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Abstract

This study examines the effect of profit sharing on the employee turnover in firms. The existence of a profit sharing programme (or performance related pay) in a firm is in general associated with a reduction in the probability of separation for salaried employees by 1-2 percentage points for the average employee. It is doubtful whether there is a reduction in the turnover for wage earners. The estimates indicate that more firm-specific human capital relative to general human capital is associated with a lower probability of separation.

1 Introduction

In recent decades the use of collective rewards to employees has increased rapidly in Finland. Especially profit sharing schemes have become more common. The aim of this paper is to examine whether or not profit sharing reduces turnover in accordance with the theoretical results in Azfar [2000] and Snellman [2002].¹ According to these theories, profit sharing can be useful to reduce the risk for inefficient separations, because it enables a more flexible wage setting with temporary pay increases if the base wage is rigid. Raising the base wage then implies a commitment to keeping a high pay in the future as well. This raises the expected cost of the firm for raising the base wage, which may lead the firm to lower the rise in the pay of the employees and instead take the costs associated with separations. Profit sharing may thus give an opportunity for firms to raise the pay of their employees without committing to keeping the higher pay in the future. This means that profit sharing may lead to higher wage costs but lower costs for separations. The possibility that profit sharing schemes provide incentives, which has been claimed to be an important reason for the use of profit sharing schemes in OECD [1995], is disregarded.

If profit sharing makes pay more flexible and, in consequence, increases the possibilities to reduce separations, one should be able to observe a negative effect on the probability for quits. Azfar and Danninger [2001] claim that they find a strong effect of profit sharing on separations, which includes both quits and dismissals, but they find the strongest effect on dismissals rather than on quits. This points toward that the use of profit sharing is endogenous with respect to the willingness of the firm to keep the employee and that they have failed to take this endogeneity into account when estimating the effect on the separations. This also influences the effect of dismissals, because a worker expecting to be dismissed is more likely to search for other jobs.

In the analysis I use matched employer-employee data. Although the data does not give the reasons for leaving a firm (or a change in the firm code), I make attempts to eliminate any bias by deleting firms with large changes in employment and using control variables for changes in employment. This greatly reduces the problem caused by dismissals, because dismissing employees and replacing them with new employees is uncommon in Finland. Although dismissals in some cases may be replaced by voluntary quits due to nonpecuniar factors,

¹Many of schemes can rather be described as pay-for-performance schemes but most have elements of profit sharing. Because of lack of information of the different types of programmes and to emphasise the collective characteristics of these schemes, I will use the term profit sharing for the rest of the paper.

which make the outside opportunities look better to the employee and which are correlated with (not) using profit sharing, the data is probably quite accurate. Some of the reductions in employment are probably consequences of firms selling a part of their business. However, since such sellings should not have been affected by the profit sharing programmes, excluding observations from such firms is likely only to improve the preciseness of the effects on the quit probability of profit sharing.

These measures do not eliminate all potential biases of the estimates. Another source of bias could be that the use of profit sharing schemes may be a response to high employee turnover. High costs for employee turnover may also induce firms to reduce employee turnover by other measures in addition to profit sharing programmes, such as better work environment and better personnel policy. On these measures there is no information in the data. The former reduces and the latter raises the absolute value of the coefficient of the profit sharing scheme. In consequence, there will be some bias in the estimates of the effects of profit sharing on quits, and it is not possible to say in what direction the estimates are biased.

The endogeneity of the decision to introduce profit sharing schemes is supported by other observations. In addition to the direct cost of having to pay a part of the profit of the firm to the employees, profit sharing schemes are also accompanied by administrative costs. These may be lower in larger firms, because they are likely to have a more efficient accounting system and better measures of the performance of the firm relative to information on the performance of individuals. In addition the profit sharing schemes are likely to differ from firm to firm, because of differences in the need to keep the employees. This is also confirmed empirically.

According to Uusitalo [2002] firms with profit sharing programmes are not only larger, but also more capital intensive. In addition they pay higher wages and have a larger share of salaried employees as well as employees with university education. This means that the decision to introduce profit sharing is not exogenous with respect to the characteristics of the firm and its employees. This may lead to omitted variable bias and I attempt to eliminate it by including control variables but lack of data prevent me from controlling for capital intensity.

The study continues as follows. The next section presents the data used in the study. The third section presents the econometric model. The fourth section presents the results and provides a number of alternative estimations in an effort to examine the robustness of the results. The fifth section discusses the results and the sixth section concludes.

