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ABSTRACT

This paper consists of three parts. First, we briefly describe some key features of the labor market in Denmark, some of which contribute to the Danish labor markets behaving quite differently from those in many other European countries. The next two parts exploit detailed linked employer-employee data. In the second part we document in some detail an important aspect of the functioning and flexibility of the labor markets in Denmark: the high level of worker mobility. We show that mobility is about as high, or even higher, as in the highly fluid U.S. labor market. Finally, we describe and examine the wage structure between and within firms and changes therein since 1980, especially with an eye on possible impacts of the trend towards a more decentralized wage determination. The shift towards decentralized wage bargaining has coincided with deregulation and increased product market competition. The evidence is, however, not consistent with stronger competition in product markets eroding firm-specific rents. Hence, the prime suspect is the change in wage setting institutions.

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Introduction

The aim of this paper is threefold. First, we give a brief description of some key features of the labor market in Denmark, some of which we argue contribute to the Danish labor markets behaving quite differently from those in many other European countries. Second, we document in some detail an important aspect of the functioning and flexibility of the labor markets in Denmark: the high level of worker mobility.[1] Third, we describe and examine the wage structure between and within firms and changes therein since 1980, especially with an eye on possible impacts of the trend towards a more decentralized wage determination.

1 The Institutional Setting

Although the Danish labor market in many respects resembles other labor markets in Europe, and Scandinavia in particular, it has a number of distinguishing features of its own. Below we briefly discuss some of them. More precisely we look at ten features of labor markets in Denmark.[2] These are:

(i) The high female labor force participation rate, which is among the highest in the world,

(ii) The retirement age which used to be relatively high, but has during relatively few years fallen substantially,

(iii) The replacement ratio of unemployment benefits for low-wage earners, which to the best of our knowledge is the highest in the world. The replacement ratio is considerably lower for high wage earners, but due to the compressed wage structure, a non-negligible portion of the employees has a very high replacement ratio.

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[1] This is one of the cornerstones of the Danish "flexicurity" model for labor market policy which has attracted a lot of attention in recent years; see e.g., chapter 2 in European Commission (2006).

[2] Some of these specific features make the labor market in Denmark in some, but absolutely not all, respects look more like that in the United States than labor markets in other European countries.

(iv) The relatively widespread eligibility for unemployment benefit.

(v) Voluntary membership of unemployment insurance funds.

(vi) Wage bargaining that used to be highly centralized, but has gradually become more decentralized.

(vii) Trade union membership and the coverage of unions are both high by international standards.

(viii) Weak job protection for blue collar workers and only a modest protection for white collar workers.

(ix) Indirect wage costs are internationally very low in Denmark, whereas the rate of direct taxation of wage income is among the highest in the world.

(x) Compared to many other countries, agreements between employers and trade unions constitute a more important regulatory mechanism than legislation and government interventions. This is one of the key elements in "the Danish model".

Each of these aspects has consequences for the behavior of people, firms and their employees, and for the functioning of the Danish labor market.

Female Labor Force Participation

The high female participation is a well-known characteristic feature of the Danish labor market. The growing female share of employment has been facilitated by a massive growth in child-care facilities. Child-care is to a large extent provided by the public sector; 6 out of 10 children in the age group 1-6 years are in publicly provided daycare. Daycare used to be highly subsidized but is now less so. Female participation started to grow in the 1970's in close connection to the growth of the public sector and the creation of the welfare state. Many of the jobs held by women, particularly in the public sector, were originally part-time jobs. Today only about 8-9% of women in the age range 25 to 55 work part-time. The increase in female labor force participation has occurred in parallel with a shift from part-time to full-time work. In recent years part-time work is

common among young women and older women and sectoral differences with respect to the part-time work are small.

Pension Systems and Retirement

Denmark has for many years had a pension system that provides the entire population (and not only the working population) with old age pension, for men as from the age of 67 and for women as from 65 (recently the old age retirement has gradually been lowered to 65 also for men). This is a pay as you go system, where benefits are regulated by the parliament and are paid out of current tax revenue. In 1979 an early retirement program was introduced. All members of the UI system could as from the age of 60 receive a benefit corresponding to the UI until the recipient is entitled to normal pension. In addition, a publicly provided disability pension is available for all age groups, where eligibility is determined on health grounds. The proportion of the labor force receiving disability pension was in 2000 about 10 per cent. As a consequence of especially the early retirement program the average retirement age has been falling over time. Thus, in 2004, only a third of the age group 60-66 were in the labor force.

The early retirement program has been particularly important for older workers because employers are reluctant to hire unemployed workers in their late or mid-fifties because they expect that they will go on early retirement as they become eligible. Bingley and Lanot (2004) have shown that there is no firm effect with respect to the use of the program, indicating that employers are not systematically pushing elderly employees into early retirement. Rather it is other factors such as the work situation of the spouse that are important.

Unemployment Benefits

The unemployment benefit system is still partly organized according to "Bismarckian principles". Thus, workers can voluntarily choose to become members of more than 30 different occupational unemployment insurance funds. Membership and eligibility to unemployment benefits are both conditional on that the person has had a job for at least one year. The unemployment benefit is 90% of the previous wage but with a

maximum of 1800€ per month. Consequently, the replacement ratio for low-wage workers is 90%, but is lower for higher income earners. Unemployment benefits are taxed, but a special tax rate of 8% on all earned income does not apply to unemployment benefits. Together, the high replacement ratio and the asymmetric tax treatment create an incentive problem for low-wage workers as they earn little by working compared to being unemployed. It has been shown that 23% of all employed women and 12% of all employed men actually earn 80€ less per week by working relative to what would have received as unemployment benefit claimants; see Smith (1998).

