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Bachelor Thesis Economics of Markets and Organizations

The succeeding step to performance-orientated work

The effect of performance related pay on labor productivity and employment

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Abstract

This paper investigates the effect of different types of performance related pay on the labor productivity. It also examines whether performance-related pay affects employment. Using the Workplace Employment Relations Survey (WERS), the effects were examined using data on 989 organizations in the United Kingdom from the years 2004 and 2011. The method in this study is a panel regression combined with firm fixed effects. The results show that only performance pay based on an objective evaluation of someone's performance has an effect on the productivity of the employees. Moreover, the use of performance-related pay has not shown a significant effect on employment.

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1. Introduction

1.1. Performance pay

The use of performance-related pay (PRP) in workplaces increased from 15% to 50% in the last quarter of the 20th century (Makridis, 2018). Performance pay are payments in exchange for the performed results. In this way, employers try to motivate their staff to perform better. Hence, there might be more profit available for the employer. Another reason to use this method of payment is for the selection of personnel. The idea behind this is that people with more qualities will earn more than under a fixed salary. In some cases, workers are able to produce more than the expected output, on which fixed salaries are based (Lazear, 1999). This implies that more highly educated people will apply for the job, because they can earn more than with a fixed salary and are aware of that as well. However, there is a lot of discussion in this area about the pros and cons.

1.2. Contradictions

Firstly, the advantages are that performance pay can lead to a motivating drive for the employees (Lazear, 2000). As described above, it leads to higher productivity rates. Furthermore, rewarding employees leads to more retention (Irshad & Afridi, 2007). In other words, performance pay may lead to higher rewards than regular wage pays. This is attractive for the employees. Therefore, people will be more comfortable, because they are rewarded for the performances they deliver. Hence, they feel more valued and in turn will stay longer. On the other hand, performance pay can lead to more wage inequality (Lemieux, MacLeod, & Parent, 2009). This can be clarified as follows. Performance pay has a lower initial level than fixed wages. Due to the large variable part of performance-related pay, wages based on the performance increase faster than fixed wages. Consequently, a large inequality arises between employees paid performance pay and, on the other hand, employees paid fixed wages by another firm. This will be further explained in the theoretical framework. Other research shows that performance-related pay results in wage inequality in the United Kingdom as well (Bryan & Bryson, 2016). Therefore, this study will also look at the effects of performance pay in the United Kingdom. In order to provide more clarity in this subject, this paper will look at the following research question:

What is the effect of performance pay on the labor productivity of employees in the United Kingdom?

1.3. Relevance

This research is relevant for a number of reasons. First, the findings in this research will be relevant for corporations. It will help them to choose the most efficient method of salary payments. Moreover, performance pay can change the composition of a company's employees. It can occur due to more workload or due to increased productivity. This is also referred to as sorting. This research will contribute to the effect of performance-related pay on sorting. Furthermore, this research is relevant, as it does not only focus on one company in specific, but it focuses on a more aggregate level, e.g. different companies. There are few studies available that estimate the effect on a firm-specific level. Lastly, it will contribute to the existing literature on this subject. There has not been a lot of research about this subject recently. As aforementioned contradictions surrounding this topic are existing. This paper aims to give a relevant contribution to the topic of performance-related pay on the productivity.

The rest of the paper is structured as follows. Firstly, the concept of performance pay will be described in the theoretic framework. Other relevant scientific articles on this theme will also be reviewed in this section and the hypothesis will be specified. Thereafter, the (origin of the) data will be described and analyzed in the data section. Subsequently, the methods to test the hypotheses will be explained in the methodology. In the result section, the results of the research will be extensively discussed and analyzed. Based on this analysis the hypotheses can be either accepted or rejected. Lastly, the answer on the research question will be given in the discussion section, together with the main findings. Moreover, the limitations of this research will be explained and suggestions for following research will be given.

2. Theoretic framework

2.1. What is performance pay?

Hourly wages are the most common version of salary payments. When a firm introduces such a schedule, they frequently determine this upon the minimum accepted level of output (Lazear, 2000). Performance pay is different. Performance benefits are rewarded on the basis of the realized output. In other words, workers paid piece rates or commissions connect the marginal cost of effort with the marginal value added (Lazear, 1999)

Performance pay is often applied to solve the principal-agent problem (Jensen & Murphy, 1990). The principal-agent problem occurs when there is asymmetric information. In this case, the effort of the employee cannot be observed by the employer. Performance pay will reveal the productivity of the worker, as he is paid according to the output, he delivers. This is called the incentive effect, as the employee has an incentive to be more productive due to the introduction of performance pay. Likewise, the employer and the employee have the same aim for the company, i.e. an optimal productivity.

2.2. Performance pay and labor productivity

2.2.1. Incentives for a higher productivity

Research into the effect of performance-related pay on labor productivity at a firm level showed a positive effect of 9% (Gielen, Kerkhofs, & van Ours, 2010). Performance pay does not always lead to an increase in the productivity. When using performance pay as a reward for tasks performed by teams, this can lead to an incentive to free ride. When that happens, group-based incentive schemes will not have a large effect on individual productivity. In this way, incentives will not lead to the desired outcome. 'Bad' incentives also appear in multitasking. When only one specific task is measured for the level of performance pay, the worker can focus only on this task. He will neglect all the other obligatory but not directly observable activities. Consequently, it is not always clear if performance pay leads to an increase in the productivity. Nevertheless, the research of Gielen et al (2010), as previously appointed, has shown a robust effect of performance related pay.

