Salary Structures

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Firms choose salary structures in the context of competition from other firms in the labor market. If the labor market operates as a competitive spot market, then choosing salary structure is tantamount to choosing a quality distribution. When salaries are set in a longer term context, firms may use different approaches to setting salaries over a worker's career. Though still constrained by the discipline that markets impose, firms may use the salary structure to provide incentives. For example, firms may couple low initial salaries with the possibility of higher salaries later in the worker's career (consistent, say, with tournaments or life-cycle motivation schemes[1]), or they might be able to provide insurance to workers (again, over the life-cycle or across individuals).[2]

In general, firms can choose the levels of wages that they pay, the slopes of the profiles, and the variance in earnings, both over time and across individuals. All of these choices have implications for labor market recruitment, worker turnover and productivity, but up to this point, we know almost nothing about firms choices of salary structures and how they vary by firm. To better understand salary structure at the level of the firm, it is necessary to have data that covers the entire firm and to have data on more than one firm. Fortunately, several new country-wide datasets available for the Scandinavian countries, France, Germany, and now for the U.S., make estimating the structure of wages and their variations feasible.[3]

In this paper, we briefly sketch some theories of salary structure within firms and then we provide some preliminary, suggestive evidence on how firms vary pay across workers. We

[1]As in Lazear (1979) or in Lazear and Rosen (1981).

[2]There is a vast literature on insurance. Early papers are Azariadis ( ), Baily ( ), Gordon ( ), and in the career context, Harris and Holmstrom (1982).

[3] These datasets also create opportunities to examine other aspects of pay and promotion. For example, they allow a more general analysis of why some firms promote more rapidly, whether firms hire in at all levels or primarily at lower levels (see Lazear, 1992, and Baker, Gibbs, and Holmstrom, 1994, for analyses of these issues at individual firms) and why some firms choose to pay high wages to buy low turnover and easier recruiting of high quality workers whereas other choose the opposite policy (see Fox, 2002, who uses the same Swedish dataset we use.)

consider models of sorting, insurance, and politics. In choosing pay structures, firms may be attempting to sort workers in order to attract and retain a given quality of worker in a competitive labor market. The sorting explanation is most closely related to measurement costs. If it is costly to measure worker output, it may pay the firm or workers simply to ignore differences across workers. The more able are disadvantaged relative to the less able, but it might not be worth bearing the cost of measurement to distinguish oneself from one's peers.

Insurance stories have found favor in the theoretical literature, but as yet, there is little empirical support for insurance playing a major role in the determination of compensation. Few doubt that workers are risk averse. The issue is whether firms act as implicit insurance agents by tailoring compensation to cater to this aversion. The inability to observe strong evidence of insurance may be due, in part, to lack of appropriate data. Part may be a result of economic factors.[4]

A third potential contributor to pay structure involves industrial politics. Unions, government, or internal political forces within a particular firm might result in pay structures that are less dispersed than the underlying productivity. For example, political pressures to keep wages down might depress the wages of the top performers or pressures to bring the bottom up might buoy the earnings of the weakest performers.

Empirically, we decompose within firm wage variance and we study patterns in employee turnover. We analyze the importance of a reference group for workers. Do workers leave when their wages are low relative to someone with their skills in the labor market, or do they leave when they are low relative to others like them in their own firm? In the starkest purely competitive spot market, the firm should be irrelevant. If workers are paid less than their alternatives in other firms, they should move to the higher paying job. If instead, labor markets

[4]See Prendergast (2002).

have longer term aspects, because of incentives, firm-specific human capital, or other considerations, then within-firm conditions may play some role in the determination of turnover.

I. Models of Salary Structure

Sorting

In this section, we consider two variants of a model where agents have underlying heterogeneity in ability or cost of effort. We start with an asymmetric information framework where workers know their own ability and then consider a world where the employee and firm are initially symmetrically ignorant about the agent's ability.[5]

Suppose that quality varies across individuals, and that the distribution of ability, q, is given by density f(q) with distribution function F(q). Ignore effort considerations. Suppose further that the information gained after measurement about a worker's ability is public. In a competitive labor market, the worker will be forced to bear the costs of measurements because all the returns will accrue to the worker, whose measured output is known by all. To make things simple, assume that worker ability can be measured instantaneously at cost θ. The worker who bears this cost then nets $q - \theta$.