Unemployment benefits are obtained from the first day of unemployment and are paid for one year without any other obligations than seeking work. After one year of unemployment, the UI recipient has to take part in an active labor market policy program. A high replacement ratio coupled with the fact that there is almost no experience rating for neither employers nor workers imply that there are many short spells of unemployment. Even in years of low unemployment more than 20% of all wage earners have experienced at least one spell of unemployment. A high proportion of these spells are concentrated around Christmas/New Year and other vacations. As a result, for low pay workers total working hours are about 80% of the total normal hours (to be explained below).

The UI system is financed by general tax revenue but operated by the private UI funds. The UI funds are formally unrelated to the trade unions, but membership of the UI system is typically considered as part of a package, which also includes union membership. As a consequence, about 80 per cent of the wage earners are members of the UI system and about 85 per cent are members of trade unions (Neumann et al., 1991).

The Danish Model for Co-operation

The overall labor market model in Denmark is often called “The Danish Model”. The key ingredient in the Danish model is that the trade unions and the employers federation (the social partners) make agreements on most regulatory issues, and the role of the government is to “pick up and pay the bill”. The social partners take responsibility for wage bargaining and wage setting. They also make agreements concerning normal

working hours, and set rules for labor protection with respect to overtime and work environment.[3] As a consequence there is no minimum wage legislation in Denmark. Nevertheless, the social partners have agreed that no member firm will pay less than 89.50 DKK per hour plus 15% vacation pay, i.e., altogether 13.8€. Although the employers' organizations do not have full coverage, the unions are very keen on identifying workplaces paying less. According to anecdotal evidence workers are being paid less in the unorganized parts of the retail sector, and in the hotels and restaurant industries.

The role of the government in Denmark is to provide unemployment benefits and to retrain workers who have lost their jobs because their productivity in their current job is too low. The government also provides health care and disability pensions. In other words, the government provides the safety net. This is also the case with respect to those who are not covered by unemployment insurance. These workers are in general eligible to social assistance, which is of the same size as the UI-benefit. The main difference is that all payments are means-tested.

The Danish labor market model has many features in common with the Swedish model and because of the similarities they are sometimes grouped together under the hat of "the Nordic Labor Market Model". The main idea is that whenever a firm cannot keep workers productive in their current job the government should take responsibility and retrain workers. After retraining the workers should now be more productive and can therefore be hired in a new firm and thereby increase overall productivity.

There are, however, distinct differences between the Danish and Swedish models. One of these is that the Danish model does not prohibit lay-offs, where the Swedish is considerably more restrictive in this respect. The idea behind the Danish model is that firms should not be forced to maintain a large workforce if it is no longer profitable to do so. In such a situation it is better for society that firms can rehire workers where these workers' labor is more productive. This increases overall flexibility and productivity. Of

[3] When the current Liberal/Conservative government has made several propositions regarding work environment, which is fairly general, both employers' and workers' organizations have been critical of state intervention into the area.

course, it also puts a burden on the workers and that is probably the main reason for the relatively high unemployment benefit in Denmark (at least for the low-wage earners). Another difference is that the Swedish model builds heavily on a tripartite cooperation between government, unions and employers. So, in Denmark the government provides income security, while the labor market organizations deliver flexibility. Hence, the system is called "flexicurity".

Working Hours

In Denmark so-called "normal working hours" are determined as the outcome of the general wage bargaining between the trade unions and the employers federation. As elsewhere, the normal working times have been gradually shortened in Denmark, too. The reduction has on average been about 0.7% per year (Andersen et *al*., 2001). Its sources have changed over time. In the late 1960s and in the beginning of the 1970s the reduction was in weekly hours, followed by a period when the annual vacation was increased from 4 to 5 weeks. In the 1990's the reduction was again implemented as a reduction in the number of weekly hours; from 40 to 37 hours. Recently, a gradual expansion of vacation weeks from 5 to 6 weeks has begun.

Annual normal working hours in Denmark are among the lowest in the world. Only the Germans work less than the 1690 hours per year worked on average by the Danes. However, far from all work that much; especially the low-wage earners work less. The average hours for low-wage-earners are only about 1140 hours in Denmark, while it was about 1700 hours in the US in the same period. The main reason is no doubt that the Danish UI system is not only subsidizing search between two jobs but also temporary lay-offs.

Wage Bargaining

Collective bargaining in Denmark has a long history – in fact, the first general collective wage agreement was settled already as early as in 1889 – and for little less than a century this was the predominant mode of wage determination. In recent years Danish wage setting has undergone large changes, which are briefly described in the sequel.

Until the beginning of the 1980s, wages were set in biannual national wage negotiations. A key feature of wage determination was an automatic wage indexation system, which linked hourly wages to the consumer price index net of indirect taxes and subsidies. Twice per year, hourly wage increases were triggered by each three-point change in the net CPI. Although the indexation was not complete, it accounted for a large share of wage increases.

General wage negotiations took place between the Danish Federation of Trade Unions (LO) and the Danish Employers' Federation (DA), typically every second year. LO and DA set the pattern for the entire manual workers' labor market. Although only about 40 per cent of the private sector labor force was employed in firms where both the employees and the employer were organized, the great majority of employers, and hence also of all workplaces, applied the results of the general agreement. The negotiations and the general agreement were split into general and specific issues such as working hours, vacations and minimum wage tariffs.[4] For the vast majority of white-collar workers and public sector employees, the wage setting mechanism is quite similar regarding negotiations, timing, etc. to that for the blue-collar workers. The difference has been that these groups have never received as much in terms of wage drift between the general contracts as blue collar workers, but have been compensated for the wage drift in the form of larger wage increases in the central bargains.

