

## Abstract

This study uses cross-section and panel data from the 1998 Workplace Employee Relations Survey to explore contextual influences on the relationship between performance-related pay (PRP) and organizational performance. While it finds strong evidence that the use of PRP can enhance performance outcomes, it also determines that this relationship is qualified by the structure of workplace monitoring environments. In addition, it presents evidence that managers learn about optimum combinations of pay system and monitoring environment through a process of experimentation. Lastly, although there exists a robust positive association in these data between use of PRP and pay inequality, it appears that these higher levels of inequality carry no performance penalty.

JEL classifications: J33, M12

Keywords: performance-related pay, incentives, performance measurement, organizational commitment

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# **Matchmaking: the Influence of Monitoring Environments on the Effectiveness of Performance Pay Systems**

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## 1. Introduction

In recent years, performance-related pay (PRP) has become a standard element of the management toolkit for achieving competitiveness. However, despite this apparent popularity among business practitioners, the evidence is weak for the blanket superiority of compensation systems that incorporate elements of PRP over their “traditional” time-based counterparts. Indeed, what is striking about the literature on PRP is the degree of variation in its results, as studies in differing sectoral and organizational contexts offer a remarkable variety of assessments of the relative effectiveness of PRP systems (Lazear 2000; Marsden et al. 2001; Levine 1991; Pfeffer and Langton 1993). In this paper we build on this observation, integrating it with a reading of the theory of the “New Economics of Personnel” (NEP) that focuses on the role of workplace context—which we label “monitoring environment”—as a critical determinant of the performance effect achieved by PRP systems. In doing so, we present evidence that there exists an interaction effect between pay system and monitoring environment which exerts a significant influence upon a workplace’s economic performance. Further, we introduce a dynamic element into our analysis in order to test the idea that managers must engage in a process of experimentation if they are to find the optimum combination of pay system and monitoring environment for their establishment. The results we obtain are consistent with this hypothesis. In our conclusion, we review the implications of our findings for both researchers and managers.

In addition to exploring the influence of PRP on economic performance, we consider its impact on and interaction with the issue of pay inequality. One account of the growth in the last two decades of pay inequality in the UK highlights the role of the contemporaneous legislative remaking of the UK labour market (Metcalf, 1995; Howell 1999; Katz and Darbishire 2000). This process, at least partly inspired by the need to boost national competitiveness, brought in its wake a notable trend towards greater institutional diversity at the level of the workplace, which manifested itself perhaps most clearly in the matter of pay. On the one hand, therefore, such umbrella institutions as the wages councils and collective bargaining, which had previously helped to generate uniformity in pay outcomes, fell into decline or were disbanded; and on the other the use of individual-centred pay mechanisms such as PRP, associated with increased pay inequality, expanded rapidly. While some assert that there exists a trade-off between efficiency and equity, with higher inequality being associated with higher performance through the greater incentives offered by PRP-like

mechanisms (Metcalf 1995), rival theoretical constructs suggest that the opposite might be true (Akerlof and Yellen 1990). Thus, we look for evidence first that PRP is accompanied by higher inequality, and second that this raised inequality is compatible with comparatively higher organizational performance.

Our data sets are drawn from the cross section and panel elements of the 1998 (and 1990) Workplace Employment Relations Survey (WERS). This survey constitutes a particularly rich source of information about workplace pay systems and practices, in addition to offering the necessary institutional and structural variables for our tests. It is the depth of the data that permits us adequately to delineate the monitoring environments of workplaces. Further, the survey's complex sample design, which aims to replicate the structure of that section of the UK economy comprised of workplaces of ten employees or larger, enables us to investigate the effects of PRP in a wide variety of industrial contexts. Unlike many other studies of PRP, therefore, we may plausibly test the extent to which NEP theory is relevant outside the world of Fordist production.

The paper is structured as follows. We begin with a review of the implications of NEP theory, from which we generate our hypotheses. Next is an overview of empirical developments in the UK labour market that are relevant to the study of PRP, which is accompanied by summary results from WERS 98 data. Having defined the context of our study, we elaborate upon the core concept of "monitoring environment" and its interaction with pay systems (which, we hypothesize, will result in a "matched" or "mismatched" outcome). A description of our generic model, which incorporates this concept, follows. Our analysis of WERS data comprises two stages: first, the application of the model to 1998 cross-sectional data, in which we test for the effect of the interaction of pay systems and monitoring environments upon workplace performance; and second, an examination using 1990-1998 panel data of the patterns of diffusion of PRP, which seeks to uncover evidence of organizational learning regarding the optimum combination of pay system and monitoring environment. We conclude with a discussion of our various results.