2 The data

The analysis uses data on pay and other characteristics of the workers in the firms gathered by Confederation of Finnish Industry and Employers as well as some data concerning the profit and other characteristics of the firms gathered by tax authorities. The data spans the time period 1997-2000 and each year there is on average more than 150,000 observations on salaried employees and a little less than 250,000 observations on wage earners. Whether an employee stays in the firm or not is deduced from whether or not the employee is observed

in the same firm in the end of the following year with a positive wage. For the wage earners this means the last quarter of the year and for the salary earners the last month of the year. If an employee is not in the same firm next year, it can either be a result of the fact that he is employed by another firm or that he for unknown reasons is no longer in the data set. In consequence, the study is concerned with whether employees who have been observed in one firm in one of the years in the time period 1997-99 is observed in the same firm in the following year.

The reasons for a disappearance from a firm may be a dismissal or a quit. Because the aim is to examine the effect of profit sharing schemes on the separation decisions of the employees, I excluded observations from firms in which many of the separations seem to be related to employment changes or restructuring of the firm. In consequence, all observations from firms in which more than half of the employees exit are excluded. As are all observations from firms in which more than 30 percent of the employees exit in such a way that there is no information (no firm code) concerning where they are employed next year, or in which more than 20 percent of the employees exit to a given firm (the firm code changes to a certain firm code different from missing). The motivation for these criteria is that when there is a greater share of exits to a certain code, they are more likely to be related to each other and to less likely to be a consequence of the explanatory variables. They can be a consequence of that a part of the firm has been bought by another firm or of that the firm has laid off employees (in the case when the firm code in the next year is missing). That a higher share of exits to missing is required for the observations from the firm to be deleted can be motivated by that there always are some employees exiting to other sectors of the economy or retiring. I also deleted all observations from firms with five or less employees in the examined category (salaried employees or wage earners) and all observations in which pay was zero. This reduces the number of observations by a few percent. I also deleted several hundred employee observations which occurred more than once in the data for one year as well as all observations from firms in which more than 30 percent of the observations were of such employees (almost no observations were deleted on the basis of this criterion).

A considerable amount of observations have also been deleted, because there are reasons for believing that these employees were very likely to exit for other reasons than job offers from other firms. Both salaried employees and wage earners are excluded if they have entered the firm in the current year, because firms have the right to dismiss new employees. In addition, profit sharing schemes often stipulate that employees should have been in the firm a certain time. Moreover, all employees older than 53 years have also been excluded, because at 54 there is a significant rise in separation risk, probably because of a discrete change in the possibility of retiring by leaving the job.

In the presented estimations for the wage earners all observations in which the person has worked less than 1,400 hours or more than 2,000 hours have also been excluded. This excludes another 25 percent of the wage earners from the estimations. Correspondingly a large number of salaried employees are excluded, because they are not ordinary salaried employees of interest for the study. Of the remaining salaried employees only those with earnings between 90,000 and 600,000 FIM were included in the study and of wage earners only those with earnings between 60,000 and 500,000 FIM. This simple criterion means that em-

ployees with somewhat lower real earnings were included for later years but this is unlikely to have any substantial effect on the estimates. After the deletions there remains on average a little more than 90,000 observations on salaried employees and a few thousand more on wage earners per year. The number of observations decline further in estimations in which women are deleted or there are missing values on some explanatory variables.

3 The model

Firms will be unwilling to raise the wage in response to an increase in demand for labour, if they expect that the increase might be temporary and wages are rigid. Profit sharing schemes may overcome the rigidity problem by introducing a mechanism which automatically adjusts the pay of the worker in response to changes in the outside option of the firm or the worker. This should enable firms to be more responsive with respect to the outside options. In consequence, the introduction of profit sharing schemes should be associated with a reduction of the number of separations.

In the subsequent empirical analysis I attempt to explain the separations of employees, grouped into white collar and blue collar employees. The main explanatory variable of interest is the profit sharing variable. As profit sharing variable this study uses the presence of a profit sharing programme in the firm for the employee category (wage earners or salaried employees), which is measured as whether anyone in the employee category receives a bonus the following year.² It is thus a firm-level dummy variable. Whether the employee got a share of the profit in the same year is also tested as an explanatory variable to examine the robustness.

Panel data from all years are used in the estimations. However, due to the fact that there is little variation of time, panel estimation methods that allow for individual effects cannot be used in the estimations. Clearly this leads to a risk for that the effects of other characteristics of firms are attributed to the profit sharing programmes and the estimates should be interpreted with caution.

