NBER project on comparison of wage structures

Finland

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1 General remarks on the Finnish data

The principal data source contains payroll records of all firms that respond to the wage survey of the Confederation of Finnish Industry (TT). In 2000, these companies employed 500,000 employees which is about a third of all private sector employees in Finland. Most TT members are large firms in manufacturing and construction industries. The wage statistics cover roughly 70 percent of all employees in these sectors. The data are used to monitor wage growth in the manufacturing sector and national statistics on earnings growth in manufacturing and construction are based mainly on these data. The data also serve as an information base for collective wage bargaining between the unions and the employer organizations.

TT gathers information on blue-collar workers (who receive an hourly wage) from the last quarter of each year, and information on white-collar workers (who receive a monthly salary) from each December. Answering the survey is compulsory for the member companies with more than 30 employees. For smaller companies, answering is voluntary. The survey gathers information on all employees of the firm. Only the top management and those working abroad are excluded. In 2000, the data contain information on 255 000 blue-collar and 172 000 white-collar employees. The records are stored at individual level; each individual is identified by a personal identity code.

Currently, we have complete wage records for both the blue-collar and the white-collar workers from 1980 to 2002. The last years of data (1996-2000) have been used previously by ourselves and by other researchers in Finland. Data up to 1995 has previously been available only for a smaller sample of individuals. Comprehensive data covering all employees and al years has been used only recently, and only in a handful of mainly ongoing studies. Therefore, not much is known about the quality of the data that covers the 1980's and the early 1990's. Also previous analyses have mainly used the white-collar and the blue-collar data separately. Combining white-collar and blue-collar worker data using firm identifiers is possible for the later years of data, but has not been previously done for the earlier period.

The wage statistics contain basic information on the employees and include details on all forms of compensation. The basic information on employees include age, sex, job category, education, industry, occupation and tenure (date of entry). Wage information differs somewhat between the blue-collar and the white-collar employees. The differences are mainly due to the fact that wages are calculated at the hourly level for the blue-collar workers and at the monthly level for the white-collar workers.

For both the white-collar and blue-collar workers the wages are reported in great detail. Data contain wages and hours divided into time-rate, piece-rate and partial piece-rate pay. Overtime pay, Sunday, and shift premiums, as well as, performance-related bonuses are reported separately. Most workers, therefore, receive compensation in several different forms. (For example, some time-rate pay, some piece-rate pay, and some overtime pay). For the purposes of this paper, we have defined wage as total compensation divided by total hours. To make the white-collar workers data comparable we have calculated the hourly wages based on the monthly wage and the usual weekly hours also for the white-collar workers.

The wage statistics contain a respondent code that reveals who provided the wage information. Most often this respondent code refers to a plant. It is possible to create firm codes based on the respondent codes, essentially combining the respondent codes that refer to the same firm. For the last years of data, the procedure is reliable, for the early years we are less certain.

2 Details on the definition on the variables and the sample

We chose to analyze three years of data 1981, 1990, and 2000. The motivation is to cover as long a time span as possible, skip the years that involve large changes in coding practice, and, at the same time, choose years that are comparable in terms of the business cycle (See table 1). For analyzing wage growth and entry rates, we calculate all statistics from year t-1 to year t. For exits, we calculate changes from the year t to the year t+1. Any restrictions on the firm size (≥25 employees) will refer to the year t. Therefore, we do not require that a firm would have had at least 25 employees or even that a firm would have existed in year t-1 or year t+1.

Some employees appear several times in data. This may happen, for example, if the employee changes firms during the observation period, or if he has several employers simultaneously. For these employees we always select the observation that has most hours, and discard the other observations on the same person. We also require that an employee can be unambiguously identified and, therefore, delete any observations that do not have a valid personal id-number.

We calculate wages including all wage components (including bonuses, overtime, etc.) and divide the total wages by total hours. For white-collar workers we calculate hourly wages dividing monthly wages by the average number of weeks per month (365/7/12) and further dividing the result by usual weekly hours. All wages are deflated to year 2000 euros using the consumer price

index[1]. To get rid of extreme observations (possibly errors), we delete all observations where the hourly wage is larger than three times the median, or less than a third of the median. This rather conservative trimming only affects approximately 0.5% of the employees but has a large effect on the estimates for the standard deviations.

