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What makes performance-related pay schemes work? Finnish evidence

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No. 929

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WHAT MAKES PERFORMANCE-RELATED PAY SCHEMES WORK?

Finnish Evidence

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ABSTRACT: We analyze how features of performance-related pay (PRP) schemes affect their perceived motivational effects using a Finnish survey from 1999. The results show that the following features are important for a successful PRP scheme: (i) the employees have to feel they are able to affect the outcomes; (ii) the organizational level of the performance measurement should be close to the employee: individual and team level performance measurements increase the probability that the scheme is perceived to be motivating; (iii) employees should be familiar with the performance measures; (iv) the level of payments should be high enough and rewards frequent enough. Low PRP levels do not generate positive effects; (v) the employees should participate in the design of the PRP scheme.

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TIIVISTELMÄ: Tarkastelemme kuinka tulospalkkausjärjestelmien piirteet vaikuttavat niiden koettuun kannustavuuteen käyttäen suomalaista kyselyaineistoa vuodelta 1999. Tulokset osoittavat, että seuraavat piirteet ovat tärkeitä kannustavalle tulospalkkausjärjestelmälle: (i) työntekijöiden täytyy voida vaikuttaa toiminnan tuloksiin; (ii) suoritusmittaus tulisi tapahtua henkilökohtaisella tasolla tai tiimitasolla; (iii) työntekijöiden tulisi tuntea suoritusmittarit; (iv) tulospalkkioiden tason tulisi olla riittävän korkea ja niitä tulisi maksaa riittävän usein. Mikäli tulospalkkioiden taso on alhainen, vaikutuksia koettuun kannustavuuteen ei ole; (v) työntekijöiden tulisi osallistua tulospalkkausjärjestelmän suunnitteluun.

1 Introduction

PRP schemes became increasingly popular in Finland during the 1990s, especially in the latter half. For example, in 1990 around 10% of employees in Finnish industry were in a PRP scheme, whereas the figure for 1998 was close to 50%. According to the survey of the Confederation of Finnish Industry and Employers (TT 1999), firms have adopted these schemes to motivate employees and increase wage flexibility. The need to motivate employees has been the dominant reason for white-collar employees. There is much evidence that PRP schemes are associated with higher productivity, the most common argument being increased employee motivation and effort.¹ The studies have mainly used an indicator variable for PRP in the production function.²

However, the PRP schemes come in many forms. It is clear that, for example, the following features of the schemes vary a great deal between firms: the organizational level of performance measurement, the performance measures, and employee participation in the design of the scheme. The main goal of PRP schemes is motivating employees, but it is not well known how these features affect the motivational outcome. The key contribution of this article is to offer analysis on this subject, which is not widely covered in the existing literature. Furthermore, our data are from the private sector, whereas most of the previous related studies have been done on public sector data. The data include a wide range of questions concerning the features of the PRP schemes and a broad set of background variables, facilitating a detailed analysis on the significance of the features of PRP schemes with regard to employees' perceptions of the effectiveness of PRP as a motivator.

¹ We use the term performance-related pay in a broad sense. We feel that it is a general term and that profit sharing schemes, merit pay schemes, and so forth, fall under the heading of PRP.

² See e.g. Kruse (1992), Wadhvani & Wall (1990), Doucouliagos (1995)

2 Previous literature

The prior studies on PRP schemes and perceived incentive effects have concentrated on two questions: 1) Do PRP schemes affect motivation? 2) How does the way the schemes are operated affect motivation?

The first question is studied by Marsden and Richardson (1994) and Marsden et al. (2001), using British public sector data. Marsden and Richardson (1994) study the motivational effects of merit pay in the Inland Revenue Service. Their emphasis is on changes in motivational responses after the introduction of merit pay. In their sample only 12% of the respondents find that the introduction of PRP increased their motivation. In addition, their results show that many felt that PRP had undermined morale, and increased jealousy among staff. Thus, they infer that the net effect on motivation might have been negative. Marsden et al. (2001) find also that for some employees the motivational effects were positive, but a larger number felt it had a negative effect on work place relations. They use data covering the Inland Revenue, the Employment Service, two NHS trust hospitals, and secondary school head teachers.

Our approach is different from these studies in that we concentrate on which factors affect the motivational effect of PRP, instead of analyzing how the motivational responses change after the introduction of a PRP scheme. In prior literature, the effects of the operation of the scheme on its success have been studied by Marsden (2004) and Marsden *et al.* (2001).

Marsden (2004) studies the role of PRP schemes in renegotiating the effort norm, but his article includes also regressions on the determinants of perceived incentive effects of PRP schemes. His results show that appraisal quality, and clearer target setting affect the perceived incentives positively. On the other hand, employees with longer tenure and lesser rewards do not consider the systems motivating. Marsden, French, and Kubo (2001) study the factors that affect the willingness of employees to work beyond job requirements. Their results show that receiving above average performance pay and clear targets increase the probability of positive incentive effects. Then again, performance measurement problems have a negative effect.

Bullock & Tubbs (1990) conducted a meta-analysis concerning gain sharing plans and the factors that make them work. Their work is very similar to ours in the sense that they also concentrate on the factors that affect the functioning of a compensation scheme and many of

the empirical hypotheses are analogous. One of their findings is that employee involvement in the design of the plan is important for its success.