## **2. Theory: Incentives, Performance, and Inequality**

As Prendergast (1999: 7) notes, incentives are provided to workers through the compensation practices of their employers. The manner in which workers then respond to these incentives plays a significant role in determining both their individual level of performance and the

performance of the organization as a whole. Within the NEP framework, one of the key decisions that managers must make about their compensation systems is whether to use “fixed or variable pay”, that is, input- or output-based (performance-based) pay (Lazear 1995).<sup>1</sup> The salience of this managerial decision derives from the expectation that neither one of these pay types produces universally superior results (Pfeffer and Langton 1993). Thus, in some contexts input-based pay will elicit better results, whereas in others PRP will be the optimum choice.

The principal factor that affects the choice of input- or performance-based pay is that of measurement costs. NEP theory asserts that, given perfect knowledge of a worker’s performance, PRP will produce better results for the firm because it creates an explicit connection between individual and organizational interests: by maximizing his or her own “take”, the worker also optimises the firm’s position. However, it is often difficult for managers to determine an individual worker’s contribution to the overall performance of an organization. Without this information, managers will not be able to match reward to performance with any degree of accuracy, with the knock-on effect that workers will not be able to count on a fair reward for effort expended. Where these uncertainties exist, managers, for their part, risk overpaying workers for their contribution, and workers, for theirs, are likely to withdraw the effort for which they cannot be sure of compensation. In such a situation, NEP theory predicts that firms would be better off paying on the basis of input (e.g., time), even though it is less strongly correlated with organizational performance than is worker performance, as it can usually be measured much more cheaply and accurately. At the margin, therefore, input-based pay is the superior type where managers and workers face significant uncertainty in the measurement of worker performance.

These implications of the NEP theoretical framework lead us to focus on the issues of worker performance measurement and its associated facility or difficulty as important intermediating variables in the relationship between pay systems and organizational performance. We describe this bundle of variables as the “monitoring environment” of a workplace. Although we conceive of monitoring environments as multi-dimensional and gradational phenomena, we argue that they may be categorized according to a binary typology. This follows from our assertion that they affect organizational performance only in interaction with compensation systems, which are themselves defined in binary terms: input-

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<sup>1</sup> As the term “output-based pay” carries strong connotations of industrial production, we prefer to use the sector-neutral rubric of “performance-based pay” (PRP). In doing so, however, we sacrifice no conceptual accuracy, as this alternative label captures the core concept of the original term, that is, payment according to the *ex post* measurement of value added by a worker.

based or worker performance-based.<sup>2</sup> Thus, we may imagine a “tipping point” in the multidimensional space described by the bundle of variables that comprise the concept of “monitoring environment”, to the one side of which lie monitoring environments that optimise organizational performance in combination with input-based pay, and to the other those that deliver superior results when paired with PRP. We present this idea in visual terms in Figure 1.

While the above reasoning does not explicitly address the issue of pay inequality, it is implicit in the discussion of input- and performance-based pay systems. NEP theory suggests that performance-based pay systems will be associated with higher levels of inequality than their input-based equivalents (Lazear 1995) on the grounds that there is greater underlying variation in the individual endowments that determine worker performance (e.g., cognitive or physical ability, risk propensity, determination, etc.) than in those that determine input (e.g., ability to put in eight hours per day, etc.). However, by increasing the level of intra-workplace pay inequality found in a workplace, performance-based pay systems run the risk of reducing the positive impact on performance of their incentive effect. This possibility is raised by Akerlof and Yellen (1990) in their discussion of the implications of equity theory for organizational performance. These authors advance a “fair wage-effort hypothesis”, in which they posit that workers’ effort is related to the perceived “fairness” of their pay, or, more precisely, that workers will withdraw effort to the extent that they consider their pay unfair. The benchmark of “fairness” that they propose is a weighted average of the pay of the workers’ peers within the organization (i.e., those who do similar work, or work of similar status) and of the market rate for their own job. Such an effect is likely to be of particular importance in production systems that emphasize teamwork and collaboration among workers to achieve shared goals. Alternatively, workers may conceive of fairness in terms of the accuracy with which performance is mapped onto reward, and may withdraw effort in the event that management fails to reward good performance appropriately. Indeed, there is evidence to suggest that this effect is a real hazard faced by managers who implement PRP systems in an organization, with the costs of errors in performance measurement rising in relation to the gearing of the pay incentive (Marsden and Richardson 1992; Marsden et al. 2001). Observers who emphasize the performance effects of norms of fairness, therefore,

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<sup>2</sup> We define a compensation system with any element of performance-based pay as “performance-based”. Though we recognize that such systems might equally be described as a mix of input- and performance-linked pay, for the purpose of this paper we focus on the categorical distinction between compensation plans that provide some variety of performance-related incentive and those that do not.

contradict the predictions of NEP theory, asserting that performance outcomes tend to be negatively related to pay inequality.

It is possible to marry the ostensibly contradictory viewpoints of NEP and equity theory by asserting that both describe real phenomena, but that these are antagonistic rather than complementary. Thus, PRP may positively influence organizational performance through its incentive effect (if it is implemented in an amenable monitoring environment), but its by-product, increased pay inequality, may simultaneously modulate performance by means of its countervailing disincentive effect. This paper addresses the question of which influence is dominant (if either), and in what contexts that dominance obtains.