We focus on full-time workers and therefore delete all observations where the usual weekly hours are less than 30. We make no restrictions by worker status and, therefore retain trainees and workers with very short contracts.

Only after doing all the data cleaning we limit the sample to the firms that have at least 25 employees. Imposing the size limit has little effect on our data because only the firms with more than 30 employees (varies slightly by industry) are required to answer the wage survey. Note that in calculating statistics for the high-level and low-level jobs we make no additional restrictions to the sample. It is therefore possible that a firm has only one high-level worker.

2.1 Specific issues for tables on wage dynamics

We perform the same data cleaning procedure for the year t-1, with the exception that we do not require that the firm had 25 employees in the previous year. Nor do we impose any limits on the firms size for the year t+1 in calculating the exit rates.

The wage growth for the workers that enter the firm as well as the wage growth by tenure are naturally defined using the information on the date when the employer was hired to the current firm. In general, all measures where the observation is a person are easy to define. In contrast, the measures where the observation is a firm can be defined in several ways. For example, we have calculated the " Average of firm average change in wage, observ = a firm " by calculating the firm averages in year t and t-1, taking the difference, and then the across firm average of these differences. In this calculation the firm does not necessarily have the same employees in both years. Equally well one could calculate the average growth of wages of individual workers by firm, and

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[1] We differ from the suggestion that wage inflation should be defined as wage growth within the sample. This should be discussed. Defining wage inflation within the sample would make average wage growth equal to zero each year. However, we cannot be sure that our sample is equally representative each year. Somehow also average real wage growth seems interesting enough not to be thrown away.

then take across firm average, but it is not clear how one should treat the employees that changed the firm between t-1 and t.

2.2. On low-level and high level jobs

The Finnish data includes an occupation code[2] for each employee. The new coding system also identifies a level for each job, but the older codes do not have a hierarchial structure. There is also a code for the job category[3] that is different for each industry but constant within industries. These job categories are important for the wage bargaining as the union bargains typically set a minimum wage for each job category. In some sense the job categories are ideal for the analysis of the wage structures, because they are defined by the qualifications required for each job and they are independent of the characteristics of the worker. (Of course these categories are to some extent arbitrary: If the employer wishes to give a worker a rise, he can easily appoint a machinist to a senior machinist without the change in title implying any changes in the tasks)

Despite the appeal of the job categories, we chose to define high-level and low-level jobs based on the occupation codes. The main reason is that there is a lot less missing data on the occupation codes. We, therefore, calculated the mean wage for each occupation code, sorted the data according to these occupation mean wages, and defined the employees who have the occupation mean wage on top 20 percent to be in the high-level jobs.

It should be noted that in calculating entry and exit rates by quartiles and deciles, we first calculated the relevant percentiles at each firm and selected the high / low –level jobs after that. For example, top quartile, therefore, refer to top quartile of firm wages calculated over all employees in the firm, not just to top quartile of high-level jobs.

3. A note on some relevant institutional features

As in other Scandinavian countries, union density is high in Finland. Union density increased fast in the 1960s and has even later on been going up rather steadily, reaching 82% in 1992.

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[2] Finnish codes: for the blue-collar workers ”ammatti”, for white-collar workers ”tilastonimike”.

[3] ”Palkkaryhmä”

The Finnish pay bargaining system is a mixture of collective and individual mechanisms. The collective constraints put on the local bargains consist of two elements[4]. Firstly, unions in each industry have established minimum tariff wages for occupational categories and job levels. Secondly, in each bargaining round, the collective parties – i.e. an industrial union and its corresponding employer association -- agree on a general wage increase that is as a general rule applied to all workers, regardless of their present wage level. The local parties can in principle deviate from that general wage increase, but a deviation requires the consent of both parties. Thus, in most cases, the general wage increase is rather mechanically applied to each person's wage. In that sense, the unions can effectively influence the speed of wage increases. The firms, on the other hand, can effectively affect the local wage structure: when recruiting a new worker, the wage can be set according to the firm's own personnel policy, as long as the wage exceeds the minimum tariff listed in the relevant collective agreement.

The general increases are formally negotiated at the industry-level between the worker and the employer organizations. Collective agreements cover even non-union members in the sectors where at least half of the employers belong to an employer organization. In practice, this implies that 95 percent of the workers in Finland are covered by the union contracts.

