

# THE PSYCHOLOGICAL COSTS OF PAY-FOR-PERFORMANCE: IMPLICATIONS FOR THE STRATEGIC COMPENSATION OF EMPLOYEES

IAN LARKIN,<sup>1</sup> LAMAR PIERCE,<sup>2\*</sup> and FRANCESCA GINO<sup>1</sup>

<sup>1</sup> Harvard Business School, Boston, Massachusetts, U.S.A.

<sup>2</sup> Olin Business School, Washington University in St. Louis, St. Louis, Missouri, U.S.A.

*Most research linking compensation to strategy relies on agency theory economics and focuses on executive pay. We instead focus on the strategic compensation of nonexecutive employees, arguing that while agency theory provides a useful framework for analyzing compensation, it fails to consider several psychological factors that increase costs from performance-based pay. We examine how psychological costs from social comparison and overconfidence reduce the efficacy of individual performance-based compensation, building a theoretical framework predicting more prominent use of team-based, seniority-based, and flatter compensation. We argue that compensation is strategic not only in motivating and attracting the worker being compensated but also in its impact on peer workers and the firm's complementary activities. The paper discusses empirical implications and possible theoretical extensions of the proposed integrated theory. Copyright © 2012 John Wiley & Sons, Ltd.*

## INTRODUCTION

Compensation is a critical component of organizational strategy, influencing firm performance by motivating employee effort and by attracting and retaining high ability employees. Compensation is the largest single cost for the average company (Gerhart, Rynes, and Fulmer, 2009), with employee wages accounting for 60 to 95 percent of average company costs excluding a firm's physical cost of goods sold (Bureau of Labor Statistics, 2009). Although literatures across disciplines including economics, social psychology, and human resource management take different approaches to studying compensation, the strategy

literature on compensation is dominated by one theory and one focus: the use of agency theory and a focus on executive compensation. Indeed, by our count, over 80 percent of recent papers on compensation in leading strategy journals explicitly or implicitly use agency theory as the dominant lens of analysis.<sup>1</sup> Nearly three-quarters of these papers also examine executive compensation,

<sup>1</sup> Between 2004 and 2009, 152 papers in five of the leading strategy journals—*Strategic Management Journal*, *Organization Science*, *Management Science*, *Academy of Management Journal*, and *Academy of Management Review*—contained the word 'compensation' in the topic listed in the Social Sciences Citation Index. 82 of these explicitly used the lens of agency theory, and a further 45 clearly used the basic predictions of agency theory in the research. Over 83 percent of the papers on compensation, therefore, rested on agency theory. In contrast, only 16 of the papers, or just more than 10 percent, discussed any concepts from social psychology or behavioral decision research. Similarly, a recent review article on compensation by Gerhart *et al.* (2009) contained over 220 citations, 60 of which were in strategy journals. Of these 60 articles, 52 explicitly or implicitly used agency theory as the

Keywords: compensation; pay; incentives; principal-agent models; motivation

\*Correspondence to: Lamar Pierce, Olin Business School, Washington University in St. Louis, One Brookings Drive Box 1133, St. Louis, MO 63130, U.S.A. E-mail: pierce@wustl.edu

rather than focusing on compensation for ‘non-boardroom’ employees.

The impact of executive compensation on firm strategy is undeniable (e.g., Dalton *et al.*, 2007; Wowak and Hambrick, 2010), given the importance of attracting top executive talent and financially motivating strong effort and profitable choices. Yet pay for top executives averages only a few percentage points of the total compensation costs of the firm (Whittlesey, 2006), meaning the bulk of a company’s wage bill represents pay to nonexecutives. Furthermore, employee compensation is intimately tied to firm decisions regarding technology, diversification, market position, and human capital (Balkin and Gomez-Mejia, 1990; Nickerson and Zenger, 2008), and has widespread implications for organizational performance (Gomez-Mejia, 1992). Nonexecutive compensation, therefore, remains an important but under-explored topic in the strategy literature.

In this paper, we examine the strategic implications of compensation choices for nonexecutive employees. We argue that agency theory falls short in providing fully accurate predictions of strategic compensation choices by firms for nonexecutive employees.<sup>2</sup> The prominent use of agency theory by strategy scholars 35 years after its introduction by Jensen and Meckling (1976) and Holmstrom (1979) suggests that this theoretical approach has substantial merit. Yet, most firms’ compensation strategies for nonexecutive employees do not fully align with the predictions of agency theory. In fact, as detailed below agency theory predicts the use of individualized performance-based pay far more frequently than is actually observed for nonexecutive employees. We argue that the predictions of agency theory often fail because performance-based pay is less effective than the theory predicts.

We propose a more realistic theory of strategic compensation for nonexecutive employees that uses the basic framework of agency theory but incorporates important insights from social psychology and behavioral decision research.

---

dominant lens of analysis, and only three discussed social psychology in a significant way. Across these two data sources, 72 percent of compensation papers in strategy journals focused on executive pay.

<sup>2</sup> The question of the extent to which agency theory is an adequate framework for explaining strategic executive compensation is outside the scope of this paper. We believe, however, that the theory developed in the paper will prove useful in examining executive compensation choices as well.

We argue that while these insights impact compensation strategy in many ways, two main factors are of first-order importance: social comparison processes and overconfidence. We concentrate on these factors because they most dramatically affect the underlying differences in the objectives and information on which agency theory is based. Also, these factors strongly influence firm performance due to their impact not only on the behavior of the employee being compensated but also on the decisions and actions of other employees. We first incorporate these factors into an agency theory framework, and then argue that the true costs of individual performance-based systems are far greater than predicted by agency theory. We use our theory to derive a set of testable propositions regarding how psychological factors, economic factors, and information influence both the efficacy and prevalence of certain strategic compensation choices. Our main argument is that psychological factors raise the cost of individual pay-for-performance, leading firms to rely on team-based, seniority-based and flatter compensation strategies such as hourly wages or salaries.

Although several notable studies in the management literature have examined the effect of individuals’ psychology on compensation (e.g., Gerhart and Rynes, 2003; Gerhart *et al.*, 2009), to the best of our knowledge our paper is the first to integrate economic and psychological factors into a theory of how strategic employee compensation impacts firm strategy and performance. The role psychology plays in compensation choice is by no means a new topic. Gerhart and colleagues (2009) cite 42 articles in psychology journals that examine compensation issues, yet most of these studies ignore or even dismiss the relevance of economic theory, in our opinion making the same mistake as agency theory research in neglecting relevant factors from other disciplines. Additionally, these studies do not attempt to fully assess the costs and benefits to firms of different compensation choices, and tend to be more narrowly focused on partial effects.

Similarly, while some economists acknowledge the importance of psychological factors such as fairness in wages (Akerlof and Yellen, 1990; Fehr and Gächter, 2000; Card *et al.*, 2012) and the non-pecuniary costs and benefits such as shame (Mas and Moretti, 2009), social preferences (Bandiera, Barankay, and Rasul, 2005), and teamwork

(Hamilton, Nickerson, and Owan, 2003), these papers primarily focus on social welfare or individual or team performance. Only Nickerson and Zenger (2008) discuss the strategic implications of psychological processes for employee compensation but, different from the current paper, focus exclusively on the role of employee envy on the firm.

Our work seeks to build theory that integrates the predictions of agency theory and insights from the psychology literature in a comprehensive way. Agency theory is a natural lens by which to study strategic compensation because it approaches the setting of compensation from a cost-benefit viewpoint, with the firm's principals, or owners, as the fundamental unit of analysis. By using agency theory as a base, our integrated framework leads to a rich set of testable predictions around the methods by which firms strategically set compensation policy. We further seek to illustrate the impact of nonexecutive compensation on the broader strategy of the firm, explaining how our framework can inform other complementary activities and choices made by the firm.

The paper is laid out as follows. In the next section, we briefly introduce the approach we take to building an integrated theory of strategic compensation. We then review agency theory as well as the literatures on social psychology and behavioral decision making for relevant and empirically supported insights regarding social comparison processes and overconfidence. Next, we combine insights from these literatures into an integrated theory of strategic compensation. We end the paper by examining the implications of our theory for strategic compensation decisions by firms, and by discussing empirical implications, testable propositions and future directions.