As from the beginning of the 1980s, there has been a tendency towards more and more decentralization of wage bargaining and wage setting. A first step was the abolishment of wag indexation in 1982. From 1987 to 1993 negotiations concerning wages were done at the industry level. From 1993 onwards the general wage negotiations have mainly focused on working hours, pensions, sickness pay and vacation. At the same time wage bargaining proper has moved down to the industry or firm levels and an increasing share of the wage agreements have been made at the individual employee

[4] As mentioned above, Denmark does not have a legally set minimum wage. However, the lowest tariff wage agreed upon in the wage negotiations sets a floor for the wages to be paid, and changes in the minimum wage tariff shifts the entire wage rate distribution.

level. Already in 1993, 71 per cent of all agreements in the market for manual labor were of this type.

While the wage setting has been decentralized in the private labor market, wage bargaining in the public sector is still highly centralized with biannual national-level negotiations. However, a new wage system called "Ny-løn" (New-wage) has considerably fewer wage tariffs than before and the intention is to move towards more individualized pay according to qualifications, job functions and individual performance also in the public sector. The performance pay element in public sector wages remains rather small, however.

The Labor Market and the Macroeconomy

Figure 1 describes the development of unemployment and annual percentage changes in real GDP since 1980. As can be seen from the figure, the time series changes in unemployment are chiefly driven by changes in GDP. As from the mid-nineties there has been a long period of continuously decline in open unemployment, and so, at the end of the period, Denmark is one of the not so numerous European countries that have succeeded in lowering its unemployment rate to levels not experienced since the seventies.

It should be noted, however, that as active labor market policies have played an increasingly important role, and as participants in active labor market programs are not counted as unemployed, open unemployment has become a more and more dubious measure of the state of the labor market. We have, therefore, in Figure 1 also included an adjusted unemployment rate which includes individuals in active labor market programs among the unemployed and consequently also in the labor force. The main difference is in the levels, while the peaks and throughs are the same. It is worth noting, that whereas the rate of unemployment during business cycle upturns is lower at the end of the period than in the mid-eighties, this is not true for the adjusted unemployment rate.

Flexibility

The institutional framework of the Danish labor market implies that there are few barriers to mobility between firms. For the employers, the costs of laying off workers are low because of the absence of severance pay legislation and experience rating in the unemployment insurance system as well as the weak job security of particularly blue-collar workers. For the employees, costs of changing employer or experiencing unemployment spells are reduced by generous unemployment benefits, which are readily available to insured employees and by the fact that many social benefits, pensions and vacation are independent of the individual's current employer and are hence transferable. As a consequence, the Danish labor market is characterized by both high job mobility and high wage mobility.

2 Data Sources

The main data source used in the empirical analyses below is the so-called IDA-database kept by Statistics Denmark. The IDA is a longitudinal database that contains information about all individuals aged 15 to 74 (demographic characteristics, education, labor market experience, tenure and earnings) and employees in all plants in Denmark during the period 1980-2001. This information has been collected by merging information from several registers in Statistics Denmark with the help of unique identification numbers for individuals and plants. The persons and plants are matched at the end of November in each year. Consequently, only changes between ends-of-Novembers are accounted for (not intermittent changes). Statistics Denmark has aggregated the plant-level information to the level of firms for the first time in the late nineties for the Pay and Performance project at Aarhus School of Business and continues to do so for the Center for Corporate Performance. With the help of the unique identification numbers of individuals and plants (firms) additional information from other registers as well as surveys to firms or individuals which have information about the same identification numbers.

The background data for the IDA consists of various registers supplemented with data from the latest census in 1970. Thus, data on education come from the Census in

1970 and from reports from all educational institutions on their current population of students and their completion. This means that the educational register contains status and all upgrades after the census.

The wage information is constructed as follows. The point of departure is register data containing tax-based information on the total earnings paid to each individual worker during the year. Earnings may consist of earnings from several employers. The data are considered to be of high quality because the tax authorities use them to assess each employee's earnings. At the same time the wage records constitute deductible labor costs for the employers.

The number of working hours is estimated as follows. The employers' contributions to a comprehensive pension scheme are determined by the number of hours worked as a fraction of normal annual working hours. Thus, for hourly paid workers, i.e. all blue-collar workers, pension contributions were up to 1993 proportional to the number of hours worked. For monthly paid salaried employees the supplementary pension is computed based on the normal length of the working day according to a three-step scale. The IDA makes use of information about the employers' contributions to the pension schemes to compute the annual number of working hours for each individual. It should be noted that these are estimates. One problem is that the supplementary pay for overtime hours does not yield additional points for the pension schemes. Hence, overtime hours are not properly accounted for.

Hourly wage rates are calculated by dividing the earnings at a particular employer with the estimated annual working hours at that employer. The estimated hourly wage rates are most reliable for the hourly paid workers. However, after 1993 pension contributions have gradually also been paid during sickness and unemployment spells. Consequently, as from the mid-nineties, the quality of the hourly wage information is likely to be of poorer quality.

3 Worker Mobility

This section looks into worker mobility in somewhat more detail. We start by considering the frequently used measures, entry and exit rates, calculated in the case of

entry rates as the proportion of new employees in the firm in end-of-November year t as compared to end-of-November year t-1 and for exit rates the proportion of employees who have exited from the firm since end-of-November in year t-1.[5] Entry and exit rates to and from Danish private sector firms during 1981-2001 are shown in *Figure 2*. We can see that the entry and exit rates show no trend and fluctuate around 26 per cent. The variations in the entry rate are clearly larger than for exits. The fluctuations appear to be pro-cyclical for both entry and exit rates. Thus, hires and separation both increase in upturns and decrease in downturns. On average about one third of all annual job exits are to non-employment states; see Frederiksen and Westergaard-Nielsen (2006).