2.2.2. Performance pay and wage inequality

Moreover, it has been found that performance rewards increase income inequality (Lemieux, MacLeod, & Parent, 2009). Performance pay is often accompanied by high administration and monitoring costs. Thus, performance pay is used if the efficiency gain of performance pay is greater than its costs, i.e. the monitoring costs. Employees who are paid in the form of performance pay are often higher in the distribution of general abilities, which leads to a higher efficiency gain. Hence, these are often people with a higher education. As a result, there is a higher return on skills for workers at the top of the distribution than workers at the bottom. At the top they earn according to performance pay and at the bottom they earn according to fixed wages. This leads to income inequality, as the more

productive workers will even earn more due to the performance-related pay. These payments will exceed the fixed wages. Moreover, income inequality may have another cause. Likewise, an increase in returns to effort can lead to more companies using performance pay, because the efficiency gain will exceed the monitoring costs (Lemieux, MacLeod, & Parent, 2009). The returns to ability then increase for fixed-wage jobs, but even more for performance-reward jobs. Due to a faster rise in performance pay than fixed wages, inequality is increasing. This does show that performance pay is used when higher productivity can be achieved. All in all, empirical evidence has shown that people with performance pay more often have higher average hourly wages, higher education, less union formation and more frequent salary payments instead of per hour (Lemieux, MacLeod, & Parent, 2009). Furthermore, Ordinary Least Squares (OLS) regression and fixed effects estimations show that the growth in performance pay is mainly due to less union formation.

2.2.3. Incentive pay schemes and productivity

Moreover, empirical research by Lazear (2000) shows that the use of incentive pay schemes leads to an increase in productivity. Hourly wages were originally used to pay workers at a car body shop in the United States of America. The experiment involved workers gradually moving from an hourly wage to performance pay. Thus, the workers were paid for the number of glass units they had placed in the cars. During this phased-in implementation of performance reward schemes, an increase in productivity was observed of 44%. Half of this can be explained by the incentive effects that this form of pay has on employees. In other words, the average output per worker rises because of incentives. Due to this introduction, 92 percent of the workers experienced an increase in their wages. Moreover, even a quarter of all workers experienced a minimum rise of 28 percent. However, the profit does not necessarily increase. This is related to the growth in productivity compared to the growth in labor and other costs. A major cost in the use of performance pay is that performances should be monitored. The ICT department often has to be set up to monitor the performances, which is very expensive. This could be done manually, but it is expensive as well. In other words, additional tasks arise and therefore additional work has to be done, which comes at a price. Hence, these costs do not guarantee an increase in profit. However, in the research by Lazear (2000), information systems were already installed for other purposes. Due to the economies of scope, that arose from this, and the gains in productivity

in this experiment, all monitor costs involved were covered. Furthermore, the quality has not decreased in this study. Employees had to repair mistakes in private and they were not paid for this. Thus, enough attention has been paid to the quality of the product.

All three previous mentioned studies show that the introduction of performance pay increases productivity of the workers (Lazear, 2000; Lemieux, MacLeod, & Parent, 2009; Gielen, Kerkhofs, & van Ours, 2010). This leads to the following hypothesis

Hypothesis 1: Performance pay will lead to higher productivity in a company than fixed wages.

2.3. Performance pay and employment

2.3.1. The sorting effect

As aforementioned, research by Lazear (2000) shows that the introduction of performance related pay increases the productivity by 44%. Half of this effect is due to incentives, while the other half is due to another effect, specifically the sorting effect. In particular, the tenure effects on productivity appear to be great. This can be explained in two ways. The first explanation is that the work often still has to be learned. The productivity of a new worker rises rapidly in the first months. On the other hand, this is due to the sorting effect. People with the lowest ability leave the company first, as they do not have the required qualities (anymore). This gives people with a higher ability the opportunity to apply for the job. It has been found that workers hired under the new conditions are more productive than those who already worked under the old conditions, when there were fixed wages (Lazear, 2000).

2.3.2. Creating employment

An increase in productivity can, hence, be a consequence of the sorting effect. Research from Gielen et al (2010) showed that the hourly productivity rose faster than the total productivity of the firm. However, one employee can only work a limited number of hours per day. For example, there are rules that an employee may not work for more than 12 hours at a time. This implies that, not only the established workers have become more productive, but also that additional workers have been hired. Otherwise this increase could not have taken place. Empirical evidence has pointed out that the worker inflow increased with 6.4% after the introduction of performance related pay. Furthermore, outflow

increased with 1% after the introduction. This means that PRP schemes provide a net increase in employment of 5%. In other words, this indicates that more employment is created by using performance related pay.

2.3.3. Self-selection

Furthermore, the effect of performance pay on sorting is investigated in a laboratory experiment (Dohmen & Falk, 2011). The participants have to solve a number of calculations in a limited amount of time. Prior to the beginning of solving the problems, they are allowed declare how they want to be paid. They can choose whether they want to be rewarded according to a fixed wage scheme or some variant of a variable wage scheme. Regarding the variable wages, they are paid according to the number of calculations they solved. It is found that the output under all variable payments is higher than under the fixed payments. Additionally, the workers who chose a variable pay scheme were faster in solving one problem than workers paid a fixed wage. This can be explained by the fact that the fixed-wage workers experience a higher error rate, as time went by. When a subject has to choose between a fixed payment and a variable payment, subjects who have a higher productivity than a certain threshold, will choose the variable pay contract. Someone with a lower productivity will opt for the fixed payment. This productivity threshold increases in the level of the fixed payment and it decreases with the attractivity of the variable payment. Someone who is more productive, is more likely to select himself into a variable wage scheme. Consequently, he is actually more productive. This is related to school performances as well. A subject with higher grades for mathematical courses, is more likely to choose a variable wage scheme, when he has to solve mathematical equations. Moreover, someone with a higher risk aversion will choose fixed payments over variable payments. Subjects with a better relative self-assessment will choose a variable pay contract.