Salary firms, which do not measure individual ability, must pay each worker the expected value of output per worker within the firm, so that in expectation the total wage bill equals the total productivity of its workers. However, it must take into account that its workers may not be a random sample of the entire population. Specifically, if anyone wants to work at the piece rate firm where measurement of ability occurs, it will be the most able. Conversely, if anyone wants to be pooled with others at a fixed salary firm where workers do not bear the costs of measurement, it will be the least able. In equilibrium, there is a critical ability level, q^*. Those

[5]See Lazear (1986) for a more detailed model of sorting and measurement costs.

with abilities above this level sort to measurement (or "piece rate") firms and those below sort to salary firms.

If this model is extended to a life cycle context, the first period is spent learning in piece rate firms. After measurement occurs, earnings fan out as workers are paid their output during the second period. In the salary firm, no measurement ever occurs. Thus, earnings are the same for all individuals and the same in both periods.[6] The sorting model therefore implies that firms with steeper age-earnings profiles are measurement firms. In those firms, wages should fan out more. In salary firms, with flatter experience-earnings profiles, there should be less variance. The implication of this form of sorting is that there is a positive correlation between slope of the experience-earnings profile and the variance in wages across individuals.[7]

Asymmetric information may be appropriate in some contexts, but in others, it seems more likely that information is symmetric (or even that the employer knows more about the worker than the worker does about himself). A sorting model with symmetric ignorance can be presented and it has many of the same implications as those of the asymmetric information model.

Because workers are symmetrically ignorant, there is no ex ante sorting by workers. What one worker chooses, all workers choose. In this case, if it pays to be measured, all prefer it. Why might it pay to be measured? If there is an alternative use of time that exceeds the productivity of the worker at the current firm, then by "weeding" out those who are poorly suited for the current firm, the total value of output and expected income rises. That is, measurement leads to efficient matching of workers to firms, as in Jovanovic (1979).

Such a model has a number of important implications for determining whether a firm will pay workers straight salaries or piece rates. First, firms are more likely to pay piece rates when

[6]Of course, the accumulation of human capital with experience could result in some upward slope, but it should not be as pronounced as that in the piece rate firm.

[7]Farber and Gibbons (1996) have already provided evidence that suggests that this occurs.

the time required to measure a worker's ability and/or the cost to the firm of measuring the worker's ability are low. Second, firms are more likely to pay piece rates (that is, pay the worker his/her exact contribution) as the outside alternative becomes more productive. That is, as the variance of a worker's productivity in various tasks increases, it makes more sense to measure workers so that they can be put in the job that has relatively high productivity. Third, as the lower tail in the distribution gets larger, piece rates are more likely to be optimal. When workers are homogeneous, a salary is more likely to be used, because it doesn't pay to measure every worker simply to weed out someone whose alternative output is not much different from what it would be in the current firm. This may provide implications across occupations. Where individuals have large differences in productivity across occupations, measurement is more valuable.

Wage levels and wage variance should be correlated across firms if sorting is important. This is clear in the context of the asymmetric information model because the lowest quality workers sort to the firms that pay all workers the same wages. It is less clear, but also likely in the symmetric ignorance model. Firms that measure truncate the lower part of the distribution. When they measure, their average wages are lower, but if the investment in measurement costs pays off, the resulting increase in wages should exceed the cost (which shows up in wage reductions). As a result, wage levels and wage variance should be correlated.

Insurance

We now consider a model where firms insure workers against the risk in intertemporal pay variation and against the risk of an unfavorable realization of their productivity. If workers do not know their abilities, they can insure by agreeing implicitly to ignore differences and to split output more or less evenly among them. One problem is that once differences in ability becomes known, the most able have an incentive to reveal this to outsiders, bidding up wages.