Looking beyond the average entry and exit rates reveals that they differ considerably between different parts of firms' wage distributions. *Figure 3* shows the entry and exit rates in the top and bottom quartiles of the wage distribution in each firm. Not surprisingly, mobility is substantially higher in the lowest quartile. In the lowest quartile entry rates exceed exit rates with a wide margin, whereas the relative magnitudes are reversed in the top quartile. Naturally, this reflects the fact that people tend to get hired at the bottom and leave from positions further up in the wage distribution. Mobility out of low paid work is in general high although it should be noted that a third of transitions out of low-wage jobs is out of the labor force; see Bolvig (2004). The two other thirds are to higher paid employment within the same firm and to jobs in other firms, respectively. Notably, Bolvig also finds that firms with higher than average share of low-wage workers have a lower workforce turnover than other firms. The entry rates in the bottom quartile vary pro-cyclically and are quite volatile. Entry into the top quartile displays the same pattern but the variation is less pronounced.

Table 1 paints a picture of the composition and development of job spells and their duration. The numbers refer to year 2000. We can see that in that year out of 1.6 million employees, almost half million had separated from a job since the previous year. Nearly one third of all employees (a little over half a million) were in another job

[5] Since the comparisons are between end-of-Novembers, and thus neglect mobility between intermittent short-term jobs, the entry and exit rates are downward biased.

(actually, at another employer) compared to last year. From the third column it can be seen that in a cross-section most people employed in Danish private sector firms – 63.2 per cent – are in jobs that had lasted less than five years. Less than ten per cent are in jobs the duration of which exceeds 15 years. This does not, however, mean that merely about ten per cent of employees end up in jobs lasting 15 years or more.

The high turnover rates do not necessarily imply that all employees in the firms leave with the same frequency and that, as a consequence of that, long-tenured jobs are thin on the ground. There are a number of reasons for why the cross-sectional picture is misleading; see Hall (1982). First, and trivially, in order to have been in a job lasting for 15 years or longer, the employee has to have been in the labor force for at least 15 years. Second, an additional reason for why the "population at risk" is considerably less than the total workforce is that most of job changes occur in the beginning of workers' labor market careers. Therefore, one should not expect to find many long-term employment relationships before the employees have turned forty. As can be seen from the three last columns in the table, the probability of staying in the same firm for one, five or ten additional years increases with tenure. Thus, for instance, the probability that a person with 10 years of tenure will remain with the same employer for five (ten) additional years is 51 (27) per cent. Taking these features into account leads, as has been shown by Hall (1982) for the US, to a completely different picture of the prevalence of long-term jobs: despite high worker turnover, long job spells can be still be common. Does the same apply also to the Danish labor market?

Table 2 gives the proportion of five-year age groups with five years of current tenure who go on to reach tenure for 20 years or more. These are calculated using the so called contemporaneous retention method of Hall (1982). We have computed these shares for two years, 1990 and 2000, respectively. Moreover, for comparison purposes we include Hall's estimates from U.S. in 1978. Three features of the table are worth noting. First, the proportions of individuals whose eventual tenure will exceed 20 years were higher in 1990 than ten years later and this was true for all age groups. Of course, this difference may simply reflect the fact 1990 was a business cycle downturn year whereas 2000 was an upturn year. As we saw earlier, mobility is pro-cyclical. Second, considerably higher proportions of the employees are in lifetime jobs than what is

observed in cross-sections. Thus, the high annual turnover rates, hovering between 25 and 30 per cent, are consistent with the observation that a considerable portion – between 25 and 35 per cent of prime age workers – of the employees land jobs in which they stay for substantial parts of their working lives. Third, the shares for Denmark appear to be somewhat lower than those for U.S. One should be cautious here, as the age structures of the US and Danish labor forces differ somewhat. Still, it is clearly the case that the proportion staying on longer is not larger, but rather smaller, in Denmark than in the U.S. This accords with our arguments above that the institutional setup of the Danish labor market strongly facilitates mobility.

4 The Changing Wage Structure

Next we briefly consider some changes in the wage structure, and in particular changes in the dispersion of wages. The wage concept used is real monthly wages (expressed in 1990 prices), calculated by multiplying each individual's hourly wage rate by the number of a full-time employee's monthly working hours. The population studied is, unless otherwise is stated, the private sector firms with minimum 20 employees. In order to reduce measurement errors in the monthly wages employees who have been in their current jobs for less than one year are omitted.

Figures 4a and *4b* document changes in the distribution of individuals' wages. We may note a clear, albeit not strong, increase in wage dispersion during the twenty years period. The increase has been about the same magnitude during both the eighties and the nineties. The period when wage differentials widened the most is 1987-94, that is the first period of a shift towards decentralized wage bargaining. In fact, the changes during the second half of the nineties are relatively small, especially in view of the changes in both wage setting and the increased adoption of new pay practices in firms (Eriksson, 2003b). There has been an increase on both sides of the median, but during the nineties wage dispersion below the median has been flat, whereas above median there is a

noteworthy jump in the mid-nineties leading to a stronger increase during that decade; see Figure 4b.

Changes in the dispersion of firm wages have followed a slightly different pattern: from being virtually flat in the eighties, the distribution of firm wages has widened during the second half of the period; see *Figure 5*.

Turning next to a decomposition of the wage dispersion into within and between firm components, we restrict the sample to firms with 50 or more employees in order to make the within-firm dispersion concept meaningful. Two points emerge from *Figure 6*. There has been a trend-wise increase in between firm variance in wages whereas wage dispersion within firms fell during the eighties up to 1990 from which on it has been increasing in tandem with that of between-firm wages. By 2000, within firm wage dispersion has not reached the level of the early eighties. Thus, the observed increase in overall wage dispersion is predominantly due to increasing wage differentials between firms.