The explanatory variables include the logarithm of the average yearly wage paid by the firm, a set of dummy variables for the tenure (current year - the year when the employee started in the firm), a set for the yearly wage of the employee (one set for each of the years) and a set for the number of employees in the firm.³ In order to get an appropriate set of dummies the categorisation has been made on the basis of logarithm of the wage or the logarithm of the number of employees in the firm, because it seems likely that what is of importance is the relative rather than the absolute change in these variables. Because the level of pay rises with time, the wage dummies have been interacted with the time dummies. The explanatory variables also include dummy variables for the level of schooling (base category is compulsory schooling for salaried employees and schooling missing for wage earners), the county, age (one for every year), job category or educational category and gender. Although they are not displayed in the tables there are also a set of schooling dummies for observations of salaried

²The reason for using information from the following year is that the bonuses are usually based on the performance of the firm in the preceding year.

³See the appendix for a description of the variables displayed in the tables.

employees in 1997 based on the variable *Koulkood*. This irregularity is a consequence of the introduction of the new schooling code in 1998 in the data set. The fineness of the categorisation of job and education varies somewhat between the models.

There are also variables for changes in the number of employees (salaried employees or wage earners) in the firm, measured in percentage points. Reductions and increases in the number of employees are measured by two different control variables and the reduction-variable is set to zero when there is an increase. Correspondingly the variable for increases is set to zero when there is a reduction in the number of employees in the category. Both variables are zero when there is no change. For wage earners there is also data on the number of hours worked and hourly wages as well as a division of the pay into a component which depends on individual raises and raises due to inconvenient working conditions. These variables are also used as explanatory variables in some specifications, since the utility of the employee is likely to be associated with the working conditions. The estimated model is a probit model, since the dependent variable is dichotomical. The model can be written as

$$p(S = 1) = \Phi(\beta'x), \quad (1)$$

in which S takes the value 1, when there is a separation, and p is the probability for it. The function Φ is the cumulative distribution function for the standardised normal distribution. The vector x denotes the explanatory variables and β' is the vector of coefficients for them. The tables will present the raw coefficients from the probit equation. I allow for correlation between errors inside one firm in the calculation of the standard errors of the estimated coefficients.

The model differs from the one of Azfar and Danninger in a number of ways. All variables that they used are not applicable to or available in the data set used in this study. In addition, some variables are substituted for by other variables which I consider more appropriate for the purpose. The profit sharing variable also differs in that I usually use a firm-wise measure rather than a measure based on whether the employee receives a profit sharing bonus. Moreover, this study includes a number of explanatory variables, which were not included in the study of Azfar and Danninger. Among these are especially variables for firm characteristics, since this data material includes some information on firms as opposed to the data used by Azfar and Danninger. However, note that variables corresponding to tenure, plant size, and profit sharing, which proved to be most influential on the separation decision in the study of Azfar and Danninger, are included as explanatory variables in this study as well.⁴

4 Results for salaried employees

In the basic estimations no variables for changes in employment are included. The estimates from these are reported in Table 1 and they indicate that the introduction of a profit sharing scheme changes the normally distributed underlying variable for the separation decision by approximately 0.12-0.15. This

⁴Work experience also reduced quits in the study of Azfar and Danninger but in this data material there is no good measure of it. The age dummies and the educational variables are together likely to capture much of the effect of work experience.

Table 1: Estimations with salaried employees.

Variable	Model 1		Model 2	
	Coefficient	Standard error	Coefficient	Standard error
Profit sharing	-.12657	.04857	-.14201	.04850
Tenure	-.04638	.00248	-.04651	.00315
Tenure2	0.001018	0.000083	.00109	.00013
Production	.01208	.03922	.00633	.04068
Supports production	-.01695	.02675	-.02416	.02892
Communication	.09445	.03100	.08816	.02573
Administration	.13589	.02901	.13530	.03753
Personnel adm.	.11396	.03781	.02655	.05654
Manager	.08852	.02080	.10137	.02304
Schooling1	.22306	.03183	.18059	.04795
Schooling2	.21332	.03790	.15043	.05289
Schooling3	.26795	.04865	.21773	.06285
Schooling4	.38986	.05320	.34124	.06434
Schooling5	.34420	.07863	.32847	.09663
Woman	-.03767	.02354	-	-
Year97	.25223	.21406	.17116	.13646
Year98	.16970	.25129	.18024	.34264
Number of obs.	275,406		174,176	
Explanatory var.	138		135	
Log likelihood	-82,642.966		-52,549.292	

implies a reduction in the probability for separation by somewhat more than two percentage points for the representative employee according to the point estimate.

In all specifications standard errors have been calculated in a way that allows for correlation in the error term between observations within firms. Model 2 in which women are excluded produces very similar estimates as Model 1 which includes observations on both men and women.