### **3. Observed Developments in the UK**

In the heyday of British manufacturing, PRP was, in the form of piece rates, a commonplace method of structuring workers' compensation. However, with the relative decline of that sector's weight in the economy, and with the introduction of production systems in which output was measured in terms of collective rather than individual endeavour, piece rate-based pay systems became less widely used. While this process was a long-term one, lasting a number of decades, we can see something of it in NES data for the 1980s and 1990s, which appear in particular to capture the effect of the accelerated contraction of the manufacturing sector following the recession of the early-1980s (Figures 2 & 3). These data series are imperfect for our purposes in that the NES definition of "payment by results" (PBR) includes not only what we call PRP (that is, pay linked directly to worker performance), but also pay linked to group or organizational performance, e.g., profit sharing. Nevertheless, the data broadly support the story outlined above, showing a steep drop both in the percentage of manual workers receiving PBR and in the share of PBR in average gross earnings among manual workers.<sup>3</sup> Interestingly, though there appears to have been a decline in the use of PRP in the shrinking manufacturing sector, over the same period the presence of PBR in the rapidly expanding service sector is steady or even grows along both recorded dimensions, implying that PRP is not in fact on the verge of extinction. On the contrary, its continued

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<sup>3</sup> We take the distinction between manual and nonmanual workers as a rough proxy for that between the "old-style" PRP of the piece rate variety and the "new style" PRP of the negotiated target variety that now predominates in the service sector. See section 4 for further discussion of this typology.

relevance in what is by far the largest part of the economy indicates that its effect on labour market behaviour is worthy of close scrutiny.

The idea that PRP is widespread and influential in its effect is supported by the results of the Institute of Personnel Development's (IPD) 1999 survey of performance pay trends in the UK. This large-scale study reports "deep and rapid growth" (IPD 1999: 2) in the use of various types of PBR during the previous fifteen years, with the most popular systems being profit sharing and PRP (Table 1). The discrepancy between the figures presented in Table 1 and those derived from NES data can be at least partially explained by the time lag between the two data sets, their differing definitions of the pay systems in question, and the bias of the IPD sample towards larger organizations. Also, given the comparatively low weight of management employees in the workforce, it is more accurate to compare the NES data with the IPD results for non-managerial employees. In any case, the report presents evidence that the rate of uptake of PRP in the period 1990-1999 far exceeded the rate of discontinuation of such pay systems (IPD 1999: 6). Not only does it appear that PRP is widely used by organizations, but also that where it exists the inclusion of almost all the organization's employees is the norm. Furthermore, the amounts of money involved in PRP rewards, while not vast, are typically "not insignificant to the employee concerned" (IPD 1999: 7).

The above material, therefore, indicates that PRP is a prominent feature of the employment relationship in the contemporary UK labour market. However, the evidence for its effectiveness in drawing superior performance from employees is less clear-cut, with differing studies reaching rival conclusions on the matter. A number of studies using private-sector samples (Metcalf 1995; Fernie and Metcalf 1995; **Heywood et al.** 1997) have pointed to the existence of a significant positive association between the use of PRP and workplace productivity or financial performance outcomes. Some observers, though, are less sanguine. Addison and Belfield (2001), for example, find no significant relationship between PRP and productivity performance in the private sector, while Marsden, French, and Kubo's (2001) study of the public sector concludes that, in the long term, PRP may actually have a negative impact on organizational performance. As regards the hypothetical association between PRP and pay inequality, the literature offers no direct answers.



#### **4. Evidence from WERS**

The data used in this study are drawn from the cross-section and panel (1990-1998) elements of the 1998 Workplace Employment Relations Survey (WERS), a large-scale interview-based study providing a rich array of information at the workplace level (see Forth and Kirby 2000 for details). Both surveys are designed to be representative of the national economy with the aid of weights, which we use here, with the qualification that the cross-section data are limited to workplaces with ten employees or more, and the panel data to those with 25 or more. Although there is no overlap between the two samples, the questions are very similar over a broad range, enabling analyses of the same type to be performed on both data sets.

We are concerned with two dependent variables in the course of our tests: workplace financial performance and intra-workplace pay inequality (Table 2). We choose the former ahead of the alternatives of productivity and quality performance on the grounds that the financial measure is the ultimate arbiter of organizational effectiveness in a capitalist economy: if PRP is genuinely to improve performance outcomes, it must do so at the level of ends rather than of means. Consequently, we restrict the samples of both data sets to private-sector workplaces, as we remain unconvinced that the (implicitly competitive) measure of financial performance in WERS can be accurately applied to the public sector. The question itself asks management to compare the performance of its workplace to that of industry competitors and to rate it on a subjective scale of 1-5, ranging from “a lot better than average” to “a lot worse than average”. While this format is at first glance less trustworthy than equivalent continuous data would be, it has the advantage of avoiding the drawbacks associated with accounting measures, and has been tested and endorsed elsewhere (Machin and Stewart 1996). On the positive side, a clear advantage of using this measure is that, because the point of reference for the respondent is that of “other establishments in the same industry”, the question underlying the variable implicitly controls for many industry and market factors.

