		0.187 (0.104)	0.085 (0.099)	0.172 (0.122)

Note: All statistics are calculated at the firm level, except the first exit rate and the plant statistics in the last two rows

Table 4
Panel B: White Collar Workers
Mobility

	All firms (# firms)			Firms with 100+ employees (# firms)		
	1974	1982	1990	1974	1982	1990
Employees (s.d.)	157.1 (477.5)	134.1 (443.0)	119.0 (319.3)	455.2 (846.1)	415.0 (837.4)	345.3 (587.6)
Number of occupations (s.d.)	30.2 (26.3)	28.9 (24.4)	25.6 (20.1)	60.7 (33.4)	59.0 (32.2)	49.5 (26.3)
Number of levels (s.d.)	3.8 (0.7)	3.7 (0.8)	3.6 (0.8)	4.4 (0.6)	4.4 (0.8)	4.3 (0.7)
Employment growth (s.d.)	7.5% (26.5%)	-0.2% (16.2%)	2.5% (48.3%)	9.1% (38.9%)	-1.0% (13.7%)	-0.2% (17.0%)
Exit rate, <i>observ = person</i> [observations]	10.1% [252,633]	9.6% [272,599]	18.6% [279,620]	9.3% [200,487]	9.3% [210,398]	19.4% [206,276]
Exit rate (s.d.)	12.5% (10.4%) [1,540]	10.6% (11.6%) [1,814]	16.9% (14.6%) [2,105]	11.0% (8.8%) [436]	10.6% (12.0%) [492]	17.7% (17.2%) [570]
Exit rate, top quartile of firm wages (s.d.)	9.7% (12.2%)	10.0% (13.6%)	15.4% (17.0%)	8.4% (9.0%)	10.2% (12.4%)	16.6% (18.4%)
Exit rate, bottom quartile of firm wages (s.d.)	18.6% (15.1%)	13.1% (15.0%)	20.8% (17.7%)	17.0% (11.3%)	12.5% (13.0%)	21.6% (17.6%)
Exit rate, top decile of firm wages (s.d.)	10.4% (15.9%)	11.0% (16.9%)	16.2% (20.9%)	9.4% (10.3%)	11.1% (13.8%)	17.7% (19.9%)
Exit rate, bottom decile of firm wages (s.d.)	23.1% (20.7%)	15.4% (19.5%)	23.6% (22.2%)	21.2% (13.3%)	14.6% (14.9%)	24.1% (18.7%)
Entry rate (s.d.)	15.3% (10.7%)	9.7% (10.6%)	17.1% (13.7%)	14.8% (10.9%)	9.5% (11.1%)	15.6% (13.6%)
Entry rate, top quartile of firm wages (s.d.)	7.6% (11.4%)	7.3% (11.4%)	12.4% (14.9%)	7.5% (11.0%)	7.3% (11.4%)	11.5% (14.0%)
Entry rate, bottom quartile of firm wages (s.d.)	29.4% (17.7%)	14.6% (15.7%)	24.6% (19.0%)	29.0% (15.0%)	14.3% (13.5%)	22.8% (16.9%)
Entry rate, top decile of firm wages (s.d.)	7.5% (14.0%)	7.4% (13.6%)	12.7% (18.2%)	7.6% (11.8%)	8.0% (12.8%)	11.7% (15.2%)

Entry rate, bottom decile of firm wages (s.d.)	38.8% (24.9%)	17.7% (21.3%)	28.9% (24.5%)		39.0% (19.0%)	17.6% (16.8%)	26.8% (19.9%)
% of employees who switch jobs internally (s.d.)	10.9% (11.5%)	8.2% (9.5%)	8.4% (10.7%)		11.7% (7.9%)	9.8% (7.2%)	8.9% (8.5%)
% of new jobs filled internally (s.d.)	32.9% (25.1%)	42.7% (31.4%)	27.6% (24.8%)		39.2% (20.1%)	52.7% (23.0%)	34.1% (21.3%)
% of workers who have been at firm 3+ years (s.d.)	92.4% (6.8%)	92.3% (7.4%)	73.7% (12.8%)		93.4% (4.7%)	93.1% (6.1%)	75.7% (11.0%)
Correlation (exit rate, average wage), observ = a firm	-0.104	0.015	0.008		-0.072	0.095	-0.026
Correlation(exit rate, average wage change)	0.026	0.141	0.139		0.067	0.155	0.187
Correlation(exit rate, s.d. of wage)	-0.040	0.012	0.049		-0.015	0.076	0.018
Correlation (entry rate, average wage), observ = a firm	-0.159	-0.013	-0.009		-0.231	-0.044	-0.105
Correlation(entry rate, average wage change), observ = a firm	0.098	0.255	0.258		-0.011	0.250	0.213
Correlation(entry rate, s.d. of wage), observ = a firm	-0.028	0.013	0.010		-0.035	0.007	-0.018
Exit rate, observ = a plant (s.d.) [N – plants]	0.131 (0.120) [2,079]	0.105 (0.122) [2,331]	0.173 (0.154) [2,393]		0.120 (0.108) [473]	0.100 (0.121) [477]	0.177 (0.171) [492]
Entry rate, observ = a plant (s.d.)	0.157 (0.118)	0.097 (0.111)	0.175 (0.149)		0.147 (0.106)	0.093 (0.117)	0.157 (0.134)

Note: All statistics are calculated at the firm level, except the first exit rate and the plant level statistics in the last two rows.