When the findings of the latter three papers are combined, it appears that the introduction of performance pay often leads to the sorting effect (Lazear, 2000; Dohmen & Falk, 2011). It has also been shown that the sorting effect can lead to more employment (Gielen, Kerkhofs, & van Ours, 2010). This then leads to the following hypothesis:

Hypothesis 2: Performance pay will lead to more employment opportunities

2.4. Similar research

Similar research has taken place by Pouliakas & Theodoropoulos (2009). They investigate the effect of performance related pay on the productivity and on absence rates. To measure this effect, they use the Workplace Employment Relations Survey (WERS) as well. This is a survey of employment relations of workplaces in the United Kingdom. In their research the surveys of 1998 and 2004 are used. My paper uses panel data of 2004 and 2011. They conclude that, if payments depend on a subjective assessment of individual earnings, it does not affect labor productivity. On the other hand, PRP schemes, which depend on an objective assessment of individual performance, have the opposite effect. However, this does not apply to all workplaces in the survey. For example, organizations in the public sector have different outcomes compared to enterprises in the private sector. It was decided not to use their paper as a theoretical background to support the hypotheses because of the following. Their research is based on cross-sectional data. This entails the risk of not estimating the correct effect because the chance of omitted variable bias is high. With cross-sectional data it is hard to account for unobserved variables. Therefore, an advantage of panel data is that unobserved variables can be accounted for, by including fixed effects. All time-invariant variables are implicitly captured when including individual fixed effects. This will probably result in a different estimation of the relationship between performance pay and the productivity of workers. Hence, in the conclusion of this paper, the found results will be compared to the results of Pouliakas & Theodoropoulos (2009).

3. Data and methodology

3.1. Data

3.1.1. Workplaces Employment Relations Survey

The data used in this research is retrieved from the 2004 and 2011 Workplace Employment Relations Survey (WERS) (Department for Business, Innovation and Skills, National Institute of Economic and Social Research, Advisory, Conciliation and Arbitration Service, 2015; Department of Trade and Industry, Forth, & Policy Studies Institute, 2014). This study uses the fifth and sixth surveys in a series of surveys of workplaces in the UK. These surveys have been conducted since 1980. All workplaces in the UK that have five or more employees are included in this large-scale study. This only concerns workplaces that are active in section C-S

of the Standard Industrial Classification (2007). As a result, 35% of all workplaces and 90% of all employees are represented by this population. A workplace refers to all activities of one employer in one location.

3.1.2. Components of the WERS

The survey consists of the following sections: Survey of Managers, comprising the Employee Profile Questionnaire (EPQ) and the Management Questionnaire (MQ); the Survey of Worker Representatives (WRQ); the Survey of Employees (SEQ); and the Financial Performance Questionnaire (for workplaces in the trading sectors) (FPQ). The interview will be held with the senior manager of each workplace, who is responsible for industrial relations, human resources or personnel. Prior to the interview, the manager provides a demographic profile of the workforce. He also provides information about the financial performance of a workplace, if it is in the private or public trading sector. Moreover, a maximum of 25 employees have to fill out a questionnaire about the workplace. An interview is also held with a union and a non-union representative, if they are both employed.
Workplace managers and employee representatives are requested to respond as objectively as possible about their workplace. Therefore, the data is not about the characteristics of the employee as a person, but about the functioning of the company as a whole.

A big advantage of the design in the WERS surveys is that two completely separate samples are used. A distinction can be made between cross-section and panel data. The panel data was conducted with the sample that was still in place at the time of the new WERS. This was done, to measure the behavior of companies over time. The most recent data will be used in this research. A panel will therefore be made from the years 2004 and 2011.

Moreover, only the Management Questionnaire will be considered. This is because it contains the most relevant information about the use of performance benefits. The overall response rate for the panel sample of 2004 and 2011 for the MQ was 52%. Finally, 989 workplaces had a useful response in the panel sample.

3.1.3. Sample

If a simple random sample is drawn, each person in the population has an equal chance of selection. In this way, the retrieved sample will most likely represent the population from which it was drawn. It should be noted that it is assumed that a non-response bias will not occur. When the sample was created for the WERS 2011, larger workplaces were more likely to be selected to participate in the survey. When the sample of workplaces was drawn for the WERS 2011, larger workplaces were more likely to be selected into participation of the survey. Moreover, workplaces in less populated industries had a greater chance to be selected into participating in the survey. Subsequently, the sample will differ notably from the population, from which it was drawn. Additionally, smaller workplaces had lower response rates, which is another way through which the sample deviates from the population. Due to all these deviations, it is important to add weights to the data. In this way, the data can be manipulated, in order to represent the population as well as possible. The weights are calculated as following:

$$weights = \frac{1}{probability\ of\ selection\ and\ response}$$

Accordingly, the known biases, that results from the selection and response process, are removed.

3.1.4. The dependent variables

The outcome variable to test the first hypothesis is a variable that shows how the company performs in terms of labor productivity compared to other companies. This has been reported by the companies themselves. It is an ordinal scale from 1 to 5. If someone enters 1, it means that the company is performing much better than their competitors. This ends in much worse, number 5. The distribution of this variable is shown in Figure 1 in the Appendix. The labor productivity has a predominantly normal distribution. It can be seen that the distributions for 2004 and 2011 are alike.

Furthermore, the outcome variable for the second hypothesis is the total employment. This is measured in the number of people, currently working at that firm. This is a continuous variable. The distribution can be seen in Figure 2 of the Appendix.