The central labour market organisations have no binding mandate for bargaining on behalf of their member associations. However, most bargaining rounds have started with negotiations between the central employer and employee confederations, creating a high degree of de facto co-ordination in the individual union contracts. The union bargains have then been negotiated, taking as a starting point the wage increases agreed upon in the central agreement. There has been considerable variation in the degree of centralization between the different bargaining rounds. During the period 1980 – 2002, there have been six bargaining rounds (1980, -83, -88, -94, -95, and 2000) when no central bargain was reached and bargaining occurred at the industry-level. The decentralised rounds usually generate a higher average rate of wage increases.

The comprehensiveness of centralized bargaining does not necessarily imply an extremely rigid wage structure. The firms also bargain locally with their employees. Wage drift, defined as the difference between union bargains and average actual wage increases, has accounted for

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4Asfar as we can see, the institutional setup is very similar to the Dutch one, extensively analysed by Teulings and Hartog (1998): wages can be determined locally, but wage changes are steered by collective agreements.

approximately 40% of the wage growth between 1970 and 2000. This fraction has declined somewhat over time, but wage drift still accounted for 35% of the wage growth in 1992- 2000. The unions do not usually attempt to constrain the growth of local or individual wages, as long as the minimum tariff levels are met and the general increases (which often do not exceed the sum of inflation and average productivity growth) are applied.

Furthermore, various performance-related pay components have become common. In 2000, more than half of the white-collar and about a third of the blue-collar workers in the sample received some performance-related pay components other than traditional piece rate pay. On average, these components were 4.4 percent of the total pay. For white-collar employees, the inclusions of such performance-related pay elements into a total compensation measures imply a far higher likelihood of pay cuts than what an analysis of the monthly salary would imply.

Tables

Table 1 Macroeconomic conditions

The Finnish economy was extremely turbulent during the 1990's. Unemployment rate grew from 3.2 percent in 1990 to 16.6 percent in 1994. Real GDP declined by 6,4 percent in 1991. Also recovery from the recession was rapid. Average growth rate for 1994-2000 was 4.4 percent.

With disturbances this large it is difficult to find a typical year in terms of business cycle. Our choice of 1981, 1990, and 2000 does not look too bad. In all these years the unemployment rate remained almost unchanged. In all cases, however the unemployment rate grew in the following year which might overstate the exit rates in the "normal" times.

