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Pay for Performance in the Public Sector—Benefits and (Hidden) Costs

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ABSTRACT

Current reforms in the public sector are characterized by the introduction of businesslike incentive structures, in particular the introduction of "pay for performance" schemes in public institutions. However, the public sector has some specific characteristics, which might restrict the naive adoption of pay for performance. Our article analyzes whether the impact of pay for performance on performance is bound to conditions, and if this is the case, under which conditions pay for performance has a positive or a negative effect on performance. We explore this contingency in a meta-analytic review of previous experimental studies on the effects of pay for performance on performance. We further show why pay for performance sometimes negatively affects personal efforts. With an experimental vignette study we demonstrate (a) that motivation is likely to be a key influence on the effect of performance-related pay on performance, and (b) that pay for performance is generally more costly as it appears because it almost always produces hidden costs of rewards. Our findings help to explain the modest success of pay for performance in the public sector.

There is a long-standing belief that the public sector and nonprofits need to be more businesslike in their attitudes and operations (Dart 2004). As a consequence, current reforms in the public sector are characterized by the introduction of management practices and techniques originally developed for the business sector, for example, budgeting techniques, market analysis, and performance management (Lane 1997; Moynihan 2006). One of the most significant challenges is the introduction of businesslike incentive structures, in particular the introduction of "pay for performance" schemes in public institutions (Varone and Giauque 2001; Swiss 2005; Cardona 2006). Two-thirds of the member countries of the Organisation for Economic Co-operation and Development (OECD) and a number of developing countries have adopted performance-related pay practices, for example, Brazil,

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Mexico, the Netherlands, New Zealand, United Kingdom, United States, and Canada (Mookherjee 1998; OECD 2005; Cardona 2006). The underlying assumption is that correctly administrated pay for performance schemes boost the efficiency of the public sector (for an overview see Burgess and Ratto 2003; for examples see Kahn, Silva, and Ziliak 2001; Swiss 2005; Lavy 2007) and positively impact employees' motivation (Propper 2006). The proponents of pay for performance draw on standard economics, particularly the economic principal agent view (Kaboolian 1998) as proposed by Jensen and Murphy (1990). These theories strongly build on the model of the self-interested *homo oeconomicus*. They take it as a matter of course that "cash compensation should be structured to provide big rewards for outstanding performance and interesting penalties for poor performance" (Jensen and Murphy 1990). The bottom line is that interests between the agent and the principal are to be aligned via monetary incentives.

However, the public sector has some specific characteristics, which might restrict the naive adoption of pay for performance. Incentive systems, which are effective and efficient in one organizational context might be ineffective or even counterproductive when implemented in a different organizational context (Chenhall 2003). Indeed, experiences with pay for performance schemes in the public sector are mixed. First, an OECD (2005) analysis states "there is no conclusive empirical evidence that such an approach has effectively helped to improve motivation and performance within the public service" (Cardona 2006). Second, Perry, Mesch, and Parlberg (2006) argue that reviews that include the public sector suggest that performance-related pay systems have generally been unsuccessful (see, e.g., Ingraham 1993; Kellough and Lu 1993). The opponents of pay for performance schemes argue that theories based on self-interest cannot provide sufficient grounds to analyze the motivation of employees, especially that of employees in the public sector (e.g., Vandenabeele and Hondeghem 2005; Moynihan and Pandey 2007). Their criticism can be substantiated by modern psychological economics (for an overview see Fehr and Falk 2002; Frey and Benz 2004; Tomer 2007) and motivation psychology, particularly self-determination theory (for an overview see Deci and Ryan 2000). These theories distinguish different kinds of motivations—extrinsic and intrinsic motivation.[1] It is acknowledged that employees are often to a high degree intrinsically motivated, that is, they perform tasks because of loyalty, an internalized sense of duty, and/or enjoyment (Perry 2000; Vandenabeele 2007). Intrinsic motivation, under certain conditions, is proposed to be undermined by pay for performance: Giving someone a performance-contingent monetary incentive to do something they already enjoy can decrease his/her motivation to do it as the person is then likely to view its action as externally driven rather than as internally appealing. Such incentives produce hidden costs (Lepper and Greene 1978), which has also been referred to as corruption effect (Deci 1975), overjustification effect (Lepper and Greene 1978), or crowding-out effect (Frey and Oberholzer-Gee 1997), and thus may negatively impact performance. Conditions, which are discussed to impact the relationship of pay for performance and performance, are, for example, task type (Jenkins et al. 1998; Osterloh and Frey 2000; Frey and Osterloh 2002; Perry, Mesch, and Paarlberg 2006) and organizational culture (Brown 2001).

The first aim of our article is thus to analyze whether the impact of pay for performance on performance is bound to conditions, and if this is the case, under which conditions

1 In recent years Deci and Ryan (2000) have started to offer an ever finer grained categorization of motivation. A discussion of all possible types of motivation, however, is beyond the scope of this article.

pay for performance has a positive or a negative effect on performance. Whereas some studies clearly show a positive relation of pay for performance on actual performance (e.g., Prendergast 1999; Lazear 2000), others just as clearly show a negative relation (e.g., Frey and Jegen 2001; Gneezy and Rustichini 2000b). Very few studies, however, have tried to shed light on this inconclusive evidence by searching for possible contingency factors (for an exception see Bertelli forthcoming; Jenkins et al. 1998). We chose to follow the call of Perry, Mesch, and Paarlberg (2006) by identifying task type as a moderator of the pay and performance link, as we expect high task variations in the private as well as in the public sector. We explore this contingency in study 1 with a meta-analytic review of previous experimental studies on the effects of pay for performance on performance.

The second aim of our article is to open the black box of motivation and to identify why pay for performance sometimes negatively affects personal efforts. Drawing on self-determination theory (e.g., Deci 1971; Deci, Koestner, and Ryan 1999a, 1999b) and on crowding theory (e.g., Frey and Jegen 2001), we propose that performance-related pay produces a cognitive shift as it amplifies the meaning of rewards for behavior, that is, it produces a price effect. At the same time it reduces the meaning of the work content itself for behavior, that is, it produces a crowding-out effect. The overall effect of pay for performance is thus dependent on the strength of these two subeffects. By opening the black box of motivation and by observing both effects, we are able to show (a) that motivation is likely to be a key influence on the effect of performance-related pay on performance, and (b) that pay for performance is generally more costly as it appears because it almost always produces hidden costs of rewards. For public management this finding could be particularly important as current reforms in public management are bound to produce a small price effect only, whereas the crowding-out effect in the current implementation practice is bound to be rather high. We test our assumptions on how pay for performance effects change in motivation and intended behavior in study 2 with an experimental vignette study that mimics a complex, upper management or civil servant–level work context.