### THE IMPLICATIONS OF THE INFREQUENCY OF INDIVIDUAL PAY-FOR-PERFORMANCE

Our research is primarily motivated by the disconnect between the broad effectiveness of individual pay-for-performance predicted by agency theory and the relative infrequency with which it is observed.<sup>3</sup> We hold that agency theory is

correct in broadly equating the *effectiveness* of different compensation regimes with their *prevalence*. Compensation systems that tend to be more effective will be used more often. Although firms often deviate from the most efficient systems and can make mistakes, in general the prevalence of systems and decisions is highly correlated with efficiency and effectiveness (Nelson, 1991; Rumelt, Schendel, and Teece, 1994). We note that the theory we propose in this paper is focused on *effectiveness*, but due to the above correlation, we will often make reference to the prevalence of certain schemes as *prima facie* evidence of effectiveness.

Indeed, the infrequent use of individual performance-based pay for nonexecutives casts doubt on its overall efficacy (Zenger, 1992). A 2010 international survey of 129,000 workers found only 40 percent received pay tied to performance at any level (individual, team, firm) (Kelly Services, 2010), and over half of Fortune 1000 companies report using individual performance-based pay for 'some,' 'almost none,' or 'none' of their work force (Lawler, 2003). Even when performance-based pay is used, the proportion contingent on performance is typically low. The median bonus for MBA graduates, whose employment skews toward professional services that frequently use performance pay, represents only 20 percent of base salary (VanderMey, 2009). Performance pay based on team metrics—such as division profitability, product market share, or other nonindividual measures—is far more common than individual performance-based pay. This unexpectedly low prevalence suggests higher costs or lower performance from individual incentives than agency theory predicts.

Still, this discrepancy does not mean that agency theory lacks empirical support. Many of the core predictions of agency theory have been empirically validated in experimental and real-world settings (Gerhart *et al.*, 2009; Prendergast, 1999). Our theory takes the agency theory insights that have received strong empirical support and integrates them with empirically validated insights from social psychology. We argue that only by using an integrated cost-benefit lens can accurate

<sup>3</sup> Note 'pay-for-performance' includes pay based on subjective measures of performance as well as objective ones. Agency

theory holds that even when output is not observable or measurable, firms will often use performance-based, subjective measures of performance (e.g., Baker, 1992).

	Firms	Employees
<b><u>PREFERENCES</u></b>		
Objective function	Maximize profits	Maximize utility
Strategic compensation variables which affect objective function	Employee skill level (+) Employee effort (+) Wage costs (-)	Pay (+) Effort (-) Risk (-/averse)
<b><u>INFORMATION</u></b>		
State of nature	Random	Random
Employee effort	Unknown/imperfect	Known
Employee ability	Unknown/imperfect	Known

Figure 1. Agency theory framework

predictions around compensation be made at the level of the firm.

## AGENCY THEORY AND STRATEGIC COMPENSATION

At its core, agency theory posits that compensation is strategic in that firms will use the compensation program that maximizes profits based on its unique costs and benefits. In agency theory, costs arise due to differences between firms and employees in two crucial areas: *objectives* and *information*. Two potential costs arise from these differences: an employee may not exert maximum effort (or effort may be inefficiently allocated), and the firm may pay workers more than they are worth (i.e., their expected marginal product). In this section, we detail the key differences between employees and firms in objectives and information, and the resulting predictions from agency theory about a firm's compensation strategy. Figure 1 summarizes the arguments described below.

### Objectives

The fundamental tension in agency theory arises from differences in the objectives of firms and

employees. Firms seek to maximize profits, and increased compensation affects profitability by motivating employee effort (+) and attracting more highly skilled employees (+) while increasing wage costs (-) (Pendergrast, 1999). Employees, on the other hand, seek to maximize utility. Increased compensation affects utility by increasing income (+), yet employees must balance utility from income with the disutility (or cost) of increasing effort (-). Agency theory argues that effort is costly to employees *at the margin*; employees may intrinsically enjoy effort in small or moderate levels, but dislike increases in effort at higher levels (Lazear and Oyer, 2011).

Agency theory further argues that firms must pay workers a premium for taking on any risk in pay uncertainty, since employees are risk averse. This creates distortion with risk neutral firm owners, who can use financial markets to optimally hedge against risk (Jensen and Meckling, 1976). However, we limit our discussion of risk in this paper for the sake of brevity, and because agency theory's predictions on risk have demonstrated very little, if any, empirical support (Pendergrast, 1999). In contrast, agency theory's prediction on the relationship between effort and pay has been largely supported in the empirical literature (Pendergrast, 1999; Lazear and Oyer, 2011).

## Information

Two information asymmetries where the worker knows more than the firm drive compensation choices in agency theory. Workers know their own effort exertion and skill level, while firms have imperfect information about both. Agency theory holds that firms overcome these asymmetries by providing incentives for workers to exert effort and self-select by skill level. For example, by offering a low guaranteed wage with a large performance element, a firm can incentivize higher effort from all workers, but it can also attract and retain workers with high skills, while ‘sorting away’ those with low skills (Lazear, 1986; Lazear and Oyer, 2011).

## Predictions of standard agency theory

The basic trade-offs in agency theory are around effort (good for the firm but bad for the employee) and pay (bad for the firm but good for the employee). Given the information problems described above, and ignoring psychological factors, firms should pay employees for performance if the productivity gains from the effort it motivates are greater than the cost of the pay. Secondly, pay-for-performance systems separate skilled employees who earn more under such schemes from unskilled ones who are better off in settings where performance does not matter.

Basic agency theory holds that there are two basic alternatives firms face when setting pay: paying a flat wage, or paying for performance. The most obvious way to pay for performance is to base pay on some observed output of the worker or company, but firms can also base pay on subjective measures not tied to observed output.<sup>4</sup> The trade-offs noted above lead to three fundamental insights on information and individual pay-for-performance that emerge from agency theory:

*Insight 1: Employees work harder when their pay is based on performance.*

*Insight 2: Firms are more likely to use performance-based pay (vs. flat pay) when they have less information about actual employee effort.*

<sup>4</sup> Agency theory holds that firms are more likely to use subjective measures as the correlation between observed output and effort is lower (Baker, 1992).

*Insight 3: Firms are more likely to use performance-based pay (vs. flat pay) when they have less information about employee skill level, and/or as employee skill level is more heterogeneous.*

## Team-based compensation

Agency theory also approaches team-based compensation with a cost-benefit lens; team-based compensation improves performance when benefits from coordination outweigh costs from the reduced effort of free riding (Bonin *et al.*, 2007). Notably, standard agency theory views team-based compensation as important only when the firm chooses a production process that requires close integration across a team to internalize production externalities from individual workers. Consequently, when coordination is unnecessary, team-based incentives are unlikely to be efficient and firms set compensation strategy largely based on the observability of output, effort, and skill. If high-powered incentives are particularly important but individual effort is not observable, firms may use team-based compensation, although the costs of free riding make this the exception rather than the rule. Furthermore, team-based pay on average may attract lower skilled or less productive workers than individual-based pay due to lower earning potential and lower costs to shirking.<sup>5</sup> This leads to a fourth insight from standard agency theory:

*Insight 4: Firms are more likely to use team-based performance pay vs. individual-based pay when coordination across workers is important, when free riding is less likely, or when monitoring costs are low.*

## Basic predictions of agency theory

Given these four insights from agency theory, we present the likely compensation choices of firms under an agency theory model in Figure 2, where coordination by employees is not required and the primary determinants of pay are observability of output, effort, and ability. As noted in the

<sup>5</sup> Results from Hamilton and colleagues' (2003) study of garment factory workers found that high ability workers prefer to work in teams, despite earning lower wages, which casts some doubt on these predictions. This is consistent with recent work on how the social preferences of workers can overwhelm financial incentives (Bandiera *et al.*, 2005).