A multi-period version of the insurance story does not suffer from this problem. In the simplest version[8], there are two types of workers: high ability and low ability. Let there be two periods. The first period is one of symmetric ignorance. In the second period, ability is known. As a result, the high types must be paid their output level. But if low types are not paid the same amount, there is no insurance. Thus, let the low types be paid exactly what the high types receive. Now, the firm is losing money because they are being paid more than their output. This is made up by underpaying all workers during the first period an amount sufficient to cover the excess payment in period 2. Thus, all workers' second period wage is the high ability marginal product and the first period wage is set such that the firm breaks even over the two periods.

This model has several implications. In firms where there is insurance, the variance in wages is low. But these firms have steep age-earnings profiles because the firm must give a raise after the first period that both keeps the high ability workers from leaving and allows the firm to extract enough in the first period to keep it profitable. This implication of the insurance story is the opposite of that for sorting. Firms that insure should have both steep experience-earnings profiles and lower variance in wages. Sorting implies steep experience-earnings profiles go with higher variance in wages.

Politics

Government, union or internal forces create pressure to ignore productivity differences and can therefore compress workers' wages relative to their marginal product. There are two ways this can come about. First, it might be that workers pressure firms to raise the wages of low ability workers relative to high ability ones. This brings up the bottom of the earnings distribution while pinching it. If this is the way that political forces work, then firms with compressed wages would have higher average wages. Alternatively, there might be pressure to

[8]This simplified model has some of the features of Harris and Holmstrom (1982). It differs primarily in that it assumes the ability to finance consumption over time, so it is possible to obtain perfect insurance.

lower the wages of the most able. In this case, a lower average wage would result and the distribution would be pinched. Firms that experienced this type of pressure would have both lower mean and lower variance wages. Stated differently, if political forces work to raise the wages of the least able, there will be a negative correlation between mean and variance in wages across firms. If political forces work to lower the wages of the most able, there will be a positive correlation between mean and variance in wages across firms.

The data will demonstrate a positive correlation between mean and variance so the only candidate story is that high ability workers have their pay reduced, resulting in low wages and low variance in firms where political forces are strong and higher wages and higher variance in firms where those forces are weak.

A result of the pay compression is that the most able in compressed firms should be disenchanted. One would expect to see higher turnover and more difficulty in recruiting the most able to the highly compressed firms. Of course, if all were anticipated perfectly, then high ability workers would not come to these firms and wage compression will simply result in a compression in the ability of those who apply for jobs. The upper tail of the ability distribution would be unavailable to the compressed firms because the upper tail of the wage distribution was unavailable at these firms.

An implication is that with the best outside opportunities will select away from politically compressed firms. This can happen at the time of hire. One possibility then is that the most able as measured, say, by the residual in the wage regression on the prior job, will be less prevalent in compressed pay firms. The same is true for observables. Those firms where the coefficients on experience and education are smallest should have the most difficult time attracting and retaining the most experienced and most educated.

Summary of Implications

Effect	Sorting	Insurance	Politics	Observed

Correlation between slope of experience-earnings profile and cross-sectional variance in wages	positive	negative	?	Positive
Correlation between mean and variance in wages across firms	positive	positive	indeter-minate	Positive for cross section; Positive for time series
Higher turnover among high earners in more compressed firms	No	No	Yes	No
High rates of turnover among young in firms with steep experience-earnings profiles	Yes	No	No	
Most able (as measured by residual in wage on prior job) in high variance firms	Possibly	No	Yes	
Most educated and experienced shun firms that have lowest coefficients on education and experience	Yes	?	Yes	

II. Results

Our data are gathered from the Swedish Federation of Industry. We concentrate on white collar men between the ages of 23 and 50 in the years 1986-1990. Table 1 provides some basic summary statistics. The average worker is about 39 years old and earns approximately 150,000 kroners per year (or roughly $25,000 using 1988 exchange rates and no adjustment for inflation.) Approximately one in every six workers leave his employer each year and less than one percent get promoted within the firm.