Figure 1 Unemployment and GDP growth 1975 - 2002

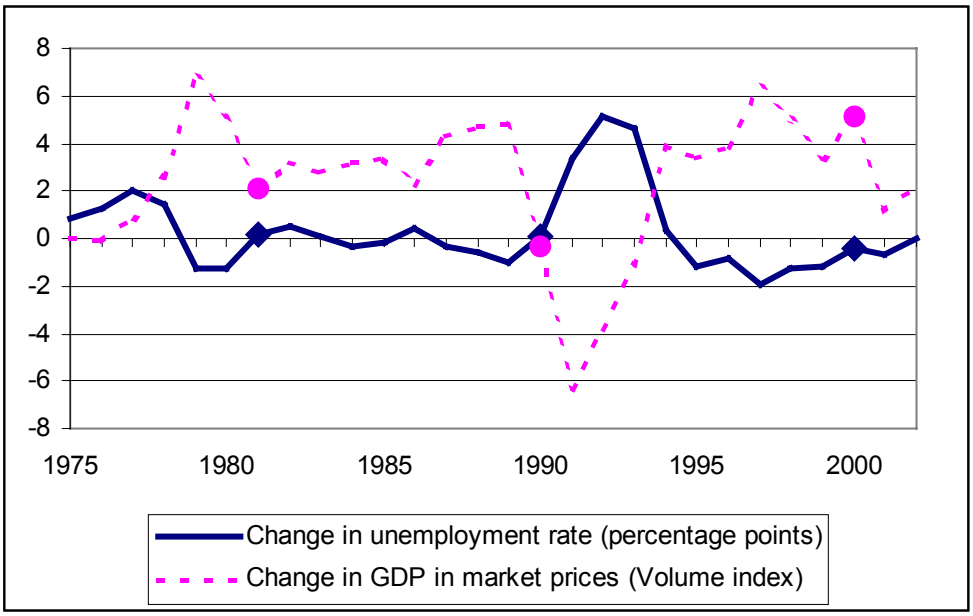

Table 1 Macroeconomic conditions

	Unemployment	Change in GDP		
		1 Year	2 year	5 year
1980	4.7	5.1	5.9	3.0
1981	***4.9***	***2.1***	***3.6***	***3.4***
1982	5.4	3.2	2.7	3.9
1983	5.5	2.8	3.0	4.0
1984	5.2	3.2	3.0	3.3
1985	5	3.4	3.3	2.9
1986	5.4	2.3	2.9	3.0
1987	5.1	4.3	3.3	3.2
1988	4.5	4.7	4.5	3.6
1989	3.5	4.8	4.8	3.9
1990	***3.2***	***-0.3***	***2.3***	***3.2***
1991	6.6	-6.4	-3.4	1.4
1992	11.7	-3.8	-5.1	-0.2
1993	16.3	-1.2	-2.5	-1.4
1994	16.6	3.9	1.4	-1.6
1995	15.4	3.4	3.7	-0.8
1996	14.6	3.9	3.7	1.2
1997	12.7	6.3	5.1	3.3
1998	11.4	5	5.7	4.5
1999	10.2	3.4	4.2	4.4
2000	***9.8***	***5.1***	***4.3***	***4.7***
2001	9.1	1.2	3.2	4.2
2002	9.1	2.2	1.7	3.4

Source: Official open unemployment rate according to the Labour Force Surveys, GDP growth in market prices (volume index) according to the National Accounts.

A note on tables 2 – 4

In general, data underlying the tables 2-4 appear to be of high quality. In particular, data on wages and hours should be accurate. Mobility measures are more suspect due to changes in firm codes.

A major problem that we have so far not fully examined is the change in firm codes due to a merger or a change in ownership. Also data coverage changes across years as the firms join or leave the employer organization. All these currently influence entry and exit rates. We will tackle the problem by following the employees and redefining firm codes if the majority of the workers can be found from two different firms in the consecutive years. Exact limits on the maximum entry or exit rates are yet to be decided upon. A related question concerns firm growth. The averages are extremely large due to some firms having very high growth rates. On the other hand, the smallest possible growth rate is –100%, and after imposing the minimum size of 25 employees in year t, usually much larger.[5]

Another major problem has to do with the firm codes in the 1981 data. The number of firms is smaller and the average firm size larger indicating a significant change in coding system. Also the codes differ between the white-collar and the blue-collar workers. We do not know the reason, but it is obvious that the 1981 data is not comparable to the other years.

Smaller problems in the 1981 data include missing dates of first employment making it impossible to split workers by tenure. (Entry and tenure less than 1 years can be defined based on the previous year, but data on the 1970's is not available)

Usual weekly hours are missing in the 1981 and the 1990 data for the blue-collar workers. Hours are only available as total over the whole three-month period. This does not allow separating workers into full-time or part-time workers. So far we have not imposed any limits on minimum hours over the three-month period either.

Another small issue has to do with using coefficient of variation. Firm means that appear in the denominator are usually close to zero and sometimes negative. This leads to estimates of CV that are very high in some firms. These extreme estimates dominate across firm averages.

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[5] A natural definition might be calculating growth rates by dividing the employment change between year t and year t-1 by the average employment in t-1 and t, instead of the base year employment in year t.