3.1.5. The independent variable

The independent variable for both hypotheses is whether performance pay is used or not. This survey identifies two types of performance related pay. The companies use payment by results, merit pay, a combination of both, or they do not use performance related pay. Payment by results can be explained by any method of payment where the pay is determined by the amount done or its value, rather than the number of hours works (Department for Business, Innovation and Skills, National Institute of Economic and Social Research, Advisory, Conciliation and Arbitration Service, 2015). This includes commissions and bonuses that are determined by individual, workplace or organization productivity or performance. It should be noted that this does not include profit-related pay schemes. Merit pay is related to a subjective assessment of individual performance by a supervisor or manager (Department for Business, Innovation and Skills, National Institute of Economic and Social Research, Advisory, Conciliation and Arbitration Service, 2015). Cross-tables are included for payments by results and merit pay in table 1 and 2, respectively. This shows that 12.64% of the companies switched to using payment by results from 2004 to 2011. On the other hand, 14.66% stopped using payment by results from 2004 to 2011. Moreover, 16.08% of the organizations started using merit pay from 2004 to 2011, while 11.83% quit using this type of performance related pay. Furthermore, table 1 and 2 in the appendix are cross tables of payment by results and merit pay in 2004 and 2011, respectively. These tables show that 8.49% of the firms use both types of performance related pay in 2004. In 2011, the proportion of companies that used both types of performance pay is equal to 10.62%.

Table 1: Cross table of payment by results per year

Payment by results		2004		
		No	Yes	Total
2011	No	592 (59.86%)	145 (14.66%)	737 (74.52%)
	Yes	125 (12.64%)	127 (12.84%)	252 (25.48%)

Total	717 (72.50%)	272 (27.50%)	989 (100%)

Table 2: Cross table of merit pay per year

Merit pay		In 2004 No	Yes	Total
In 2011	No	601 (60.77%)	117 (11.83%)	718 (72.60%)
	Yes	159 (16.08%)	112 (11.32%)	271 (27.40%)
Total		760 (76.85%)	229 (23.15%)	989 (100%)

The key descriptive statistics of the dependent and independent variables can be seen in Table 3. These tables show, that the number of observations differ for some variables. All of the observations must be equal before performing an OLS regression. Furthermore, there is a large variation in the employee inflow.

Table 3: Descriptive statistics of the labor productivity, the employee inflow and the types of performance pay

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Labor productivity	1,734	3.745	.7359	1	5
Employment	1,978	509.2	1203.6	5	11605
Payment by results	1,978	.2649	.4414	0	1
Merit Pay	1,978	.2528	.4347	0	1

3.2. Methodology

Firstly, the effect of performance related pay on the labor productivity will be elaborated. Despite the ordinal character of the dependent variable, an ordinary least squares (OLS) regression combined with fixed effects will be used to estimate this effect. The regression has the following form:

$$Y_{it} = \gamma_i + \delta_t + \beta_1 T_{1,it} + \beta_2 T_{2,it} + \beta_3 (T_{1,it} \times T_{2,it}) + \varepsilon_{it}$$

Where Y_{it} is the outcome indicator that measures the labor productivity on a scale of 1 (much worse labor productivity than the competition) to 5 (much better labor productivity than the competition), T_1 and T_2 are dummy variables for payment by results and merit pay respectively and an interaction variable between these two is included. This is a dummy variable that equals 1 if both types of performance pay are used. Moreover, γ_i and δ_t are vectors for firm and time fixed effects, respectively. Lastly, the β's are the coefficients and ε_{it} is the error term.

The effect of performance related pay on the employment will be estimated with an OLS regression combined with fixed effects of the following form:

$$\log(Y_{it}) = \gamma_i + \delta_t + \beta_1 T_{1,it} + \beta_2 T_{2,it} + \beta_3 (T_{1,it} \times T_{2,it}) + \varepsilon_{it}$$

Where Y_{it} is the outcome indicator, that measures the log of the total employment in number of people, T_1 and T_2 are dummy variables that denote whether payment by results and merit pay are used, respectively. Moreover, the interaction variable between the two types of performance related pay is included in the regression. Furthermore, γ_i and γ_t are vectors for firm and time fixed effects, respectively, the β's are the coefficients and ε_{it} is the error term.

4. Results

In this section, the results of the aforementioned methods will be discussed, to examine the effect of the use of performance pay on productivity and employment.

4.1. Results of performance pay on the labor productivity

Firstly, hypothesis 1 will be tested, which states that performance pay leads to higher labor productivity. The results of two different regressions are shown in Table 4. In model 1, the coefficients have been estimated by an OLS regression without firm fixed effects. On the other hand, the coefficients in model 2 have been estimated using OLS with firm fixed

effects. As a result, all time-invariant omitted variables are eliminated, so there will be no omitted variable bias.

Therefore, the results in model 1 are biased, because they are likely to suffer from omitted variable bias. For instance, merit pay leads to an increase in the labor productivity of 0.01656 in model 1. Thus, firms that use merit pay have a higher productivity on average than firms that do not. However, in model 2 merit pay leads to an increase of 0.1039 in the labor productivity. This is a larger effect than in model 1. This implies that the effect is greater in reality, than estimated in model 1. Using merit pay leads to an increase in the reported labor productivity, but it is not significant. Moreover, the coefficient of payment by results is equal to 0.08397 in model 1. This suggests that firms that use payments by results often have a higher productivity than companies that do not. On the other hand, this coefficient is equal to 0.1721 in model 2. This means that there is a larger effect on the labor productivity than estimated initially. In model 2 the coefficient is significant on a 5% significance level. The use of payment by results leads to an increase in the labor productivity.