STUDY 1: PAY FOR PERFORMANCE, TASK TYPE, AND PERFORMANCE

Hypotheses

The issue of whether performance-related pay really improves efficiency and productivity is highly contested (Francois 2000; Moynihan 2007). Two opposing views exist both in the private and public sectors.

On the one hand, researchers stemming from standard economics and behavioral management theory argue that performance-related pay raises individual performance if it is correctly administrated. Therefore, these researchers focus their efforts on discussing the technically correct implementation of performance-related pay such as how problems of measurability might be overcome (for a thorough discussion about possible implementation problems, see Burgess and Ratto 2003). On the other hand, researchers with a psychological economics[2] or self-determination theory background argue that beyond these

2 Psychological economics is a combination of economics and psychology. It is often referred to as behavioral economics. However, in our opinion this term is misleading. In psychology, the term "behaviorist" denotes a scientific approach that investigates observable stimulus-response relationships as this is the case with standard economics and behavioral management theory. Thus, we prefer to use the term "psychological economics," which also includes theories that model cognitive and emotional processes (see also Tomer 2007).

implementation problems there is a more fundamental problem caused by performance-related pay: It is proposed that this form of pay harms individual performance in the case of interesting tasks. Tasks are considered to be interesting if they are perceived to be challenging, enjoyable, and/or purposeful. These researchers conclude that task type is an important moderator of the effect of pay for performance on actual performance (Frey and Oberholzer-Gee 1997; Perry, Mesch, and Paarlberg 2006).

For public administration, the consequences of this second view are arguably more severe than that for the private sector for two reasons. First, current reforms of the public sector predominantly target senior civil servants (OECD 2005). Senior civil servants, however, are more likely to work on interesting tasks than lower ranked public servants as their job content is likely to be broader, more responsible and more challenging. Thus, performance-related pay might be directed toward the wrong recipients. Second, an effectively managed public administration agency is likely to provide predominantly interesting activities to take advantage of beneficial self-selection of employees (Behn 1995). It is often proposed that people do not enter the public service to maximize income; instead, they hope to do interesting work (e.g., Perry 1997; Wise 2004; Buelens and Van den Broeck 2007). Thus, the public sector needs to offset differences in the level of compensation between the public and the private sector by offering nonpecuniary benefits, such as interesting work, to keep levels of motivation high (Rainey 1983; Francois 2000). In addition, recent formal theory has uncovered institutional incentives that may explain why public agencies are better off to attract and retain intrinsically motivated, policy-concerned individuals: Intrinsically motivated public service agents are shown to have a higher incentive to invest in expert knowledge than extrinsically motivated ones and therefore function as the "institutional memory" of public service (Gailmard and Patty 2007). Extrinsically motivated public service agents, on the other hand, will only acquire expertise if their learning is conditioned to material incentives and such a conditioning in the public service is difficult as not all relevant expertise development can be monitored.

In the following we discuss these two views in more detail.

Standard Economic and Behavioral Management View

Standard economic theory is based on the assumption of rational, selfish, and extrinsically motivated actors, the so-called *homo oeconomicus* (see Fehr and Gächter 1998; Frey 1999), who react to external incentives in a predictable manner. This is implicitly based on the stimulus-response theory, which involves only observable factors in a black-box treatment. Changes in behavior are traced back to changes in restrictions, and not to changes in preferences (see Stigler and Becker 1977). As a consequence, human behavior can be directed through the selective deployment of rewards or sanctions. Individuals will perform best when the incentive system links rewards as closely as possible to performance. The same argument is also supported by behavioral management theory. Behavioral management theory argues that pay for performance enhances personal efforts and thus individual performance (e.g., Luthans and Kreitner 1985; Lehman and Geller 2004).

Behavioral management scholars and standard economists have conducted a number of studies to support this argument (for an overview see Prendergast 1999; Stajkovic and Luthans 2003). Lazear (2000), for example, analyzed the case of Safelite, the United States' largest windshield manufacturer. In the mid-1990s Safelite replaced hourly wages by piece rates (with a guaranteed minimum wage). As a result productivity improved by 44% (Lazear 2000). In a recent overview of the literature, Rynes, Gerhart, and Parks (2005) conclude that

"PE (performance evaluation) and PFP (pay for performance) are two of the most powerful tools in an organization's motivational arsenal . . . so powerful that one of the main challenges for managers is to make sure that their compensation systems are not motivating the wrong kinds of behavior" (Rynes, Gerhart, and Parks 2005).

The Psychological Economics and Self-determination View

In contrast to the standard economics view, psychological economics and self-determination theory argue that there are different types of motivations—extrinsic and intrinsic motivation (Frey 1997; Lindenberg 2001; Deci and Ryan 2002)—and that performance of intrinsically motivated tasks is harmed by pay for performance.

Psychological economics and self-determination theory suggest that motivation is not a unitary phenomenon. Individuals may not only have different levels of motivation but also experience different kinds of motivation depending on the specificities of the organizational context and of the task characteristics (Ryan and Deci 2000). Extrinsic motivation satisfies personal needs indirectly, that is, extrinsic motivation refers to doing something because it leads to separable outcomes such as monetary compensation (Ryan and Deci 2000). Money cannot produce direct utility, but it enables an individual to acquire desired products. Intrinsic motivation, in contrast, satisfies personal needs directly (Frey and Jegen 2001) by creating an intrinsic reward for those who perform the tasks (George 1992). Tasks are thought to be intrinsically rewarding if they are perceived to be interesting, that is, to be challenging, enjoyable, or purposeful. In the remainder of this article we will call these tasks "interesting tasks" (Hackman and Lawler 1971; Golombiewski 1980; Kuvaas 2006). In short, psychological economics and self-determination theory assume that individuals may also derive utility from the activity itself (Deci 1975; Lindenberg 2001).

Pay for performance is proposed to have under certain conditions a negative, crowding-out effect on intrinsic motivation.[3] For this reason especially the performance of interesting tasks is likely to suffer upon the introduction of performance-related pay (Ryan and Deci 2000; Frey and Jegen 2001). This argument is supported by numerous experiments and field studies in psychology (e.g., Deci 1971; Lepper and Greene 1978; Amabile 1998) and psychological economics (e.g., Frey and Oberholzer-Gee 1997; Fehr and Falk 2002; Irlenbusch and Sliwka 2003; Falk and Kosfeld 2006). For example, McGraw and McCullers (1979) show that contingently rewarded students perform considerably worse than their unpaid colleagues at interesting "out-of-the-box"-thinking tasks. A further example is the experiment by Gneezy and Rustichini (2000a), which analyze parental response to the introduction of a financial incentive to collect their children on time from day care. In a number of day care centers a fine was introduced for late-coming parents. Contrary to the expected effect, this fine did not induce parents to collect their children on time but instead led to a steep increase in the number of latecomers.