3 Theoretical considerations

We first review some of the main implications of economic theory for the optimal PRP scheme. Then we turn to the organization psychology literature, which helps in formulating hypotheses that cannot be easily derived from economic theory.

Incentives and effort provision in economic theory

The basic incentive problem starts with the assumption that the agent's effort is unobservable or unverifiable, but output can be observed. The output depends stochastically on the agent's effort, and effort is costly to the agent. As effort is unobservable, the employment contract cannot be based on it, but can be based on the output. The agent controls his average pay by choosing the level of effort, higher effort bringing higher income on average. Tying the agent's income to the realized output can be a way of inducing the agent to work harder, but if the agent is risk averse, this creates a problem in the sense that the agent has to carry some risk. The risk in the incentive scheme arises from the fact that the output is not a perfect signal of the agent's action. Despite a high level of effort, the output may be low because of events beyond the agent's control. The optimal incentive scheme should balance incentive provision and insurance against random fluctuations in earnings.

These risk considerations do not mean that performance measures out of the agent's control should never be used (See Holmström 1979), since they may provide valuable information on the agent's effort level and, thus, decrease the error made in estimating the agent's level of effort. For example, a manager's bonus could depend on the relevant industry's performance. This is clearly beyond his control, but judging a manager's performance is easier, when taking into account how other similar firms have succeeded.

We are interested in the implications that these models have for the optimal level of effort³. The level of effort that the employee chooses depends on the intensity of the incentives. The

³ These results are from a popular family of incentives models, where the contracts are linear and error terms normally distributed, see e.g. Milgrom & Roberts (1992) Chap. 7.

optimal intensity of the incentives, on the other hand, depends on measurement error, the responsiveness to incentives, and the degree of risk aversion. Increased measurement error and risk aversion decrease the intensity of the incentives. If there is much measurement error, the agent's actions affect the output relatively little and, hence, strengthening incentives will not have much effect on the choice of effort. The more risk averse the agent is, the more insurance he wants against income fluctuations. This can be achieved by decreasing the dependence of income on output. On the other hand, the better the agent responds to incentives the higher the intensity should be. This will likely be the case when the agent has considerable discretion over the actions he can take.

When the agent has multiple tasks, or a task has many dimensions, another problem arises. Holmström and Milgrom (1991) show that incentives direct the allocation of effort between tasks, in addition to allocating risk and inducing effort. If only some of these tasks can be measured, then the PRP component should be low on *all* tasks. Strong incentives on some task would lead to distortion in effort allocation among tasks. If some task cannot be contracted on, or is very difficult to measure, rewarding other tasks leads to a concentration of effort on the rewarded task and no effort being put into the other task. In this case, it may be best to provide no incentives for any task, if the level of voluntary co-operation is high enough, so that some effort is exerted anyway (as Holmström and Milgrom assume). To give a trivial example, if pay is tied only to quantity and quality is not measured, it is probable that there will be much low quality output.

Incentive considerations for teams are also relevant here. The problems with team incentives arise from the unobservability of individual effort *and* output. In this setting, incentive pay can only be tied to the output of the whole team. This in turn creates a free-rider problem. Consider a situation where individual outputs are unobservable and there are N members in the team. Here the problem is that an individual agent gets only $1/N$ times the marginal product of his effort, but carries the marginal cost himself. This leads to an under-provision of effort. There are, nevertheless, solutions to this problem. Kandel and Lazear (1992) suggest that the agents have incentives to monitor themselves, which may solve the " $1/N$ problem". The idea is that the employees see other group members' level of effort, and are able to inflict some kind of cost on other members who are shirking. These costs are best thought to be mental. An individual agent has the incentive to carry out monitoring activities, as they induce the other group members to put forth more effort. Kandel and Lazear's model shows that

even though the direct incentives to put forth effort decrease as N increases, the effect via monitoring activities may be increasing in N , so that the total effort may increase. To summarize, it is not completely clear that incentives in a group setting will fail.

Social approval, which is a key element in the enforcement of social norms, may affect the incentive schemes, according to Fehr and Falk (2002). In firms, the relevant norms are those related to the provision of effort. Fehr and Falk feel that a key factor affecting these norms is whether the effort produces positive or negative externalities. Consider, for example, teams where shirking causes a negative externality on other members, or, in other words, the provision of effort produces positive externalities. This means that social disapproval is targeted at shirkers, and that there are incentives to encourage the other members of the team. Fehr and Falk suggest that the principal may generate effort-enhancing norms through incentive schemes that create positive externalities. The implication of this on the empirical work is that team-based incentive schemes, in particular, might be effective.

Motivation and organization psychology

The other branch of literature relevant to this study is organization psychology. The expectancy and goal-setting theories are most relevant, as we are considering how employees are motivated (see e.g. Bartol and Durham 2000). Motivation is usually defined as willingness to take some action. The expectancy theory of motivation is close to economic reasoning, and it emphasizes the importance of the link between behavior and performance. Expectancy theory predicts that motivation to put forth effort depends on (i) the desirability of the rewards associated with a given level of effort; (ii) the belief that a given performance will produce the rewards; and (iii) the belief that a given level of effort will actually lead to a desired level of performance.

These predictions have implications for PRP schemes. Firstly, this means that the rewards, whatever form they take, must be large enough. Furthermore, it has to be noted that money, that is, PRP payments, are not the only possible rewards. However, they are the only ones we are able to measure. Secondly, it is important that the PRP scheme is designed so that it is known how performance is measured and how the level of performance affects the rewards. Thirdly, the employee must be able to accomplish the task, that is, he or she must be able to reach the desired level of performance by choosing his or her level of effort accordingly.