The standard deviation of log wages within a firm averages 0.263. That is, about two-thirds of workers in a typical firm earn between 25% below and 25% above the firm average wage. The standard deviation in log wages within a firm/occupation cell averages 0.223. This suggests that there is almost as much variation in the pay of people working in a given occupation at an average firm as there is in the pay of all people at the firm.

As a first step in understanding at what level of aggregation wages are structured and how firms differentiate the pay of workers, we disaggregate the contributions of occupations and firms to pay variation. We start with the firm/occupation standard deviation of wages described above, limiting ourselves to firm/occupation cells for which we have at least six employee wage observations in 1987. We then regress the firm/occupation standard deviation of wages on a full set of firm indicators and a full set of occupation indicators. In other words, we put all workers into a group with others who have the same occupation at the same firm and we determine how much variation there is in wages within the group. We then determine how much of the variation *across* groups in the amount of variation *within* groups is due to differences in wage policies across firms, how much is due to differences in wage structures of different occupations, and how much variation remains unexplained.

We found that *both* firms and occupations are significant (both statistically and economically) in determining the level of within-group variation. Tests of the joint significance of either the set of firm indicators or the occupations indicators easily reject the null hypothesis that either of these groups of indicators has no explanatory power. More specifically, the firm indicators explain 31% of the across group variation in within group wage variation and the occupation indicators explain 18% of this variation. We also ran regressions with each group of indicators separately. Regressing firm/occupation wage variation on the set of firm indicators yields an r-square of 0.363, while a regression on occupation indicators has an r-square of 0.231. This suggests that both firms and occupations vary in how finely they separate the pay of workers form one another. The cross-occupational differences could simply reflect exogenous factors that determine how productivity varies within a given occupation. However, the importance of firm effects suggests that firms either vary significantly in their selection methods or in the amount they compress wages relative to productivity.

We now ask what other factors vary with within-firm wage variance. That is, are the firms that vary wages significantly (either between workers or over time) also high wage firms? To look at this is a simple manner, we divided the firms into three categories – those whose within-firm wage variation was in the top 20% of all firms in the sample ("high variance firms"), those in the bottom 20% ("low variance firms"), and the other firms in the three middle quintiles. For now, we focus on the two extreme quintiles. The average wage of the high variance firms is 5% higher than the low variance firms. When including all pay (such as bonuses and commissions), the average pay in high variance firms is 9.5% higher than in low variance firms. Some of this difference appears to be due to the high variance firms selecting on high productivity workers, however, because this difference gets smaller when controlling for observable worker characteristics. Specifically, we ran a cross-sectional wage regression controlling for region, education, industry, firm size, age, and age squared.[9] We then calculated the residual from this regression for each person and averaged the residual within each firm in the sample. The average wage (total pay) residuals at high variance firms are 2.8% (8.4%) higher than low variance firms. This positive relationship between pay and variance is consistent with both sorting and insurance models of wage determination.

We next perform a similar analysis, but focus on inter-temporal wage variation. We calculated the residuals from a regression of total pay on the same explanatory variables as above, including observations from 1986 through 1990. We then calculated the standard deviation of the residuals for each person and calculated the average individual inter-temporal standard deviations for each firm. We refer to those firms with the top 20% inter-temporal variation as "high time variance firms" and the bottom 20% as "low time variance firms. Total pay averages 5.6% more at high time variance firms than at low time variance firms. Average residuals from the pay regression are 6.8% higher at high time variance firms. This is consistent with firms paying a premium to compensate risk averse workers for pay variation over time. However, it could also be that those firms that measure their employees performance carefully attract higher ability people.

[9] We ran separate regressions for base wage and for all pay. All the explanatory variables in these regression, except age and age squared, are indicator variables. The regression r-squares are approximately 0.4.