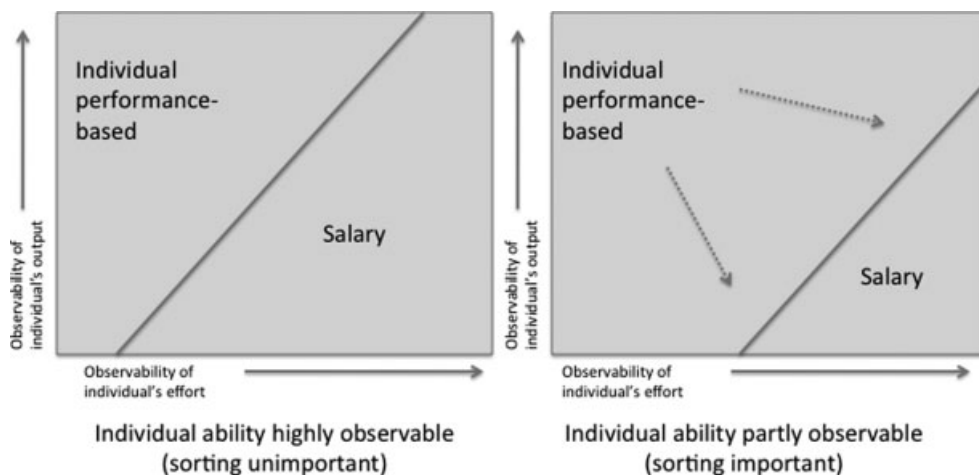


Figure 2. Compensation predictions from agency theory (with no task coordination benefits)

left-hand figure, when ability is observable, *individual performance-based pay* is more likely to be used as a firm better observes individual output, but is less able to observe actual effort. When both effort and output are highly observable, firms prefer to use a set *salary*, where an employee is given a set wage regardless of performance.<sup>6</sup> It is important to note that with effort and output both observable, this salary is inherently based on average performance. While the worker can reduce effort for short periods, the observability of this effort means that the firm can adjust compensation or terminate the employee in response to observed output.

As noted in the right-hand figure, the situation changes dramatically when individual skill is not observable. In such cases, compensation not only motivates employees but also attracts specific types of employees to the firm. Individual performance-based pay is more likely across both margins on the graph: at a given level of output or effort observability, firms are more likely to use performance-based pay when employee skills are not observable compared to when they are.

When it is important for employees to coordinate effort across tasks, a third compensation strategy comes into play: *team performance-based pay*. This refers to a pay system that measures and rewards performance at a level other than the individual, such as the division, product line, or company. As depicted in Figure 3, assuming

imperfect (but not zero) observability of individual output, team performance-based pay is more likely when coordination across employees increases and observability of individual effort decreases. Finally, as individual effort observability increases, firms again prefer salaries because they are the most efficient form of compensation. As before, individual-based performance pay becomes more important as the need for sorting due to skill unobservability grows stronger.

Agency theory provides a compact, plausible theory that predicts the profitability and use of performance-based pay in a wide range of settings. It is, therefore, surprising that individual performance-based pay is used so little (Camerer, Loewenstein, and Rabin, 2004; Baker, Jensen, and Murphy, 1988), given the strong empirical evidence of its impact on employee effort (e.g., Lazear, 1986; Paarsch and Shearer, 2000). Part of this inconsistency may be due to the fact that the induced effort is directed toward nonproductive or detrimental activities (Kerr, 1975; Oyer, 1998; Larkin, 2007). However, even considering these ‘gaming costs,’ the magnitude in performance differences in the above empirical studies makes it difficult to believe gaming alone explains the dearth of performance-based pay.<sup>7</sup>

<sup>7</sup>Note that the existence of costs from performance-based pay, as demonstrated in the studies above, does not mean that these pay systems are suboptimal. Agency theory would hold that the net benefits of the system, even including the identified costs, must be greater than the net benefits of any other system.

<sup>6</sup>This prediction also stems from the assumed risk aversion of employees.

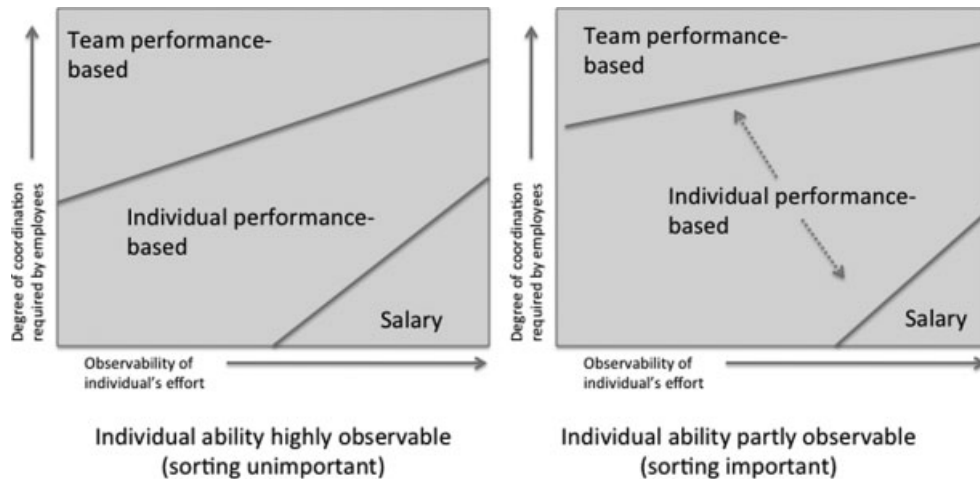


Figure 3. Compensation predictions from agency theory (with task coordination benefits and imperfect observability of individual output)

### INCORPORATING INSIGHTS FROM PSYCHOLOGY AND DECISION RESEARCH INTO AGENCY THEORY

We argue that the low prevalence of individual performance-based pay in firms reflects several important relationships between the psychology of employees and their pay, utility, and resulting actions. In each case, the psychological mechanism we suggest to be at work makes performance-based pay more costly for firms, which may help explain why performance-based pay is less common than agency theory predicts. However, we also argue that the basic structure of agency theory is still a useful lens for examining how insights from psychology and behavioral decision research affect compensation predictions. Like agency theory, our framework decomposes the strategic element of compensation into differences between firms and employees in objectives and information, and recognizes that there is a ‘work-shirk’ trade-off for the average employee. Integrating psychological insights into this agency-based framework allows us to put forward an integrated theory of strategic compensation that considers both economic and psychological factors, and a testable set of propositions.

As with all models, we abstract away from many variables that are relevant to compensation, and focus on two psychological factors that, in our view, create the largest impact on the methods by which firms compensate workers: overconfidence and social comparison processes. In this section,

we discuss how these psychological factors add costs to performance-based compensation systems, using the framework developed in Section 2. These additions are depicted in Figure 4. Throughout the section, we will refer back to this figure to clearly explain how the consideration of these psychological costs modifies some of the main predictions of standard agency theory.

#### Performance-based pay and social comparison

Social comparison theory (Festinger, 1954) introduces considerable costs associated with individual pay-for-performance systems because it argues that individuals evaluate their own abilities and opinions in comparison to referent others. Psychologists have long suggested that individuals have an innate desire to self-evaluate by assessing their abilities and opinions. Because objective, nonsocial standards are commonly lacking for most such assessments, people typically look to others as a standard. Generally, individuals seek and are affected by social comparisons with people who are similar to them (Festinger, 1954), gaining information about their own performance.

As noted in Figure 4, social comparison theory adds a fourth information set to the three studied in agency theory: firms’ and employees’ knowledge about the pay of other employees. When deciding how much effort to exert, workers respond not only to their own compensation but also to pay *relative* to their peers as they socially