The goal-setting theory suggests that employee motivation is enhanced if the goals are clear, acceptable, and achievable (Bartol and Durham 2000). Participation in decision-making can ease goal-setting. Erez *et al.* (1985) provided evidence that the goals are accepted better if one has participated in decision-making. These points suggest that if the PRP scheme has been clearly stated and employees have participated in its design, it should be more effective as a motivator.

Equity concerns are also relevant when discussing rewards and incentives. If a scheme is felt to be unfair, it can probably have even negative effects on motivation and effort. However, we are unable to deal with these issues in this paper because of data limitations. We have no way of measuring the experienced equity of PRP schemes.

4 Some notes on the Finnish labor market

Here we point out some features of the Finnish labor market system that are relevant in placing this study in context. This section will clarify why PRP is an important issue in Finland.

The first feature is that the Finnish labor market is highly organized. Approximately 80 % of the salaried employees belong to unions (Vartiainen 1998). Employees join unions based on their profession or education. The employees' unions are organized into three confederations in Finland. SAK, The Central Organization of Finnish Trade Unions, is the largest in Finland with over a million wage earners, that is, blue-collar workers, as members. The second largest trade union confederation is STTK, The Finnish Confederation of Salaried Employees. Its 21 affiliated trade unions represent approximately 650, 000 professional employees. The third one is AKAVA, the Confederation of Unions for Academic Professionals in Finland. It is a trade union confederation for those with university, professional, or other higher education, formed by 31 affiliates with about 400, 000 members and 80% unionization rate.

On the employer side, there are four main confederations: The Confederation of Finnish Industry and Employers (30 branch associations, 5,700 firms with 540, 000 employees); The Employers' Federation of Service Industries (13 branch associations, 9,500 firms with 374, 000 employees); Local Authority Employers in Finland (429, 000 employees); and State Employers' Office (123, 000 employees).

Wage bargaining takes place mainly at the sectoral or industry level, and there are usually different collective agreements for workers paid on an hourly basis (blue-collar) and for salaried employees (white-collar). The negotiations take place usually every second year, although there are exceptions. (Vartiainen 1998)

The collective agreements usually stipulate minimum tariff wages at different job-complexity levels and educational levels in a given industry. The agreement includes a general increase that is also applied to all wages and salaries. The actual wage increase is the sum of the general increase and the wage drift. (Vartiainen 1998). It is important to note that PRP issues are not usually negotiated in the collective bargaining, but the employer is usually able to unilaterally decide on these schemes. These schemes are very important from the employers' point of view, as it is the only part of the remuneration that they can, in principle, choose unilaterally. The employers would like to have more local level bargaining, so that wages could be better adjusted to productivity at the plant level. Currently, PRP arrangements are a way of introducing some flexibility.

Overtime pay is another aspect that is important for our study. According to the law, top management is not entitled to overtime pay, unlike all the other employees. Top management here means the CEO and employees reporting directly to the CEO. Nevertheless, in practice most of the employees in our data do not receive overtime pay, or do not receive the full amount to which they are entitled. This has some implications for our study.

5 Data

The data are a survey from 1999. They have been compiled from the annual wage surveys of three employees' unions. These are The Union of Professional Engineers in Finland (IL), The Finnish Association of Graduate Engineers (TEK), and The Finnish Association of Graduates in Economics and Business Administration (SEFE). Therefore, the population under study is mainly highly educated and members of AKAVA. The number of observations is 19,336, of which 7,559 belong to IL, 7,509 to TEK, and 4,468 to SEFE. In 1999 these unions used an identical questionnaire on PRP. In this study, we use only the employees who are in PRP schemes, since the answers to the questions relating to the schemes are naturally only available for them. The number of employees in PRP schemes is 9,107 of which 3,529 belong to IL, 3,671 to TEK, and 1,907 to SEFE.

5.1 *The dependent variable*

The surveys have information on the employees' perceptions on the effects of the PRP scheme, which makes it possible to analyze the factors that make PRP schemes effective. The dependent variable in the analysis is constructed from the question "do you feel PRP motivating?" where the answer possibilities are yes/no/can not say. "Yes" is coded as 1, and "no" and "cannot say" as 0. This variable tells whether the individual feels that PRP is motivating.

There is naturally the problem that this is a subjective assessment. To assess the quality of the dependent variable, the following checks were carried out. Firstly, it was tested whether the ones who feel that PRP schemes are motivating, have longer working hours. Secondly, a self reported measure of perceived workload was compared between the ones who feel that PRP schemes are motivating and the ones that do not. The checks point to a common pattern: The ones who feel that PRP schemes are motivating work longer hours, and do not feel that they have to work too much. These results increase our confidence in our measure of the motivational effect of PRP schemes.

5.2 *The independent variables*

The data have detailed information on the PRP schemes, including the following features: organizational levels of performance measurement; the performance measures; who has set the rules for the scheme; whether the scheme has been described in writing; how much the employees feel they can influence the PRP payments; do they feel that they know the performance measures; the timing of the payments, and the income share of the payments. These variables describe the PRP scheme in a very detailed way. The questionnaire also includes a detailed set of background variables.

