Finland: firm factors in wages and wage changes[*]

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July 20, 2004

1 Introduction

This paper consist of two parts. Firstly, we describe the data sets that have been used to compute the standard tables of this volume, and summarize the main findings that these standard tables suggest. These data encompass the entire Finnish manufacturing workforce for the three comparison years 1981, 1990 and 2000. The tables for these three years are based on a register data set in which we have merged the separate files for blue-collar workers and salaried employees. The motivation for these tables has been set out in another chapter of this volume. These tables are presented in a separate appendix at the end of the paper, so that a reader interested in country comparisons can readily focus on that comparable material.

The merging of blue-collar worker files with salaried employee files yields new insights but is cumbersome and involves non-trivial decisions that are to some extent arbitrary, since the statistical framework for entering employee information differs between workers and salaried employees. The former group is remunerated by the hour, whereas the salaried employees command a monthly salary. Furthermore, these groups are covered by very different collective agreements.

That is why the second part of the paper focuses on the group of salaried employees only. To compensate for this loss of generality, we provide a much more detailed analysis of these employees' wage structure in years 1980 through 2000. In particular, we describe the changing role of the firm specific factors as

well as the career patterns of individuals. The tables and figures of this part of the paper are included in the main text, since they differ somewhat from the tables and figures of the other papers of the project.

2   The Finnish data sets and tables

2.1   General

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 255000 blue-collar and 172000 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 all 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.

2.2   The comparison tables: details on variable definitions and the sample

In the main table supplement, comparable to the similar tables for the other countries, we chose to analyze three years of data, namely 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 on macroeconomic conditions). 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 base year t. Therefore, we do not require that a firm would have had at least 30 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, over-

time, 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. 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 per cent 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.

2.3   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. One could equally well calculate the average growth of wages of individual workers by firm, and 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.

2.4   On low-level and high-level jobs

The Finnish data includes an occupation code for each employee. The new coding system also identifies a level for each job, but the older codes do not have such hierarchial structure. There is also a code for the job category 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   Wage setting institutions

As in the 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 per cent in 1992.

The Finnish pay bargaining system is often characterised as "centralised", but such a unidimensional depiction is somewhat misleading since wage setting in Finland – as in all other heavily unionised countries – is a mixture of collective and individual mechanisms. It is actually very hard to find an employee of a privately owned firm whose salary would be directly determined by some collective agreement or other collective intervention. A more accurate description would be to say that pay bargaining is local but pay increases are co-prdinated by collectively agreed general wage increases, and, furthermore, there are minimum pay levels for the different occupational categories, as set out in the different collective agreements. There is no minimum wage legislation.

More precisely, the collective constraints put on the local bargains consist of two elements. Firstly, unions in each industry have established minimum tariff wages for occupational categories and job levels. Thus, when a firm hires an employee and bargains with him/her about the initial salary, both local parties are bound by these minimum tariffs. Most workers and employees of the manufac-

turing sector are, however, paid more than these minimum levels, so that these minimum tariffs are rarely directly binding[1].

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. This increase i called the "general increase" and it is most often define in percentage terms, although the blue-collar unions and their central federation have in most bargaining rounds sought to establish a minimum money increase as well, so that the lowest wages would in fact be increased relatively more than other wages[2].

It is important to understand that the general increase is not a binding contraint for the local parties if they both are prepared to deviate from it. Of course, nothing prevents a firm from increasing an individual's wage by more than the general increase. On the other hand, if the firm finds its jobs threatened, it can initiate negotiations on lower pay increases or even pay cuts. If the local parties can agree on such an outcome, they are perfectly free to do so. The exact legal significance of the general increase is that an industrial peace clause is associated with it: once the union has signed a new collective agreement, the workers have relinquished their right to undertake strikes or other industrial actions. Similarly, the firms whose employer association has agreed on a general increase cannot anymore initiate lockouts or other conflictual actions. Thus, after a general increase has been agreed upon, both parties can take it as granted that a deviation from the general increase cannot occur without their consent.

Thus, the local parties can in principle deviate from that general wage increase, but a deviation requires the consent of both parties. Consequently, the general wage increase is in most cases 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.

To sum up, the Finnish wage bargaining system, although centralised by some measures, has not really been interestged in determining the entire structure of relative wages. Rather, its main and stated objective has been to control the average rate of wage growth while leaving relative wages to decentralised decisionmaking.

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

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[1]Of course, they can indirectly affect the bargaining outcome even if the actual wage exceed the minimum tariff wage

[2]This is currently a point of contention in the Finnish pay bargaining debate.