Our chosen measure of inequality is the log of the 75:25 ratio for full-time employees of the organization. This statistic suffers from two weaknesses; the first being that of its restricted coverage (excluding part-time workers), and the second being that it is computed from banded rather than continuous pay data and according to a strong assumption about the distribution of workers within pay bands, with the result that it tends to homogenize results at the workplace level and therefore underestimates variation across workplaces. What it loses

in subtlety, though, it gains by maximizing the number of establishments in the sample. The wide intervals of the pay bands used in the survey often lead to the clustering of the employees of any given workplace within only one or two pay bands, which would prevent any meaningful calculation of inequality if it were assumed that all employees in each band earned at the same level. However, the manner in which we calculate the 75:25 ratio enables us still to include such establishments in the sample instead of rejecting them as insufficiently informative. Despite caveats, therefore, we believe that the measure offers a useful estimate of the level of inequality present in within the core workforce of an establishment and is robust to the influence of unrepresentative individuals in the tails of the workplace distribution.

Our most important independent variable relates to the usage of PRP in a given workplace, in which PRP corresponds to our notion of pay that is directly linked to worker performance (Table 2). This variable does not relate solely to the narrow case of traditional piece rates, though, as measures of performance are diverse in their form in the contemporary economy. Rather, it encompasses all types of performance-based pay systems, be they the simple “per widget” rates of artisanal production or the sophisticated schemes of the knowledge economy in which workers are rewarded for their achievement of previously negotiated goals. The important element that these various types of pay system have in common is that of measurable performance targets, be they determined by physical reality (e.g., number of artefacts produced in a given period of time) or by human abstraction (e.g., project  $x$  to be completed for client  $y$  by date  $z$ ).

It is instructive at this point to turn to preliminary results from the WERS cross-section data, as they both corroborate a number of the results reported in the literature and help to frame the argument of the paper. First, in the case of financial performance outcomes, workplaces that use PRP systems on average outperform those that do not (Table 3). This result is significant and the difference between the two averages is equivalent to nearly one third of the standard deviation of financial performance across the entire sample, a non-negligible amount. While we include no external controls at this preliminary stage, it should be noted that the chosen performance measure—workplace financial performance relative to that of other establishments in the same industry—implicitly accounts for much of the variation among observations. These data are therefore consistent with the argument that

PRP has a real and positive effect on organizational performance.<sup>4</sup> Certainly, they indicate that the relationship between financial performance and use (or non-use) of PRP is one worthy of further exploration. Second, the presence of PRP systems in a workplace is associated with greater levels of pay inequality (Table 4). This result also is significant and of a non-negligible magnitude (equal to approximately one quarter of the standard deviation of the sample). Here too, the outcome is in accordance with the predictions and findings of a strand of the existing literature. In addition, it reinforces our suspicion that PRP, organizational performance, and inequality interact with one another in ways that have tangible consequences.

## **5. Hypotheses**

### **5.1 Match and mismatch**

The evidence presented in the previous section points towards an association between the use of PRP on the one hand and higher levels of organizational performance and intra-establishment pay inequality on the other. This association is, up to a point, broadly in alignment with the predictions of NEP theory. However, as we have discussed above, a close reading of the NEP literature underscores the importance of monitoring environments—bundles of variables that describe the relative effectiveness of performance monitoring—as a mediating factor in these interrelationships. We argue that such environments are functions of the production regimes in which they are embedded, as it is the nature of the production process in a given workplace that defines the relative feasibility of effective performance monitoring. For example, let us compare the monitoring environment found in an apparel-making facility with that of a management consultancy office. In the former case, performance measurement is both cheap and easy, as management has only to count discrete finished products (items of clothing). Furthermore, assuming that each worker has his or her own sewing machine and workstation and that the facility takes the form of a single large space, a very small number of managers can accurately match workers to their performance. Under such an ideal-typical production regime, the monitoring environment is well adapted

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<sup>4</sup> We are unable to make a firmer assessment of the direction of causation without access to more nuanced panel data. On the theoretical level, though, we are encouraged by the fact that there are few intervening variables that might corrupt the relation between performance incentive (i.e., PRP) and worker performance. This contrasts with, say, profit-related pay, in which a great many establishment characteristics intervene between the incentive and worker performance (e.g., quality of capital, market conditions, etc.).

to the use of PRP, and we may surmise that the introduction of PRP would lead to superior organizational performance. However, in the alternative case of the management consultancy office, the picture is very different. Here, workers are engaged in complex, abstract tasks, the final shape of which may well not be fully defined in advance. In addition, workers work together on some tasks, singly on others, and often work away from the office location, all of which poses great obstacles to the consistent and accurate monitoring, measurement, and attribution of performance. In this context, with a less friendly monitoring environment, it is much less likely that PRP will improve performance outcomes.