5.3 *Description of the PRP schemes*

Table 1 gives the summary statistics concerning the PRP schemes. In the sample, the income of 47% of the employees depends on performance. This is a high figure, but it is in line with the figures from broader surveys. The average share of the PRP is 8% of the total monthly wage. This is important, since the magnitude of the PRP is often considered critical for its effectiveness as a motivator (see e.g. Harris, 2001 and Marsden and Richardson, 1994). There is substantial dispersion in the PRP share of the total wage. In the first quartile, the mean is less than 0.5%

and in the fourth quartile it is 21%. The frequency of PRP payments is clearly divided between two categories: PRP is paid either yearly or monthly, but once a year payments dominate.

Table 1. Summaries of the Features of the PRP Schemes

Variable	Obs	Mean	Std. Dev.	Min	Max
PRP motivates	9107	0.481	0.500	0	1
Share of PRP of total earnings	9045	0.078	0.096	0	1
Share of PRP of total earnings 1st Q.	2268	0.002	0.004	0	0.013
Share of PRP of total earnings 2nd Q.	2410	0.036	0.012	0.014	0.05
Share of PRP of total earnings 3rd Q.	2460	0.087	0.016	0.051	0.1
Share of PRP of total earnings 4th Q.	1907	0.212	0.128	0.102	1
PRP measurement levels					
Personal level	9107	0.368	0.482	0	1
Team level	9107	0.270	0.444	0	1
Department level	9107	0.566	0.496	0	1
Corporation level	9107	0.582	0.493	0	1
Other level	9107	0.020	0.141	0	1
# of PRP levels	9107	1.806	0.933	0	5
PRP measures					
Financial	9107	0.849	0.358	0	1
Customer satisfaction	9107	0.301	0.459	0	1
Development goal	9107	0.281	0.450	0	1
Work atmosphere	9107	0.138	0.345	0	1
Productivity	9107	0.408	0.492	0	1
Other measure	9107	0.103	0.305	0	1
# of PRP measures	9107	2.081	1.097	0	6
Frequency of PRP payments					
	%				
Monthly	25.68				
7-11 times a year	1.01				
3-6 times a year	7.96				
Two times a year	8.29				
Once a year	55.5				
Less frequently	1.55				
Ability to influence the level of PRP payments					
	%				
Very high	4.76				
High	26.46				
Rather low	40.96				
Very low	26.19				
Cannot say	1.63				
How well do you know the measure used in the PRP scheme?					
	%				
Very well	33.18				
Rather well	42.34				
Rather poorly	17.04				
Poorly	6.48				
Cannot say	0.96				
How have the principles of the PRP scheme been defined?					
	%				
Orally or cannot say	18.03				
In writing in the employment contract or otherwise	81.97				
Who has the defined the PRP scheme?					
	%				
Employer and employees jointly	30.56				
Employer unilaterally	45.46				
Agreed on a personal level	13.94				
Otherwise	10.04				
Does your income depend on performance?					
	%				
Yes	47.10				
No	52.90				

Half of the employees in PRP schemes report that they are motivated by these schemes. This is quite a large share but, nevertheless, there is room for improvement if the aim of the schemes is motivation. On the other hand, the aim could be labor cost flexibility in economic downturns and not just motivation.

The organizational level of performance measurement is an important feature of the PRP scheme. The department level and corporate level are used in nearly 60% of the cases. Team level is used in 27% of the PRP schemes. On average, there are approximately two levels of measurement used. The measures include some financial factor in 85% and productivity evaluation in 40% of the PRP schemes. Customer satisfaction and development goals are also important. Most of the schemes apply two distinct measures, the average being 2.1. The knowledge of the performance measures used is an important factor in increasing the motivation of the employees according to the goal-setting theory. It is seen that the measures are usually quite well known since about 75% say that they know the measures very well or rather well.

The ability to influence the level of the PRP payments is an important motivating factor, according to expectancy and economic theories. Nevertheless, most of the employees feel that they cannot affect the outcome very much. This may suggest that PRP is used not only as a motivational instrument, but also as a way of increasing nominal wage flexibility.

According to the goal-setting theory, co-operation increases motivation through better internalization of the goals. In spite of this, in almost half of the cases the employer decides unilaterally about the scheme, the employees are involved as a group in about 30% of the cases, and it is agreed on a personal level in 14% of the cases.

The goal setting theory suggests that clear goals motivate. Table 1 describes how often the scheme has been agreed on in writing. We consider this clear goal setting. As can be seen, in most cases the scheme has been defined in writing.

Finally, to gain some insight into the motivational effects and support for PRP, we cross tabulate the perceived motivation and support. The results are in Table 2. It shows that those who feel that PRP motivates also support it in 95% of the cases. However, it is striking that around 68% of the respondents, who are not motivated by PRP, support it. One can therefore state

that in most of the cases it does not bother the employees. This is in contrast with the results of Marsden and Richardson (1994) who find that in their sample 36% of the respondents felt that the idea of PRP is fundamentally unfair. On the other hand, 57% said that it was good in principle and 49% supported it, even when all its faults had been taken into account. Of course, it should be remembered that their sample was from the British public sector, and we are dealing mostly with Finnish private sector employees.