Table 2. Structure of Wages Within and Between Firms

	Wages in 2000 euros			Log wages in 2000 euros		
	1981	1990	2000	1981	1990	2000
Average Wage, observation = a person	7.33	9.28	10.39	1.94	2.18	2.29
(s.d.)	(2.32)	(3.03)	(3.46)	(0.32)	(0.33)	(0.33)
(90%-ile)	(10.30)	(13.17)	(14.82)	(2.35)	(2.59)	(2.71)
(10%-ile)	(4.36)	(5.40)	(5.95)	(1.53)	(1.76)	(1.86)
[N – workers]	(311696)	(424944)	(380644)	(311696)	(424944)	(380644)
Average of firm average wage, observ = a firm (weights observations differently from previous row)	6.65	7.94	9.01	1.84	2.00	2.15
(s.d.)	(1.01)	(2.03)	(1.63)	(0.16)	(0.23)	(0.17)
(90%-ile)	(8.21)	(10.83)	(11.13)	(2.09)	(2.34)	(2.37)
(10%-ile)	(5.60)	(5.86)	(7.01)	(1.68)	(1.74)	(1.92)
[N – firms]	(479)	(1973)	(1863)	(479)	(1973)	(1863)
Average of s.d. of wage, observ = a firm	1.95	2.46	2.29	1.95	0.29	0.25
(s.d.)	(0.63)	(1.02)	(0.94)	(0.63)	(0.09)	(0.08)
(90%-ile)	(2.74)	(3.73)	(3.60)	(2.74)	(0.38)	(0.36)
(10%-ile)	(1.07)	(1.20)	(1.15)	(1.07)	(0.17)	(0.15)
[N – firms]	(479)	(1948)	(1863)	(479)	(1948)	(1863)
Average Coefficient of variation of wages, observ = a firm)	0.30	0.31	0.25	1.07	0.14	0.12
(s.d.)	(0.11)	(0.10)	(0.08)	(0.37)	(0.04)	(0.04)
(90%-ile)	(0.44)	(0.44)	(0.36)	(1.55)	(0.20)	(0.16)
(10%-ile)	(0.17)	(0.18)	(0.15)	(0.60)	(0.09)	(0.07)
[N – firms]	(479)	(1948)	(1863)	(479)	(1948)	(1863)
Correlation(average wage, s.d. of wage), observ = a firm	-0.15	0.65	0.53	0.00	0.00	0.16
Average Wage for workers between 25 and 30, observation = a person	6.90	8.78	9.77	1.88	2.12	2.23
(s.d.)	(2.15)	(2.93)	(3.08)	(0.32)	(0.33)	(0.32)
(90%-ile)	(9.66)	(12.54)	(13.72)	(2.30)	(2.54)	(2.64)
(10%-ile)	(4.15)	(5.02)	(5.82)	(1.47)	(1.69)	(1.82)
[N – workers]	(58121)	(65243)	(51046)	(58121)	(65243)	(51046)
Average Wage for workers between 45 and 50, observation = a person	7.64	9.66	10.68	1.99	2.22	2.31
(s.d.)	(2.37)	(3.10)	(3.56)	(0.30)	(0.31)	(0.33)
(90%-ile)	(10.68)	(13.63)	(15.24)	(2.37)	(2.62)	(2.74)
(10%-ile)	(4.60)	(5.69)	(6.13)	(1.60)	(1.82)	(1.89)
[N – workers]	(35972)	(61170)	(70212)	(35972)	(61170)	(70212)

Table 3: Wage Dynamics

	Change in Wages in 2000 euros (defined as wage in year t – wage in year t –1)			Change in Log wages in 2000 euros (defined as wage in year t – wage in year t –1)		
	1981	1990	2000	1981	1990	2000
Average change in wage observation = a person	0.02	0.33	0.33	0.01	0.04	0.03
(s.d.)	(0.78)	(1.29)	(1.23)	(0.09)	(0.11)	(0.10)
90%-ile	(1.01)	(1.98)	(1.91)	(0.12)	(0.18)	(0.16)
10%-ile	(-0.98)	(-1.32)	(-1.25)	(-0.11)	(-0.11)	(-0.10)
[N – workers]	(257279)	(345937)	(312968)	(257279)	(345937)	(312968)
Average of firm average change in wage, observ = a firm	0.05	0.30	0.27	0.01	0.03	0.03
(s.d.)	(0.24)	(0.56)	(0.73)	(0.03)	(0.05)	(0.06)
90%-ile	(0.24)	(0.83)	(0.82)	(0.04)	(0.08)	(0.08)
10%-ile	(-0.20)	(-0.19)	(-0.19)	(-0.02)	(-0.01)	(-0.02)
[N – firms]	(472)	(1854)	(1321)	(472)	(1854)	(1321)
Average of s.d. of change in wage, observ = a firm	0.59	1.15	1.07	0.08	0.11	0.09
(s.d.)	(0.32)	(0.83)	(0.68)	(0.03)	(0.05)	(0.05)
90%-ile	(0.94)	(2.36)	(1.87)	(0.11)	(0.18)	(0.15)
10%-ile	(0.33)	(0.44)	(0.43)	(0.05)	(0.06)	(0.05)
[N – firms]	(468)	(1835)	(1307)	(468)	(1835)	(1307)
Avg Coefficient of variation of change in wages, observ = a firm)	17.35	37.31	-3.92	-1.99	6.00	13.38
(s.d.)	(311.34)	(1495.82)	(211.07)	(48.09)	(123.33)	(628.05)
(90%-ile)	(10.76)	(7.75)	(9.16)	(9.15)	(6.99)	(8.23)
(10%-ile)	(-7.22)	(-4.78)	(-5.55)	(-7.46)	(-4.03)	(-5.04)
[N – firms]	(468)	(1835)	(1307)	(468)	(1835)	(1307)
Avg change in wage for people who change firms, observ = a person	0.23	0.48	0.49	0.04	0.06	0.05
(s.d.)	(1.33)	(2.34)	(1.90)	(0.16)	(0.21)	(0.16)
90%-ile	(1.93)	(3.49)	(2.92)	(0.25)	(0.32)	(0.26)
10%-ile	(-1.47)	(-2.52)	(-1.95)	(-0.18)	(-0.21)	(-0.16)
[N – workers]	(7777)	(16693)	(14473)	(7777)	(16693)	(14473)
Avg change in wage for people with tenure < 3 years, observ = a person	-	0.49	0.64	-	0.06	0.07
(s.d.)		(1.54)	(1.41)		(0.14)	(0.13)
90%-ile		(2.47)	(2.46)		(0.24)	(0.23)
10%-ile		(-1.48)	(-1.17)		(-0.12)	(-0.09)
[N – workers]		(59700)	(44811)		(59700)	(44811)
Avg change in wage for people with tenure > 3 years, observ = a person	-	0.28	0.27	-	0.03	0.02
(s.d.)		(1.12)	(1.13)		(0.10)	(0.09)
90%-ile		(1.72)	(1.72)		(0.15)	(0.14)
10%-ile		(-1.16)	(-1.19)		(-0.09)	(-0.09)
[N – workers]		(269544)	(253684)		(269544)	(253684)