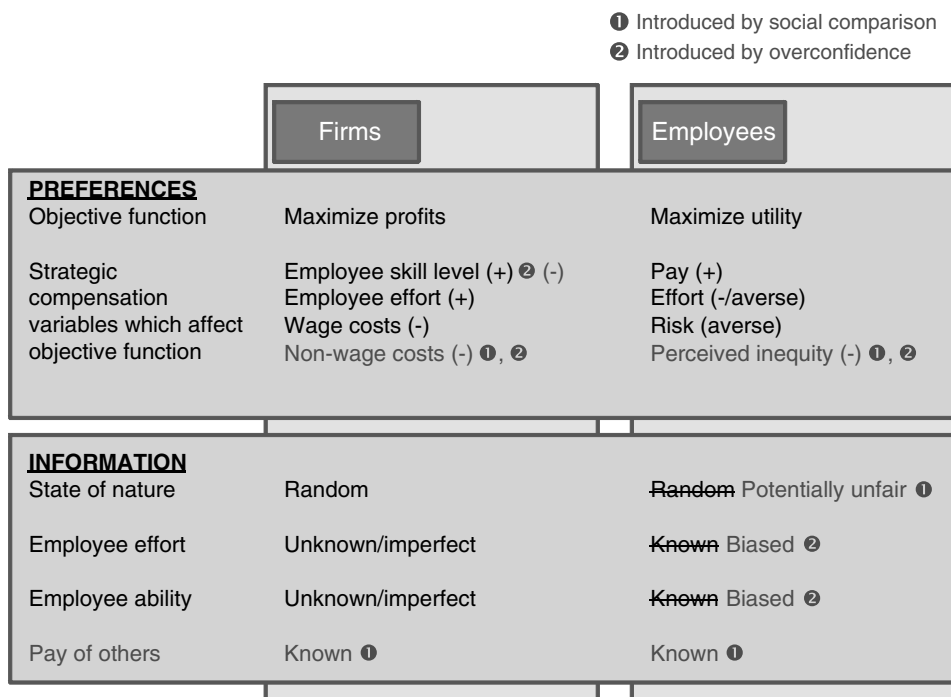


Figure 4. Insights from psychology and decision research on the agency theory framework

compare. In individual pay-for-performance systems, pay will inevitably vary across employees, generating frequent pay comparisons between peers. As suggested by equity theory (Adams, 1965), workers are not necessarily disturbed by such differences, since they consider information about both the inputs (performance) and outputs (pay) in such comparisons. If workers were to rationally perceive pay inequality to be fairly justified by purely objective and easily observable performance differences, then such pay differences would generate few (if any) psychological costs. Yet pay comparisons can lead to distress resulting from perceptions of inequity if inputs or performance are either unobservable or perceptions of those inputs are biased. For example, employees might believe they are working longer hours or harder than referent coworkers, and if their pay level is relatively low, they will likely perceive inequity.

Theoretical work in economics and strategy has followed psychology in arguing that such comparisons can lead to reduced effort (Solow, 1979; Akerlof and Yellen, 1990) and behavior grounded in envy, attrition, and the tendency to sabotage other workers within the same organization (Nickerson and Zenger, 2008; Bartling and

von Siemens, 2010).<sup>8</sup> Empirical studies show that social comparisons are indeed important to workers (Blinder and Choi, 1990; Campbell and Kamlani, 1990; Agell and Lundborg, 2003; Larkin, 2012), and can hurt morale (Mas, 2008), stimulate unethical behavior (Cropanzano, Rupp, and Byrne, 2003; Pruitt and Kimmel, 1977; Gino and Pierce, 2010a; Edelman and Larkin, 2009), and reduce effort (Greenberg, 1988, Cohn *et al.*, 2012; Nosenzo, 2010). Perceived inequity can also increase turnover and absenteeism and lower commitment to the organization (Schwarzwald, Koslowsky, and Shalit, 1992). While this negative impact is typically stronger when the employee is disadvantaged (Bloom, 1999), costly behavior can also occur when the employee is advantaged and feels compelled to help others (Gino and Pierce, 2009).

Perceived inequity in pay can furthermore have a costly asymmetric effect. Recent evidence suggests that below-median earners suffer lower job

<sup>8</sup> Social psychology's work on equity and social comparison has slowly disseminated into the economics literature, and has had a profound impact on experimental economics (Rabin, 1996), particularly in the literature on fairness (e.g., Camerer, 2003; Fehr and Gächter, 2000; Fehr and Schmidt, 1999; Frey and Meier, 2004).



satisfaction and are more likely to search for a new job, while above-median earners generate no productivity benefits from superior pay (Card *et al.*, 2012) and may even engage in costly actions to assuage guilt (Gino and Pierce, 2009; 2010b). While not all below-median earners perceive unfairness, this evidence is certainly consistent with a substantial frequency of inequity perception, and may also reflect dissatisfaction with the procedures used to allocate pay across workers. Social comparison across firms by chief executive officers (CEOs) has also been shown to lead to costly escalations in executive salaries, a phenomenon that can also occur between employees in the same firms (Faulkender and Yang, 2010; DiPrete, Eirich, and Pittinsky, 2008). As noted in Figure 4, social comparison theory adds two insights to the costs of performance-based pay:

*Insight 5a: Perceived inequity through wage comparison reduces the effort benefits of individual pay-for-performance compensation systems.*

*Insight 5b: Perceived inequity through wage comparison introduces additional costs from sabotage and attrition in individual pay-for-performance compensation systems.*

Furthermore, employees may believe ‘random shocks’ to performance-based pay as being unfair, especially if these shocks do not occur to other workers. If a regional salesperson’s territory suffers an economic downturn, for example, this may impact his or her pay despite no change in his or her effort or ability. Other shocks such as weather, equipment malfunctions, customer bankruptcies, or changes in consumer preferences, may negatively impact worker compensation outside the employee’s control. Resulting perceptions of unfairness can lead to the same problems noted above: lack of effort, sabotage, and attrition. As noted in Figure 4, this generates an additional insight:

*Insight 6: Perceived inequity arising through random shocks in pay introduces additional costs from effort, sabotage, and attrition in individual pay-for-performance compensation systems.*

Therefore, social comparison theory essentially adds another information set to agency theory:

the pay of others. The firm, of course, knows all of its employees’ pay levels, but the effects of social comparison on pay are greater as workers have more information about the pay of referent others. The psychology literature has until recently placed less emphasis on tying the importance of social comparisons to employee actions that benefit or cost firms, and the strategy literature has, with the exception of Nickerson and Zenger (2008), not yet integrated this construct into studies of organizational strategy. As we show in a later section, the failure of agency theory to include social comparisons costs means that many of the firmwide costs of performance-based pay are missed.

### **Overconfidence and performance-based pay**

Psychologists and decision research scholars have long noted that people tend to be overconfident about their own abilities and too optimistic about their futures (e.g., Weinstein, 1980; Taylor and Brown, 1988). Overconfidence is thought to take at least three forms (Moore and Healy, 2008). First, individuals consistently express unwarranted subjective certainty in their personal and social predictions (e.g., Dunning *et al.*, 1990; Vallone *et al.*, 1990). Second, they commonly overestimate their own ability; and finally, they tend to overestimate their ability relative to others (Christensen-Szalanski and Bushyhead, 1981; Russo and Schoemaker, 1991; Zenger, 1992; Svenson, 1981).

Recent research has shown that overconfidence is less an individual personality trait than it is a bias that affects most people, depending on the task at hand (e.g., Moore and Healy, 2008). People tend to be overconfident about their ability on tasks they perform very frequently, find easy, or are familiar with. Conversely, people tend to be underconfident on difficult tasks or those they seldom carry out (e.g., Moore, 2007; Moore and Kim, 2003). This tendency has strong implications for overconfidence in work settings, since work inherently involves tasks with which employees are commonly very familiar.<sup>9</sup> We suggest that overconfidence changes the informational landscape by

<sup>9</sup> Economists have begun to study the effect of overconfidence on firm and employee actions, finding overconfidence influences individuals’ market-entry decisions (Camerer and Lovo, 1999), investment decisions (e.g., Barber and Odean, 2001), and CEOs’ corporate decisions (e.g., Malmendier and Tate, 2005).

which firms determine compensation structure, as noted in Figure 4.

When overconfident, employees' biased beliefs about their own ability and effort alters the cost-benefit landscape of performance-based pay. First and foremost, performance-based pay may fail to efficiently sort workers by skill level, reducing one of the fundamental benefits of performance-based pay. Overconfident workers will tend to select into performance-based compensation systems, particularly preferring individual-based pay-for-performance (Cable and Judge, 1994; Larkin and Leider, 2012). This implies that workers may no longer accurately self-select into optimal workplaces based on the incentives therein. Instead, overestimating their ability, they may select into performance-based positions that are suboptimal for their skill set. If workers overestimate the speed with which they can complete tasks (Buehler, Griffin, and Ross, 1994), for instance, they may expect a much higher compensation than they will ultimately receive, leading to repeated turnover as workers seek their true vocation.