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 starting point for all employee-employer relationships is of course a local bargain. Wage drift, defined as the difference between general increases and average actual wage increases, has accounted for approximately 40 per cent of the wage growth between 1970 and 2000. This fraction has declined somewhat over time, but wage drift still accounted for 35 per cent 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 hardly 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.

4   Macroeconomic conditions

The Finnish economy has been characterised by rapid but volatile growth, driven by export fluctuations that have often been all but reinforced by domestic fiscal and monetary policy. The volatility of exports is mostly due to the dominant position of a couple of manufacturing sectors like wood and pulp, metal and engineering, and, a latecomer of the 1990s, the electronics sector spearheaded by Nokia.

The 1990's were a particularly turbulent period. The unemployment rate in-

Table 1: *

Table 1: Macroeconomic conditions

Macroeconomic conditions

Year	Unemployment	1-year gdp change	2-year gdp change	5-year gdp change
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

creased from 3.2 percent in 1990 to 16.6 percent in 1994. Real GDP declined by 6,4 percent in 1991 and the recession continued during 1992 and 1993. Recovery from the recession was equally rapid. The average growth rate for 1994-2000 was 4.4 percent, clearly higher than in other OECD economies. With disturbances this large it is quite 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.

5   Discussion on the comparison tables

The comparison tables (see the table appendix) yield a picture of wage differentials that is broadly typical of a Nordic country. For example, the wage dispersion entries of table 2 are quite similar to the corresponding tables presented in the Sweden chapter by Skans et al. The average wage of the 10th decile is about 57-59 percent of the mean wage in Finland, and a couple of percentage points more in Sweden. This is not unexpected in the light of the Swedish trade unions' more ambitious egalitarian policies. The standard deviation of log wages is almost exactly the same in the two countries.

We explained above that the bargains on wage increases have been fairly tightly determined by collective agreements that set out a recommendation for wage general "default" wage increases. One would consequently expect that the standard deviation of wage changes would be low in Finland. Table 3 of the appendix readily confirms this picture. The standard deviation of the year-to-year change in pay is in the order of 0.10, clearly lower than in Sweden where the corresponding entry varies between 0.14 and 0.16 – and manifestly lower than in less neo-corporatist countries like France, where the standard deviation estimate is reported to vary between 0.29 and 0.34. In other countries like Germany and the US, the corresponding entries are even higher. Thus, whatever the merits or dismerits of this pattern, we see clearly that the Finnish wage setting institutions lead to extremely uniform wage increases[3].

The conclusions on mobility and personnel flows between firms are perhaps the most contentious, since so many data problems undermine these assessments. The mobility table of Panel A reveals very high mobility figures like exit rates that vary between 12.17 per cent and 23.12 per cent. Compared to the US, for example, these are very high figures, and they do not shrink by much even if we only look at high-level jobs (Panel B). Yet, as we will see in the latter part of the paper, once we compute the exit rates by various more sophisticated criteria than a change in the employer code, we get figures that typically vary between 5 and 10 per cent and do not deviate from the corresponding findigs from the US data.

6   Salaried employees: decomposing salaries

In this latter part of the paper, we take a closer look at the variation of pay in the group of salaried employees. We lose some generality by leaving out time-remunerated workers, but can instead carry out more detailed analyses on employees. We exploit this by describing our variation measures and other statistics

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[3]This has been a natural conjecture for many researchers, but this project has probably exposed this stylised fact more forcefully than any other study so far.

Table 2: *

Table 2: Variance decomposition for raw logsalary and residual logsalary, firms 1980-89

| year | sd, raw | ANOVA for raw wage and residual wage | | | |
		between-Rsquare	sd, resid	between-Rsquare	n(firms)
1980	0.36	0.03	0.24	0.04	548
1981	0.34	0.03	0.24	0.04	592
1982	0.34	0.03	0.24	0.04	654
1983	0.34	0.03	0.24	0.04	683
1984	0.34	0.03	0.24	0.04	695
1985	0.34	0.03	0.25	0.04	691
1986	0.34	0.03	0.25	0.05	691
1987	0.34	0.04	0.25	0.05	700
1988	0.34	0.04	0.25	0.05	748
1989	0.34	0.04	0.25	0.06	801

for all years 1980 through 2000. This time, the tables are included in the text, in order to make them readily available to the reader.