Table 4: Mobility
Panel A
All Jobs *

	All firms (# firms)			Firms with 100+ employees (# firms)		
	1981	1990	2000	1981	1990	2000
Employees	651	228	279	928	517	536
(s.d.)	(650.72)	(228.10)	(278.66)	(1864.50)	(932.15)	(1171.04)
Number of occupations	49	27	26	62	47	41
(s.d.)	(39.96)	(26.78)	(22.72)	(41.75)	(32.99)	(25.25)
Number of levels						
(s.d.)						
Employment growth	31	35	27	0	28	23
(s.d.)	(46.60)	(59.20)	(42.31)	(0.00)	(49.68)	(32.47)
Exit rate, observ = person	16.69	32.58	18.78	16.46	32.38	18.29
Exit rate	20.19	23.12	12.17	18.78	21.75	10.86
(s.d.)	(11.89)	(14.34)	(11.02)	(10.94)	(13.59)	(10.35)
Exit rate, top quartile of firm wages	17.91	19.54	12.52	15.71	16.51	9.73
(s.d.)	(13.22)	(14.78)	(12.14)	(11.52)	(14.15)	(11.26)
Exit rate, bottom quartile of firm wages	24.67	28.97	18.93	0.00	25.76	15.96
(s.d.)	(12.82)	(15.97)	(13.79)	(0.00)	(14.68)	(11.99)
Exit rate, top decile of firm wages	18.64	23.60	17.86	15.76	17.96	13.03
(s.d.)	(13.47)	(15.69)	(14.76)	(11.75)	(14.34)	(12.81)
Exit rate, bottom decile of firm wages	29.27	29.93	23.64	28.11	24.75	18.66
(s.d.)	(13.82)	(16.01)	(15.28)	(12.58)	(14.36)	(12.56)
Entry rate	17.31	17.31	16.38	22.57	14.95	15.44
(s.d.)	(13.16)	(13.16)	(12.83)	(12.93)	(11.56)	(12.10)
Entry rate, top quartile of firm wages	17.46	14.05	14.40	15.24	9.76	0.00
(s.d.)	(13.00)	(13.07)	(13.73)	(11.83)	(10.70)	(0.00)
Entry rate, bottom quartile of firm wages	29.73	24.65	30.35	28.10	21.22	28.28
(s.d.)	(14.11)	(15.76)	(16.59)	(12.71)	(14.36)	(15.65)
Entry rate, top decile of firm wages	18.42	18.88	19.78	15.73	11.76	14.01
(s.d.)	(14.11)	(15.18)	(16.55)	(13.01)	(11.93)	(13.24)
Entry rate, bottom decile of firm wages	36.13	26.68	32.42	35.17	19.99	28.79
(s.d.)	(15.62)	(16.42)	(17.32)	(14.86)	(13.16)	(16.55)
% of employees who switch jobs* internally	7.69	5.25	8.24	7.45	3.92	7.90
(s.d.)	(6.80)	(12.10)	(16.74)	(5.91)	(7.50)	(15.23)
% of new jobs* filled internally	21.52	18.79	22.72	23.87	19.28	24.12
(s.d.)	(15.65)	(26.72)	(27.03)	(14.99)	(25.11)	(24.53)
% of workers who have been at firm 5+ years	-	45.86	58.03	-	53.37	59.98
(s.d.)		(25.30)	(24.34)		(23.33)	(22.25)
Correlation (entry rate, average wage), observ = a firm	-0.16	0.26	-0.04	0.04	0.28	-0.09
Correlation(entry rate, average wage change), observ = a firm	0.13	0.11	0.04	0.06	0.20	0.07
Correlation(entry rate, s.d. of wage), observ = a firm	-0.12	0.27	0.01	-0.18	0.31	0.01