We now consider how wage variance changes with age. As discussed in the theoretical section above, if firms are gaining increasingly precise estimates of their workers' productivity over time, and if pay reflects the firm's best estimate of the employee's marginal product at any given time, then we would expect wage residuals to become more variable over time. We ran the same regressions of wages and total pay on the same variables as discussed above, but also included firm fixed effects. The average squared residual of these regressions rises monotonically with age. The average squared wage residual is 0.0334 for workers in their 20's, 0.519 for those in their 30's, and 0.647 for those in their 40's. Average squared total pay residuals follow a very similar pattern. Such as relationship has been shown numerous times in individual data before,[10] but controlling for firm effects allows us to demonstrate that this increase in variance occurs both within firms as well as between firms. We believe this suggests that individual firms are paying people at least somewhat based on their individual ability rather than more able workers simply sorting to higher pay firms, and that firms more precisely estimate productivity as employees gain labor market experience.

Tables 2-4 begin our analysis of employee turnover. We run probits where the dependent variable takes the value of one if the employee is at a firm in 1988, but no longer works at that firm in 1989. The dependent variables capture the employee's wage and recent wage growth relative to some reference group, as well as whether the person was recently promoted. "Relative wage" is the log of the person's 1987 wage minus the log of the average 1987 wage of the other people in the reference group. "Relative Raise" is the log change in the individual's wage from 1986 to 1987 minus the average log change of the other people in the reference group. "Promote" is an indicator variable for whether the person was promoted between 1986 and 1987.[11]

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[10] See, for example, Farber and Gibbons (1996).

[11] Note that we use 1986 and 1987 wage observations because, if the person leaves the firm in 1988, the wage may be biased down. This could potentially create a mechanical relationship between wage and turnover.

In columns 1 and 2, the comparison group for each worker is all other people in his occupation in the entire dataset. This is comparable to what we could calculate if we were using a standard dataset that did not allow the matching of workers to firm (for example, if we were using the Current Population Survey or the National Longitudinal Survey of Youth.) Columns 3 and 4 take advantage of the firm/employee match by comparing workers wages and raises to all others at the same firm. Finally, columns 5 and 6 focus on a more specific peer group – those employees in the same occupation and at the same firm.

No matter what reference group we look at, we conclude that those workers who are relatively well paid and who have recently been promoted are more likely to leave their jobs. But increases in pay lower turnover. The estimates in column 1 suggest that a worker who is paid 10% more than another worker with the same occupation is, all else equal, less likely by 1.6 percentage points to leave his job in a given year. Given an unconditional turnover rate of about 16%, this is a substantial effect. However, relative pay within a firm appears to be a better indicator of a person's ability or outside opportunities than pay relative to the wider economy. An employee who is paid 10% more than another person at his firm has a 6.3% greater chance of leaving his firm than his peer. Though the estimates are less precise, a worker who got a 10% raise is, all else – including the level of pay – equal, 5 percentage points less likely to leave the firm than another employee of the firm who got no raise. The results are similar when looking at the firm/occupation group as a reference point. These estimates suggest that some firms may not be able to raise some of their best workers pay, nor promote them enough, to keep up with their market opportunities. More specifically, employees near the top of their firms' pay scale may be people with specialized skills that can be more profitably employed elsewhere.

Columns 4 and 6 show that this relationship between pay and turnover is not completely captured through a linear estimate. We broke the relative wage and relative raise variables down into a series of four indicator variables each and we use the bottom quartile of each as the excluded category in our probits. Column 4 shows that an employee in the top quartile of a firm's pay scale has a 2.7% higher probability of turning over than an employee in the bottom quartile. None of the other quartile indicators is significant. The effect is similar, though smaller, when looking at the firm/occupation reference group. It appears that it is truly only the top talent in the firm where firms' wage policies limit their ability to pay people and ward off outside opportunities. The raise effects, on the other hand, work in the opposite direction. Employees who are in the bottom quartile of raises are significantly more likely to turn over, but there are no significant differences among the top 75% of raises. This suggests that poor performers receive low pay raises before being fired or that poor performers take a bad raise as a signal that they should look elsewhere. As with the finding that high pay workers turn over more, this also could suggest that efficient sorting goes on at the extreme of the pay scale.