Besides the effect of profit sharing one can notice that the coefficients for the occupational dummies of the employees are significant. As are the coefficients of the schooling dummies. Working with the manufacturing process or research and development, reduces the probability of separation relative to jobs which are likely to vary less across firms. Similarly more general education (at least a masters degree, *Schooling4* and *Schooling5*) is associated with more mobility compared to only compulsory schooling (base category) or vocational schooling (represented by *Schooling1* and *Schooling2*). These results support the hypothesis that more firm-specific human capital relative to other human capital reduces the probability for a separation. This was expected since a larger proportion of firm-specific human capital increases the utility of staying in the firm relative to the utility in the outside option.

The coefficient of the profit sharing variable in Table 1 may reflect a corre-

lation between down-sizing and not paying bonuses to the employees. Such a correlation might exist since an unprofitable firm is more likely to dismiss employees and the employees in it are also less likely to meet the criteria for getting a share of the profit. To avoid this source of errors in the estimates the percentage change in the number of salaried employees is introduced in the models. To allow for different effects of increases and reductions in the number of employees, the former are measured by the *Growth*-variable and the latter by the variable *Reduction*. The effects are likely to differ since a reduction in the number of employees increases the probability for that any given employee in the firm is dismissed. Whether the number of employees is unchanged or increases should not have any sizable effect on the number of dismissed workers. It may affect the career opportunities, but the effect of this on the employee's quit decision is likely to be much smaller than the effect of down-sizing on the risk for being dismissed.⁵

It might be argued that the *Growth*- and *Reduction*-variables to some extent are endogenous. However, these variables are based on the decisions of the firm and the dependent variable is the quit of the individual. Although they may be overlapping to some extent, the change in employment in a firm is not directly related to the decision to exit of individual employees, with which this study is concerned.

The resulting estimates might better measure the influence from the profit-sharing schemes on the quits of the employees. Table 2 presents the estimates with the variables for the employment change included. The variable *Reduction* is very strongly related to the separation risk. This indicates that dismissals have been an important explanation to the separations. The coefficient for the influence of profit sharing declines compared to the estimates in Table 1, which might be a consequence of that the correlation between down-sizing and not paying bonuses because of poor performance affected the estimates in Table 1. The estimates implies that for the average employee an introduction of a profit sharing scheme reduces separations by less than two percent according to the point estimate. However, the coefficients of the profit sharing variable are still significantly different from zero. Whether women are included or not does not influence the estimates.

The occupational categories had significant coefficients in all estimations. These coefficients reflect differences in the outside options across the categories. It is possible to control even better for these differences by including a dummy variable for each occupational code. The results of this are presented in Table 3 (no coefficients for occupational dummies are included). In these models the coefficients of the profit sharing dummy decline further but the coefficients are still significantly different from zero. The point estimates imply that the introduction of a profit sharing programme is associated with a reduction in the separation probability of the average employee by slightly more than one percentage point.

That the amount of firm-specific human capital relative to general human capital affects the probability for exit makes it likely that profit sharing schemes can have stronger effects on employees with a relatively small amount of firm-

⁵In some cases an increase in the number of employees may be a consequence of a mergers and acquisitions. In such cases the firm may actually dismiss a part of the employees, although the number of employees increases.

Table 2: Estimations with salaried employees. Changes in the number of salaried employees included among the explanatory variables.

Variable	Model 3		Model 4	
	Coefficient	Standard error	Coefficient	Standard error
Profit sharing	-.09424	.03653	-.11424	.04729
Reduction	.03407	.00223	.03216	.00270
Growth	0.000072	0.000315	0.000050	0.000339
Tenure	-.04926	.00244	-.04916	.00328
Tenure2	0.001088	0.000086	0.001153	0.000136
Production	.00682	.03913	-.00037	.04088
Supports production	-.01254	.02474	-.02131	.02711
Communication	.09743	.02578	.08777	.02249
Administration	.13036	.02775	.12333	.03431
Personnel adm.	.09469	.03690	-.00786	.05537
Manager	.09137	.02155	.10583	.02322
Schooling1	.22945	.03158	.18923	.05014
Schooling2	.22720	.03746	.15900	.05722
Schooling3	.27766	.04672	.22259	.06572
Schooling4	.38480	.04737	.33277	.06346
Schooling5	.35588	.06876	.33374	.08987
Woman	-.04455	.02259	-	-
Year97	.25896	.21645	.24322	.21994
Year98	-.10509	.26745	.24205	.25260
Number of obs.	275,406		174,176	
Explanatory var.	140		137	
Log likelihood	-81,033.277		-51,663.354	

Table 3: Estimations with salaried employees. Changes in number of salaried employees and dummies for each occupational code are included as explanatory variable.