Firstly, in tables 2 and (3), we report a variance decomposition for monthly salaries, through years 1980-2000. This analysis is rather descriptive but it permits comparisons with results from other countries. Furthermore, it permits comparisons in time. The following tables report an ANOVA decomposition for the log of the monthly wage, computed first using the raw logwages of all full-time salaried employees, and then after projecting the wages on three conventional covariates, namely education, age and gender. The decomposition is carried out separately for the 1980s and 1990s, since a comprehensive recoding of the firms took place between years 1989 and 1990. That recoding implied, inter alia, that the number of firms trebled, so that the firm coding became much less aggregated than what was the case is in the 1980s. Thus, it is hardly reasonable to draw inferences an the change of the variance components between these two years.

We see, firstly, that the variance component associated with firm means is rather low to start with, in comparison with similar analyses conducted on comparable data sets from other countries (eventual reference to other papers of the project). The firm means only explain a paltry 3 to 4 per cent of salary variation in the 1980s, and the coeffect of determination increases to a range between 10 and 20 percentage points in the 1990s. In other words, knowing a person's firm and the mean wage of that firm does not much improve our ability to predict the person's salary. In this respect, Finland is a typical Nordic economy. With an organised labour market, unexplained wage variation is relatively low, a result that

Table 3: *

Table 3: Variance decomposition for raw logsalary and residual logsalary, firms 1990-2000

	ANOVA for raw wage and residual wage				
year	sd, raw	between-Rsquare	sd, resid	between-Rsquare	n(firms)
1990	0.34	0.10	0.26	0.13	2690
1991	0.33	0.10	0.25	0.13	2702
1992	0.33	0.10	0.25	0.13	2423
1993	0.32	0.10	0.25	0.12	1404
1994	0.32	0.11	0.21	0.12	1545
1995	0.32	0.13	0.21	0.13	1532
1996	0.31	0.11	0.21	0.11	1488
1997	0.33	0.20	0.22	0.16	1593
1998	0.33	0.27	0.23	0.18	1637
1999	0.33	0.27	0.23	0.19	1601
2000	0.33	0.29	0.24	0.21	1714

has in various guises been reported in many other analyses[4].

Secondly, we note that the firm component increases steadily. Measurement and classification changes can account for the large jump in years 1989-1990, but a gentle similar trend is discernible from year to year even in years with unchanged classification schemes. The latter part of the 1990s deserves attention in particular. That was a time of large migration between firms, associated with a rapid productivity growth and a reallocation of resources to the growing electronic industry (Maliranta 2003). These trends are reflected in the growth of the firm specific variance component. Furthermore, we see a particularly stark and interesting increase in the firm mean variance component of the "raw" wage, unconditioned on the Mincer variables, while the corresponding increase in the anova of Mincer residuals is less pronounced. This is consistent with the hypothesis that employees are increasingly allocated to firms which employ similar individuals: the hughly educated work with highly educated, and the less educated work with the less educated.

The next table, table 4 reports the same exercise, computed for establishments. Establishment codes generate a finer partition of the employee material, since one firm can consist of many establishments. Furthermore, there are no structural changes in the way establishments are coded, throughout our investigation span of years 1980 through 2000. We see that there is a similar gentle but perennial trend toward a larger variance component associated with different firm means.

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[4]A classic reference is Holmlund and Zetterberg 1981

Table 4: *

Table 4: Variance decomposition for raw logsalary and residual logsalary, establishments

ANOVA for raw wage and residual wage

year	sd, raw	between-Rsquare	sd, resid	between-Rsquare	n(est)
1980	0.36	0.10	0.24	0.15	3551
1981	0.34	0.10	0.24	0.15	3601
1982	0.34	0.11	0.24	0.15	3736
1983	0.34	0.11	0.24	0.15	3791
1984	0.34	0.11	0.24	0.15	3837
1985	0.34	0.11	0.25	0.16	3865
1986	0.34	0.11	0.25	0.16	3858
1987	0.34	0.11	0.25	0.16	3872
1988	0.34	0.11	0.25	0.16	3840
1989	0.34	0.12	0.25	0.17	3869
1990	0.34	0.12	0.26	0.18	3988
1991	0.33	0.13	0.25	0.18	4117
1992	0.33	0.12	0.25	0.17	3636
1993	0.32	0.13	0.25	0.17	2289
1994	0.32	0.13	0.21	0.16	2550
1995	0.32	0.16	0.21	0.17	2660
1996	0.31	0.16	0.21	0.15	2635
1997	0.33	0.24	0.22	0.19	2679
1998	0.33	0.29	0.23	0.21	2664
1999	0.33	0.29	0.23	0.22	2574
2000	0.33	0.31	0.24	0.24	2695

7   Mobility between firms and establishments

We now turn to the incidence of employer changes and establishment changes. Table (5) reports the relative frequencies of changing firm or establishment. The probabilities are computed conditionally on the individual being present in the data in the next year, so that a person who leaves the firm because he/she exits the entire manufacturing workforce does not affect the incidence computation.