In Table 3, we add a variable to capture how variable pay is within an employee's reference group. "Wage Spread" is the standard deviation of log wage of all employees at a firm (columns 1 and 2) or all employees in the same occupation at a firm (columns 3 and 4.) As shown in column 1, firms that have greater spread in the pay of their workers have lower turnover. This may be because firms that compress their wages less face lower competitive threat for employees because workers are paid their marginal products. Alternatively, it could be that some firms' production processes allow them to efficiently employ a more heterogeneous set of workers (that is, a wider variety of abilities) and to find efficient uses for a greater set of employees.

Columns 2 and 4 of Table 3 interact wage spread with the wage and raise quartile indicators used in Table 2. The increase in coefficients with raise quartile indicates that, while getting a big raise deters turnover at all firms, the deterrent effect is larger at firms with less variable wage schedules. That is, if an employee gets a large raise at a firm that has high wage variability, that has less of an effect on his turnover probability than if he got the same raise at a low wage variability firm. Also, we know from Table 2 that higher pay employees within their firm/occupation group are more likely to leave their jobs. The increasing coefficients with wage quartile in column 4 of Table 3 provides some evidence that this effect is larger at HIGH wage variability firms. That is, at firms where there is substantial wage spread within occupation, it is even more the case that the high pay employees within a given group are more likely to leave.

In Table 4, we consider how wages, recent raises, and turnover affect future pay increases. We run OLS regressions where the dependent variable is the log change in wage from 1987 to 1990. The sample is limited to those employees for whom we have a 1990 wage observation. This introduces potential selection bias as employees who leave their job are underrepresented. However, we have almost 7,000 observations (almost 10% of the sample) of job changers. Column 1 shows that high wage workers as of 1987 get lower raises in subsequent years, which suggests some mean reversion in wages. However, those who got large raises before 1987 continue to get large raises after. That is, wage changes are positively serially correlated. Column 2 shows that workers get approximately a 5% premium for switching jobs.

In column 4, we limit the sample to workers who change jobs and find that pay dynamics are similar to those for the larger sample. That is, those who were getting relatively high raises at their first employer continue to get high raises at their new job and those who were well paid at their old job get somewhat lower pay increases when switching jobs.

Conclusions

References

Table 1
Summary Statistics

	Sample Mean	Sample Median
Age	38.73 (7.14)	40
Wage (Kroners/Month)	13,191 (3,839)	12,272
Raise (1986 to 1987) in logs	0.0795 (0.050)	0.0648
Turnover (1988 to 1989)	16.3%	
Promotion	0.90%	
Firm s.d. of log wages	0.263 (0.050)	0.265
Firm/Occupation s.d. of log wages	0.223 (0.080)	0.227

Notes: Data from the Swedish Employers' Federation. Sample limited to men between the ages of 23 and 50. Sample includes 84,778 employees at 2,010 firms covering 47 occupations. All employees who do not have at least five coworkers at their firm in the same occupation category were dropped. Standard deviations are in parentheses. "Firm s.d. of log wages" is the standard deviation of 1987 wages at each worker's firm. "Firm/Occupation s.d. of log wages" is the standard deviation of 1987 for all employees in a given occupation at a firm.

Table 2

Turnover, Wages, and Wage Dynamics

Dependent Variable = 1 if employee is at firm in 1988 but not at the same firm in 1989