While this sorting problem may impact some firms less due to superior capability to identify talent, considerable evidence suggests that hiring lower ability workers is a widespread problem (Bertrand and Mullainathan, 2004). A similar sorting problem may occur when overconfident workers are promoted more frequently under a tournament-based promotion system, exacerbating problems as they rise to managerial positions (Goel and Thakor, 2008). These overconfident managers may, in turn, attract similar overconfident employees, amplifying future problems (Van den Steen, 2005). Based on this reasoning, we propose the following insight:

*Insight 7: Overconfidence bias reduces the sorting benefits of individual pay-for-performance compensation systems.*

Overconfidence not only has immediate implications for the optimal sorting of workers across jobs but also it may lead to reduced effort when combined with social comparison. A worker, believing him or herself one of the most skilled (as in Zenger, 1992), will perceive lower pay than a peer as inequitable, despite that peer's true superior performance. This perceived inequity would be particularly severe when there is imperfect information equating effort and ability to measurable and, thus,

compensable performance (Zenger and Hesterly, 1997). Thus, we suggest that:

*Insight 8a: Overconfidence bias increases perceived inequity in wage comparison and thereby decreases the effort benefits of individual pay-for-performance compensation systems.*

*Insight 8b: Overconfidence bias increases perceived inequity in wage comparison and thereby aggravates costs from sabotage and attrition in individual pay-for-performance compensation systems.*

## REDUCING PSYCHOLOGICAL COSTS THROUGH TEAM-BASED AND SCALED COMPENSATION

Although psychological costs of social comparison and overconfidence make individual pay-for-performance systems less attractive than under a pure agency theory model, firms may still wish to harness the effort improvement from performance-based pay. We argue that firms frequently use intermediate forms of compensation that combine some level of pay-for-performance with the flatter wages of fixed salaries. In this section, we use an integrated agency and psychology lens to analyze the costs and benefits of two of these intermediate forms: *team-based* and *scale-based* wages. While both team-based and scale-based systems can be costly due to decreased effort, they present clear psychological benefits.

Under a team-based system, an employee is compensated based on the performance of multiple employees, not just his or her own individual performance. The primary psychological benefit of team-based performance pay is that it reduces the costs of social comparison. This benefit makes it relatively more attractive than predicted by agency theory, which holds that team-based pay will be used only when there are benefits to coordination across employees that are greater than the costs of free riding.

Under a scaled wage system, employees are compensated in relatively tight 'bands' based largely on seniority. As with team-based systems, scaled wages result in lower costs from social comparison and overconfidence and are therefore more attractive than standard agency theory would

predict, even if effort is somewhat attenuated due to weakened incentives.

### **Reducing social comparison costs through intermediate forms of compensation**

In team-based compensation systems, the firm retains performance-based incentives but, instead of tying them to individual performance, links them with the performance of teams of employees. These teams may be extremely large, such as at the business unit or firm level, or may be based in small work groups. In general, smaller groups present higher powered incentives and reduce free riding, while larger groups present weaker incentives.

Team-based compensation can reduce one dimension of social comparison: wage comparison. By equalizing earnings across workers within teams, team-based compensation removes discrepancies in income among immediate coworkers that might be perceived as sources for inequity or unfairness. Employees, however, examine the ratio of inputs to outcomes when judging equity (Adams, 1965). The evening of wages within teams reduces social comparison on wages (outcomes) and not comparisons of contribution through perceived ability or effort (inputs). Team members will, therefore, perceive equivalent pay among members as truly equitable only if they perceive each employee's contribution to the team to be equal, so some problems of social comparison remain. Although overconfidence may magnify perceptions of own contributions, existing studies, while limited, suggest that perceptions of fairness depend much more on outcomes than inputs (Oliver and Swan, 1989; Siegel, Schraeder, and Morrison, 2008; Kim *et al.*, 2009), with employees more focused on compensation than inputs (Gomez-Mejia and Balkin, 1992).<sup>10</sup> Team-based compensation would best resolve the social comparison problem in teams where contribution is homogeneous, but given the lesser weight of inputs in equity evaluations, even widely heterogeneous differences in ability or effort are unlikely to produce the social comparison costs that wage

inequality will. This reasoning leads to the following proposition:

*Proposition 1: Team-based compensation reduces costs of social comparison when individual contribution is not highly heterogeneous within the team.*

Team-based compensation fails to reduce an additional social comparison cost, however: it cannot address wage comparisons across teams. Workers in some teams may believe earnings in higher-paid teams are inequitable, which may lead to psychological costs similar to individual-based systems. This problem may be exacerbated by workers' perception that their team assignment was inherently unfair, and thereby may create a new dimension for comparison.

Firms can reduce this potential social comparison cost by implementing scaled wages. Scaled wages will severely reduce equity and envy-based problems associated with wage comparisons across teams by creating uniformity throughout the firm for given job and seniority levels. While workers may still perceive outcome and effort to be unfair, this perception will be less personal given the firm's consistent policy of scale-based wages. The worker may view the policy as unfair, but will not feel personally affronted by a managerial decision to underpay them. Costs from inequity and envy will therefore be reduced, reducing psychological costs relative to performance-based pay. Scaled wages will, of course, motivate the highest ability workers to leave the firm because their contribution will not be adequately remunerated, but this is a cost already accounted for in economic theories of agency. Similarly, scaled wages may also involve larger administrative and bureaucratic costs, since firms must determine and communicate the appropriate basis on which the scaled system is based. These administrative costs, however, may actually deepen employee trust in the fairness of the system. Thus, we propose that:

*Proposition 2: Scaled wages have lower social comparison costs than team-based and individual-based compensation systems.*

We illustrate our model's predicted impact of social comparison on the likely compensation choices of the firm in Figure 5. For reference, the

<sup>10</sup> Gächter, Nosenzo, and Sefton (2010) find that laboratory participants socially compare on effort, and that this reduces the efficacy of increases in flattened financial incentives in inducing effort. This suggests team-based compensation may be less effective relative to flat wages in motivating effort.

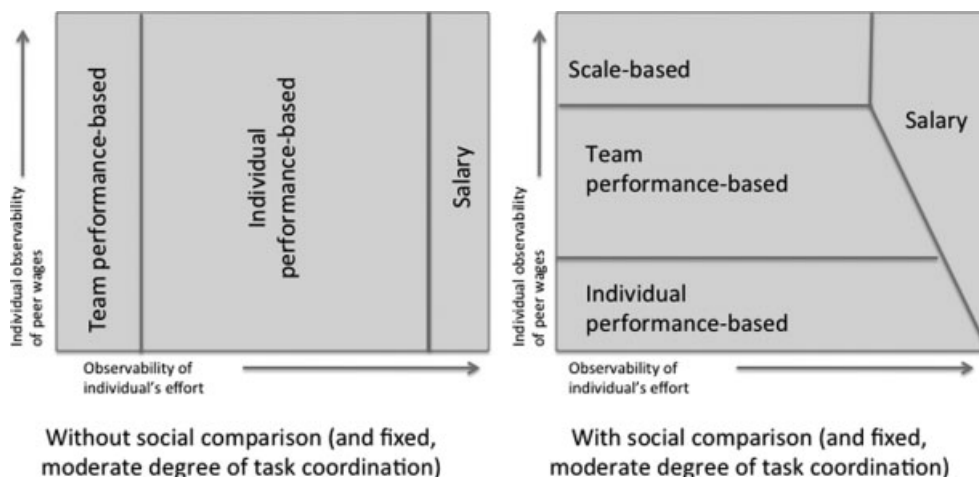


Figure 5. Compensation implications of social comparison

left-hand box shows the standard predictions of agency theory, based on Figure 3 and the assumption of a moderate degree of task coordination across employees. As noted in the figure, agency theory assumes that compensation choice does not depend on the ability of employees to observe the pay of peers. The right-hand box shows how the incorporation of social comparison costs changes the model's predicted compensation choice. As seen in the figure, individual performance-based pay is predicted far less often when social comparison is present, and team-based and salary-based pay are predicted more often. Also, scale-based pay is predicted with social comparison, but not under agency theory. The model's predictions, therefore, dramatically change with the incorporation of psychology.

At high levels of pay observability by peers, performance-based pay is very costly, and firms are predicted to turn toward scale-based pay or flat salaries. As employee observability of peer pay goes down, pay based on team performance becomes more likely as the motivational benefits of pay for performance begin to outweigh the costs of social comparison. Still, if peers have some view of peer pay, the model holds that firms are unlikely to base pay primarily on individual performance. Hence, team-based pay is used far more frequently than predicted in agency theory because of its lower social comparison costs. Finally, individual-based performance pay is predicted only when peers have very poor visibility of others' pay, and when effort cannot be perfectly observed. This is

analogous to the prediction of standard agency theory, which does not take social comparison costs into consideration.