5 CHANGES IN WAGE SETTING IN LARGER DANISH FIRMS, 1980-2000[6]

As was discussed above, Denmark has during the two recent decades experienced a shift in wage bargaining from a highly centralized system to a considerably more decentralized wage setting. The end of the era of centralized wage bargaining came in two steps: the first in 1987 when bargaining moved down to the level of industries, and the second and more important one, involving a larger share of wage setting actually being done at the level of firms, in years 1994-95. It seems plausible to assume that as a consequence of the decentralization of the wage bargaining and wage setting processes,

[6] This section draws heavily on Eriksson (2003a).

the relative weights of employer and employee effects for the resulting wage structure may have changed. The aim of this section is to describe and analyse these changes.

A shift to more decentralised wage setting is, however, not the only possible cause of changes in firms' internal wage structure. The much discussed skill-biased technological change suggests that not only do returns to observable skills increase, but the returns to unobservable skills as picked up by the firm effects in a standard cross-sectional earnings equation may increase as well (Katz and Autor, 1999). Thus, inequality among employers should rise in tandem with rising returns to observable skills. Another source of changes in firms' wage structures is changes in firms' local monopoly power. Deregulation of several markets and increasing international competition due to the implementation of the European Single Market Program in 1988-92 and steadily falling transportation and information transmission costs can have eroded firms' product market rents. When this is the case, we would expect inequality among employers to have declined over time.[7]

How could decentralization contribute to changes? One way of thinking about it is that under centralized wage setting, firm-specific bargaining is constrained and hence, local bargaining power is in general low and varies little across firms. With weakening centralized wage-setting institutions, local bargaining power rises and consequently, we would expect to see an increase in the variability of the firm-specific component of wages.

Next we examine changes in wage setting in Danish firms from the perspective of eventual changes in their internal labour markets. For this reason the analysis is restricted to a sub-sample from the IDA database consisting of larger private sector firms. More precisely, the sample we henceforth examine consists of 222 firms that have been above the size of 200 employees in each year during the period 1980-2000.[8] The number of observations on individuals varied between 417,267 in 1995 and 457,821 in 1990.

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[7] The prediction concerning the impact of increased competition on within-firm inequality is ambiguous; see e.g., Cuñat and Guadalupe (2006).

[8] About half of the firms have less than 500 employees and about the same proportion of the firms are from

Wage equations with hourly wage rates as the dependent variable and using the observable individual characteristics age, education, gender and tenure plus employer-specific intercepts as explanatory variables are estimated. The estimations are carried out for five different cross-sections: years 1980, 1985, 1990, 1995 and 2000. In the sequel we briefly present and discuss some of the results obtained.

It should be emphasized that not only does the population of firms differ from the one examined in the previous section, also the wage concept, the hourly wage rate, is a different one. This explains why we from *Table 3* observe a somewhat different picture of changes in the wage structure: wage dispersion first decreased during the eighties and then increased during the nineties. In 2000, between-persons wage inequality was still smaller than 20 years ago, but had almost returned to its 1985 level. As we will come back to later, during the same period between-firm wage inequality has grown considerably.

From *Table 4*, where the estimates of the returns to the skill variables and gender are collected, we can first of all observe that including the firm fixed effects into the estimating equations does very little to change the estimates to the human capital variables. On the other hand, we can see that some of the estimated returns to skill have changed over time. Thus, during the eighties, the age-earnings profiles became successively steeper but have not changed much since. Returns to tenure have also increased, although it should be noticed that their magnitude is relative small: less than one per cent per year.

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the manufacturing sector, whereas the remaining 20 and 30 per cent are in the trade and services sectors, respectively. The firms differ quite a lot with respect to employment growth; a little over 40 per cent has experienced a decline in employment during the two decades. The workforces in the sample firms consist to 60 per cent of males (differing from the whole Danish labour force where the gender shares are equal – the difference is due to the fact that the firms are from the private sector) and their skill structures have undergone considerable changes during period; with a notable decline in the share of unskilled blue-collar workers. At the same the age structure has remained remarkably stable.

The largest changes have occurred with respect to returns to schooling. The estimated return to one additional year of schooling has almost doubled during the twenty-year period. The return started to grow from a very low level indeed and has at the end of the period reached about the same magnitude as one additional year of labour market experience. All in all, the estimates indicate that there has been an increase in the returns to observable skills according to several dimensions during the period under study.

For the gender differential estimates it makes a difference whether the firm effects are included or not, as entering them leads to a drop in the differential by about one third. During the two decades, there was first a decrease in the male-female wage differential but this decline seems to have levelled off during the nineties. This corroborates what has been found in the gender gap studies. Most of that literature does not, however, account for the demand side.[9] The results in Table 4 demonstrate that this can be misleading. Moreover, there is an interesting pattern insofar that the gender gap reduction is much larger when firm fixed effects are controlled for.

Table 5 displays the adjusted R^2 statistics from estimations with the firm effects only and with firm fixed effects and human capital, respectively. We may observe first, that on their own the firm fixed effects explain an increasing portion of differences in individual wage differentials. Second, the "full" model's explanatory power has also increased over time.

The dispersion of "raw" firm fixed effects has increased; in fact, it has more than doubled; see *Table 6.* The increase has been especially pronounced in the nineties. Together with increases in returns to observable individual characteristics this is consistent with firm fixed effects picking up sorting according to unobservable skills.[10]

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[9] Datta Gupta and Rothstein (2005) is an exception using Danish data.

[10] Davis and Haltiwanger (1991) have found a similar pattern for US manufacturing during the sixties, seventies and eighties.

Although part of the increase goes away when observables are controlled for, a considerable portion remains. Thus, changes in observable skills are not able to explain the whole observed increase in between-firm inequality. The observed pattern is, however, also consistent with an increasing dispersion of bargaining power as a result of weakening of centralized bargaining institutions. In contrast to the changes mentioned above, the dispersion of the residuals of the wage equations displays no trend, but varies around a stable mean. The fact that the dispersion of fixed effects has not decreased, but rather increased, indicates that increasing competition has not lead to the predicted decline in between employer inequality.