As a consequence, psychological economics and self-determination theory propose that pay for performance hurts performance in the case of interesting tasks. In contrast, standard economics and behavioral management theory propose that pay for performance increases performance, independent of the type of task involved. Thus, these two conflicting views lead to the following hypotheses:

3 But see the "reward" controversy between Deci, Koestner, and Ryan (1999a, 1999b) and Eisenberger, Pierce, and Cameron (1999).

H_{1a} Pay for performance increases performance irrespective of the rewarded task.

H_{1b} Pay for performance increases performance in the case of less interesting tasks and decreases performance in the case of interesting tasks.

In a next step we test these competing hypotheses with a meta-analysis.

Meta-analysis

Methods

There have only been very few meta-analyses, which focus exclusively on the effect of pay for performance on performance (for an overview in public administration, see Perry, Mesch, and Paarlberg 2006), and to our knowledge there has only been one meta-analysis which seeks to test for the moderating effect of differentially motivating tasks (Jenkins et al. 1998). We suggest that this meta-analysis needs to be complemented for three reasons: First, Jenkins et al. (1998) are primarily interested in the explained variance. They do not analyze the direction of the influence of pay for performance on work efforts as they are not interested in the change of signs depending on the type of tasks. Second, the authors concentrate exclusively on results found in psychology and organizational behavior journals. Results reported in economic journals are not taken into account, and thus, studies from standard economics and psychological economics are neglected. Third, their study has a cutoff point of 1996, so the meta-analysis stops at a time when studies of motivation in psychological economics were just starting to gain momentum (see the highly cited Frey and Oberholzer-Gee 1997).

Sample

We apply the following rules of inclusion: We focus on experimental studies which (a) address the effect of incentives on task performance and not on some other dependent variable, (b) report "hard" performance measures (quantity and/or quality measures), (c) introduce pay for performance on an individual level, (d) have a control group, (e) provide enough information to allow us to determine the effects of pay for performance on performance, and (f) use adult populations. We identified these studies through four search avenues. First, we conducted computerized database searches from 1971[4] to 2006 using the key words "pay for performance," "tangible rewards," "monetary rewards," "performance-contingent rewards," "performance," and "intrinsic motivation." Second, we conducted manual searches of those journals that featured prominently in our database search, namely *Academy of Management Journal*, *American Journal of Psychology*, *Journal of Accounting Research*, *Journal of Applied Psychology*, *Journal of Management Accounting Research*, *Journal of Personality and Social Psychology*, *Quarterly Journal of Economics*, *Organizational Behavior and Human Performance*, and *Organizational Behavior and Human Decision Processes*. Third, we examined the reference lists in several meta-analyses.[5] Finally, we made a query for unpublished working papers in the field of economics. We conducted this query because in this field the search for studies is particularly difficult as economists often do not report simple correlation coefficients or *F* values needed for

4 We took 1971 as the starting point because it was in this year that the first study on the undermining effect of tangible rewards was published.

5 Bonner et al. (2000); Cameron and Pierce (1994); Deci, Koestner, and Ryan (1999); Eisenberger and Cameron (1996); Jenkins et al. (1998); Rummel and Feinberg (1988); Wiersma (1992).

Table 1
Study 1: Statistic for Each Study of the Meta-analysis

ID	Study Name	Number of Subgroups within Study	Control Sample Size (mean)	Bonus Sample Size (mean)	Standard Difference in Means (performance bonus group − performance control group)[a]	Significance	SE	*Z* Value	Journal (1 = economic, 2 = psychological)	Task (1 = simple and/or boring, 2 = difficult and/or interesting)	Outcome Measurement (1 = quality, 2 = quantity)
1	Ashton (1990)	2	23	25.5	0.22		0.20	1.10	1	1	2
2	Bailey, Brown, and Cocco (1998)	2	24	24	0.81	***	0.21	3.80	1	1	2
3	Baumeister (1984)	2	9	9	−1.07	***	0.36	−2.99	2	1	2
4	Brockner and Vasta (1981)	1	26	26	−0.49	*	0.28	−1.73	2	2	2
5	Campbell (1984)	16	14	14	−0.63	***	0.10	−6.50	2	2	1
6	Chow (1983)	10	10.4	10.4	0.66	***	0.14	4.62	1	1	2
7	Daniel and Esser (1980)	1	32	32	1.51	***	0.28	5.34	2	2	2
8	Fabes, Moran, and McCullers (1981)	23	19	22.3	−0.29	***	0.07	−4.39	2	1 and 2	1 and 2
9	Farh, Griffeth, and Balkin (1991)	1	14	8	1.58	***	0.50	3.14	2	1	2
10	Farr (1976)	1	45	45	2.56	***	0.28	8.99	2	1	2
11	Fatseas and Hirst (1992)	8	15	15	0.37	***	0.13	2.86	1	1	2
12	Fehr and Götte (2005)	2	22	20	−0.02		0.22	−0.10	1	1	2
13	Fossum (1979)	3	20	20	1.39	***	0.20	6.84	2	1	2
14	Frey and Götte (1999)	2	306	63.5	0.11		0.12	0.96	1	2	2
15	Gneezy and Rustichini (2000)	5	48	48	−0.17	*	0.09	−1.86	1	2	2
16	Hamner and Foster (1975)	8	16	16	0.11		0.13	.90	2	1 & 2	1 & 2
17	Harackiewicz, Manderlink, and Sansone (1984)	1	15	15	0.87	**	0.38	2.29	2	2	2
18	Henry and Strickland (1994)	1	68	69	0.99	***	0.18	5.49	2	1	2
19	Hogarth et al. (1991)	2	20	20	0.36		0.23	1.59	2	2	2