As is typically the case in these matched employee-firm-analyes, the coding of firms and establishments can change. Firstly, a total overhaul of coding practices can occasionally take place. Seconly, some firms just change code because of a merger or another legal restructuring, although the firm continues to operate in much the same way as before. In order to get around such problems, researchers sometimes rely on job flows of individuals to determine whether a person has changed employer or not.

In order to maximise our available information, we have in table (5) included results from both types of exercises. In the "code" columns, the reported employer change incidence is based on observing a new employer code or establishment code between two consecutive years. In the "flow" columns, we have instead determined a firm exit by the following criterion: once we have identified the set of individuals working for firm k in the base year t, we check whether at least 75 per cent of those individuals are to be found under one and the same code in the consecutive year $t + 1$ (regardless of what that code is), and we judge that if that is the case, then those individuals have not changed jobs.

Years 1989 and 1990 stand out immediately as a time in which the coding system was overhauled. Furthermore, even establishment codes have been thoroughly resuffled in some years (1989, 1992-1993, 1994-1995). Yet, notwithstanding the problem years 1989 and 1990, the firm code column and the firm flow column yield a reasonably similar overall picture of mobility, which, furthermore, is more in tune with the mobility figures obtained from some US analyses.

For those who do note change employer or establishment, the probability of a task change ("occupation change") is reported in table (6). Again, some years stand out as problem years of classification reforms.

8   The implication of job and promotion flows for salary changes

As argued above, the observed increase in firm-specific wage differentials is not necessarily in contradiction with the existing wage setting institutions, the main of which is to control the average growth of wages and salaries. We turn next to

Table 5: *

Table 5: Incidence of job changes and establishment changes

Prob of job change and establishment change

year	empl ch., flow	empl ch., code	est ch., flow	est ch., code
1980	0.05	0.04	0.05	0.04
1981	0.05	0.04	0.05	0.04
1982	0.06	0.05	0.05	0.05
1983	0.07	0.06	0.07	0.06
1984	0.07	0.06	0.07	0.06
1985	0.08	0.07	0.08	0.07
1986	0.15	0.10	0.12	0.11
1987	0.12	0.09	0.10	0.09
1988	0.13	0.11	0.11	0.11
1989	0.86	1.00	0.41	1.00
1990	0.08	0.09	0.11	0.15
1991	0.07	0.08	0.08	0.10
1992	0.08	0.07	0.20	1.00
1993	0.08	0.07	0.06	0.10
1994	0.05	0.09	0.26	1.00
1995	0.05	0.09	0.07	0.13
1996	0.08	0.09	0.23	0.15
1997	0.04	0.04	0.05	0.13
1998	0.05	0.05	0.05	0.08
1999	0.06	0.07	0.07	0.11

Table 6: *

Table 6: Incidence of promotions with unchanged firm and unchanged establishment

year	Prob of occupation change	
	P(occ. changes, firm unchanged)	P(occ. changes, est. unchanged)
1980	0.06	0.07
1981	0.06	0.07
1982	0.07	0.09
1983	0.07	0.09
1984	0.07	0.08
1985	0.07	0.09
1986	0.07	0.13
1987	0.07	0.13
1988	0.08	0.12
1989	0.10	0.87
1990	0.07	0.09
1991	0.06	0.09
1992	0.07	0.11
1993	0.07	0.10
1994	0.06	0.09
1995	0.07	0.09
1996	0.07	0.13
1997	0.08	0.09
1998	1.00	1.00
1999	0.01	0.02

an analysis of the variation and level of salary increases, conditional on these exit and promotion events.

Table (7) reports the mean year-to-year real salary increases for all employees, and then separately for three groups: for those who change employer, those who stay with their firm but change occupation, and those who carry on with the present occupation at the present firm. We have subtracted the increase of the consumer price index from the mean percentual salary increase for each group, so that these numbers tell the increase in the real earnings level. The differences between these groups are in general very small, and the general wage trends dominate the wage changes in all categories. A similar picture emerges from the next table, table (8), which reports the standard deviation salary changes in each group. Job changer, however, are exposed to higher earnings variability in all of our investigation years. Years 1991 through 1993 were depression years in which there was clearly more variation than in normal times, regardless of group.