Furthermore, it is important to realize that the effect of using both performance rewards is not the same as adding both effects separately. Therefore, the interaction variable has been added. The interaction term has an effect of 0.001009 on the labor productivity in model 1, while in model 2 the effect is equal to -0.1699. In both models this coefficient is not significant. For model 1, this means that companies that offer both variants of performance pay are on average even more productive. This effect is added to the separate effects of the types of performance pay together. For model 2, the interaction variable shows that using both types of performance pay decreases the labor productivity. The effect of using both merit pay and payment by results is therefore equal to: 0.1039 + 0.1721 - 0.1699 = 0.1061. This shows that part of the effect is removed by the interaction variable. Thus, it does not mean that adding an extra kind of performance reward will increase productivity even more. For example, it can also be seen that the total effect of using both performance rewards (0.1061) is smaller than the effect of payment by results (0.1721). This clarifies that the use of an extra form of performance pay does not necessarily lead to higher productivity. In this case it would be even better to only use payment by results. Payment by results provides a

greater increase in labor productivity than the use of both types. A company that uses payment by results therefore does not have to use an extra form of performance-related pay. That would even reduce the productivity they have at the time. The effect of merit pay is slightly smaller than that of both types of performance-related pay. Thus, if merit pay is already being used in a company, the productivity could be somewhat increased by adding payment by results. The effect of using both variants of performance pay is positive. This means that it is better to use both types than no performance reward at all.

Furthermore, the constant is difficult to compare, because in model 2 this concerns a company-specific value. In model 1 the year dummy is equal to -.005860. This would mean that a company in 2011 has a lower labor productivity than a company in 2004. However, in model 2 this value is .01064. As a matter of fact, a company in 2011 actually has a better labor productivity than one in 2004. This is not significant, so there is a lot of uncertainty in this estimation.

Finally, the R squared of this model is equal to 0.006926. This means that 0.6926% of the variance in the reported labor productivity can be explained by this model.

Table 4: OLS estimates of the effect of performance related pay on the labor productivity

Variable	Model 1	Model 2
Labor productivity		
Merit pay	0.01656	.1039
	(.05136)	(.08646)
Payments by results	.08397*	.1721**
	(.04839)	(.07873)
Both types of PRP	.001009	-.1699
	(.09088)	(.1308)
Year	-.005860	.01064
	(.03536)	(.03602)

Constant	3.452***	3.414***
	(.02848)	(.03151)
Observations	1,734	1,734
R^2	.002834	.006926

*Legend: * p<10%, ** p < 5%, *** p < 1%*

4.2. Results of performance pay on the employment

Next, we turn to hypothesis 2, which states that performance pay leads to more employment. The results of the OLS regression for the log of employment is represented in Table 5. In model 1, the values are estimated using an OLS regression without firm fixed effects, while model 2 uses OLS regression with firm fixed effects. Model 1 probably has omitted variable bias, making this an unreliable model. For instance, payment by results increases the employment with 19.05% in model 1, whereas in model 2 it decreases the employment with 8.835%. Thus, in reality the effect of using payment by results is smaller, than initially estimated. For model 1, this means that companies that use payment by results on average have higher employment than companies that do not. In model 2 a causal effect can be estimated. Using payment by results decreases the employment. Moreover, using merit pay increases the employment with 114.7% in model 1. This implies, that in a company that uses merit pay, employment is almost twice as large, on average. On the other hand, in model 2 it decreases the employment with 0.3415%. Thus, the effect is actually much smaller, and merit pay leads to a decrease in the employment. However, both variables are not significant. This leads to uncertainty in the estimations.

Furthermore, the interaction variable can be examined. The effect of using both types of performance-related pay is not the sum of the effect of both types separately. Using merit pay and payments by results also have an effect on each other. The interaction variable reduces employment by 17.10% in model 1, while in model 2 it increases the employment by 2.924%. In model 1 this means that in companies that use both forms of performance-related pay, the effect is often reduced by the interaction term. The total effect of using both merit pay and payment by results, in model 2, is equal to: -0.08835 – 0.003415 + 0.02924 = -0.06253. The use of both types of performance pay thus reduces employment by 6.253%. The use of only payment by results leads to a decrease in employment of 8.835%.

Compared to this, a company can limit the decline by also using merit pay. As mentioned before, the effect of using both types of performance pay is 6.253% and this is smaller than that of payment by results. On the other hand, merit pay decreases the employment by 0.3245%. This is much less than when both variants are used. Thus, it is better for a company that only uses merit pay to keep it that way. Otherwise, there will be a greater decline in employment. As aforementioned, the use of both variants of performance-related pay implies a decrease in employment. In that case, it is better not to use a performance reward than to use performance related payments. As a result, there will not be a reduction in employment.

Moreover, the constant cannot be interpreted, because fixed effects are included. This makes the constant firm-specific. The time variable is also considered. In both models the time dummy is significant. In model 1 a firm in 2011 has a 2.572% lower level of employment than in 2004. However, in model 2 a firm in 2011 has a 1.548% higher level of employment than in 2004. Thus, employment has increased over time.

Finally, the R squared of this model is equal to 0.0008540. This means that 0.08540% of the variance in the employee inflow can be explained by this model.

Table 5: Estimates of performance related pay on the log of employment

Variable	Model 1	Model 2
Log(number of employees)		
Payment by results	0.1905	-.08835
	(.1055)	
Merit pay	1.147	-0.003415
	(.1197)	(0.06144)
Both types of PRP	-0.1710	0.02924
	(.1955)	(.1025)
Year	-.02572***	0.01548***
	(.07789)	(.08163)

Constant	4.295***	4.591***
	(.06265)	(.02385)
Observations	1,978	1,978
R^2	0.07358	0.0008540

*Legend: * p<10%, ** p < 5%, *** p < 1%*

5. Discussion

5.1. Conclusion

In this paper, the effect of performance-related pay on productivity is investigated. The central research question is *'What is the effect of performance pay on the labor productivity of employees in the United Kingdom?'* This has been tested on the basis of two hypotheses, specifically *'Performance pay leads to higher productivity'* and *'Performance pay leads to more employment opportunities'*.