### Reducing overconfidence costs through flattening compensation

Overconfidence creates considerable problems for individual-based compensation in its aggravation of social comparison and its undermining of efficient sorting processes. It creates similar problems in team-based compensation. Overconfident employees, unless they can observe the actual contribution of teammates, will usually interpret underperformance by the team as reflective of other workers' deficiencies, while they attribute strong team performance to themselves. These biased conclusions, which result from biases in attribution of performance, will create erroneous perceptions of inequity that may lead to reduced effort, higher attrition, and reduced cooperation. Similarly, overconfident workers will perceive assignments to lower quality teams as unfair, because they will perceive their teammates as below their own ability. This can result in workers constantly trying to switch into better teams of the level they perceive themselves to be. Thus, we introduce the following proposition:

*Proposition 3: Team-based compensation only resolves problems of overconfidence in individual pay-for-performance systems if the actual contribution of teammates is observable.*

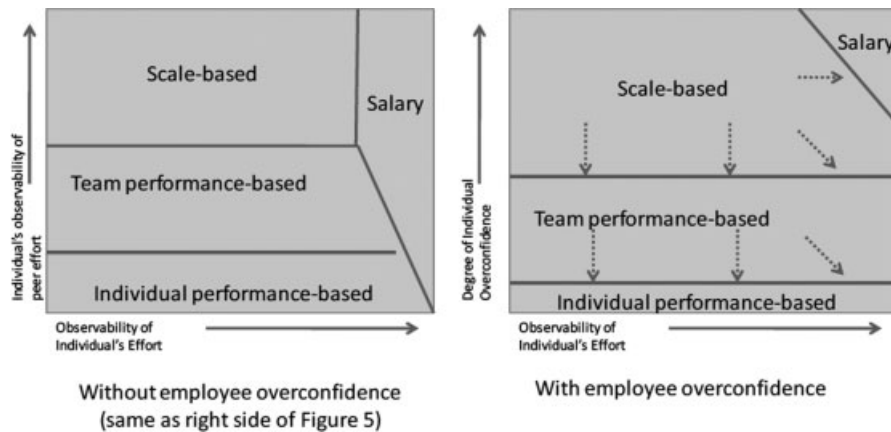


Figure 6. Compensation implications of overconfidence

Introducing scaled compensation within teams may not completely alleviate costs of overconfidence, but scaled wage systems can prove much less costly when overconfidence is present. With flatter wages across the firm, workers are less likely to socially compare with peers in other teams, and are less likely to expend political effort attempting to transfer into other teams. Instead, overconfident workers under scale-based wages will potentially observe workers at other firms earning higher wages and attempt to leave a firm in order to restore perceived inequality. The most overconfident workers are unlikely to even sort into the firm, given their perception that they will never be paid what they are truly worth. Scale-based wages, therefore, solve psychological costs of overconfidence by sorting out the most overconfident workers. This reasoning leads to our next proposition:

*Proposition 4: Scale-based wages reduce costs of overconfidence in individual- and team-based pay-for-performance.*

We present the impact of overconfidence on likely pay choices in Figure 6, which shows our model's predictions about how a firm's compensation policy changes when employees are overconfident. For comparison, Figure 6 on the left repeats the right-hand box in Figure 5, where overconfidence is not considered. As noted in the figure, overconfidence increases the need for team-based and scale-based wages because they sort out overconfident workers who are more likely to perceive inequity in pay. Correspondingly, firms

are less likely to use salaries even when individual effort is observable, because employees do not have unbiased views on their own or others' efforts. Even when employees cannot see one another's pay, firms are more likely to use team-based pay because an overconfident employee has biased views about his or her own contributions and effort and overestimates the pay of peers (Lawler, 1965; Milkovich and Anderson, 1972). A team performance-based system can provide positive effort motivation while weeding out highly overconfident workers. Therefore, when overconfidence is most severe, scale-based and team performance-based wages will drive out the most overconfident and potentially destructive workers, and are much more likely to be used than salaries or individual performance-based wages. Compared to the predictions from standard agency theory shown in the left-hand side of Figure 5, which does not take into account the costs of social comparison or overconfidence, our model shows that scale and team performance-based pay are far more likely than agency theory predicts.

## IMPLICATIONS FOR FIRM STRATEGY

Reflecting agency theory, strategic compensation has almost exclusively focused on improved effort and sorting that firms enjoy when using optimal compensation strategy. While these direct effects are undeniably relevant, an important implication of our model is that indirect effects of compensation also have strategic implications. Indeed, employee compensation is not an isolated firm

policy. It broadly impacts the other choices and activities of the firm, and must be complementary with them in order to support the firm's strategic position (Porter, 1996). Also, social comparison theory suggests that compensation for one employee can spill over and affect decisions made by other employees within a firm.

Social comparison costs can dramatically impact the overall strategy of the firm by limiting the firm's ability to apply high powered incentives or a wide variance in compensation levels across employees. Williamson (1985) explained how this can affect a firm's corporate strategy in limiting gains from mergers and acquisitions in his discussion of Tenneco's acquisition of Houston Oil and Minerals Corporation. Agency theory would predict that premerger firms having considerably different pay structures would have little impact on the post-merger firm. Yet Tenneco was forced to standardize pay across employees to avoid social comparison costs, an adjustment that cost USAir 143 million USD the year following its acquisition of Piedmont Aviation (Kole and Lehn, 2000). This reflects how firm boundaries can change reference groups among employees and force firms to elevate the wages of the lowest peer group to improve perceptions of pay equity among new coworkers (Zenger and Hesterly, 1997; Kwon and Meyersson-Milgrom, 2009).

Similarly, Dushnitsky and Shapira (2010) suggest that a firm's strategic decision to implement a corporate venture capital program may create problems of social comparison, since the efficacy of high powered incentives in such programs necessitates pay-for-performance. Since the considerable upside of such compensation contracts can generate huge pay inequalities within the firm, such programs may generate conflict across personnel. Similar problems have limited the ability to implement individual pay-for-performance for internal pension fund managers in firms and state governments (Young, 2010; Wee, 2010). In enterprise software, aggressive pay-for-performance in sales—a single job function—has been shown to be correlated with high turnover and low employee satisfaction in other job functions such as marketing and product development (Larkin, 2008).

Overconfidence can also impact the strategic implications of compensation policy. Investment banks frequently take highly leveraged positions in the marketplace, creating tremendous profit

potential but also greater risk. The high powered performance-based incentives of investment banking attract many high ability individuals, but these compensation schemes also attract some of the most overconfident workers in the world (Gladwell, 2009). While this overconfidence may yield some benefits in bluffing and credible commitment, it also produced considerable problems at firms like Bear Stearns, which collapsed early in the recent banking crisis. First, persistent overconfidence led the bank toward aggressive, highly leveraged derivatives that ultimately yielded liquidity problems. Second, envy and comparison of bonus pay led to increasingly aggressive behavior in investment banks.

Furthermore, recent work suggests that overconfident CEOs are more likely to pursue innovation, particularly in highly competitive industries (Galasso and Simcoe, 2011). While the focus of our paper is nonexecutive pay, the same rule may apply at lower levels in the firm, whether in research and development (R&D), product development, operations, or finance. Experimental evidence suggests that overconfident technical managers are much more likely to pursue aggressive R&D strategy (Englmaier, 2010). Under individual pay-for-performance, which is inherently highly competitive, nonexecutive employees may also pursue extensive innovation for financial or career gains. The decision to grant such employees wide discretion in applying innovation and change within the firm may require flatter compensation structures to reduce the risk of attracting overconfident workers and incentivizing them toward excessive risk.

Similarly, many firms position their products in ways that require personal and customized sales channels. Because effort is difficult to monitor among these salespeople, firms typically employ pay-for-performance commission schemes, which motivates effort, but can provide few sorting benefits. One leading management consulting company used extensive surveys to find that enterprise software salespeople's expected commissions averaged \$800,000 per year. Yet these expectations were nearly *eight times* the actual median compensation, suggesting high overconfidence about their own sales abilities. Larkin (2007) notes that the annual attrition rate of similar software salespeople was nearly 30 percent, and average tenure level was only two years, suggesting that salesperson failure to meet excessive expectations motivated

attrition. Given that industry sales cycles are a year or more and customer relationships are critical, high salesperson attrition is extremely costly to software vendors (Sink, 2006).