Continued

Table 1 *(continued)*
Study 1: Statistic for Each Study of the Meta-analysis

ID	Study Name	Number of Subgroups within Study	Control Sample Size (mean)	Bonus Sample Size (mean)	Standard Difference in Means (performance bonus group − performance control group)[a]	Significance	SE	*Z* Value	Journal (1 = economic, 2 = psychological)	Task (1 = simple and/or boring, 2 = difficult and/or interesting)	Outcome Measurement (1 = quality, 2 = quantity)
20	Lazear (2000)	1	1,377	1,377	0.36	***	0.04	9.33	1	1	2
21	Lee, Locke, and Phan (1997)	12	11.7	11.5	−0.33	***	0.12	−2.72	1	2	2
22	Libby and Lipe (1992)	2	40	38	0.33	**	0.16	2.04	1	1	2
23	Lienhard (2006)	1	112	112	0.43	***	0.14	3.16	2	1	2
24	Lopez (1981)	1	93	93	1.18	***	0.16	7.42	2	1	1

ID	Study Name	Number of Subgroups within Study	Control Sample Size (mean)	Bonus Sample Size (mean)	Standard Difference in Means (performance bonus group − performance control group)[a]	*p* Value	SE	*Z* Value	Journal (1 = economic, 2 = psychological)	Task (1 = simple and/or boring, 2 = difficult and/or interesting)	Outcome Measurement (1 = quality, 2 = quantity)
25	Mowen, Middlemist, and Luther (1981)	1	62	62	−0.46	***	0.18	−2.53	2	2	2
26	Paarsch and Shearer (2000)	1	17	17	1.08	***	0.37	2.93		1	2
27	Phillips and Freedman (1988)	4	17	17	0.70	***	0.18	3.97	2	1 and 2	2
28	Pinder (1976)	2	20	20	0.75	**	0.33	2.30	2	1	2
29	Pokorny (1994)	8	17	17	−0.03		0.12	−0.22		1 and 2	2
30	Pritchard, Campbell, and Campbell (1977)	1	14	14	0.18		0.38	0.48	2	2	2
31	Remus, O'Connor, and Griggs (1998)	2	17	17	0.01		0.24	0.05	2	1	1
32	Saari and Latham (1982)	3	12	12	2.43	***	0.31	7.82	2	1	2

Continued

Table 1 *(continued)*
Study 1: Statistic for Each Study of the Meta-analysis

ID	Study Name	Number of Subgroups within Study	Control Sample Size (mean)	Bonus Sample Size (mean)	Standard Difference in Means (performance bonus group − performance control group)[a]	*p* Value	SE	*Z* Value	Journal (1 = economic, 2 = psychological)	Task (1 = simple and/or boring, 2 = difficult and/or interesting)	Outcome Measurement (1 = quality, 2 = quantity)
33	Scott, Farh, and Podsakoff (1988)	1	48	48	2.69	***	0.28	9.56	2	2	2
34	Shearer (2004)	1	9	9	0.85	*	0.49	1.73	1	1	2
35	Stajkovic and Luthans (2001)	2	23.5	23	0.50	**	0.21	2.39	2	1	1 and 2
36	Stone and Ziebart (1995)	1	42	42	1.05	***	0.23	4.50	2	1	1
37	Terborg and Miller (1978)	2	30	30	0.08		0.18	0.45	2	2	1 and 2
38	Turnage and Muchinsky (1976)	1	20	20	−1.49	***	0.36	−4.16	2	1	2
39	Turnage and Muchinsky (1976)	1	20	20	1.19	***	0.34	3.47	2	2	2
40	Vecchio (1982)	2	43	0	−0.26		0.16	−1.56	2	2	1 and 2
41	Wageman and Baker (1997)	2	36	38	0.84	***	0.17	4.90	2	1	2
42	Wimperis and Farr (1979)	1	16	16	−1.51	***	0.40	−3.76	2	2	2
43	Wright (1990)	3	55	55	0.46	***	0.11	4.10	2	1	2
44	Yukl and Latham (1975)	2	13	12.5	−0.69	**	0.29	−2.39	2	1	2
45	Yukl, Latham, and Pursell (1976)	3	15	15	−0.29		0.22	−1.30	2	1	2
46	Yukl, Wexley, and Seymore (1972)	3	5	5	1.80	***	0.43	4.16	2	1	2

[a]In this column, positive values indicates that monetary rewards raise the work performance and negative values indicate that monetary rewards decrease the work performance.
*$p < .1$, **$p < .05$, ***$p < .01$.

computation in a meta-analysis. The four search avenues and the five inclusion rules yielded 46 empirical studies (total sample size of the 46 studies = 27,524) with 155 usable subgroup samples (total sample size of the 155 subgroup samples = 46,363). Descriptive information of these studies is contained in Table 1.[6]

Procedures

Our meta-analysis was conducted using the approach of Hunter and Schmidt (2004). Meta-analysis allows the aggregation of results across separate studies and thus provides an estimate of the true relationship between two variables in a population. The zero-order correlations between the variables of interest are weighted by the sample size of the study to calculate the mean weighted correlation across all the studies in the analysis. The standard deviation of the observed correlations is then calculated to estimate their true variability. Computations for the meta-analysis were performed by using the Comprehensive Meta-analysis (Borenstein 2000). This software package allows to control for three artifacts—sampling error, measurement error, and range restriction—which mask true variability by employing the artifact distribution formulas of Hunter and Schmidt.

Nonindependence and Outliers

As noted, many of the 46 studies report more than one mean difference between the rewarded group and the control group. We used the following criteria to ensure an acceptable level of independence among those studies with multiple subgroups. For studies with multiple independent samples, statistics from each sample were included. If a sample reported more than one statistic for a single relationship (for instance, because it involved multiple operationalizations of the same construct), we combined these statistics. Further, we plotted a study's effect size against its standard error to detect outliers. The studies were distributed symmetrically about the combined effect size and point out the absence of publication bias.

Moderator

Since we aim to analyze the overall relationship of pay for performance and performance, as well as the relationship dependent on task type, a moderator analysis was conducted. We asked two coders to independently sort the experiments into two categories: noninteresting and interesting tasks. This particular coding was chosen as we assume noninteresting tasks to be predominantly extrinsically motivated and interesting tasks to be more clearly intrinsically motivated. In 15% of the cases there was no agreement between the coders, and therefore, a third expert was asked to decide on the final ballot. Subsequently, the total sample was divided into two groups according to task type. For each group a separate net effect and a critical ratio can be calculated.

6 As seen in the table, our analysis mainly builds on studies conducted in the laboratory, in the private sector or in the public domain. There are no studies included from the public sector. This can be explained by the fact that we restricted our sample to experimental studies, which are less numerous in the public sector, and that we chose journals that are more likely to publish basic research rather than applied research. The resulting restrictions for the generalizability of our results, however, apply not only to public management but also to all specific industries that have not been included in the meta-analysis. Further research is certainly needed to claim the transferability of these results to all possible contexts.