Testing the first hypothesis showed that the two types of performance pay used in this study, merit pay and payment by results, have a different effect on productivity within a company. Merit pay does not have a significant effect on the labor productivity. However, payments by results leads to an increase in the labor productivity. Thus, the hypothesis that performance pay leads to higher levels of productivity can be accepted for performance pay that is defined by an objective assessment of individual performances. This partly contradicts other studies, including those by Lazear (2000) and Gielen et al (2010), which have found an overall positive effect of performance pay. In addition, testing hypothesis 2 has shown that the use of performance-related pay does not have a significant effect on the employment. This means that performance pay does not provide more employment opportunities. Thus, hypothesis 2 must be rejected. The findings of this paper are in contrast with findings of other papers, such as Gielen et al (2010) and Lazear (2000), which did find a significant and positive result.

Therefore, the research question can be answered as follows. Payment by results has a positive effect on the labor productivity in an organization. The workers are more motivated by this type of pay than they are under a fixed wage. However, merit pay does not have a

significant effect on the productivity. Moreover, the use of performance pay does not lead to an increase in employment opportunities.

Research by Pouliakas & Theodoropoulos (2009) found that types of performance related pay that are associated with the objective evaluation of individual performance increase the productivity and types of performance related pay that are measured by the subjective evaluation of individual merit are not related to the productivity. In this paper, payment by results is linked to the objective evaluation and merit pay is related to a subjective assessment of individual performance. Similar to the paper of Pouliakas & Theodoropoulos (2009), this paper found that performance related pay linked to the subjective evaluation is not related to the productivity, but performance related pay that is linked to an objective evaluation is related to the productivity. The latter has a positive effect on labor productivity.

5.2. Internal validity

In order to make causal connections, it is important that the findings are internally valid. Internal validity is violated, when omitted variable bias (OVB) is involved. OVB occurs when there are variables, which are not included in the model, but which influence both the dependent and the independent variable. Because fixed effects are used, all time-invariant omitted variables are implicitly captured. These will therefore not lead to a bias. The existing biases are then due to unobserved time-variant variables.

Therefore, it is likely that there are omitted variables that have an effect on the dependent and independent variable but are not included. For the first hypothesis, this is represented in Figure 1. For instance, Lemieux, Macleod and Parent (2009) have shown that less union formation is a determinant of both performance pay and labor productivity. Furthermore, research by Dohmen and Falk (2011) has shown that individual attitudes, such as willingness to take risks and relative self-assessment are important variables that influence whether someone chooses for performance pay. Omitting these variables only cause omitted variable bias if they vary over time. As mentioned before, adding fixed effects removes all time invariant biases.

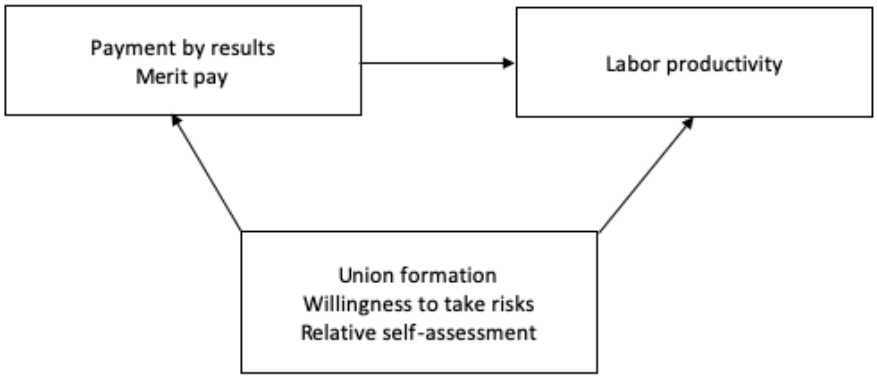

Figure 1. Causal diagram of two types of performance related pay on the labor productivity.

Furthermore, omitted variable bias can also occur in the regression to test hypothesis 2. This is shown in Figure 2. According to Yang (2007), market conditions play a big role in the employee inflow. Performance pay can only lead to an increase in productivity if there are more jobs than employees. Hence, the employees can quickly find a new and better job. Furthermore, Lazear (1999) points out, that risk aversion and retention are also key determinants of the effect on employment. Again, it is important to note that this only causes OVB if these variables vary over time. The occurrence of the omitted variable bias in both regressions threatens the internal validity.

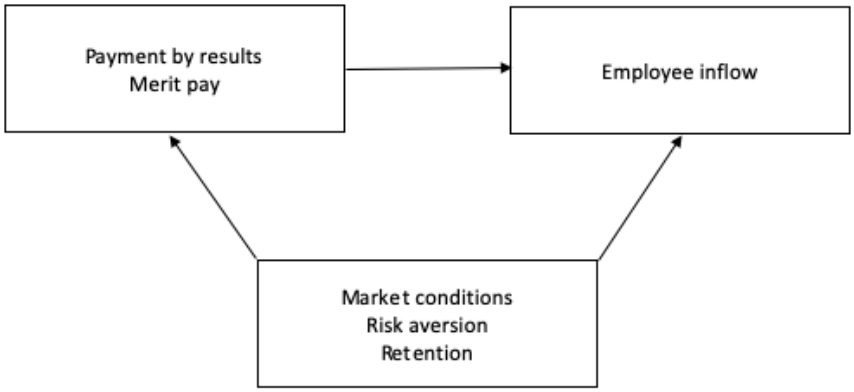

Figure 2. Causal diagram of two types of performance related pay on the employee inflow

Moreover, larger firms and firms from less populated industries were overrepresented in the survey. This implies that there is selection bias, which threatens the internal validity.