As even these thumbnail sketches illustrate, monitoring environments are complex phenomena that define themselves along multiple dimensions. However, NEP theory does not automatically generate a finite list of variables that would encompass the concept of the monitoring environment. Consequently, we rely for its formulation on the exhaustive reading of the NEP-related literature performed by Fernie and Metcalf (1999) (Table 5). This table enumerates all of the implications of NEP theory for the issues of worker performance monitoring and organizational performance that have previously been proposed. Collectively, these variables describe the monitoring environment of an establishment. Given the interaction of the monitoring environment with pay systems that can be defined in binary terms (input-based or performance-based; time pay or PRP), we posit that monitoring environments can also be categorized along parallel lines (Figure 1). Optimal organizational performance results from the “correct” combination of pay system and monitoring environment, and suboptimal performance stems from “incorrect” combinations. We refer to these two types of combination as “matched” and “mismatched” cases respectively. Thus, our first hypothesis is that matched workplaces will outperform, *ceteris paribus*, their mismatched counterparts.

## **5.2 Learning by trial and error**

One could argue that if the above argument were true, there would exist no real-life examples of “mismatch”, as managers would ensure that their establishments’ pay systems and monitoring environments were in alignment. However, as we have seen, monitoring environments are extremely complex phenomena defined along multiple dimensions. It is therefore entirely conceivable that in many cases managers simply do not know in advance which pay system will obtain optimal results in combination with their establishment’s production regime (and, by extension, monitoring environment). As a result we anticipate

that, in such cases, managers must engage in trial-and-error behaviour in order to discover which pay system best suits their requirements. Our second hypothesis, then, is that workplace-level learning processes will manifest themselves on the collective level as a general tendency among establishments to gravitate towards a matched combination of pay system and monitoring environment.

## **6. Testing the Hypotheses**

### **6.1 Model**

The principle challenge for our analysis is to differentiate between matched and mismatched combinations of pay system and monitoring environment. We approach this problem by predicting which establishments “ought” to use PRP and which “ought not” (and should therefore use an input-based pay system). We then combine these predicted results with current data on pay system usage in order to categorize establishments according to the rubric of match or mismatch.

Our predictive method is to use a logit equation to regress the indicator variable for the use of PRP on a set of independent variables that collectively describe the monitoring environment of the workplace (Table 5). While we are unable to find adequate measures in WERS (either cross-section or panel data) for every one of the variables proposed by Fernie and Metcalf, we succeed in the great majority of cases, including the most important ones that relate to the costs of measurement of input and performance. As a result we are confident that the resultant group of independent variables captures the bulk of variation among types of monitoring environment. Having run the equation on the data, we divide the sample into those that ought and those that ought not to use PRP according to their predicted probability statistic. We use a cut-off point of 0.5: establishments with a probability statistic equal to or greater than this value are placed in the “ought” category, all others in the “ought not” category. When this binary classification is combined with current data on pay usage, it results in the fourfold categorization shown in Figure 1, with matched cases featured in the upper-left and lower-right quadrants, and mismatched cases along the other diagonal.

This system of classification is applied to both the cross-section and panel data (both periods) in order to facilitate the testing of the concepts of match/mismatch and trial-and-error learning. Due to the substantial overlap in terms of featured questions between the two

questionnaires, the respective models are largely identical. The model used on the panel data is, however, simpler than its cross-section counterpart, as the former questionnaire is less extensive in the areas of job organization and external market environments (see Table 5).

## **6.2 Classification by match and mismatch**

The application of the above method of classification to WERS 98 cross-section data reveals that approximately 20% of the weighted sample currently uses PRP (Table 6). This figure may be contrasted with the model's prediction that only 16% of establishments ought to be employing such a pay system. However, there is little overlap between these two groups, as only 3% of the sample is categorized as both currently using PRP and having a suitably matched monitoring environment.<sup>5</sup> Given that 66% of establishments are classed as matched cases that do not (and ought not to) use PRP, the model therefore indicates that nearly a third of establishments currently suffer from mismatch between their pay system type and monitoring environment. This result suggests that a large part of the sample could improve its level of organizational performance by modifying its compensation system.

## **6.3 Financial performance outcomes**

Subsample means of financial performance are computed for each of the quadrant-groups displayed in Table 6. The results suggest that the relationship between pay system and monitoring environment exerts a significant influence on the performance of organizations: matched cases on average outperform mismatched cases within each pay system type (Table 7). This is to say that, of the establishments that do not use PRP, those whose monitoring environment fits the use of input-based pay, are the superior performers. And of the workplaces that do use PRP, those with the matched variety of monitoring environment outperform those that do not.