Table 2
Study 1: Results of the Meta-analysis

Model	Number of Studies (number of subgroups)	Est.[a]	SE	*Z* Value	Heterogeneity (*Q* value)
Overall effect	46 (155)	0.23***	0.02	11.03	700.56***
Task type					
Noninteresting tasks	31 (82)	0.42***	0.03	16.24	338.88***
Interesting tasks	20 (73)	−0.13***	0.04	−3.46	235.17***
Journal					
Economic	11 (47)	0.26***	0.03	8.87	72.36***
Psychological	34 (99)	0.21***	0.03	6.75	616.09***

[a]In this column, positive values indicates that monetary rewards raise the work performance and negative values indicate that monetary rewards decrease the work performance.
Est., Estimate
*$p < .1$, **$p < .05$, ***$p < .01$.

Results and Discussion

Table 2 illustrates the results of our meta-analysis: Overall we find a significant and positive net effect of pay for performance on performance (0.23**). Task type consistently moderated this effect: Pay for performance increases performance in the case of noninteresting tasks (0.42***), whereas in the case of interesting tasks pay for performance reduces performance (−0.13***). Thus, the findings of the meta-analysis substantiate Hypothesis 1b. On the basis of these findings hypothesis 1a has to be refuted.

Our results contradict the findings of the meta-analysis of Jenkins et al. (1998). The authors do not find a moderating effect of task type. These differences can be explained by two facts. First, we have analyzed the data to distinguish direction effects, whereas Jenkins et al. (1998) have looked for explained variance. Second, Jenkins et al. (1998) were suggesting that their coding in intrinsic/extrinsic tasks might have been too crude. Jenkins et al. (1998) distinguished task types by referring to the original classification by the researchers who conducted the experiment. We applied a different coding strategy and cross-checked self-labeling by the author with expert coder's perception of the tasks studied.

To control the validity of our findings we additionally tested whether the type of publication outlet moderated the findings. We found no moderator effect of the publication outlet, that is, studies published both in economic and in psychological journals show a positive and commensurate net effect of tangible rewards on performance (0.26*** and 0.22***).

STUDY 2: PAY FOR PERFORMANCE, MOTIVATION AND PERFORMANCE

Hypotheses

The aim of this second study is to identify why pay for performance sometimes negatively affects personal efforts. We open the black box of motivation and analyze the effect of performance-contingent rewards on motivation directly. We suggest that performance-contingent rewards affect a cognitive shift, which promotes two opposing motivational effects (Frey 1997). On the one hand, performance-contingent rewards subdue the internalized meaning of the work itself, that is, lowers the power of intrinsic motivation for

a particular activity: Pay for performance causes a crowding-out effect. On the other hand, pay for performance strengthens the meaning of external rewards, that is, boosts the power of extrinsic motivation for a particular activity: Pay for performance causes a price effect on motivation and performance. The overall effect thus is dependent on the relative strength of the two unobservable contradicting effects.

There are two reasons why we believe it is important to open this black box of motivation. First, a well-funded critique of the possible negative effects of pay for performance on intrinsic motivation argues that most studies are subject to circular reasoning (e.g., Kunz and Pfaff 2002). Most experimental studies stipulate the crowding-out effect post hoc to explain why performance-contingent rewards were found to have no uniform positive effect on performance. This can be illustrated with a field experiment of Gneezy and Rustichini (2000b). The authors investigate the influence of monetary incentives on the behavior of pupils while making a voluntary collection. A total of 180 pupils were divided into three random groups. The first group received no reward, the second group received 1%, and the third group 10%, of the sum collected. The group receiving 1% collected significantly less than that which received nothing more than a "thank-you." The third group collected more than the second group, yet still collected less than the first group. The interpretation of this finding is that the weak monetary incentive of 1% of the sum collected crowd-out the pupils' intrinsic motivation. The stronger incentive of 10% of the sum collected is interpreted to raise individual efforts again by the price effect. It strengthens the pupil's extrinsic motivation. However, the opposing effects are postulated post hoc. They provide no conclusive evidence for changes in motivation because they do not look into the black box but only consider observable outputs.

Second, public management in contrast to private sector management is often plagued by a severe limitation of funding available for performance-related pay: Merit increments tend to be below a maximum of 5% (OECD 2005). As a consequence, the possible price effect of performance-related pay is probably rather low. The crowding-out effect, however, could be high because the job content and intrinsic rewards seem to be important drivers of public service employees (Francois 2000; Frank, and Lewis 2004; Le Grand 2006). If we can show that both effects are decisive for the magnitude and direction of the influence of pay for performance on performance, public sector management should reconsider the current use of pay for performance: A low-price effect coupled with a high-crowding-out effect are bound to result in a drop in performance.

To open the black box of motivation and to analyze the unobservable cognitive processes, we will draw on self-determination theory (Deci 1985; Deci, Connell, and Ryan 1989)[7]: Based on the concept of the "locus of causality" (De Charms 1968), the theory

7 Psychological economics has offered a number of alternative theoretical explanations for the crowding-out effect, which will not be discussed in this article in more detail for limited space reasons. For example, Benabou and Tirole (2003) suggest that individuals—under some conditions—perceive pay for performance as an indicator for the desirability of an assignment: Highly incentivized tasks are projected to be unpleasant. These attributions impact the subsequent willingness of individuals to exert personal efforts at such tasks. While, for example, Gneezy and Rusticchini (2000b) suggest that the undermining effect of pay for performance may be best explained by its framing effect, the introduction of pay for performance signals to the employee that a former incomplete work contract is now complete. Under this new regime additional—voluntary—efforts become obsolete. Thus, efforts are exerted only to the point as being specified and paid for. For additional explanations of the crowding-out effect, see Fehr and Falk (2002), Gneezy (2004), and Sliwka (2003).

(a) systematically explains the transition from intrinsic to extrinsic motivation and (b) accounts for why and under which conditions external incentives lead to a shift in motivation.

Locus of Causality

Self-determination theory analyzes the influence of pay for performance on the perceived locus of causality (De Charms 1968). The perceived locus of causality is a personal attribution of behavior: Individuals distinguish to what degree an activity is initiated and endorsed by themselves (internal locus of causality) or to what degree an activity is forced upon them (external locus of causality) (De Charms 1968). Intrinsic motivation is linked to an internal locus of causality. In contrast, extrinsic motivation is the result of external pressure and thus is linked to an external locus of causality (Ryan and Connell 1989). In reality the degree to which behavior is self-initiated or externally initiated varies. For many activities, both types of motivations simultaneously play a role.