Table 4: Mobility
Panel B
High-Level Jobs

	All firms (# firms)			Firms with 100+ employees (# firms)		
	1981	1990	2000	1981	1990	2000
Employees	170	69	79	458	458	429
(s.d.)	(170.00)	(69.30)	(79.32)	(620.73)	(620.73)	(634.93)
Number of occupations	6	6	6	22	22	21
(s.d.)	(9.25)	(9.25)	(9.24)	(18.80)	(18.80)	(15.82)
Number of levels						
(s.d.)						
Employment growth	16	21	15	11	10	10
(s.d.)	(28.19)	(49.89)	(37.31)	(17.68)	(10.72)	(16.95)
Exit rate, observ = person	12.05	18.78	18.78	11.94	18.29	18.29
Exit rate	17.79	22.36	15.34	17.69	18.69	7.59
(s.d.)	(19.47)	(16.05)	(15.31)	(12.74)	(14.70)	(9.94)
Exit rate, top quartile of firm wages	17.63	22.33	15.80	12.42	17.86	7.58
(s.d.)	(12.88)	(16.12)	(15.24)	(8.97)	(15.02)	(9.71)
Exit rate, bottom quartile of firm wages	34.67	39.32	18.78	34.67	46.83	15.68
(s.d.)	(29.53)	(16.25)	(6.52)	(29.53)	(22.32)	(5.20)
Exit rate, top decile of firm wages	18.05	24.62	18.95	12.35	17.34	9.12
(s.d.)	(13.13)	(16.46)	(16.06)	(9.10)	(14.59)	(10.88)
Exit rate, bottom decile of firm wages	0.00	42.22	0.00	0.00	0.00	0.00
(s.d.)	(0.00)	(15.40)	(0.00)	(0.00)	(0.00)	(0.00)
Entry rate	17.43	17.18	14.24	11.54	9.95	7.88
(s.d.)	(13.92)	(15.56)	(14.70)	(10.04)	(9.83)	(10.53)
Entry rate, top quartile of firm wages	17.49	16.84	17.41	11.18	9.19	9.43
(s.d.)	(13.88)	(15.12)	(16.09)	(9.70)	(9.73)	(10.70)
Entry rate, bottom quartile of firm wages	17.24	34.89	25.87	17.24	22.34	8.84
(s.d.)	(0.00)	(16.00)	(23.88)	(0.00)	(15.62)	(1.19)
Entry rate, top decile of firm wages	17.94	19.73	20.61	10.94	9.75	10.80
(s.d.)	(14.40)	(16.20)	(17.09)	(9.66)	(9.96)	(11.71)
Entry rate, bottom decile of firm wages	0.00	47.78	0.00	0.00	0.00	0.00
(s.d.)	(0.00)	(13.47)	(0.00)	(0.00)	(0.00)	(0.00)
% of employees who switch jobs* internally	7.04	4.45	8.11	5.39	4.35	6.24
(s.d.)	(11.43)	(13.03)	(20.29)	(4.80)	(8.63)	(11.88)
% of new jobs* filled internally	27.18	22.62	34.81	32.22	28.17	40.71
(s.d.)	(27.20)	(34.23)	(39.11)	(20.07)	(30.16)	(29.62)
% of workers who have been at firm 5+ years	-	54.36	68.48	-	64.71	73.93
(s.d.)		(33.10)	(30.26)		(24.01)	(19.68)
Correlation (entry rate, average wage), observ = a firm	-0.01	0.26	0.13	0.13	0.48	0.18
Correlation(entry rate, average wage change), observ = a firm	0.18	0.11	0.08	0.44	0.03	0.13
Correlation(entry rate, s.d. of wage), observ = a firm	-0.01	0.27	0.17	0.08	0.47	0.35