This claim, however, does not obscure the fact that these results reinforce a conclusion reached early in the analysis, that establishments that use PRP on average outperform those that do not, regardless of the monitoring environments they use and of their match/mismatch status (Table 3). Due to limitations in the data, though, our analysis is

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<sup>5</sup> Note that in Tables 6, 7, and 9, the white quadrants denote cases in which pay system and monitoring environment are matched, whereas the shaded quadrants denote cases in which they are mismatched.

unable to control for certain influences that might drive this overall pattern, such as workforce composition or market structure.

Interestingly, the match/mismatch distinction exerts no independent influence on pay inequality. It remains the case that establishments using PRP have more unequal pay structures than those that do not (see Table 4), and our tests fail to discern any difference in inequality between the matched and mismatched subgroups of the broader categories of PRP users and non-PRP users. This result supports the view that there exists a trade-off in the use of PRP that pits performance against inequality, and that the trade-off may well not be worth it in cases in which pay system and monitoring environment are not aligned.

#### **6.4 Experimentation with pay systems**

The above static analysis indicates that a sizeable proportion of establishments does not use the pay system that would produce optimum performance outcomes in combination with its production regime (and, by extension, its monitoring environment). Using panel data for 1990 and 1998, we repeat our method of classification for both periods in order to introduce a dynamic element into our study. Table 8 displays the results of this analysis, tabulating the use of PRP in 1990 with that in 1998. There is evidence of considerable flux among workplaces in the use of pay systems: only 42% of the weighted sample are reported as using PRP in 1990, compared to 57% in 1998.<sup>6</sup> This general increase in the coverage of PRP masks a degree of churning, though, as 11% of establishments actually ceased using PRP during the period 1990-1998, compared to the 26% that acquired such a pay system. On the whole, these results suggest that managers engage in widespread experimentation with different types of pay system. The next section probes for an underlying pattern to these movements.

#### **6.5 “Correct” and “incorrect” managerial decisions**

There are two reasons for which a matched combination of pay system and monitoring environment might become mismatched, and vice versa. First of all, the establishment might

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<sup>6</sup> Caveat: in the cross-section data for 1998, the proportion of workplaces using PRP is only 21% (Table 6), compared to the value of 57% in the panel data. This difference can be substantially explained by the facts that the cross-section sample covers establishments of 10 or more employees and above, whereas the panel sample's lower limit is 25 employees, and that the two sample structures differ, as the panel sample has a much greater mean and standard deviation of establishment size. As the use of PRP is correlated with establishment size, it follows that a greater proportion of the panel sample is recorded as using PRP.

undergo an organizational upheaval—internally or externally imposed—that results in a change of production regime and, consequently, of monitoring environment type. Alternatively, management might modify the compensation system in the hope of obtaining improved performance. In either scenario, match becomes mismatch, or the other way around.

We hypothesized above that, in the case of this second variety of change, managers would appraise performance under the new compensation system, learn from the experience, and then decide whether to stick with the new pay structure (i.e., the change resulted in improved performance) or to revert to the previous kind (i.e., the change resulted in diminished performance). We referred to this process as learning by trial and error, conjecturing that over time it would lead to an increasing proportion of establishment's adopting the matched set of pay system and monitoring environment. However, this assumption must be qualified, as the existence of any such process relies on managers' readiness to experiment. Where there is no experimentation, there can be no learning.

We test for the effect of experimentation on learning by examining management decisions about compensation systems. Using the findings from the panel data regarding match and mismatch of pay and monitoring in 1990 and 1998, we classify decisions about compensation made during this period as either “correct” or “incorrect”. Correct decisions are those to retain or move to a matched combination of pay and monitoring systems; incorrect systems are those to keep or move to the opposite. We control for the effect of changes in the production regime by removing from the sample those establishments whose monitoring environment—according to the prediction of the model—changes during the period 1990-1998. Any changes in the pay systems of the observations that remain, therefore, must be due to managerial choice. Our results indicate that managers who have experience of matched pay systems and monitoring environments (and the performance gains they bring) are significantly more likely to make correct decisions in the subsequent period about which pay system to employ: whereas 72% of establishment managements that have a matched combination of pay and monitoring systems in the first period subsequently make the correct decision, only 48% of those that do not also make the correct decision (Table 9). It may be surmised, therefore, that managers do learn from their experimentation with pay systems.



## 7. Conclusions

This paper addresses the relationship between PRP and organizational performance, about the form of which there is considerable disagreement. In doing so, it uncovers evidence that this relationship is strongly mediated by a multidimensional factor that we refer to as an establishment's monitoring environment. Principally, this factor pertains to managers' ability to measure worker performance within the constraints of the production regime of their workplace. Thus, it is not so much the choice of pay system that drives organizational performance outcomes, but the combination of pay system and monitoring environment: "matched" combinations outperform their "mismatched" counterparts.