Motivation Shift

Self-determination theory analyzes why and in which direction the locus of causality, and with it motivation, is changed (Deci 1980). It works from the assumption that individuals have a need for self-determination (Deci 1985; Deci and Flaste 1995): Individuals prefer to actively engage with their environment and, if given the chance to do so, self-initiate their activities (Deci and Ryan 2000). This is, for example, the case if individuals are given extensive rights for participation in decision making (Leana, Ahlbrandt, and Murrell 1992; Mayer and Schoorman 1998). In such an environment intrinsic motivation is strengthened as individuals perceive themselves to be "master of their own destiny." At the same time this perception of self-determination buffers their experience of external pressure. External pressure is viewed to be more distant and thus extrinsic motivation is weakened.

Pay for performance, however, has been shown to heighten the salience of external control and thus to reduce perceptions of self-determination (Deci, Koestner, and Ryan 1999a, 1999b). In such an environment individuals perceive themselves to be "puppet on strings," whereby their intrinsic motivation is thwarted (Deci 1971). This crowding-out effect is perhaps most clearly seen when one attempts to reward activities that are not normally compensated monetarily, such as play or learning. But this effect also occurs when one offers additional financial incentives for tasks that are already compensated. The reason is that pay for performance relative to fixed wages causes a salient perception of control. First, Deci, Koestner, and Ryan (1999) show in a meta-analysis that the more contingent financial incentives are administered, the higher perceptions of control become: For example, task-contingent rewards hardly undermine intrinsic motivation, whereas completion-contingent rewards are found to undermine intrinsic motivation quite severely. Second, pay for performance creates recurring events of anxiety and salience (Gerhart and Rynes 2003) and thus has been found to lead to emotional arousal (Campbell, Campbell, and Chia 1998) and exhaustion (Brown and Benson 2003).

As a consequence, pay for performance has been suggested to crowd-out intrinsic motivation and to strengthen extrinsic motivation, that is, to produce a price effect. This leads to the following hypotheses:

H_2 Pay for performance affects the relation between intrinsic motivation and effort negatively: High performance-contingent rewards reduce the effect of intrinsic motivation on effort.

H_3 Pay for performance affects the relation between extrinsic motivation and effort positively: High performance-contingent rewards increase the effect of extrinsic motivation on effort.

The relative strength of both contrary unobservable effects is dependent on the original motivation for a task and produces the observable total effect on behavior.

Vignette Study

Experimental Design

To analyze the proposed motivation shift, we conducted a vignette study, also called a factorial survey (Rossi and Anderson 1982). Vignette studies are suited to the analysis of the conditions of social contexts, for instance, the scope of norms. Vignettes provide "... short descriptions of a person or a social situation which contain precise references to what are thought to be (...) important factors in decision-making or judgment-making processes of the respondents..." (Alexander and Becker 1978). Within the description, the independent variables are systematically varied by the experimenter. Then the targeted variable, for instance, behavioral intentions, is asked about.

Participants are led to weigh the significance of single characteristics to arrive at an overall preference for one alternative. As in reality, the participants are involved in a trade-off. In short, vignette analyses, like the conjoint method, are based on the following three concepts: (a) Every situation consists of a bundle of characteristics; (b) every participant makes an individual evaluation of the benefits of various combinations of characteristics; (c) the combination of the benefits of various characteristics provides the relative overall benefit to an individual.

Experimental Procedure

Our vignette is composed of 10 independent factor variables. The vignette was modeled to represent a complex, project-type work environment, which is typical for professional, upper level managerial and civil servant work. Each factor represents a different characteristic of the organizational context and can be given a positive value (e.g., "you can largely organize your own working day") or a negative value (e.g., "the organization of your working day is prescribed for you"). The vignette covers three dimensions of a working context: job design, work climate, and external incentives.

The design we used was not a reduced design, in contrast to most conjoint method experiments. We asked the entire combination of vignettes across several participants. This procedure possesses the advantage that an analysis of the moderation effects between test factors and effect factors is later possible. The consideration of moderating influences of contextual factors is widespread in the social sciences and should also be observed in experimental designs. The different vignettes were allocated randomly to respondents; each respondent had to answer three vignettes.

To achieve a high external validity and to avoid cognitive overload we conducted a pretest with executive MBA students (100 questionnaires and 300 vignettes, response rate 25%). As a result the vignettes were shortened (one variable was dropped) and the wording was adapted. Our main study was conducted in 2006 with 186 part-time executive MBA students on-site, who each filled out three vignettes (149 questionnaires and 447 completely

Table 3
Study 2: Means, SD, and Correlation Matrix (447 vignettes from 149 people)

Measures	Mean	SD	1	2	3	4	5	6	7	8
1 Additional performance	3.52	0.96								
2 Performance-contingent pay	0.42	0.49	.09**							
3 Intrinsic motivation	3.76	0.77	.53***	.03						
4 Extrinsic motivation	3.30	1.03	.18***	.15***	.28***					
5 Realistic vignettes	2.64	0.83	−.25***	.05	−.17***	−.11**				
6 Gender	0.58	0.49	−.11**	.01	−.19***	−.07	.14**			
7 Year of birth	1977	4.98	−.04	.07	−.18***	.01	.08*	.06		
8 Length of employment	9.48	5.75	.01	−.05	.16***	−.05	−.11**	−.03	−.53***	
9 Complexity of knowledge in current work	3.89	0.94	.10	.06	.03	.05	−.01	.03	.01	.10**

Note: Measurements and scales: (1) Additional performance: To complete these tasks, I will within my working hours invest additional time in meetings which, while voluntary, are significant for the project (1 = no hours, 5 = >5 h). (2) Performance-contingent pay: 0 = pay is fixed, or, performance-contingent pay is only slight (5% bonus), 1 = pay is performance contingent (50% bonus). (4) Intrinsic motivation: Additional time in meetings (a) because I like doing this (1 = strongly disagree, 5 = strongly agree) and (b) because I think it is the right thing to do. It reflects my personal work ethics (1 = strongly disagree, 5 = strongly agree). (5) Extrinsic motivation: Additional time in meetings because another behavior would involve many disadvantages for me (1 = strongly disagree, 5 = strongly agree). (6) Realistic vignettes: 1 = very unrealistic, 5 = very realistic. (7) Gender: 0 = female, 1 = male. (8) Length of employment: in years. (9) Complexity of knowledge in current work: 1 = not knowledge intensive, 5 = very knowledge intensive.
$N = 447$, $*p < .1$, $**p < .05$, $***p < .01$.

filled vignettes, response rate 80%). A typical respondent had been working for 9 years and had completed a college of professional studies; 67% have managing functions.