The very small differences in mean wage increases between these groups, as depicted in table (7), are not surprising in the light of what we know of career and tenure patterns. We know that younger employees typically gain more by changing jobs or occupations. Thus, repeating the same exercise separately for all age groups but aggregating over all years should yield more information. That computation is reported in table (9). For that table, we have used the entire panel of employees, and computed a similar breakdown of salary increases, but separately for each agegroup from 25 to 60. A clear pattern emerges: young workers gain a lot by changing employer, but also by being promoted within the firm. For older workers, the flow events hardly play any role. For the very oldest age groups, being allocated to new tasks within the firm is associated with a drop in real wages.

As far as the "tightness" of the collective agreement system is concerned, one of the most interesting questions is surely the extent to which individual firms have to adjust their wage changes to an encompassing general increase. To shed light on this, table 10 reports an ANOVA decompostion of yearly salary increases, with firm means as the conditioning variable as in the first table. There, we can again see a clear trend towards a more firm specific determination of wage increases. The depression years stand out again, since these special years called for dramatic cost readjustments in some firms and not in others. Furthermore, there were no centralised wage agreements in years 1993 and 1994. In the boom years of the late 1990s, economic policymakers again resorted to co-ordinated wage settlements in order to put a brake on inflation, and we can see a corresponding downward shift in the firm variance component in these years.

It is quite interesting that such large shifts in variance components can occur within an unchanged instional framework for wage determination. This does not mean that wage increases would be particularly firm-specific in international comparison. However, it shows that the firms can to some extent at least use wage

Table 7: *

Table 7: Mean real salary increases for job stayers and job changer, promoted job stayers and stagnant job stayers

	Mean salary increases for four groups			
year	stayers	changers	occ. changes	occ. unchanged
19801981	0.02	0.04	0.04	0.01
19811982	-0.01	0.02	0.02	-0.01
19821983	0.01	0.04	0.04	0.01
19831984	0.02	0.04	0.05	0.02
19841985	0.01	0.05	0.05	0.01
19851986	0.01	0.04	0.04	0.01
19861987	0.03	0.05	0.06	0.03
19871988	0.06	0.08	0.09	0.06
19881989	0.03	0.05	0.07	0.03
19891990	0.02	0.02	0.06	0.02
19901991	-0.00	0.01	0.02	-0.00
19911992	-0.03	-0.03	-0.02	-0.03
19921993	-0.01	-0.00	0.02	-0.01
19931994	0.02	0.03	0.04	0.02
19941995	0.08	0.09	0.10	0.07
19951996	0.03	0.04	0.06	0.02
19961997	0.02	0.03	0.07	0.02
19971998	0.04	0.07	0.07	0.03
19981999	0.03	0.05	0.03	.
19992000	0.05	0.08	0.04	0.05

Table 8: *

Table 8: Standard deviation of variation of salary changes

Coefficient of variation

year	stayers	changers	occ. changes	occ. unchanged
19801981	0.06	0.12	0.09	0.06
19811982	0.06	0.10	0.09	0.06
19821983	0.06	0.10	0.09	0.06
19831984	0.06	0.10	0.09	0.06
19841985	0.06	0.12	0.09	0.06
19851986	0.06	0.10	0.09	0.06
19861987	0.06	0.09	0.09	0.06
19871988	0.07	0.10	0.09	0.06
19881989	0.07	0.11	0.11	0.07
19891990	0.07	0.08	0.11	0.07
19901991	0.06	0.08	0.09	0.06
19911992	0.05	0.06	0.08	0.04
19921993	0.06	0.08	0.09	0.06
19931994	0.06	0.07	0.10	0.06
19941995	0.07	0.09	0.09	0.07
19951996	0.07	0.10	0.10	0.06
19961997	0.08	0.10	0.12	0.07
19971998	0.08	0.13	0.11	0.08
19981999	0.09	0.12	0.09	.
19992000	0.09	0.13	0.11	0.09

Table 9: *

Table 9: Mean real salary increases for job stayers and job changers, promoted job stayers and stagnant job stayers, for different age groups