Table 2. The support and motivation for PRP schemes

Do you support the use of PRP?				
Does PRP motivate you?	Yes	No	Cannot say	Total
No	2977	801	604	4382
Yes	3955	73	131	4159
Total	6932	874	735	8541
Pearson χ^2	1.0e+03 (p=0.000)			

6 Empirical analysis

We use probit models in the analysis. We begin this section by presenting the hypotheses, based on the earlier theoretical considerations. When using models of economics to derive the hypotheses, we use “effort” and “motivation” interchangeably. If motivation is defined as “willingness to undertake certain kinds of action⁴”, then the “effort” in the models of economics corresponds to this quite well.

H1: The effect on effort is higher when the organizational level of performance measurement is close to the employee, and the performance measures are such that the employee can control them.

The *organizational level of performance measurement*, ranging here from the individual level to the corporate level, is an important aspect of a PRP scheme. The higher the level of performance measurement, the more imprecise the measurement is likely to be. In this case, it is optimal to decrease the dependence of the wage on output and, thus, the effect on effort also decreases.

⁴ As in Marsden *et al.* (2001) pp. 7.

Controllability of the performance measures is related to three features. The first factor is *the quantitative nature of performance measurement*. Quantitative measures (e.g. financial and productivity goals) are probably measured from a higher organizational level than the qualitative (e.g. development goals and customer satisfaction) measures. On the other hand, the qualitative measures may be more imprecise. Therefore, the theory does not offer very clear predictions here. The second factor is *how the PRP system is defined*. The goal-setting theory suggests that *clear*, acceptable, and achievable goals increase motivation. We consider goals to be clearer when they are written down, so that one may come back to them later. The third factor, *knowing the performance measures*, is important for controllability. If the features of the scheme are unclear, the decisions on the level of effort and on the allocation of effort between tasks should lead to low effort in all the tasks, besides the ones that provide private benefits to the employee.

H2: The clearer the relationship between the effort and rewards, the higher the effect on effort.

More frequent payments make the relationship between effort provision and outcomes clearer and, thus, according to the expectancy theory we should expect it to have positive effects on motivation.

H3: The higher the share of the PRP of wage income, the higher the influence on effort.

This follows directly from the basic incentive models of the economic theory: the effort provision is linked directly to the strength of incentives. Additionally, there is empirical evidence that shows that payments that are too small may not have a noticeable effect on the effort choice, see Harris (2001) and Marsden *et al.* (2001).

H4: The more participation in the design of the scheme, the more motivating the system.

The goal setting theory suggests that the employees are more motivated when participating in decisions concerning the PRP system. Mitchell *et al.* (2000) suggest that participation in goal setting may have positive effects on performance, especially on complex tasks. Task complexity is high for the highly educated and, thus, we may expect positive effects.

6.1 Results

The results from probit regression are given in Table 3. There are regressions including all employees, management only, and the R&D-employees only. Management is defined as top management and management.⁵ Table 3 reports marginal effects and z-values.

The first hypothesis (*H1*), asserting that the organizational level of performance measurement should be close to the employee, and the performance measures such that the employee can control them, is supported. The results support this in five ways. Firstly, personal level of measurement has a positive and significant effect on motivation. This is what we would expect, because the employee can control the outcome best when measured from a personal level, *ceteris paribus*. Furthermore, there seems to be a tendency that the higher the level of measurement, the more negative is the marginal effect on effort, although this effect is smaller in the second column, where the ability to influence PRP payments is included in the model. Personal level measurement is particularly effective in R&D work. Such work is complex and it may be that it is difficult to create objective measures that would not lead to unwanted behavior. This may explain why personal assessment is considered motivating. In the management sample, the organizational level of measurement does not seem to affect the motivational effect.

Secondly, it seems that development goals increase effort. This is probably because these variables are measured from a level that is close to the employee, and are factors that he or she can control better.

Thirdly, the perceived ability to influence the level of PRP payments is a significant and strong predictor. If the ability to influence is not very high or high, motivation and effort are decreased, and the marginal effect is two times higher in the very low category when compared to the low category.

⁵ Top management includes general director, CEO, deputy managing director, and equivalent; management includes, for example, functional managers and line managers.

Table 3. The Motivational Effect of PRP

	All	All	Management	Research and Development
The Motivational Effect of PRP				
Ability to affect the outcome (HI)				
<i>Level of Measurement</i>				
Personal level	0.089*** [6.46]	0.025* [1.74]	0.062 [1.61]	0.214*** [3.25]
Team level	0.044*** [3.04]	0.028* [1.88]	-0.074 [1.49]	0.015 [0.22]
Department level	0.002 [0.12]	0.01 [0.72]	0.023 [0.55]	0.074 [1.18]
Corporation level	-0.046*** [3.42]	-0.018 [1.31]	0.024 [0.54]	-0.009 [0.15]
Other level	-0.156*** [3.54]	-0.144*** [3.17]	-0.352** [1.98]	-0.375* [1.75]
<i>Measures Used</i>				
Financial goal	0.007 [0.39]	0.005 [0.25]	-0.111 [1.43]	0.011 [0.15]
Customer satisfaction goal	-0.009 [0.62]	-0.016 [1.13]	-0.049 [1.10]	0.014 [0.21]
Development goal	0.058*** [3.99]	0.044*** [2.96]	0.035 [0.86]	0.03 [0.50]
Work atmosphere goal	0.005 [0.28]	0.003 [0.17]	0.07 [1.44]	-0.068 [0.74]
Productivity goal	0.018 [1.31]	0.005 [0.33]	0.021 [0.56]	-0.062 [0.93]
Other goal/cannot say	-0.033 [1.55]	-0.029 [1.36]	0.049 [0.73]	-0.162* [1.74]
<i>How Well Knows the Measures</i>				
Measures known well	-0.107*** [7.22]	-0.063*** [4.11]	-0.024 [0.57]	-0.084 [1.03]
Measures known rather poorly	-0.174*** [9.11]	-0.092*** [4.53]	-0.119 [1.39]	-0.127 [1.26]
Measures known poorly	-0.247*** [8.83]	-0.125*** [4.08]	-0.061 [0.27]	0.061 [0.43]
Cannot say	-0.212*** [3.51]	-0.144** [2.20]	0.143 [0.48]	-0.096 [0.38]
<i>Written agreement on PRP</i>				
	-0.007 [0.41]	0.003 [0.16]	0.076 [1.42]	0.151* [1.79]
<i>Influence on PRP payments</i>				
Influence on PRP high		0.009 [0.29]	0.033 [0.58]	-0.079 [0.23]
Influence on PRP low		-0.199*** [6.22]	-0.176*** [2.81]	-0.131 [0.38]
Influence on PRP very low		-0.403*** [12.77]	-0.428*** [5.10]	-0.375 [1.13]
Influence on PRP cannot say		-0.248*** [4.64]	-0.245 [0.99]	-0.192 [0.53]