Operationalization

The dependent variable—*performance*—was modeled as a task that could theoretically be motivated intrinsically as well as extrinsically. This way we are more likely to be able to show the motivation shift in both directions. The vignettes present hypothetical project situations for which we then asked intended work behavior. We measure work performance with the following item: "To complete these tasks, I will within my working hours invest additional time in meetings which, although voluntary, are significant for the project. Estimate how many hours of your working week you would give" (scale: >5 h; ≤3–4 h; ≤2 h; ≤1 h; no hours). Intended behavior may be overstated due to a social desirability bias. We tried to reduce this problem with the help of a random design: As each person answers three vignettes, the random design controls for some person-specific errors. However, we do not measure behavior itself, which has to be taken into account when interpreting the results.

Three variables measured the main effects: pay for performance, extrinsic motivation, and intrinsic motivation. *Pay for performance* was modeled with two different values: (0) Your pay does not vary. You receive a fixed salary. (1) Your pay varies widely. It consists of 50% fixed salary and a 50% performance-contingent bonus. *Extrinsic and intrinsic motivations* were measured with a version of the self-regulation questionnaire that assesses the degree to which an individual's perceived locus of causality for a particular behavior tends to be internal or external (Ryan and Connell 1989). The instrument has been validated in various fields of motivation research (e.g., Grolnick, Ryan, and Deci 1991; Biddle, Soos, and Chatzisarantis 1999). The participants have to indicate on a 1–5 scale why they have chosen a particular behavior ("Referring to your previous answer about the use of additional time in meetings: please describe why you give this much additional time"). Intrinsic

motivation corresponds to an internal locus of causality and was measured with the items (a) "I behave so because I like doing this" and (b) "I behave so because I think it is the right thing to do. It reflects my personal work ethics." Extrinsic motivation corresponds to an external locus of causality and was measured with the item "I behave so because another behavior would involve many disadvantages for me."

The two interaction effects—the crowding-out and the price effect—were operationalized in the following way. We measured the *crowding-out effect* as the effect of intrinsic motivation on performance dependent on the existence of pay for performance (1 = yes, 0 = no). A negative, significant coefficient of intrinsic motivation on performance in the case of the existence of pay for performance corresponds to Hypothesis H2. We measured the *price effect* as the effect of extrinsic motivation on performance dependent on the existence of pay for performance (1 = yes, 0 = no). A positive, significant coefficient of extrinsic motivation on performance in the case of the existence of pay for performance corresponds to Hypothesis H3.

In addition we controlled for a number of other influencing factors. At the level of each vignette we controlled the participants' perception of the realism of the individual vignettes (scale: 1 = very unrealistic, 5 = very realistic). Further, at the level of each respondent we controlled for gender, year of birth, length of employment (in years), and the complexity of knowledge in their current work (scale: 1 = not knowledge intensive, 5 = very knowledge intensive) (Table 3).

Analytical Method

We used multilevel mixed-effects linear regression. Mixed models are characterized as containing both fixed effects and random effects. The fixed effects are analogous to standard regression coefficients and are estimated directly. Fixed effects thus indicate the "true" effects of variables on outcomes. The random effects are not directly estimated but are summarized according to their estimated variances and covariances. Random effects take the form of the grouping structure of the data, which consist of multiple levels of nested groups. The model thus takes into account that every person answered three vignettes. One caveat of our model should be kept in mind when interpreting our results: The problem with self-assessment questions is that responses to them differ across respondents according to *both* the actual level and interpersonal incomparability. The advantage of mixed-effects model is that these models correct for random measurement errors. The disadvantage of mixed-effects model is that these models might also correct for differential item functioning, that is, the way different individuals answer the same question differently. The literature offers some novel approaches, that is, parametric models, to address this problem (King et al. 2004). Our research design, however, does not allow applying these novel approaches.

Results and Discussion

Table 4 shows the results of the regression.

Model 2 indicates that pay for performance in general raises the intention of our participants to make additional commitments to work ($\beta = 0.24^{***}$). In Model 3 we introduce motivation as a further parameter for work effort. Intrinsic motivation strongly increases additional work efforts ($\beta = 0.60^{***}$), whereas extrinsic motivation raises performance only slightly ($\beta = 0.11^{*}$). Model 4 takes account of the interaction between motivation and pay for performance. In line with Hypotheses H2, the findings show that pay for

Table 4
Study 2: Empirical Results of the Multilevel Mixed-Effects Linear Regression (447 vignettes from 149 people)

	Dependent Variable											
	Additional Performance											
	Model 1			Model 2			Model 3			Model 4		
Independent Variables:	Est.	Significance	*T*	Est.	Significance	*T*	Est.	Significance	*T*	Est.	Significance	*T*
External incentive:												
2 Performance-contingent pay				.24	***	2.56	.23	***	2.75	.68		1.36
Motivation:												
3 Intrinsic motivation							.60	***	10.12	.71	***	9.08
4 Extrinsic motivation							.11	*	1.88	−.03		−.53
External incentive × motivation:												
Performance-contingent pay × intrinsic motivation										−.25	**	−2.19
Performance-contingent pay × extrinsic motivation										.14	*	1.66
Control variables:												
5 Realistic vignettes	.33	***	−5.35	.34	***	5.48	.26	***	4.99	.22	***	3.96
6 Gender	−.16		−1.31	−.17		−1.36	.02		.13	.02		.14
7 Year of birth	−.03		−1.50	−.03		−1.56	.00		.22	−.01		−.57
8 Length of employment	−.04	*	−1.88	−.04	*	−1.83	−.01		−.37	−.03		−1.58
9 Complexity of knowledge in current work	.16	**	2.44	.15	**	2.35	.03		.57	.12	*	1.87
Random effects:	Est.		SE	Est.		SE	Est.		SE	Est.		SE
SD (R.id)	.48		.07	.50		.07	.47		.06	.51		.06
SD (residual)	.77		.04	.75		.04	.65		.03	.63		.03
Model fit												
Log-restricted likelihood			−420			−418			−379			−382
Wald χ^2 (DF)			40			47			186			159
Prob > χ^2			.00			.00			.00			.00

Est., Estimate; R.id, Residual ID; DF, Degrees of freedom
*$p < .1$, **$p < .05$, ***$p < .01$.

performance has a strong negative effect on intrinsic motivation, and thus reduces the intention to deliver additional effort at work ($\beta = -0.25^{**}$ = hidden crowding-out effect). Thus, the introduction of pay for performance reduces the intrinsically motivated component of additional effort by 0.25. At the same time and in line with Hypotheses H3, pay for performance has a positive effect on the extrinsic motivation of the participants and raises the intention to make additional efforts at work ($\beta = 0.14^{*}$ = hidden price effect). Thus, the introduction of pay for performance increases the extrinsically motivated component of additional effort at work by 0.14.