Mean salary increases for four groups

age	stayers	changers	occ. changes	occ. unchanged
25	0.07	0.09	0.13	0.06
26	0.06	0.08	0.10	0.05
27	0.05	0.08	0.09	0.05
28	0.05	0.07	0.08	0.04
29	0.04	0.07	0.07	0.04
30	0.04	0.06	0.06	0.04
31	0.04	0.06	0.06	0.03
32	0.03	0.05	0.06	0.03
33	0.03	0.05	0.05	0.03
34	0.03	0.04	0.05	0.03
35	0.03	0.04	0.05	0.03
36	0.03	0.04	0.04	0.02
37	0.03	0.04	0.04	0.02
38	0.02	0.03	0.04	0.02
39	0.02	0.03	0.04	0.02
40	0.02	0.03	0.03	0.02
41	0.02	0.03	0.03	0.02
42	0.02	0.02	0.03	0.02
43	0.02	0.02	0.03	0.02
44	0.02	0.02	0.02	0.02
45	0.02	0.02	0.02	0.01
46	0.02	0.02	0.02	0.02
47	0.02	0.02	0.02	0.01
48	0.01	0.02	0.02	0.01
49	0.01	0.02	0.02	0.01
50	0.01	0.01	0.02	0.01
51	0.01	0.01	0.02	0.01
52	0.01	0.01	0.01	0.01
53	0.01	0.01	0.01	0.01
54	0.01	0.01	0.01	0.01
55	0.00	0.01	-0.01	0.00
56	0.00	0.01	-0.01	0.01
57	0.00	0.00	-0.02	0.00
58	0.00	0.00	-0.01	0.00
59	-0.00	0.00	-0.02	0.00
60	-0.00	0.00	-0.02	0.00

Table 10: *

Table 10: Decomposition of variance for salary increases, job stayers

ANOVA for salary increases

year-to-year	sd	between-Rsquare
19801981	0.06	0.03
19811982	0.06	0.03
19821983	0.06	0.03
19831984	0.06	0.03
19841985	0.06	0.03
19851986	0.06	0.03
19861987	0.06	0.07
19871988	0.07	0.05
19881989	0.07	0.03
19891990	0.07	0.09
19901991	0.06	0.10
19911992	0.05	0.10
19921993	0.06	0.12
19931994	0.06	0.15
19941995	0.07	0.19
19951996	0.07	0.08
19961997	0.08	0.11
19971998	0.08	0.07
19981999	0.09	0.09
19992000	0.09	0.09

changes as individual incentives and group incentives within a pay bargaining system that aims at steering the overall pace of wage change.

9   Job and occupation transitions and career profiles

Finally, we characterize the career dynamics of a couple of cohorts of new entrants into the industry. We select two cohorts, one that enters the industry in 1981 and another that enters in 1987. We select all the entrants that were under 35 years of age in the initial year and who were not observable in the panel in the year preceding the initial year. From these cohorts, we further select all those who are observed in the industry for 12 consecutive years after the initial year. For each individual, we compute the sum of job changes within a current employer ("promotion") and a change of employer ("job transition"). We measure the effect of such cumulated changes on the relative position of the employee. To this end,

Table 11: *

Table 11: 1981 cohort relative wage gains as a function of job changes (vertical direction downward) and internal promotions (horizontal direction)

$$
\begin{pmatrix}
8 & 16 & 20 & 14 & 14 & 8 & . & 15 \\
10 & 13 & 18 & 28 & 19 & 17 & 38 & . \\
9 & 15 & 20 & 21 & 21 & 9 & -5 & . \\
11 & 15 & 12 & 18 & 19 & . & . & . \\
13 & 19 & 13 & 34 & 30 & . & . & . \\
12 & 19 & 26 & . & . & . & . & . \\
3 & 20 & 39 & . & . & . & . & . \\
14 & -1 & 52 & 15 & . & . & . & . \\
11 & . & . & . & . & . & . & .
\end{pmatrix}
$$

start the analysis by computing, for each employee, his or her procentual rank, i.e. the percentile in the aggregate salary distribution; that is, the group of the employee when all employees have been ranked and then divided into 100 groups. Note that we have used the entire salaried employee workforce to compute these ranks and not only the chosen cohort.

Our career variable is then the gain in the relative position of the employee during the 12 years of interest. This procedure abstracts from aggregate productivity shock and inflations shocks and other business cycle phenomena and focuses solely on the relative performance of the employee.

We report four matrices for each cohort. The first matrix (depicted as table 11) report the average increase in the relative position of an employee, as a function of the number of promotions (horizontal direction) and job changes (vertical direction). For example, for the first matrix that concerns the 1981 cohort, we see that a person who has no such changes at all has an average climbed 8 permille points in the industry's salary distribution. If he/she has got one promotion but has stayed with the same employer, his gain is 16 points, and so on. The next matrix reports the headcounts of all "promotion" - "job transition" combinations, from year 1981 to 1993.

The third matrix reports the initial ranking of these individuals, as a function of their subsequent job and career moves, and the last matrix, finally, depicts the final ranking of the individual in the industry's wage structure.