Variable	Model 5		Model 6	
	Coefficient	Standard error	Coefficient	Standard error
Profit sharing	-.08516	.03692	-.10137	.04467
Reduction	.03473	.00214	.03298	.00256
Growth	0.000040	0.000308	-0.000007	0.000330
Tenure	-.04795	.00243	-.04788	.00320
Tenure2	0.001073	0.000085	0.001146	0.000137
Schooling1	.22777	.03309	.18814	.05095
Schooling2	.22053	.03821	.15420	.05790
Schooling3	.24150	.04647	.18179	.06534
Schooling4	.35116	.04778	.29462	.06282
Schooling5	.35347	.06992	.32389	.09192
Woman	-.02170	.02283	-	-
Year97	.24725	.21750	.22276	.22239
Year98	-.12321	.26411	.23622	.25529
Number of obs.	275,406		174,144	
Explanatory var.	206		201	
Log likelihood	-80,719.349		-51,428.477	

Table 4: Estimations with salaried employees. Variables for interaction between profit sharing and other variables. Changes in number of salaried employees and dummies for each occupational code are included as explanatory variables.

Variable	Model 7		Model 8	
	Coefficient	Standard error	Coefficient	Standard error
Profit sharing	-.06617	.04637	-.05876	.05097
Ps*Woman	.02796	.04137	-	-
Ps*Production	-.06222	.03233	-.03839	.03331
Ps*(Low education)	.06186	.05230	.06037	.07389
Ps*(Medium education)	.07012	.03149	.03876	.03773
Reduction	.03500	.00203	.03319	.00250
Growth	0.000035	0.000310	-0.000010	0.000334
Tenure	-.04409	.00506	-.04555	.00480
Tenure2	0.001022	0.000095	0.001220	0.000183
Schooling1	.22913	.03365	.19419	.05246
Schooling2	.21667	.03340	.17725	.06428
Schooling3	.23511	.04032	.20233	.06887
Schooling4	.39995	.05542	.34514	.07880
Schooling5	.40435	.07873	.37441	.10793
Woman	-.04157	.03591	-	-
Year97	.29870	.21936	.30680	.24122
Year98	-.11835	.26494	-.04764	.28180
Number of obs.	275,406		174,144	
Explanatory var.	212		207	
Log likelihood	-80,690.471		-51,408.788	

specific human capital. One can imagine that there are different reasons for exit. These may include unexpected accidents or events, which leave the employee with little choice but to quit the job. In such cases the profit sharing scheme does not have any influence. The profit sharing variable is likely to be of greater importance when the utility of the outside option more often is close to the utility of staying in the firm. Then the separation is a consequence of consideration by the employee and not the consequence of exogenous forces. In addition, some groups of employees may be more likely to receive bonuses than others because they are more important to the firms or because there is a higher risk that these employees quit. To test these hypotheses the profit sharing dummy is interacted with variables indicating the level of general human capital relative to firm-specific human capital (tenure, tenure squared, employed in production, activity which supports production or R&D) as well as with the dummy variable for women. As the estimations in Table 4 indicate there is no robust evidence of such effects.

Estimations with separate models for each of the three years show that the coefficient of the profit sharing variable was most negative in 1997 and insignifi-

Table 5: Estimations with salaried employees and profit sharing variable measured on the level of the individual. Dummies for each occupational code are included as explanatory variables.

Variable	Model 9		Model 10	
	Coefficient	Standard error	Coefficient	Standard error
Profit sharing	-.07772	.03083	-.08532	.03632
Reduction	.03516	.00239	.03379	.00288
Growth	0.000095	0.000297	0.000031	0.000337
Tenure	-.04343	.00291	-.04525	.00385
Tenure2	0.000959	0.000098	0.00110	0.00015
Schooling1	.24111	.02884	.22159	.04328
Schooling2	.23623	.03293	.19210	.05073
Schooling3	.26526	.04096	.22833	.05656
Schooling4	.38406	.04590	.35782	.06030
Schooling5	.36744	.06838	.35021	.08806
Woman	-.02781	.02394	-	-
Year97	.26155	.23420	.28469	.25713
Year98	.21785	.24739	-.03412	.31096
Number of obs.	247,789		155,793	
Explanatory var.	205		201	
Log likelihood	-68,312.404		-43,382.159	

cantly different from zero in the other two years but the differences in the coefficient between the years were not significant.