Let us now consider what has happened to the persistence of firm effects over time. *Table 7a* answers that question by measuring the "persistence" by means of autocorrelations: corr (FE(f,t), FE(f,t-T)) for different time gaps T (5, 10 and 15 years, respectively).[11] The fixed effects are taken from the wage regressions that include human capital controls.[12] The key message from the table is that there have been no major changes in the persistence in firm fixed effects over time. There is a slight decline in the five-year correlations, but this provides only limited evidence of a weakening importance of internal labour markets. The persistence is fairly strong and does not decay rapidly as the time gap is widened. The same exercise was also carried out for rank correlations; see *Table* 7b. The pattern with respect to changes over time is the same, except that the decay associated with lengthening the time differences becomes stronger. At any rate, the results of both tables indicate that firms that pay above (below) the average also are very likely to continue doing that five or ten years later.

Eriksson (2003a) also estimated the wage equations separately for each firm and year and retained the coefficient estimates from each regression and used them as data. The first thing looked at is the changes in their between-firm spread over time. The mean

[11] FE denotes the firm fixed effects.

[12] Excluding controls leads to somewhat higher correlations, but the pattern observed in Table 7a remains intact.

across firms estimates of the return to schooling, say, differs somewhat from those reported in Table 4, which were based on estimating the equation on all firms. The dispersion of the coefficients for age, schooling, tenure and gender is set out in *Table 8*. From this it can be seen that not only has the mean returns to schooling increased, but its dispersion has too. The development of the age coefficients is different; they first increase and then decline. The gender wage gap coefficient, which on average has first declined and then has stayed flat displays an increasing dispersion across firms over time. Hence, overall there appears to have been a tendency towards an increase in the spread, not only in firm fixed effects, but also in how firms reward different observable individual traits of their employees.

A second thing the estimated firm-wise coefficients are used for is to look at their persistence, again by means of computed autocorrelations. The five-year autocorrelations for age, schooling, tenure and gender are collected in *Table 9*. Strong internal labour markets would imply highly persistent firm-specific returns. This is also what is found, although the correlations are somewhat lower than for firm fixed effects. Moreover, for schooling and gender a decline in the persistence can be observed. Consequently, there is some indication of internal structures have become more flexible. The changes do not appear to be large, however.

Summarizing the analysis of the larger firms it was found that there has been a clear increase in between-firm wage inequality. This is not consistent with the notion that increased competition in the product markets erodes firm-specific rents. Between-employee wage inequality first decreased but increased during the nineties**,** and at the same time returns to human capital, in particular schooling, have increased. The dispersion in firm-specific fixed effects has increased over time, which is consistent with both skill-biased technological change and weakened centralized wage bargaining. The employer effects are relatively persistent and there are no traces of significant changes in this. The same holds for returns to human capital at the level of the firm. Both the observable and the time-invariant unobservable worker and employer characteristics, respectively, have become more important in explaining wage inequality.

6 Concluding remarks

The key messages of this chapter are two. First, the institutional setup of the Danish labor market differs not only from that found in most other European countries but also from that in the neighboring Nordic countries. A main difference is the absence of barriers to mobility. In a sense this is only natural as for almost a century Danish wage setting was highly centralized and characterized by a very compressed wage structure which left only limited scope for employers to adjust to changing labor market conditions through wage adjustment. Worker mobility is indeed high. We show that mobility is about as high, or even higher, as in the highly fluid U.S. labor market. But we also document that although labor turnover rates are high, a considerable portion of workers are in long-term employment relationships.

Second, the ongoing process towards increasingly decentralized wage setting, which began in the second half of the eighties, has given rise to an increase, albeit of relatively modest magnitude, in the dispersion of wages. The widening wage distribution seems to be predominantly due to increased wage differentials between firms, and considerably less due to growing within firm wage dispersion. In parallel, the level and between-firm variance in returns to human capital have increased. The shift towards decentralized wage bargaining has coincided with deregulation and increased product market competition. The evidence appears not to be consistent with stronger competition in product markets eroding firm-specific rents. Hence, the prime suspect is the change in wage setting institutions.

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Table 1. Distribution of tenure and contemporaneous retention rates in 2000

Tenure (in years)	**Movers**	**Stayers**	**Prob. staying one add. year**	**Prob. staying 5 more years**	**Prob. staying 10 more years**
1	215,638	292,641	0.58	0.35	0.18
2	85,371	169,124	0.66	0.35	0.18
3	50,866	102,096	0.67	0.42	0.21
4	32,284	73,264	0.69	0.47	0.24
5	30,090	60,748	0.67	0.50	0.26
6	13,924	52,413	0.79	0.51	0.27
7	10,274	44,692	0.81	0.51	0.27
8	7,216	35,145	0.83	0.51	0.27
9	5,849	32,988	0.85	0.51	0.27
10	11,934	35,854	0.75	0.51	0.28
11	5,312	26,475	0.83	0.52	0.29
12	3,194	22,083	0.87	0.53	0.31
13	2,816	18,671	0.87	0.53	0.31
14	2,888	19,189	0.87	0.53	0.30
15	2,385	16,880	0.88	0.54	0.29
16	1,962	14,748	0.88	0.56	0.29
17	1,601	11,786	0.88	0.58	0.28
18	1,094	8,599	0.89	0.59	0.29
19	982	7,612	0.89	0.57	0.28
20	836	6,666	0.89	0.54	0.25
20+	10,253	66,655			

Table 2. Proportions reaching 20+ years of tenure*

Age group	Denmark 1990	Denmark 2000	U.S. 1978 (Hall, 1982)
20-24	71.3	58.5	36.6
25-29	34.6	29.6	44.9
30-34	26.9	24.5	39.3
35-39	29.3	25.2	35.9
40-44	28.4	25.9	25.2
45-49	14.1	11.0	8.7
50-54	10.6	7.3	4.3

* The numbers show the proportion of those in each age group with 5 years of tenure who go on to reach tenure of 20 years or more.