Note. Reference groups are measures known very well; agreement agreed orally or cannot say; influence on PRP scheme very high.

	All	All	Management	Research and Development
Frequency of Payments (H2)				
Frequency 7-11 times a year	-0.415*** [7.21]	-0.407*** [6.85]		
Frequency 3-6 times a year	-0.049 [1.55]	-0.035 [1.07]	0.111 [1.04]	-0.225 [1.56]
Frequency 1-2 times a year or less	-0.110*** [4.23]	-0.106*** [4.00]	0.028 [0.33]	-0.284** [2.13]
Share of PRP (H3)				
Share of PRP of total earnings 2nd quartile	-0.001 [0.03]	-0.008 [0.49]	0.028 [0.48]	-0.011 [0.14]
Share of PRP of total earnings 3rd quartile	0.126*** [7.52]	0.081*** [4.66]	0.155*** [3.32]	-0.031 [0.40]
Share of PRP of total earnings 4th quartile	0.216*** [11.38]	0.152*** [7.64]	0.223*** [4.78]	0.135 [1.32]
Monthly wage	0.057*** [8.01]	0.036*** [4.87]	-0.001 [0.07]	0.067 [1.26]
Participation in design (H4)				
Employer alone decides the design	-0.076*** [6.10]	-0.041*** [3.21]	-0.018 [0.50]	-0.118** [2.04]
Type of work				
Overtime %	-0.156** [2.57]	-0.224*** [3.58]	-0.177 [1.23]	-0.313 [0.89]
Fixed-term contract	0.165*** [3.43]	0.168*** [3.42]	0.165 [0.60]	0.201 [1.11]
Business school education	0.049* [1.66]	0.063** [2.10]	0.145* [1.65]	-0.128 [0.40]
Industry				
IT sector	0.087*** [5.47]	0.078*** [4.73]	-0.008 [0.15]	-0.007 [0.10]
Construction, energy	0.065** [2.26]	0.052* [1.79]	-0.1 [1.31]	0.287 [1.25]
Technical services	0.058* [1.90]	0.054* [1.72]	0.117 [1.30]	-0.062 [0.33]
Trade	0.077*** [2.59]	0.067** [2.19]	0.095 [1.52]	
Finance	0.035 [1.07]	0.026 [0.78]	0.002 [0.02]	
Services	-0.055** [2.36]	-0.065*** [2.69]	-0.046 [0.70]	-0.088 [0.62]
Other background variables				
Higher university education, doctoral	-0.053*** [3.83]	-0.030** [2.13]	-0.009 [0.23]	0.063 [0.87]
Labor market experience	-0.005*** [6.35]	-0.004*** [4.94]	-0.002 [0.90]	-0.012*** [2.76]
Observations	7839	7839	899	463
Pseudo R-squared	0.13	0.18	0.17	0.2
Log likelihood	-4732	-4467.78	-479.07	-256.31

Note. Table reports marginal effects. Absolute value of z statistics in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%. Reference groups are frequency of payments monthly; employer and employee decide jointly or decided on a personal level or cannot say; full time employment; engineering education; manufacturing. The dependent variable is constructed from the question "do you feel PRP motivating?" where the answer possibilities are yes/no/can not say. "Yes" is coded as 1 and "no" and "cannot say" as 0. The estimation includes also a constant, regional dummies and firm size dummies that are not reported.

Fourthly, knowing the measures very well appears to be quite important. There is a considerable reduction in the effect on effort, if they are not very well known. This is expected, because if the employee is unaware of how the PRP payments are formed, the whole system must seem pretty random. This imposes considerable risk on the employee.

Finally, whether or not the PRP system is defined in writing, does not seem to be important. It may be that the effect is already captured by the previous factor, that is, knowing the measures.