This result obtains most strongly in the class of establishments that use PRP, despite the fact that the use of PRP is associated with higher intra-workplace inequality. Other studies have suggested that higher inequality is negatively associated with organizational performance, but our results indicate that, even if this is the case, any negative effect is overpowered by the positive incentive effect provided by the pay structure.

By extending our analysis to panel data, we discover evidence for the existence of a trial-and-error learning process among managers with regard to their choice of pay system. This result suggests that managers are aware that there is no universally superior type of pay system, and that they must take into account their pay system's interaction with workplace-specific factors in the search for optimal organizational performance. It also appears that it is because managers realize that these factors are too complex for the answer to be apparent *ex ante* that they actively engage in experimentation.

Lastly, it must be noted that, while the conclusions of our study are aligned with our theoretical predictions, we are unable to be certain of the direction of the arrow of causation between the combination of pay system/monitoring environment and organizational performance. However, our findings are highly consistent with the notion that it is the former driving the latter, and the absence of possible mediating variables also provides reason to think that we are on relatively firm ground in our conclusions. To be absolutely certain of our findings would require access to a more sophisticated panel data set.

**Table 1: Use of different types of PBR in the UK (public and private sectors)**

	Percentage responses	
	<i>Yes</i>	<i>No</i>
<b>Management employees</b>		
<i>Individual PRP</i>	40	60
<i>Team-based PRP</i>	8	92
<i>Skill- or competency-based pay</i>	6	94
<i>Profit-related pay</i>	35	65
<i>Employee share ownership scheme</i>	17	83
<b>Non-management employees</b>		
<i>Individual PRP</i>	25	75
<i>Team-based PRP</i>	8	92
<i>Skill- or competency-based pay</i>	11	89
<i>Profit-related pay</i>	34	66
<i>Employee share ownership scheme</i>	15	85
Source: Performance pay trends in the UK, IPD survey report, September 1999		

**Table 2: Summary of key variables**

Variable	Definition	Observations	Mean	Standard deviation	Minimum	Maximum
<b>Financial performance</b>	Subjective ranking of performance relative to industry competitors	1171	3.707088	0.865547	1	5
<b>Pay inequality</b>	Log of 75:25 ratio for full-time workforce	1323	1.047959	0.02025	1.006919	1.138644
<b>Use of PRP</b>	Usage of pay linked directly to worker performance	1323	0.278156	0.44826	0	1

**Table 3: PRP and financial performance**

Use of performance pay system	Establishment financial performance (standard error)	% of across-sample standard deviation of financial performance
<b>Yes</b>	3.88 (0.07)	
<b>No</b>	3.60 (0.05)	
<b>Difference</b>	0.27*	31.9%
* Significant at the 1% level		
Source: WERS 98 cross-section data		

**Table 4: PRP and intra-workplace pay inequality**

Use of performance pay system	Intra-workplace pay inequality (standard error)	% of across-sample standard deviation of pay inequality
Yes	1.052 (0.003)	
No	1.047 (0.001)	
<b>Difference</b>	0.005*	24.6%

\* Significant at the 10% level  
Source: WERS 98 cross-section data

**Table 5: Monitoring environments (Based on Table 1, Fernie and Metcalf 1998)**

Pay by PRP system if...	Characteristic	Pay by basic if...	Measure or proxy available in WERS98 cross-section?	Measure or proxy available in WERS90-98 panel?
<i>Measuring output, monitoring input, and nature of the job:</i>				
Low	Output measurement costs	High	Y	Y
High	Cost of monitoring input/effort	Low	Y	Y
Low	Supervision intensity, programmability	High	Y	Y
High	Span of control	Low	N	N
Large	Workgroup size	Small	Y	Y
Repetitive	Job task	Wide range	Y	N
Unimportant	Team production	Important	Y	N
High	Labour intensity	Low	Y	Y
<i>Role of technical change:</i>				
No	(i). If technical change is rapid	Yes	Y	N
Yes	(ii). Whether technical change is skill-biased	No	N	N
<i>Labour market and product market:</i>				
High	Worker heterogeneity (of ability)	Low	N	N
High	Wage in alternative firm	Low	Y	N
High	<b>Elasticity of effort wrt wage</b>	Low	N	N
Low	Risk aversion (worker)	High	N	N
No	Union recognition	Yes	Y	Y
Short	Tenure	Long	Y	Y
Few	No. of occupations	Many	Y	Y
Low	Cost of monitoring quality of output	High	Y	N
High	Competition	Low	Y	N

**Table 6: Classification by match and mismatch**

Weighted sample proportions (%)	Whether establishment "ought" to use PRP		
	<i>Yes</i>	<i>No</i>	<i>Total</i>
<b>Current use of PRP system</b>			
<i>Yes</i>	3	18	21
<i>No</i>	13	66	79
<i>Total</i>	16	84	100