## EMPIRICAL IMPLICATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The agency theory approach to strategic compensation has proved very robust: it makes simple, testable predictions, many of which have held up to considerable empirical testing. The three major predictions with strong empirical support are that 1) employees increase effort in response to incentives; 2) employees put effort into 'gaming' incentive systems that can negatively affect performance; and 3) incentives can lead employees to sort by skill level.

Our integrated framework suggests a number of new predictions regarding the role of psychological costs in the study of strategic compensation. We identified two sets of psychological costs: social comparison and overconfidence. A first set of predictions focuses on social comparison costs. Our theory predicts that social comparison costs reduce the efficacy of individual performance-based pay as a compensation strategy. Consequently, firms will take one of two actions when social comparisons are prevalent among employees: dampen the use of performance-based incentives, or attempt to keep wages secret. Although many firms have strict wage secrecy policies, these are frequently ineffective due to workers' overestimation of peer wages (Lawler, 1965; Milkovich and Anderson, 1972) or are explicitly illegal (Card *et al.*, 2012). The difficulty of imposing and maintaining wage secrecy makes flattening wages through scale- or team-based pay a frequently necessary solution.

One approach to testing these propositions is to collect data from surveys or industry reviews to examine how and when the prevalence and costs of social comparisons vary across industry and company environments. Instruments developed in the psychology literature provide guidance on how to measure social comparison processes using survey items or field interventions in organizations. Such an analysis would be inherently cross-sectional, however, and would merely establish correlations between social comparison and compensation practices.

One fruitful avenue for empirical testing may be publicly funded organizations such as universities and hospitals. In many jurisdictions, salary disclosure laws have produced natural experiments that allow for the study of behavioral responses to newly observed peer compensation, and the organizational responses to them. Recent work by Card *et al.* (2012), which exploits the public disclosure of California employee salaries, is an example of the potential of this approach. Similarly, acquiring data on firms that change compensation structure or acquire another firm with different wage levels can allow for examining how increased variance in pay may reduce worker productivity. Such findings would be particularly striking if productivity decreased despite absolute pay increases. Exploiting variation in worker assignment (Chan Li, and Pierce, 2012; Mas and Moretti, 2009) or exogenous organizational change for workers (Dahl, 2011) could allow for estimating the effect of relative pay on performance while controlling for absolute pay. Similar changes between team- and individual- based compensation systems could potentially identify how individuals react to social comparison in different incentive structures, and how that influences performance. Where data on such changes are not available, field experiments that change compensation systems for a random set of employees and study resulting behavior and performance may prove useful (for a recent example, see Hossain and List, 2012).

A second set of new predictions resulting from our theoretical framework centers around overconfidence. If overconfidence plays a negative role in the job function, we predict that firms will either dampen incentive intensity, or set up a compensation scheme that sorts against overconfidence. As noted, overconfidence can exacerbate the perceived inequity of pay-for-performance schemes in settings where social comparisons matter. We would, therefore, expect that industries and job settings marked by strong social comparison effects will strategically use compensation to screen against overconfidence. Furthermore, theoretical work suggests it can considerably reduce sorting benefits from individual pay-for-performance and even generate an escalating attraction and promotion of overconfident employees (Van den Steen, 2005; Goel and Thakor, 2008). However, we still have limited empirical evidence on how compensation sorts by confidence,

so future research needs to first focus on this question.

In job functions where confidence is important for success, such as in the sales setting, we predict that firms will strategically use compensation to sort by confidence. Data on sales commission structure by industry are available (e.g., Dartnell Corp., 2009); a researcher could test whether industries with lower 'lead-to-sales' ratios, and/or industries with longer sales cycles, have commission schedules that appear to cater to overconfident employees. For example, in enterprise software, an industry with low 'lead-to-sales' ratios and an 18–24 month sales cycle, salespeople are paid by convex commission schedules that can differ by a factor of 20 times or more depending on the salesperson's other sales in the quarter (Larkin, 2007). Our theoretical framework predicts a relationship between convex compensation (or other schemes that would sort by confidence) and the industry sales cycle and/or lead-to-sales ratio. However, we still need a better understanding of the role confidence plays in job functions outside sales. There is considerable research yet to be done on psychological factors that cause employees to sort into different job functions.

Future research might also benefit from extending our theoretical framework to include new factors influencing strategic compensation such as employee attitudes toward risk and uncertainty, or to relax some of the assumptions made in our model, for example, around the fixed nature of production and technology. These extensions are likely to provide opportunities for future research on the boundary conditions of influences identified in our model.

### Managerial implications

We believe our work has a number of immediate implications for managers in both the private and public sector. The first, and most obvious implication, is that the efficacy of individual pay-for-performance is powerfully influenced by psychological factors, which if not considered *a priori* could have considerable unintended consequences for the firm. In choosing whether to implement such a pay system, managers must consider not only easily quantifiable economic costs related to the observability of worker pay and productivity but also psychological costs due to social comparisons and overconfidence.

Under increasing global pressure for worker performance in private sectors, managers are reevaluating traditional scale-based and other flat compensation systems and experimenting with high powered incentive systems. Similarly, in the public sector, managers facing tightened budgets and public perceptions of ineffectiveness are implementing pay-for-performance schemes to improve effort in settings where these schemes have rarely been used before, such as education (e.g., Lavy, 2009) and aviation regulation (Barr, 2004). While in many cases these increased incentives may prove effective, our work suggests that there may be a sound basis for many of the existing flat compensation systems. Focusing exclusively on increasing effort through high powered incentives may ignore many of the social and psychological benefits that existing compensation systems provide.

In addition, social networking and related phenomena have made information about peer effort, performance, and compensation more readily available. We would argue that the costs of performance-based systems are heightened as employees share information across social networks, similar to the impact of online salary information for public employees observed in Card *et al.* (2012). With pay secrecy increasingly difficult to enforce and the private lives of coworkers increasingly observable, social comparison costs seem even more likely to play an important role in compensation in the future.

### Limitations

Our theoretical framework needs to be qualified in light of various limitations. One limitation is our focus on financial incentives as the major driver of effort and job choice. Research in psychology and organizational behavior has proposed that individuals are intrinsically motivated by jobs or tasks (Deci and Ryan, 1985, Deci, 1971). While many scholars agree that money is a strong motivator (Jurgensen, 1978; Rynes, Gerhart, and Minette, 2004), powerful pecuniary incentives may be detrimental in that they reduce an individual's intrinsic motivation and interest in the task or job. As Deci and Ryan (1985) argue, this reduction occurs because when effort is exerted in exchange for pay, compensation becomes an aspect controlled by others that threatens the individual's need for self-determination. In the majority of cases, the



effects of extrinsic or pay-based motivators on intrinsic motivation are negative (Deci, Koestner, and Ryan, 1999; Gerhart and Rynes, 2003). This stream of research highlights the importance of distinguishing between extrinsic and intrinsic motivation, distinctions which are increasingly being incorporated into the personnel economics literature (Hamilton *et al.*, 2003; Bandiera *et al.*, 2005; Mas and Moretti, 2009).

An additional limitation of this work is that we ignore other psychological factors that can impact the role of employee compensation in firm strategy. Loss aversion, for example, could greatly impact the efficacy of individual pay-for-performance. Considerable work in psychology and behavioral decision research has shown that many individuals are asymmetrically loss averse, where losses are of greater impact than same-sized gains (Kahneman and Tversky, 1979; Tversky and Kahneman, 1991, 1992). These models present individuals as having psychologically important reference points, targeting income levels based on previous earnings, social expectations, cash-flow requirements, or arbitrary numbers. Workers below the target suffer tremendous losses from this sub-reference income, and will respond with increased effort (Camerer *et al.*, 1997; Fehr and Goette, 2007), misrepresentation of performance or gaming (Schweitzer, Ordóñez, and Douma, 2004), and increased risk taking. This loss-averse behavior could particularly hurt the firm when the income of the pay-for-performance worker depends on economic returns to the firm. Since such workers typically earn more when returns are high, the direct implication is that workers will put forth less effort when it is most beneficial to the firm and more effort when least beneficial (Koszegi and Rabin, 2009).