The second hypothesis (*H2*), that a clear relationship between effort provision and rewards increases motivation, is also supported. One measure for this is the frequency of payments. It seems that monthly payments are the best for inducing effort. On the other hand, the frequency of payments must correspond to the natural pace of gaining knowledge about the performance of the employee, and this may not always be possible on a monthly basis. It seems that irregular payments, 7-11 times a year, decrease the perceived motivational effect. Many of those with irregular PRP schemes are presumably doing project work. These employees are already uncertain about the continuity of the job assignment, and further uncertainty in income streams is unwelcome. In addition, it is seen that in the management and R&D samples the frequency of payments seems to have no effect on the impact of the scheme, except that in the R&D sample infrequent payments are seen as de-motivating.

The third hypothesis (*H3*), the higher the share of the PRP the higher the effort, is supported. Table 3 shows that the higher share of PRP payments is an important predictor, supporting the results of Harris (2001), Marsden *et al.* (2001) and Marsden (2004). When compared to being in the first quartile of PRP payments, being in the second does not increase the perceived motivational effect. However, in the third and fourth quartile the effect is positive and the marginal effect is larger in the fourth quartile. In other words, PRP payments must exceed the median 5% of annual salaries to be effective. Marsden *et al.* (2001) also found that above average PRP increases the probability of positive incentive effects. This relationship holds for the first three columns, but in the R&D sample the level of payments seems unimportant.

Hypothesis (*H4*) of the importance of co-operation is supported. Employee participation in the decision-making about the PRP scheme seems to increase effort. The PRP schemes are found to be more motivating when employees and employer decide jointly about the scheme, than

when the employer decides unilaterally. This is most apparent in R&D work. A possible explanation is that in R&D work the employees may have a better idea of the proper performance measures, as the work is complex.

Turning to the variables concerning the type of work, we see that the amount of overtime affects the motivational effect of PRP. It is typical that white-collar workers are not compensated for overtime, but, at the same time, the average length of the workweek has increased over the years. Working overtime decreases the probability that PRP schemes are considered motivating. Working overtime can be interpreted as putting forth more effort. One interpretation of our results is that the effort produces insufficient rewards. On the other hand, this may reflect the fact that many who work overtime are not compensated for it, even though they would be entitled to overtime pay, and this may affect their opinion about the motivating effect of PRP.

It is interesting to note that fixed term employees and those with business school education feel that PRP schemes are more motivating, than those in full-time employment and engineers, respectively. There also seems to be differences by industry. When compared to manufacturing, employees in all the other industries seem to find PRP schemes more motivating, except in finance where there is no difference, and in services where the schemes are not experienced in a positive manner.

Labor market experience has a negative coefficient, meaning that more experienced employees do not find the PRP schemes to be motivating. This result is in line with Marsden (2004). However, in the management sample this is not the case. Experienced employees may dislike PRP schemes if they have been introduced at the expense of seniority wages.

7 Conclusion

Performance-related pay schemes are mainly adopted to motivate employees. Nevertheless, research on the effect of the design of PRP schemes on its effectiveness as a motivator is scarce. Using Finnish data on highly educated employees, we are able to offer empirical results on this topic.

Our study has shown that the features of a PRP scheme do matter for its effects on motivation. The results show that the organizational level of performance measurement matters for the success of a PRP scheme. The closer to the employee it is, the better are the results. Personal and team level measurement is better than company level. Generally, factors that make it easier for the employees to affect the level of PRP payments are important. For example, it is important to know the performance measures. Also, the level of payments should be high enough, and they should be paid frequently enough. The practitioners often use a rule of thumb that the PRP must be at least 5% of the total salary, which is in accordance with our results. We find that the level of PRP payments should exceed the median to have positive effects, which is in line with previous studies. The results show that monthly payments are viewed as the most motivating. Employee involvement in the planning of the scheme is also important. If the employer decides unilaterally on the scheme it is less likely to be considered motivating. These results, where analogous, are similar to the findings of previous research, even though previous studies used mainly public sector data.

An important topic of future research is to study how the motivational effects translate into firm level outcomes. Specifically, one would like to study how the motivational effects are related to profitability.

References

- Bartol, K. and Durham, C., 2000, Incentives: Theory and Practice, in Cooper. C. and Locke, E., (Eds.) *Industrial and Organizational Psychology*, Oxford: Blackwell.
- Bullock, R.J, and Tubbs M.E., 1990, A Case Meta-Analysis of Gainsharing Plans as Organization Development Interventions, *Journal of Applied Behavioral Science* 26, 383-404.
- Doucouliaagos, C., 1995, Worker Participation and Productivity in Labor Managed and Participatory Capitalist Firms: A Meta-Analysis, *Industrial and Labor Relations Review* 49, 58-77.
- Erez, M., Earley P. and Hulin, C., 1985, The Impact of Participation on Goal Acceptance and Performance: A Two-Step Model, *Academy of Management Journal*, 50-66;
- Fehr, E. and Falk A., 2002, Psychological Foundations of Incentives, *European Economic Review*, 46, 687-724.