As a test of robustness I also run estimations in which the existence of profit sharing is measured on the level of the individual. In these models whether the employee has been given a share of the profit in the same year as the other explanatory variables are measured. This is also an imperfect measure of the incidence of profit sharing, since employees do not have to expect to get a share of profit in the following year or in the future, although they got a share of the profit the year before it is measured whether the separation takes place. The expected bonus in the future may be of greater importance for the separation decision and as mentioned earlier the bonus is often based on the profit in the preceding year, implying that the employee might estimate the bonus in the preceding year rather precisely. To avoid problems with persons not eligible for bonuses employees with a tenure of less than two years are excluded. The results are presented in Table 5. The control variables in the specifications are the same as in Table 3 and in Model 10 observations of women are excluded.

The estimates are rather similar to those in earlier specifications, although the t-values are higher. This indicates that variation across employees or groups of employees may be more important than variation over time for the effects of profit sharing on separations. However, the fact that the coefficient and the effect on the separation probability of the average employee do not change much indicates that the presence of a profit sharing programme may have some effect

Table 6: Estimations with wage earners. Dummies for category of yearly income included as control variables.

Variable	Model 11		Model 12	
	Coefficient	Standard error	Coefficient	Standard error
Profit sharing	-.02744	.03646	-.02022	.03914
Tenure	-.05065	.00437	-.04822	.00523
Tenure2	.00128	.00012	.00120	.00013
Schooling1	.00594	.02408	-.00193	.02631
Schooling2	.07683	.02123	.05396	.02276
Schooling3	.46187	.03873	.46308	.04477
Schooling4	.71525	.07059	.66368	.07923
Schooling5	.16009	.15831	.19401	.19657
Woman	-.12749	.03331	-	-
Year97	.04990	.52232	-.00594	.71139
Year98	5.4831	.43320	-.26777	1.34665
Number of obs.	287,109		225,602	
Explanatory var.	112		133	
Log likelihood	-59,493.382		-46,257.301	

although no bonus is paid to an employee. The point estimates imply that profit sharing reduces the separation risk by between one and two percent for the average employee.

5 Results for wage earners

Among wage earners profit sharing programmes are less frequent. The bonuses also form a smaller share of the total income of those wage earners who receive them. This makes it less likely that the profit sharing programmes have any sizable impact on the wage earners quit decisions. There is also data on the trades of the wage earners, i.e. a rather precise categorisation of the tasks of the employee. Because there is a greater number of codes and the jobs differ from industry to industry to a greater extent than for salaried employees, only estimates in which dummies for every trade have been used as control variables were made. However, since the inclusion of these did not change the results, finally only estimations without trade dummies were used and included in the presentation. The results were similar if dummies based on a more detailed educational categorisation were used instead of job dummies. Table 6 presents estimations with data for wage earners corresponding to those in the specifications for salaried employees in Table 1. As expected, the coefficient of the profit sharing variable is smaller than in the estimations for salaried employees. Moreover, it is insignificantly different from zero.

The data for the wage earners also includes information on how many hours each employee has worked and the employee's hourly wage. The hourly wage may be a better measure of the wage level than the total pay during a year. To

investigate this I categorise the employees into twenty wage categories for each year on the basis of their hourly pay. Assigning each of the categories a dummy results in a set of 59 dummies (and a base category), which can be used instead of the corresponding set of dummies based on the yearly income. However, this change of control variables did not result in any major changes in the coefficients of interest.

In the following models dummies for how many hours the employees have worked are also included. These dummies are based on a categorisation of the employees into 20 groups in the interval from 1400 to 2000 hours. The number of hours worked is likely to not only measure the utility of having the job. It also reflects the outside option of the employee. An employee, who is often ill, is likely to have a worse outside option than those who work more. The possibility to work overtime may also increase the utility of the job and leave less time for searching a different job. However, the utility is likely to be lower than if the employee had earned the pay during regular hours.

The data mostly gives no information on the reasons for deviations in the hours worked and it is not possible to know how these effects should be controlled for in the estimation of the effects of profit sharing programmes or other forms of pay. However, the dummies for the hours worked are significant and the probability for separation is lowest in the intervals at the medium level. Introducing the variables for changes in employment, assuming that they do not themselves cause serious endogeneity problems, leads to a further decline in the absolute value of the coefficient of the profit sharing variable and it even becomes positive in Model 13. The estimates are presented in Table 7.

In addition to the total wage, there is information on the base level of the wage and the pay for regular hours. I also tested with the shares of the total pay formed by the different kinds of pay as explanatory variables. They have a significant effect on the separation decision in some specifications but did not change the estimate of the effect of pay or profit sharing to any appreciable extent. Like for salaried employees I tested whether the result changes when I use a profit sharing variable which denotes whether the employee has received a bonus in the previous year. As in the previous section, only observations of employees with more than one year of tenure are included.