Source: WERS 98 cross-section data

**Table 7: Financial performance outcomes**

Mean establishment financial performance (standard error)	Establishment's monitoring environment is suited to PRP	
	<i>Yes</i>	<i>No</i>
<b>Establishment uses PRP system</b>		
<i>Yes</i>	4.11* (0.11)	3.84* (0.08)
<i>No</i>	3.38* (0.12)	3.65* (0.06)

\* These values are all significantly different from one another at the 10% level or better  
Source: WERS 98 cross-section data

**Table 8: Experimentation with pay systems**

Weighted sample proportions (%)	Use of PRP system in 1998		
	<i>Yes</i>	<i>No</i>	<i>Total</i>
<b>Use of PRP system in 1990</b>			
<i>Yes</i>	31	11	42
<i>No</i>	26	32	58
<i>Total</i>	57	43	100

Source: WERS 98 panel data

**Table 9: Managerial decision making and learning**

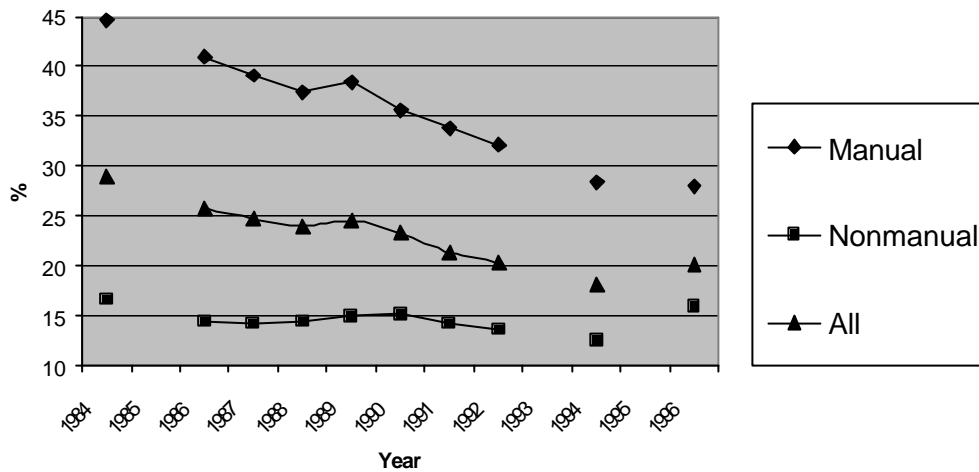
Column proportions (%)	Matched combination of pay system and monitoring environment in 1990	
	<i>Yes</i>	<i>No</i>
<b>Correct subsequent decision regarding pay system</b>		
<i>Yes</i>	72*	48*
<i>No</i>	28*	52*
<i>Totals</i>	100	100

\* These values are significantly different from one another at the 1% level or better  
Source: WERS 98 panel data

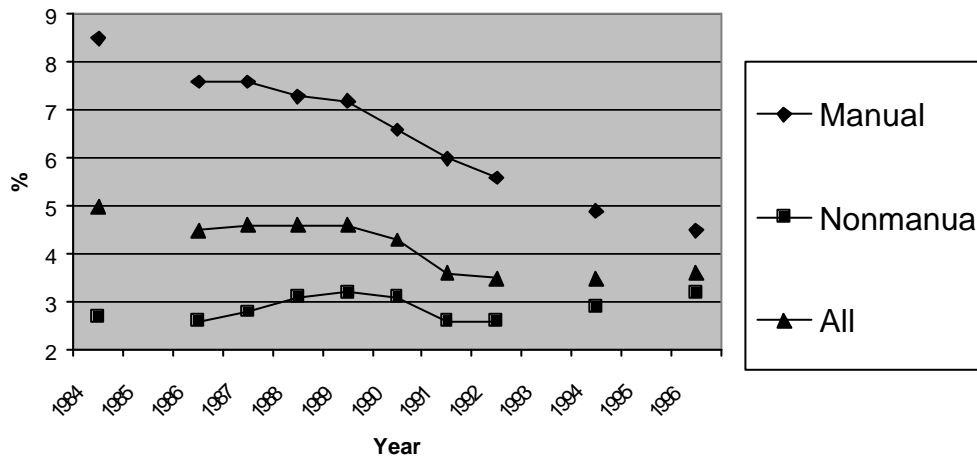
**Figure 1: Predicted organizational performance by combinations of pay system and monitoring environment**

Pay system	Monitoring environment	
	<i>Cheap, accurate</i>	<i>Expensive, inaccurate</i>
<i>Performance-based</i>	Optimal	Suboptimal
<i>Input-based</i>	Suboptimal	Optimal

**Figure 2: % of employees receiving some form of PBR (Source: NES)<sup>7</sup>**



**Figure 3: PBR as % Average Gross Earnings (Source: NES)<sup>8</sup>**



<sup>7</sup> Note: missing observations denote years for which data could not be found.

<sup>8</sup> Note: missing observations denote years for which data could not be found.

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