- Harris, L., 2001, Rewarding Employee Performance: Line Managers' Values, Beliefs and Perspectives, *International Journal of Human Resource Management* 12, 1182-1192.
- Holmström, B., 1979, Moral Hazard and Observability, *Bell Journal of Economics*, 10, 74-91.
- Holmström, B. and Milgrom, P., 1991, Multi-task Principal-Agent Problems: Incentive Contracts, Asset Ownership and Job Design, *Journal of Law, Economics and Organization* 7, Special Issue.
- Kandel, E. and Lazear E.P., 1992 Peer Pressure and Partnerships, *Journal of Political Economy* 100, 801-817.
- Kruse, D. L., 1992, Profit Sharing and Productivity: Microeconomic evidence from the United States, *Economic Journal* 102, 24-36.
- Marsden, D., 2004, The Role of Performance-Related Pay in Renegotiating the "Effort Bargain": The Case of British Public Services", *Industrial and Labor Relations Review*, Vol. 57, No.3, 350-370.
- Marsden, D., French S. and Kubo, K., 2001, Does Performance Pay Demotivate and Does it Matter?, Centre for Economic Performance Discussion Papers.
- Marsden, D. and Richardson, R., 1994, Performing for Pay? The Effects of 'Merit Pay' on Motivation in a Public Service, *British Journal of Industrial Relations* 32, 243-260.
- Mitchell, T., Thompson K, and George-Falvy, J., 2000, Goal Setting: Theory and Practice, in Cooper. C. and Locke, E., (Eds.) *Industrial and Organizational Psychology*, Oxford: Blackwell.
- Milgrom, P. and Roberts, J., 1992, *Economics, Organization and Management*, Englewood Cliffs, NJ: Prentice-Hall.
- Rivers, D. and Vuong, Q., 1988, Limited Information Estimators and Exogeneity Tests for Simultaneous Probit Models, *Journal of Econometrics* 39, 347-366.
- TT (The Confederation of Finnish Industry and Employers), 1999, TT:n tulospalkkauselvitys, Helsinki.
- Vartiainen, J., 1998, *The Labour Market in Finland - Institutions and Outcomes*, Prime Minister's Office, Helsinki. Available at www.vnk.fi/resource/fi/2096.pdf.
- Wadhvani, S. and Wall M., 1990, The Effects of Profit sharing on Employment, Wages, Stock Returns and Productivity: Evidence from UK Micro-Data, *The Economic Journal* 100, 1-17.
- Wooldridge, J., 2002, *Econometric Analysis of Cross Section and Panel Data*, Cambridge: MIT Press.

Appendix

The data set

The data are originally from annual wage surveys of three employee unions. IL and SEFE sent the questionnaires to half of their members, who had been randomly chosen. TEK sent the questionnaire to half of their members that do not work for large firms, and to all of their members that work for large firms. By ‘large firm’ we mean here firms where there are over 100 employees that belong to TEK. There are around 70 firms in this category. The response rates were 49% for IL, 48% for SEFE, and 45% for TEK. The estimates presented are not weighted to take this into account. However, the results of the weighted estimation are almost identical.

The distributions of the following variables were trimmed, 1% of both tails for each: monthly wage, real work time, and overtime.

We concentrate on the full-time and fixed term employees, so part-time employees (149 obs.), the unemployed (238 obs.), part-time pensioners (510 obs.), entrepreneurs (382 obs.), and students (346 obs.) were dropped from the sample. The ones whose wage (130 obs.) is unknown, were also dropped from the sample.

For those employees whose employer is known, the employer type was corrected as there were some inaccuracies. The firm size variable was constructed from a question asking the size of the unit that has uniform human resource and pay policies. This makes the variable very prone to measurement error. The industry variable reflects the industry in which the employee is working, and there might be variation in this variable within an employer as large firms operate in many industries. The same applies to the area code.

Variable definitions

IT sector: Telecommunications and data processing.

Monthly wage: Earnings in October 1999 including fringe benefits and bonuses paid during October.

Share of PRP of earnings: The share of PRP payments of annual income.

Endogeneity of PRP share

One might feel that there is a possibility that the PRP share is endogenous in the equation we estimate. The additional instrument used was the position in the organization, that is, whether one is a manager, expert, and so on. We are confident that this is exogenous in the equation explaining the PRP share, and there are no theoretical reasons to include it in the motivation equation, nor is it significant if we do so. We used the Rivers & Vuong (1988) procedure, that is, we first estimated the PRP share equation and plugged in the residuals to the probit model explaining the motivational effect of PRP (see e.g. Wooldridge 2002, 473-474). The coefficient on the residuals was not significant. However, the F test on the exclusion restrictions shows that the instruments are not very strong. (Results not reported, available upon request)

Tables**Table A.1 Summary statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
Monthly wage ^{a)}	9107	3.480	1.285	1.514	8.409
Higher university education, doctoral	9107	0.551	0.497	0	1
Real weekly work time ^{b)}	8782	42.735	4.694	25	60
Overtime %	8485	0.122	0.111	-0.120	0.579
Female	9071	0.160	0.367	0	1
Experience ^{c)}	9001	13.190	9.243	0	44
Fixed term contract	9061	0.016	0.126	0	1
Position					
Management	1128				
Middle management	3604				
Experts	3721				
University employees	456				
Other white-collar	35				
Employer type					
State	395				
State owned business, other general government, organisation	129				
Municipality, municipality owned business	71				
Other	16				
Private	8446				
Region					
Helsinki region	3862				
City (not Helsinki region)	2068				
Provincial center	1260				
Industrial Region	1148				
Rural district	301				
Peripheria	61				
Industry					
manufacturing	3039				
IT sector	2942				
Construction, energy	459				
Technical services	441				
Trade	545				
Finance	425				
Services	963				
Firm Size					
1-30	507				
30-499	2634				
500-2999	2251				
3000-	3567				
Union					
TEK	3671				
SEFE	1907				
IL	3529				

a) in €1000 b) hours c) years

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