Table 3. Between-persons wage inequality

Year	CV(hourly wage)
1980	0.634
1985	0.585
1990	0.504
1995	0.512
2000	0.576

Table 4. Returns to skill estimates*

Year	Age	Age sq/100	Years of schooling	Tenure	Gender: male
1980	0.041	-0.004	0.028	0.004	0.236
	(0.039)	(-0.004)	(0.030)	(0.003)	(0.181)
1985	0.042	-0.004	0.027	0.004	0.210
	(0.041)	(-0.004)	(0.029)	(0.003)	(0.145)
1990	0.057	-0.006	(0.031	0.006	0.192
	(0.056)	(-0.006)	0.033)	(0.003)	(0.120)
1995	0.055	-0.006	0.044	0.008	0.180
	(0.052)	(-0.005)	(0.045)	(0.006)	(0.113)
2000	0.052	-0.005	0.050	0.008	0.192
	(0.050)	(-0.005)	(0.051)	(0.006)	(0.115)

*. Standard errors are omitted because they are all so small. The numbers in parentheses are estimates from equations including firm fixed effects.

Table 5. Adjusted R^2s

	1980	1985	1990	1995	2000
Firm fixed effects only	0.190	0.179	0.226	0.267	0.283
Firm fixed effects + human capital	0.308	0.379	0.451	0.498	0.483

Table 6. Dispersion (standard deviation) of firm fixed effects

Year	Without controls	With controls
1980	0.098	0.081
1985	0.113	0.098
1990	0.152	0.107
1995	0.213	0.192
2000	0.259	0.207

Table 7a. Firm fixed effects persistence*

Year	- 5years	- 10 years	- 15 years
1985	0.870		
1990	0.837	0.697	
1995	0.836	0.692	0.588
2000	0.824	0.695	0.601

Table 7b. Firm fixed effects persistence – rank correlations*

Year	- 5years	- 10 years	- 15 years
1985	0.761		
1990	0.794	0.589	
1995	0.727	0.610	0.403
2000	0.795	0.600	0.486

*. Autocorrelations of fixed effects estimated from wage equations including controls

Table 8. Dispersion (standard deviation) of regression coefficients across firms

Year	sd(βage)	sd(βschooling)	sd(βtenure)	sd(βgender)
1980	0.012	0.012	0.017	0.110
1985	0.030	0.017	0.012	0.113
1990	0.020	0.028	0.007	0.139
1995	0.013	0.031	0.013	0.164
2000	0.016	0.028	0.012	0.168

Table 9. The persistence of βs over time; 5-year autocorrelations

Year	Age	Schooling	Tenure	Gender
1985	0.579	0.721	0.697	0.836
1990	0.731	0.670	0.655	0.730
1995	0.777	0.692	0.671	0.737
2000	0.724	0.656	0.649	0.685

Figure 1. Development in unemployment and annual growth in GDP.

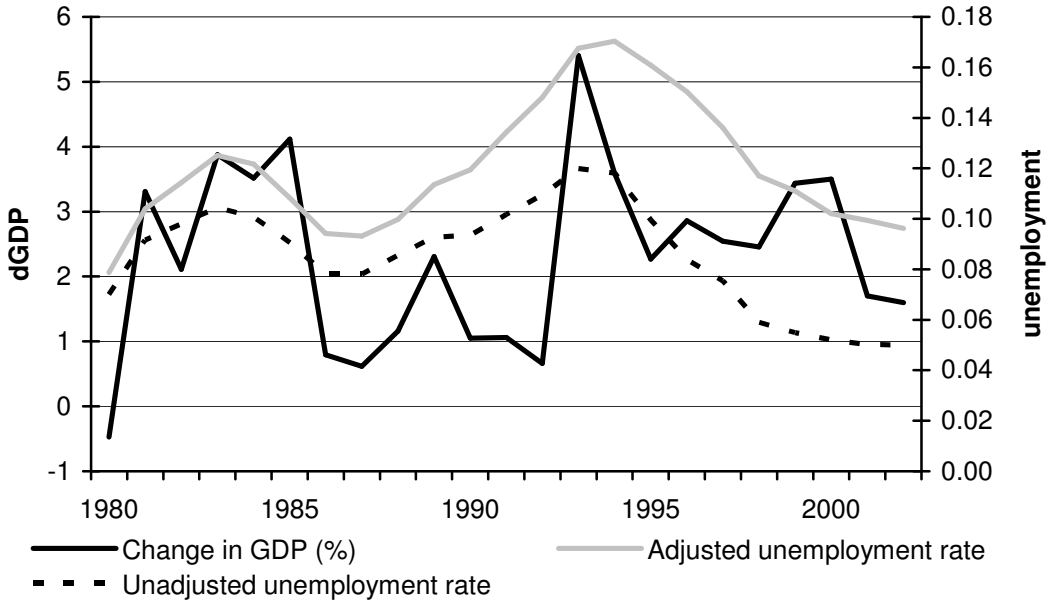

Figure 2. Exit and entry rates

Figure 3. Exit and entry rates for workers from different positions of firms' wage distributions.