The four last matrices report a similar exercise for the 1987 cohort. It is interesting to note that the mean gain, in 12 career years, is very different in the two groups. The earlier group gained on average 14 promille points in the salary distribution, whereas the mean gain of the later group was almost twice as large,

Table 12: *

Table 12: 1981 cohort headcounts according to number of job changes (vertical direction downward) and internal promotions (horizontal direction)

$$
\begin{pmatrix}
624 & 504 & 300 & 156 & 84 & 24 & 0 & 12 \\
4752 & 2928 & 1284 & 648 & 120 & 60 & 24 & 0 \\
5124 & 3780 & 1704 & 516 & 180 & 96 & 24 & 0 \\
2916 & 2328 & 900 & 384 & 48 & 0 & 0 & 0 \\
1044 & 1116 & 288 & 84 & 12 & 0 & 0 & 0 \\
468 & 288 & 108 & 0 & 0 & 0 & 0 & 0 \\
240 & 120 & 60 & 0 & 0 & 0 & 0 & 0 \\
72 & 12 & 24 & 12 & 0 & 0 & 0 & 0 \\
12 & 0 & 0 & 0 & 0 & 0 & 0 & 0
\end{pmatrix}
$$

Table 13: *

Table 13: 1981 cohort initial ranks as a function of subsequent job changes (vertical direction downward) and internal promotions (horizontal direction)

$$
\begin{pmatrix}
43 & 41 & 47 & 46 & 35 & 36 & . & 82 \\
39 & 40 & 34 & 27 & 47 & 44 & 28 & . \\
39 & 43 & 42 & 39 & 32 & 38 & 44 & . \\
43 & 44 & 42 & 47 & 61 & . & . & . \\
48 & 43 & 49 & 28 & 33 & . & . & . \\
44 & 50 & 40 & . & . & . & . & . \\
56 & 43 & 31 & . & . & . & . & . \\
52 & 77 & 42 & 68 & . & . & . & . \\
21 & . & . & . & . & . & . & .
\end{pmatrix}
$$

Table 14: *

Table 14: 1981 cohort final ranks as a function of the number of job changes (vertical direction downward) and internal promotions (horizontal direction)

$$
\begin{pmatrix}
52 & 58 & 67 & 61 & 49 & 45 & . & 97 \\
49 & 54 & 53 & 56 & 67 & 61 & 66 & . \\
48 & 58 & 62 & 60 & 54 & 48 & 39 & . \\
54 & 59 & 55 & 65 & 81 & . & . & . \\
62 & 63 & 62 & 63 & 63 & . & . & . \\
57 & 69 & 67 & . & . & . & . & . \\
60 & 63 & 71 & . & . & . & . & . \\
66 & 75 & 94 & 84 & . & . & . & . \\
32 & . & . & . & . & . & . & .
\end{pmatrix}
$$

Table 15: *

Table 15: 1987 cohort relative wage gains as a function of job changes (vertical direction downward) and internal promotions (horizontal direction)

$$
\begin{pmatrix}
. & 25 & 33 & 36 & 37 & 40 & . & . & . \\
2 & 18 & 23 & 26 & 32 & 36 & . & 49 & 7 \\
17 & 23 & 26 & 34 & 36 & 47 & . & . & . \\
19 & 24 & 32 & 34 & 40 & 81 & . & . & . \\
25 & 28 & 34 & 27 & 23 & 55 & . & . & . \\
41 & 33 & 48 & 68 & . & . & . & . & . \\
39 & 6 & . & 26 & . & . & . & . & .
\end{pmatrix}
$$

namely 25. We can only speculate on these differences. Both cohorts were hit by the depression of years 1991 through 1993. Otherwise, se can note that the earlier cohort did best when it stuck with one employer and aimed for promotions; in contrast, the later cohort that was soon hit by the depression, often did best by changing employer, a finding that rhymes with studies that have shown the large productivity effects of firm-to-firm job flows in the 1990s (see Maliranta 2003).

By looking at the final rankings, we see that there is a fairly clear concentration of "good performance" in the lower left corner of the matrices, yet not in the first column. (see tables 14 and 18). In other words, those employees who landed a well-paid job had a large number of employer changes and a couple of internal promotions. However, intriguingly, these same elements of the matrix tend to be associated with a fairly high initial ranking as well.