Table 4: Mobility
Panel C
Low-Level Jobs

	All firms (# firms)			Firms with 100+ employees (# firms)		
	1981	1990	2000	1981	1990	2000
Employees	187	57	83	403	310	365
(s.d.)	(186.57)	(57.22)	(82.76)	(352.44)	(302.49)	(1073.68)
Number of occupations	11	11	11	28	28	24
(s.d.)	(9.67)	(9.67)	(8.90)	(10.15)	(10.15)	(10.50)
Number of levels						
(s.d.)						
Employment growth	53	47	50	35	27	36
(s.d.)	(72.30)	(61.73)	(66.67)	(48.33)	(17.86)	(39.55)
Exit rate, observ = person	19.01	18.78	18.78	18.60	18.29	18.29
Exit rate	24.36	26.43	17.52	20.07	20.73	14.52
(s.d.)	(13.65)	(15.03)	(12.40)	(10.23)	(11.42)	(9.66)
Exit rate, top quartile of firm wages	17.63	27.92	18.09	12.42	17.18	14.19
(s.d.)	(12.88)	(16.08)	(11.39)	(8.97)	(9.13)	(9.15)
Exit rate, bottom quartile of firm wages	34.67	27.53	19.68	34.67	22.14	16.32
(s.d.)	(29.53)	(15.41)	(13.75)	(29.53)	(12.23)	(10.84)
Exit rate, top decile of firm wages	18.05	37.80	29.17	12.35	42.86	27.69
(s.d.)	(13.13)	(10.93)	(11.99)	(9.10)	(0.00)	(16.54)
Exit rate, bottom decile of firm wages	0.00	29.22	23.60	0.00	23.21	18.68
(s.d.)	(0.00)	(15.74)	(15.23)	(0.00)	(13.82)	(11.47)
Entry rate	22.45	22.45	24.88	29.59	15.72	20.94
(s.d.)	(14.74)	(14.74)	(16.56)	(15.29)	(9.52)	(13.42)
Entry rate, top quartile of firm wages	36.33	20.29	22.10	0.00	8.63	16.38
(s.d.)	(14.81)	(14.49)	(16.04)	(0.00)	(3.49)	(13.75)
Entry rate, bottom quartile of firm wages	31.77	23.69	30.05	27.57	17.31	27.36
(s.d.)	(15.00)	(15.14)	(16.72)	(11.46)	(10.90)	(15.71)
Entry rate, top decile of firm wages	0.00	20.00	27.71	0.00	0.00	24.04
(s.d.)	(0.00)	(0.00)	(15.60)	(0.00)	(0.00)	(11.97)
Entry rate, bottom decile of firm wages	37.10	25.67	32.17	34.88	17.13	29.94
(s.d.)	(15.06)	(15.90)	(17.36)	(12.14)	(10.53)	(16.34)
% of employees who switch jobs* internally	8.50	2.65	7.94	7.62	1.40	7.77
(s.d.)	(9.87)	(11.12)	(16.30)	(5.50)	(3.30)	(14.22)
% of new jobs* filled internally	15.77	5.97	16.13	19.29	6.40	18.98
(s.d.)	(13.83)	(17.09)	(23.93)	(10.55)	(15.00)	(20.82)
% of workers who have been at firm 5+ years	-	43.11	47.36	-	56.79	52.47
(s.d.)		(27.29)	(28.27)		(18.14)	(23.24)
Correlation (entry rate, average wage), observ = a firm	0.28	0.18	0.36	0.45	0.07	0.30
Correlation(entry rate, average wage change), observ = a firm	-0.21	0.00	-0.01	-0.63	0.09	-0.25
Correlation(entry rate, s.d. of wage), observ = a firm	-0.24	-0.04	-0.22	-0.53	0.01	-0.06