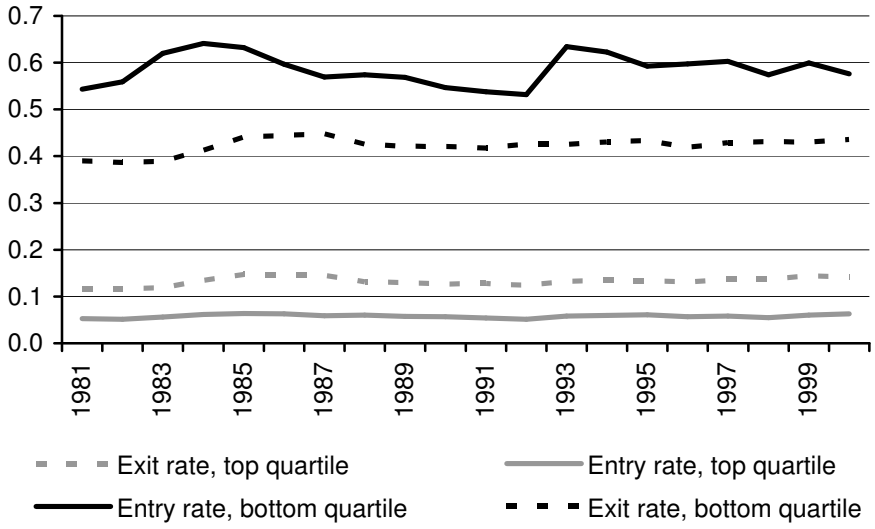

Figure 4a. Wage dispersion 1980-2000 as measured by the P90/P10-ratio

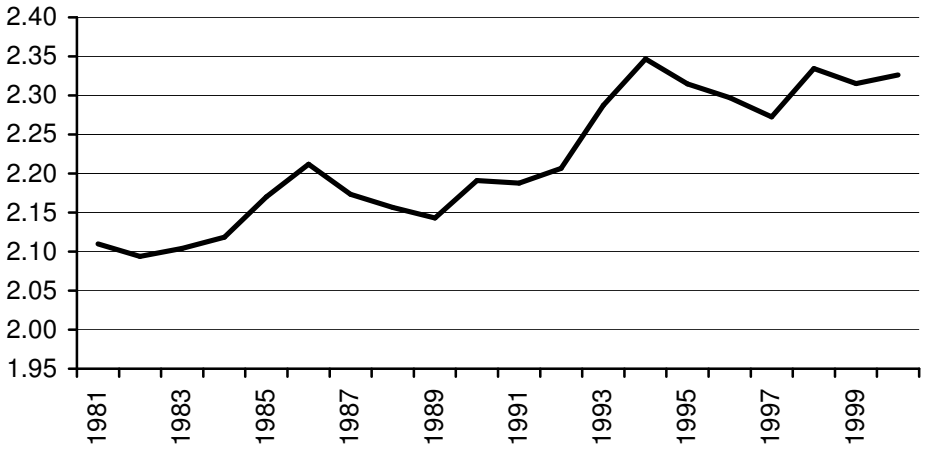

Figure 4b. P90/P50 and P50/P10-ratios, 1980-2000

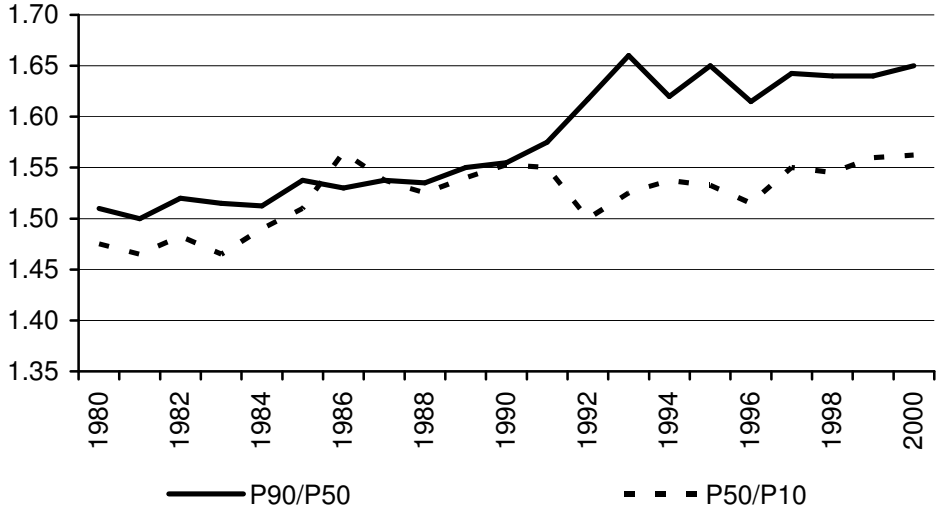

Figure 5. Coefficient of variation of firm average wages

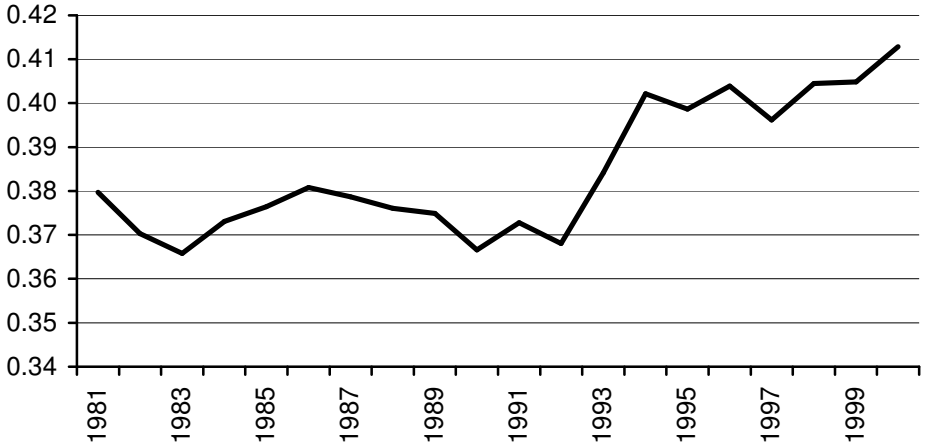

Figure 6. Variation in wages within and between firms, 1980 -2000.