Table 16: *

Table 16: 1987 cohort headcounts according to number of job changes (vertical direction downward) and internal promotions (horizontal direction)

$$
\begin{pmatrix}
0 & 564 & 396 & 348 & 108 & 36 & 0 & 0 & 0 \\
24 & 3360 & 1800 & 996 & 456 & 156 & 0 & 12 & 12 \\
384 & 2268 & 1416 & 696 & 168 & 36 & 0 & 0 & 0 \\
408 & 996 & 588 & 228 & 72 & 12 & 0 & 0 & 0 \\
120 & 240 & 240 & 72 & 12 & 12 & 0 & 0 & 0 \\
84 & 168 & 48 & 24 & 0 & 0 & 0 & 0 & 0 \\
60 & 12 & 0 & 12 & 0 & 0 & 0 & 0 & 0
\end{pmatrix}
$$

Table 17: *

Table 17: 1987 cohort initial ranks as a function of subsequent job changes (vertical direction downward) and internal promotions (horizontal direction)

$$
\begin{pmatrix}
. & 38 & 35 & 28 & 29 & 26 & . & . & . \\
34 & 37 & 34 & 33 & 32 & 27 & . & 24 & 85 \\
38 & 39 & 40 & 32 & 37 & 44 & . & . & . \\
36 & 38 & 42 & 36 & 40 & 13 & . & . & . \\
32 & 34 & 42 & 68 & 62 & 21 & . & . & . \\
30 & 43 & 37 & 21 & . & . & . & . & . \\
49 & 73 & . & 67 & . & . & . & . & .
\end{pmatrix}
$$

Table 18: *

Table 18: 1987 cohort final ranks as a function of the number of job changes (vertical direction downward) and internal promotions (horizontal direction)

$$
\begin{pmatrix}
. & 63 & 68 & 64 & 67 & 67 & . & . & . \\
36 & 55 & 58 & 60 & 65 & 63 & . & 73 & 93 \\
55 & 63 & 66 & 66 & 73 & 92 & . & . & . \\
56 & 63 & 74 & 71 & 80 & 94 & . & . & . \\
58 & 62 & 76 & 95 & 86 & 77 & . & . & . \\
71 & 77 & 85 & 90 & . & . & . & . & . \\
89 & 79 & . & 93 & . & . & . & . & .
\end{pmatrix}
$$

Table 19: *

Table 19: Probability of a wage cut from base year to next and the coefficient of variation of pay changes, both computed for narrow and wide pay, job stayers

Prob(salary cut) and CV(salary change), job stayers

year	salary no PP	salary+PP	CV(salary no PP)	CV(with PP)
9697	0.04	0.13	2.10	2.06
9798	0.02	0.07	1.21	1.23
9899	0.04	0.14	1.45	1.63
99100	0.02	0.06	1.04	1.11

Table 20: *

Table 20: Probability of a wage cut from base year to next and the coefficient of variation of pay changes, both computed for narrow and wide pay, job stayers

Prob(wage cut) and CV(wage change), job stayers

year	timewage	timewage+PP	CV(timewage)	CV(timewage+PP)
9697	0.22	0.21	1.88	1.81
9798	0.19	0.19	1.60	1.52
9899	0.25	0.27	2.06	2.13
99100	0.15	0.15	1.31	1.28

10   New pay forms and pay flexibility

We have so far confined our analyses to a narrowly defined base monhthly salary. However, in the 1990s, new pay forms related to firm profits or some group or firm performance measures became increasingly popular in Finnish manufacturing. This may due to two factors at least. Production technologies may evolve in a way that makes the measurement of individual performance more difficult at the same time when productivity comes increasingly to to depend on group performance. Another motivation for an increased use of performance related pay may be disinflation: when inflation is low, maintaining a given downward real wage flexibility necessitates a higher propensity of nominal pay cuts (see Macleod and Malcomson 1993). Pay cuts are probably easier to carry out for such pay components as performance pay and profit sharing, since they are not regulated by collective agreements and are at the discretion of management.

In the context of this paper, one would expect that such new pay forms would also increase the firms specific component in wage variation.

We illustrate this with a table on the incidence of nominal pay cuts, computed for both narrowly defined monthly salary and the total salary which is a sum of the narrow salary and eventual performance pay.

Table 19 shows that this effect can be quite important for salaried employees. In a similar vein, if we carry out an analysis of variance, similar to that reported in table 10, for wage increases, but this time taking intoaccount new performance pay schemes, we see that these new pay schemes greatly reinforce the move to a larger firm-specificity of wage changes.

This trend is not general, however: for hourly paid blue-collar workers, there is no such effect and the incidence of pay cuts is fairly high to start with. This is shown in table 20 in which we report the same exercise for blue-collar workers. There is much more downward flexibility in the worker wages to start with, and the introduction of performance pay schemes does not mean a momentous change in this respect.

11   References

-to be added