Implications and Limitations of our Research

Our meta-analysis clearly demonstrates that the task type moderates the effect of pay for performance on performance. Pay for performance has a strong, positive effect on performance in the case of noninteresting tasks. Pay for performance, however, tends to have a negative effect on performance in the case of interesting tasks. The vignette study reveals (a) why pay for performance sometimes undermines performance and (b) how pay for performance produces hidden costs, which also need to be accounted for.

1. Pay for performance causes a cognitive shift, that is, it strengthens extrinsic motivation for behavior (causes a price effect) and at the same time weakens intrinsic motivation for behavior (causes a crowding-out effect). Depending on the strength of these two opposing effects, pay for performance either hurts or promotes personal efforts: The more intrinsic motivation was there at the beginning, the more of it can be destroyed.

2. Hidden costs arise even if the price effect is stronger than the crowding-effect. The loss of intrinsically motivated behavior has always to be compensated by external rewards.

Our findings help to explain the modest success of pay for performance in the public sector, for five reasons. First, it seems that in the public sector high intrinsic motivation is at stake (Cacioppe and Mock 1984; Crewson 1997; Jurkiewicz and Massey 1997; Perry 1997; Houston 2000; Buelens and Van den Broeck 2007). Thus, pay for performance can potentially create a strong crowding-out effect. Second, public funding is clearly more limited than private sector funding. As a result—and as suggested by a number of studies—the price effect of pay for performance in public management tends to be rather small (Ingraham 1993; Kellough and Lu 1993; Moon 2000), whereas the crowding-out effect in the case of interesting, and thus potentially intrinsically rewarding, tasks may weigh considerably. Third, pay for performance might reduce investments in policy expertise and select the wrong type of employees as pointed out by the study of Gailmard and Patty (2007). Fourth, the so-called multitasking problem (e.g., Holmström and Milgrom 1991) can pose an additional difficulty for implementing pay for performance in the public sector: Pay for performance requires the precise measuring of performance and the attribution of this performance to individual efforts to be effective. However, public service institutions often have to deliver complex products and services such as "good health" or "good education" (Plant 2003). To specify every aspect of such tasks is often very difficult. As a result, extrinsically motivated persons, subject to a pay for performance system, have a strong incentive to fulfill only what is easy to measure, that is, the quantifiable performance-related aspects of a task. What is not easy to measure is disregarded, though it might be important for fulfilling the task (for examples from the public sector, see Dalrymple 2004; van Bockel and Noordegraaf 2006). A more subjective performance

evaluation could address the problem of multitasking but creates new problems instead. Subjective performance evaluation procedures are subject to systematic cognitive biases in evaluation (e.g., Rynes, Gerhart, and Parks 2005) and might be considered as procedurally unfair as they cannot provide consistency and objectivity in the same way as objective evaluations do. Fifth, from a politico-economic perspective, the application of performance-contingent rewards also carries the danger of political manipulation. Political economists have traditionally focused on politicians' possibilities and incentives to manipulate the criteria by which they are evaluated (e.g., Frey 1983; Benz and Frey 2007). In this view, pay for performance for politicians and high-level public service agents does not make sense because these individuals are the ones who decide the very standards by which they are compensated.

Our research also suggests in which areas pay for performance might have the potential to augment performance in the public sector. Performance-related pay can successfully boost personal efforts in the case of less interesting tasks, for example, tasks that require low investments in policy expertise. An early qualification of the American National Research Council panel of the experience with performance-related pay in public administration in the 1980s and early 1990s came to a similar conclusion (Milkovich and Wigdor 1991). According to Buelens and Van den Broeck (2007), lower level employees of public administration are more likely to find their job less interesting than managers in the public service and thus might be valid candidates for pay for performance. Because the nature of these tasks is not intrinsically rewarding, pay for performance in this case is likely to augment extrinsic motivation for these tasks considerably, while there is no danger to destroy a great amount of intrinsic motivation. In addition, the outcome of such tasks is more easy to measure than complex tasks and thus problems of multitasking are less likely to play a role.

Four limitations of our research need to be addressed. First, our meta-analysis is based on highly controlled experiments and field experiments. Although experiments possess the advantage of the isolated alteration of a few factors under controlled conditions (Starmer 1999), they lack external validity because of the high level of abstraction for the participants (Harrison and List 2004). Thus, we should translate these findings carefully to the real world. In the case of our vignette study, this abstraction is somewhat reduced as a real administrative work context is simulated. Second, the vignette study has the drawback not to observe real behavior but only behavioral intentions. Further research in the field, preferably field experiments, is needed to analyze the effects of pay for performance on performance in applied fields such as in public administration. Also a meta-analysis that is based on applied field studies and which compares the effects of pay for performance in the private and the public sector could be an issue for further research. Third, as already mentioned we used a mixed-effects model to study the cognitive shift. The problem with self-assessment questions is that answers to these differ across respondents according to the actual level and interpersonal incomparability (differential item functioning along with random measurement error). The inclusion of random effects possesses some advantages but might also hurt the orthogonality assumption: Random effects not only correct for random measurement errors but also correct for systematic person-specific effects, that is, the way different individuals answer the same question differently (King et al. 2004). Our study does not disjoint both effects. The literature started to offer parametric methods that address this problem. Further studies should be aware of this issue and could apply more profound models. Fourth, our design does not allow us to observe the path sizes of the hidden price effect or the hidden

crowding-out effect depending on the level of pay for performance. To understand the hidden costs of rewards better, future research needs to measure the motivational effects of different performance-contingent rewards on performance and motivation.

In the light of this current, albeit limited, evidence we propose that it might be wise to follow a suggestion by Moynihan (2007) to retain the positive functions of performance management—in particular its motivating feedback function (Deci, Koestner, and Ryan 1999)—by blocking pay for performance, which in the public sector might offer more disadvantages than advantages.

Supplementary material

Supplementary material is available at the *Journal of Public Administration Research and Theory* online (www.jpart.oxfordjournals.org).

APPENDIX

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