These estimates show that in the case of wage earners the choice of profit sharing variable as explanatory variable affects the result. One reason for this result may be that whether wage earners get bonuses is determined on the basis of smaller units than the firm. In consequence, the existence of a profit sharing programme in the firm gives less information about whether the employee has got a bonus or at least has had a realistic opportunity to get a bonus in the case of wage earners than in the case of salaried workers.

6 Discussion

These estimations have indicated that there is a significant relationship at least between paying bonuses and being able to keep the salaried workers in the firm. However, the effect is small. According to the point estimates the availability of profit sharing schemes reduces the quit rate by approximately 1-2 percentage points for salaried employees and maybe even less for wage earners. Since the

Table 7: Estimations with wage earners. Dummies for category of yearly income included as control variables.

Variable	Model 13		Model 14	
	Coefficient	Standard error	Coefficient	Standard error
Profit sharing	.00294	.03124	-.00933	.03358
Reduction	.03909	.00309	.04115	.00325
Growth	.00145	.00075	.00167	.00084
Tenure	-.05093	.00442	-.05148	.00506
Tenure2	.00128	.00011	.00128	.00012
Schooling1	.00092	.02296	-.00589	.02568
Schooling2	.07653	.02103	.05392	.02273
Schooling3	.47048	.03949	.47944	.04660
Schooling4	.73312	.06774	.67732	.07904
Schooling5	.14611	.17301	.20325	.19939
Woman	-.13516	.03222	-	-
Year97	-.40313	.67207	-.07299	.71349
Year98	-.59318	1.29686	-.28794	1.34968
Number of obs.	287,105		225,602	
Explanatory var.	137		134	
Log likelihood	-57,716.066		-44,956.441	

Table 8: Estimations with wage earners. Dummies for category of yearly income included as control variables. Individual profit sharing variables used.

Variable	Model 15		Model 16	
	Coefficient	Standard error	Coefficient	Standard error
Profit sharing	-.08828	.05092	-.10652	.05001
Reduction	.04011	.00313	.04166	.00334
Growth	.00140	.00074	.00166	.00084
Tenure	-.03789	.00452	-.03867	.00515
Tenure2	.00092	.00012	.00094	.00013
Schooling1	.01331	.02421	.01083	.02701
Schooling2	.08660	.02205	.07116	.02425
Schooling3	.50181	.04821	.51518	.05521
Schooling4	.71353	.08014	.66378	.09358
Schooling5	.18267	.19803	.19282	.21592
Woman	-.13318	.03372	-	-
Year97	.25710	.82505	.23328	.82534
Year98	.63227	1.03108	.04585	1.69054
Number of obs.	263,018		207,764	
Explanatory var.	135		132	
Log likelihood	-48,119.347		-37,841.936	

average bonus is about 5 percent of yearly income, this indicates that for every percent the wage is raised through bonuses, the quit ratio is reduced by much less than one percentage point. Profit sharing is thus a rather expensive way of reducing quits among the employees. However, other forms of pay does not seem to be more efficient in keeping the workers in the firm, since the effect of other payment variable does not seem to be larger. On the contrary, an examination of the dummy variables for the base pay (not shown) indicates that it is even more weakly related to quits.

There were reasons to suspect that the estimates of Azfar and Danninger were strongly biased because of the endogeneity of the profit sharing with respect to the firm's interest for keeping the employee. If the firm plans to dismiss workers, it is unlikely that it would pay them a share of the profit. The employees are also more likely to quit then, not because of the absence of profit sharing but because of that it is highly likely that they are dismissed, if they do not quit. The weaker relationship in this study gives some support to this claim and so does the reduction in the estimates when the change in employment in the firms is included among the explanatory variables. However, much of the difference may be a result of differences between the Finnish and the American labour market.

There are also effects which have not been taken into account in this study. Azfar and Danninger argued that the strong correlation between faster wage growth and profit sharing is a sign of that profit sharing is associated with an accumulation of human capital, which is reflected in the pay of the employees. However, faster wage growth is likely to be a reflection of an upward-sloping

pay profile which is another way of the firm to attempt to reduce the employee turnover. That profit sharing tends to be used together with upward-sloping earnings profiles also indicates that it might be a way for the firm to reduce separations. This means that the estimates of Azfar and Danninger concerning the effects of profit sharing suffer from omitted variable bias. This may also be the case in this study, if upward-sloping earnings profiles are used by firms as a complement to profit sharing. In addition, firms may use a large set of policies to increase the satisfaction of the employees on their jobs. These may also be used as complements (or substitutes) to profit sharing cause biases in the estimated effects of profit sharing, if their effect is not accounted for in estimations.