5.3. External Validity

Furthermore, it is important for the findings to be externally valid. External validity implies that the findings are applicable in other settings than the settings used in the experiment.

These findings are probably not externally valid, because only corporations in the United Kingdom have been surveyed. Hence, the results might not apply for other countries. For example, countries that have an economy that is less developed than the economy in England, will probably have other outcomes. In addition, the last survey dates from 2011, which is now nearly 10 years ago. This can be labeled as slightly dated and, thus, it is hard to say if the results are still valid in the present day.

5.4. Limitations

Moreover, this research has some limitations. Firstly, the dependent variables are subjectively reported by the manager of the company. Regarding an ordinal scale, everyone has a different perception of their own performance and where it lies on this scale. For example, Figure 1 of the appendix shows that hardly anyone considers their labor productivity to be much better or much worse than their competitors. This is remarkable, because it is likely that there are more companies in the survey that should be placed there. A numerical variable, such as the turnover, may be more representative as a dependent variable.

Another weakness of this research is that OLS regression was used instead of a logistic regression to test the first hypothesis. Since the dependent variable has an ordinal character, the best option would be logistic regression. Logistic regression estimates the probability of an outcome. For the ease of the research, OLS regression was chosen. The results of both regressions are often still close to each other, but it cannot be stated with certainty. The risk with OLS is that with the given independent variable, it is possible to go beyond the scale of the dependent variable, when in fact this cannot. Therefore, logistic regression would be better. In addition, the models have a very low value of R squared. This indicates that little variance in the dependent variables is explained by the model. As a result, the findings are also less reliable. It is likely that other variables affect the dependent variable.

Furthermore, panel data is used in this study. This is useful to correct for time invariant omitted variables. The drawback in this data is that there is only a 2-year series. That makes the results less reliable, so it would be better to use a data set that has more consecutive years. Then more attention can be paid to certain differences that exist between the years.

Lastly, a few remarks can be made regarding the number of observations. In particular, 989 companies participated for 2 years. A total of 1978 observations is fairly reliable. However, for panel regressions, the coefficients are estimated based on the variation over the years. It has been shown that the percentage of companies that change over the years is approximately above 10% for both types of performance pay. In particular, 27.91% has switched with regard to payments by results and for merit pay that is 33.66%, regardless of the direction. This greatly reduces the number of observations and makes the findings less reliable.

5.5. Recommendations

All in all, a few recommendations can be made for follow-up research. Observations from several recent years in sequence can be looked at, to estimate a more reliable effect. Furthermore, several countries could be included in the survey to increase external validity. Participants can also be chosen at random in order to avoid selection bias. Hence, the sample will give a better reflection of the actual population. Moreover, a more objective dependent variable could be looked at, such as the turnover of a company. In this way, the results do not depend on subjective responses.

Bibliography

Bryan, M., & Bryson, A. (2016). Has performance pay increased wage inequality in Britain? *Labour Economics, 41*, 149-161.

Department for Business, Innovation and Skills, National Institute of Economic and Social Research, Advisory, Conciliation and Arbitration Service. (2015). *Workplace Employee Relations Survey, 2011*. [data collection]. *6th Edition.* UK Data Service. SN: 7226,

Department of Trade and Industry, Employment Market Analysis and Research, Forth, J., Policy Studies Institute, Advisory, Conciliation and Arbitration Service. (2014). *Workplace Employee Relations Survey, 2004; Cross-Section Survey, 2004 and Panel Survey, 1998-2004, Wave 2*. [data collection]. *5th Edition.* UK Data Service. SN: 5294

Dohmen, T., & Falk, A. (2011). Performance Pay and Multidimensional Sorting: Productivity, Preferences, and Gender. *American Economic Review, 101*, 556–590.

Gielen, A. C., Kerkhofs, M. J., & van Ours, J. C. (2010). How performance related pay affects productivity and employment. *Journal of Population Economics, 23*, 291-301.

Green, C., & Heywood, J. S. (2008). Does Performance Pay Increase Job Satisfaction? *Economica, 75*, 710-725.

Irshad, M., & Afridi, F. (2007). FACTORS AFFECTING EMPLOYEES RETENTION: EVIDENCE FROM LITERATURE. *Abasyn Journal of Social Sciences, 4*(2), 307-339.

Jensen, M. C., & Murphy, K. J. (1990). Performance Pay and Top-Management Incentives. *Journal of Political Economy, 98*(2), 225- 264.

Lazear, E. P. (1999). Output-based Pay: Incentives or Sorting? *NBER Working Paper, 7419*.

Lazear, E. P. (2000). Performance Pay and Productivty. *American Economic Review, 90*(5), 1346-1361.

Lemieux, T., MacLeod, B. W., & Parent, D. (2009). Performance pay and wage inequality. *The Quarterly Journal of Economics, 124*(1), 1-49.

Makridis, C. (2018). Work and Grow Rich: The Dynamic Effects of Performance Pay Contracts.

Pouliakas, K., & Theodoropoulos, N. (2009). Variety of Performance Pay and Firm Performance: Effect of Financial Incentives on Worker Absence and Productivity. *Munich Personal RePEc Archive* , 1-21.

Yang, H. (2007). Efficiency wages and subjective performance pay. *Economic Inquiry, 46*(2), 179-196.