	(1)	(2)	(3)	(4)	(5)	(6)
Relative Group	Occupation (All Firms)		Own Firm		Firm/Occupation	
Relative Wage	0.016		0.063		0.043	
	(2.82)		(10.81)		(6.83)	
Top Quartile		0.002		0.027		0.014
		(0.57)		(6.47)		(3.49)
Second Quartile		-0.006		0.005		-0.001
		(1.54)		(1.14)		(0.40)
Third Quartile		-0.002		0.001		0.004
		(0.59)		(0.004)		(1.07)
Relative Raise ('86 to '87)	-0.044		-0.052		-0.062	
	(1.58)		(1.83)		(2.22)	
Top Quartile		-0.009		-0.010		-0.122
		(2.51)		(2.69)		(3.27)
Second Quartile		-0.023		-0.020		-0.018
		(6.51)		(5.58)		(4.89)
Third Quartile		-0.017		-0.014		-0.014
		(4.77)		(3.91)		(3.84)
Promote	0.032	0.029	0.030	0.29	0.031	0.030
	(2.31)	(2.13)	(2.20)	(2.69)	(2.29)	(2.19)
Log-likelihood	-37,400	-37,378	-37,347	-37,357	-37,381	-37,381

Notes: Results shown are from probits. Coefficients are marginal effects of a one unit change in the explanatory variable. Absolute value of z-statistics are in parentheses. Data from the Swedish Employers' Federation. Sample limited to men between the ages of 23 and 50. Sample includes 84,778 employees at 2,010 firms covering 47 occupations. All employees who do not have at least five coworkers at their firm in the same occupation category were dropped. "Relative Wage" is the log of the individual's wage minus the log of the average (not including the individual) wage in the relative group. For example, in column 1 (2), "relative wage" is the log of the individual's wage minus the log of the average of the wage of all other workers in the sample (at the firm) who work in the same occupation. "Relative raise" is the log change in the person's wage from 1986 to 1987 minus the average (not including the individual) log change in the relative group. "Promote" is an indicator variable for the employee getting a promotion between 1986 and 1987. In columns 2, 4, and 6, the excluded category is the bottom quartile for both relative wage and raise. Each regression includes a full set of age dummies.

Table 3
Turnover and Wage Compression

Dependent Variable = 1 if employee is at firm in 1988 but not at the same firm in 1989

	(1)	(2)	(3)	(4)
Relative Group	Own Firm		Firm/Occupation	
Wage Spread	-0.462		-0.126	
	(18.28)		(7.97)	
High Wage Spread * Wage Quartile:				
Top		0.012		0.025
		(1.73)		(3.36)
Second		-0.002		0.020
		(0.29)		(2.59)
Third		-0.012		0.011
		(1.62)		(1.40)
High Wage Spread * Raise Quartile:				
Top		0.023		0.026
		(3.18)		(3.51)
Second		0.011		0.019
		(1.47)		(2.47)
Third		0.003		0.006
		(0.45)		(0.84)
Promote		0.29		0.029
		(2.12)		(2.19)
Log-likelihood	-37,189	-36,969	-37,349	-37,307

Notes: See notes to Table 2 for details on sample and interpretation of coefficients. Wage spread in columns 1 and 2 is the standard deviation of log wages at the individual's firm. In columns 3 and 4, wage spread is the standard deviation of log wages for people in the individual's occupation at his/her firm. The coefficients in columns 2 and 4 are interactions between an indicator for whether the person's firm (or, in column 4, firm/occupation) is in the to half of all wage spreads with an indicator for the wage and raise quartiles used in Table 1. All columns include the wage and raise quartile indicators. Columns 2 and 4 include a high wage spread indicator.

Table 4
Turnover and Future Raises

Dependent Variable = log 1990 wage – log 1987 wage

	(1)	(2)	(3)	(4)
Relative Wage (1987)	-0.056		-0.057	-0.095
	(17.90)		(18.28)	(8.21)
Relative Raise ('86 to '87)	0.255		0.254	0.132
	(16.44)		(16.47)	(2.62)
Turnover ('88 to '89)		0.051	0.051	N/A
		(22.80)	(23.07)	
R-Square	0.111	0.111	0.117	0.122
Observations	70,121	70,121	70,121	6,995

Notes: See notes to Table 2 for sample details. Coefficients are from OLS regressions. "Turnover" is an indicator for the person working at a different firm in 1989 than in 1988. Column 4 sample is limited to those for whom turnover equals one. Each regression includes a full set of age dummies.