7 Conclusion

According to the results in this study the effect of profit sharing programmes on separations is weak. The point estimates say that it costs considerably more than the pay for one year of one employee to prohibit one quit among the salaried employees. If there is an effect it is not very large and the main benefits of profit sharing programmes probably come in other forms such as a more co-operative attitude among the employees. This means that any judgment of profit sharing programmes should be cautious. It is also worth pointing out that there is no sign of profit sharing being less efficient than other kinds of pay in reducing quits among the employees. This combined with the possibility of an automatic reduction in pay in downturns may make it preferred by firms.

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Appendix

The definitions of the variables are displayed in the table.

VARIABLE	DEFINITION
Administrates	1 = For the salaried employee the variable tilnimike in the data set takes one the following values: 521, 522, 523, 524, 611, 711, 712, 721, 722, 731, 732, 741, 742, 743, 751, 752, 753, 754, 761, 762, 763, 764, 771. 0 = The variable tilnimike takes any other value.
Communication	1 = For the salaried employee the variable tilnimike in the data set takes one the following values: 321, 322, 323, 411, 412, 413, 414, 415, 416, 421, 422, 431, 511, 512, 513. 0 = The variable tilnimike takes any other value.
Growth	If the number of employees (depending on the model, either salaried employees or wage earners) in the following year is greater than the number of employees in the current year the value of the variable is calculated as: (number of employees in the firm in following year – number of employees in the firm in current year) / number of employees in the firm in the current year. Otherwise it is set to zero.
Manager	1 = For the salaried employee the variable tilnimike in the data set takes one the following values: 111, 221, 311, 321, 411, 511, 521, 711, 811, 851 0 = The variable tilnimike takes any other value.
Personnel adm.	1 = For the salaried employee the variable tilnimike in the data set takes one the following values: 811, 821, 822, 831, 832, 841, 851, 852, 853, 861 0 = The variable tilnimike takes any other value.
Production	1 = For the salaried employee the variable tilnimike in the data set takes one the following values: 211, 212, 213, 214, 215, 216 0 = The variable tilnimike takes any other value.
Profit sharing	Usually: 1 = someone in the firm has got a bonus, 0 = nobody in the firm has got a bonus. Table 5 & 8: 1 = the employee got a bonus in the current year, 0 = the employee did not get a bonus in the current year.
Ps*Production	The dummy variable Profit sharing multiplied by the dummy variable Production
Ps*(Low education)	The dummy variable Profit sharing multiplied by the sum of the dummy variables Schooling1 and a dummy which takes the value 1 when the koul6=0 in 1998 and 1999.
Ps*(Medium education)	The dummy variable Profit sharing multiplied by the sum of the dummy variables Schooling2 and Schooling3.
Ps*Woman	The dummy variable Profit sharing multiplied by the dummy variable Woman

VARIABLE	DEFINITION
Reduction	If the number of employees (depending on the model, either salaried employees or wage earners) in the following year is smaller than the number of employees in the current year the value of the variable is calculated as: (number of employees in the firm in current year – number of employees in the firm in following year) / number of employees in the firm in the current year. Otherwise it is set to 0.
Schooling1	Takes the value 1 for salaried employees 1998-99 if the first number in the variable Koul6 takes the value 3 and for wage earners if the first number in the variable Koulkood takes the value 3. Otherwise Schooling1 = 0.
Schooling2	Takes the value 1 for salaried employees 1998-99 if the first number in the variable Koul6 takes the value 5 and for wage earners if the first number in the variable Koulkood takes the value 4. Otherwise Schooling2 = 0.
Schooling3	Takes the value 1 for salaried employees 1998-99 if the first number in the variable Koul6 takes the value 6 and for wage earners if the first number in the variable Koulkood takes the value 5. Otherwise Schooling3 = 0.
Schooling4	Takes the value 1 for salaried employees 1998-99 if the first number in the variable Koul6 takes the value 7 and for wage earners if the first number in the variable Koulkood takes the value 6. Otherwise Schooling4 = 0.
Schooling5	Takes the value 1 for salaried employees 1998-99 if the first number in the variable Koul6 takes the value 8 and for wage earners if the first number in the variable Koulkood takes the value 7. Otherwise Schooling5 = 0.
Supports production	1 = For the salaried employee the variable tilnimike in the data set takes one the following values: 131, 132, 221, 222, 223, 224, 225, 311, 312, 313.0 = The variable tilnimike takes any other value.
Tenure	Current year – year of entry into the firm
Tenure2	The square of the tenure variable
Woman	Takes the value 1 for women and 0 for men.
Year97	Takes the value 1 when the observation is from year 1997 and the value 0 otherwise.
Year98	Takes the value 1 when the observation is from year 1998 and the value 0 otherwise.