Appendix

Tables

Table 1: Cross table of payment by results by merit pay in 2004

Performance pay		Merit pay No	Yes	Total
Payment by results	No	571 (57.74%)	147 (14.86%)	718 (72.60%)
	Yes	166 (16.78%)	105 (10.62%)	271 (27.40%)
Total		737 (74.52%)	252 (25.48%)	989 (100%)

Table 2: Cross table of times of payment by results by merit pay in 2011

Performance pay		Merit pay No	Yes	Total
Payment by results	No	572 (57.84%)	188 (19.00%)	760 (76.85%)
	Yes	145 (14.66%)	84 (8.49%)	229 (23.15%)
Total		717 (72.50%)	272 (27.50%)	989 (100%)

Figures

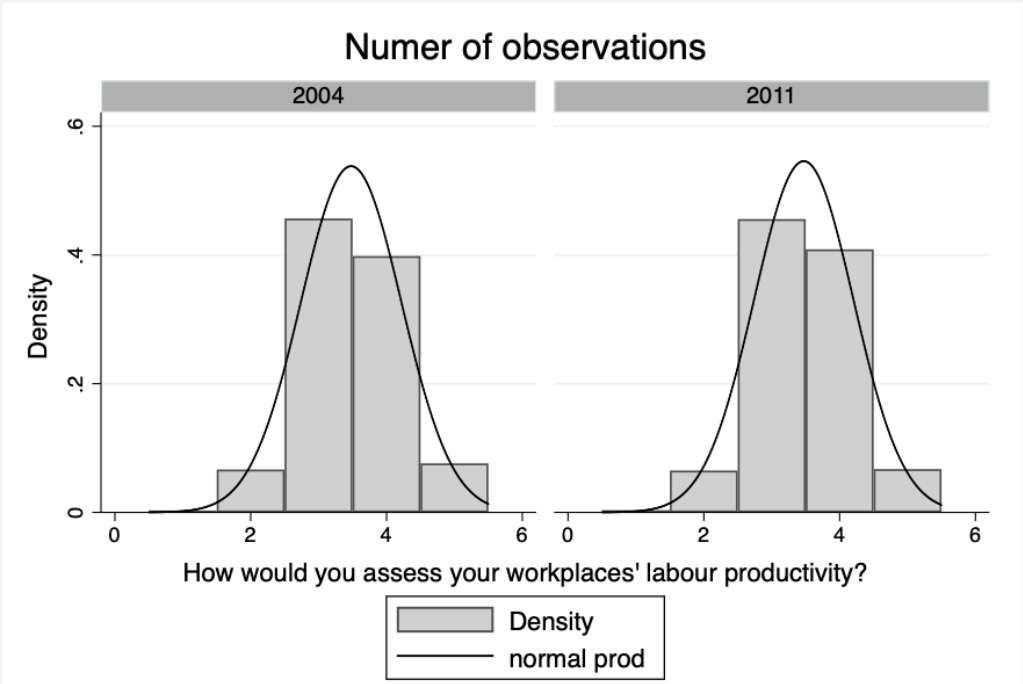

Figure 1. Distribution of the self-reported workplace productivity of companies in the 2004-2011 panel WERS survey

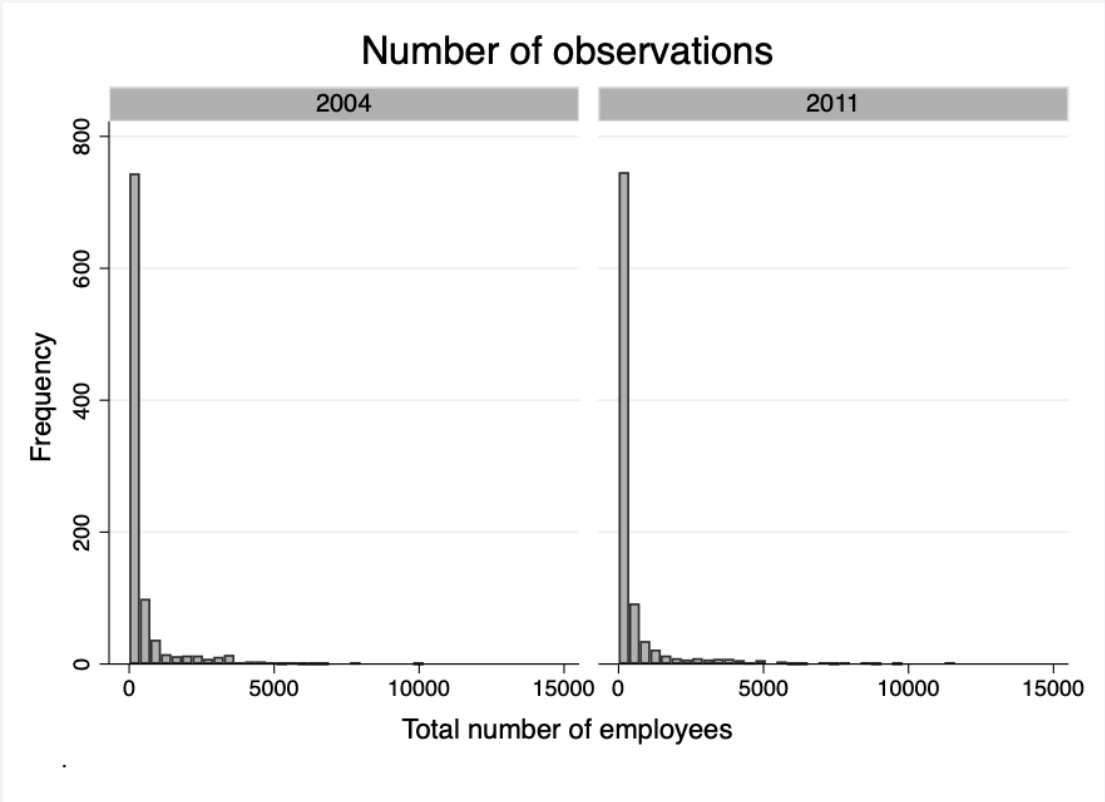

Figure 2. The distribution of total number of employees per company in the 2004-2011 panel WERS survey