## CONCLUSION

Compensation is inherently strategic. Organizations use different compensation strategies and have discriminatory power in choosing their reward and pay policies (Gerhart and Milkovich, 1990). As the human resource and personnel economics literatures explain, these policies directly affect employee performance, but they are also highly complementary with the other activities of the firm. Compensation is not an isolated choice for the firm. It is inextricably linked to its technology,

marketing, operations, and financial decisions. Furthermore, in a world with imperfect information, differing risk attitudes and behavioral biases, achieving an efficient, 'first best' compensation scheme is impossible, thereby creating the opportunity for firms to gain strategic advantage through compensation strategies complementary to their market position. Given the important effects of compensation for both firm performance and employee behavior, it is important to understand what factors managers should consider when designing their firms' compensation systems and what elements should be in place for compensation systems to produce desirable worker behavior.

This paper proposed an integrated framework of strategic compensation drawing from both the economics and psychology literatures. The dominant theoretical perspective for the majority of studies of compensation has been the economics theory of agency (e.g., Jensen and Meckling, 1976; Holmstrom, 1979). Agency theory, with the later extensions of personnel economics, provides powerful insight into the strategic role of compensation by clearly defining the mechanisms that affect employee and firm performance, namely effort provision and sorting. In economic theory, the three observability problems of effort, skill, and output are key to the efficacy of compensation systems in incentivizing effort and sorting workers.

We argued that, while providing useful insights on how to design compensation systems, the economic perspective on strategic compensation captures only some of the factors that can affect compensation policy performance. We described an integrated theoretical framework that relies on the effort provision and sorting mechanisms of agency theory, but that introduces psychological factors largely neglected in economics. We focused on the psychology of information, specifically incorporating social comparison costs and overconfidence costs, and their effects on the performance and likely frequency of specific compensation strategies. We demonstrated that firms that account for these psychological costs will likely enact flatter compensation policies or else suffer costs of lower effort, lower ability, and sabotage in their workers. We believe our theoretical framework offers guidance on the main factors managers should consider when determining compensation strategy. At the same time, it offers guidance to researchers interested in advancing and deepening

our understanding of the economic and psychological foundations of strategic compensation.

## ACKNOWLEDGEMENTS

We thank Editor Will Mitchell, Todd Zenger, and three anonymous reviewers for insightful feedback on earlier versions of this paper, as well as the Harrington Foundation for its generous financial support.

## REFERENCES

- Adams JS. 1965. Inequity in social exchange. In *Advances in Experimental Social Psychology*, Berkowitz L (ed). Academic Press: New York; 267–299.
- Agell J, Lundborg P. 2003. Survey evidence on wage rigidity and unemployment: Sweden in the 1990s. *Scandinavian Journal of Economics* **105**(1): 15–29.
- Akerlof GA, Yellen JL. 1990. The fair-wage effort hypothesis and unemployment. *Quarterly Journal of Economics* **105**: 255–283.
- Baker GP. 1992. Incentive contracts and performance measurement. *Journal of Political Economy* **100**(3): 598–614.
- Baker GP, Jensen MC, Murphy KJ. 1988. Compensation and incentives: theory and practice. *Journal of Finance* **43**(3): 593–616.
- Balkin DB, Gomez-Mejia LR. 1990. Matching compensation and organizational strategies. *Strategic Management Journal* **11**(2): 153–169.
- Bandiera O, Barankay I, Rasul I. 2005. Social preferences and the response to incentives: evidence from personnel data. *Quarterly Journal of Economics* **120**: 917–962.
- Barber BM, Odean T. 2001. Boys will be boys: gender, overconfidence, and common stock investment. *Quarterly Journal of Economics* **116**(1): 261–292.
- Barr S. 2004. At FAA, some lingering discontent over pay system. *Washington Post*, 30 November. Metro; B02.
- Bartling B, von Siemens FA. 2010. The intensity of incentives in firms and markets: moral hazard with envious agents. *Labour Economics* **17**(3): 598–607.
- Bertrand M, Mullainathan S. 2004. Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *American Economic Review* **94**(4): 991–1013.
- Blinder AS, Choi DH. 1990. A shred of evidence on theories of wage stickiness. *Quarterly Journal of Economics* **105**: 1003–1015.
- Bloom M. 1999. The performance effects of pay dispersion on individuals and organizations. *Academy of Management Journal* **42**: 25–40.
- Bonin H, Dohmen T, Falk A, Huffman D, Sunde U. 2007. Cross-sectional earnings risk and occupational sorting: the role of risk attitudes. *Labour Economics* **14**: 926–937.
- Buehler R, Griffin D, Ross M. 1994. Exploring the ‘planning fallacy’: why people underestimate their task completion times. *Journal of Personality and Social Psychology* **67**: 366–381.
- Bureau of Labor Statistics. 2009. National Compensation Survey. <http://www.bls.gov/ceci/> (accessed 1 May 2011).
- Cable DM, Judge TA. 1994. Pay preferences and job search decisions: a person-organization fit perspective. *Personnel Psychology* **47**: 317–348.
- Camerer C. 2003. Strategizing in the brain. *Science* **300**: 1673–1675.
- Camerer C, Babcock L, Loewenstein G, Thaler R. 1997. Labor supply of New York City cabdrivers: one day at a time. *Quarterly Journal of Economics* **112**(2): 407–441.
- Camerer C, Loewenstein G, Rabin M. 2004. *Advances in Behavioral Economics*. Princeton University Press: Princeton, NJ.
- Camerer C, Lovo D. 1999. Overconfidence and excess entry: an experimental approach. *American Economic Review* **89**(1): 306–318.
- Campbell C, Kamlani K. 1990. The reasons for wage rigidity: evidence from a survey of firms. *Quarterly Journal of Economics* **112**: 759–789.
- Card D, Mas A, Moretti E, Saez E. 2012. Inequality at work: the effect of peer salaries on job satisfaction. *American Economic Review* **102**: forthcoming.
- Chan TY, Li J, Pierce L. 2012. Compensation and peer effects in competing sales teams. Working paper. Available at: Available at SSRN: <http://ssrn.com/abstract=1367441> or <http://dx.doi.org/10.2139/ssrn.1367441>.
- Christensen-Szalanski JJ, Bushyhead JB. 1981. Physicians’ use of probabilistic information in a real clinical setting. *Journal of Experimental Psychology: Human Perception and Performance* **7**(4): 928–935.
- Cohn A, Fehr E, Herrmann B, Schneider F. 2012. *Social comparison and effort provision: evidence from a field experiment*. IZA Discussion Paper No. 5550. Institute for the Study of Labor: Bonn, Germany.
- Cropanzano R, Rupp DE, Byrne ZS. 2003. The relationship of emotional exhaustion to work attitudes, job performance, and organizational citizenship behaviors. *Journal of Applied Psychology* **88**(1): 160–169.
- Dahl M. 2011. Organizational change and employee stress. *Management Science* **57**(2): 240–256.
- Dalton DR, Hitt MA, Certo ST, Dalton C. 2007. The fundamental agency problem and its mitigation: independence, equity, and the market for corporate control. *Academy of Management Annals* **1**: 1–65.
- Dartnell Corp. 2009. *Dartnell’s 30<sup>th</sup> Sales Force Compensation Survey*. Dartnell Corporation: Chicago, IL.
- Deci E. 1971. Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology* **18**: 105–115.
- Deci EL, Koestner R, Ryan RM. 1999. A meta-analytic review of experiments examining the

- effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin* **125**: 627–668.
- Deci EL, Ryan RM. 1985. *Intrinsic Motivation and Self-Determination in Human Behavior*. Plenum: New York.
- DiPrete TA, Eirich GM, Pittinsky M. 2008. Compensation benchmarking, leapfrogs, and the surge in executive pay. *American Journal of Sociology* **115**(6): 1671–1712.
- Dunning D, Griffin DW, Milojkovic J D, Ross L. 1990. The overconfidence effect in social prediction. *Journal of Personality and Social Psychology* **58**: 568–581.
- Dushnitsky G, Shapira ZB. 2010. Entrepreneurial finance meets corporate reality: comparing investment practices and performance of corporate and independent venture capitalists. *Strategic Management Journal* **31**(9): 990–1017.
- Edelman B, Larkin I. 2009. *Demographics, career concerns or social comparison: who games SSRN download counts*. HBS Working paper no. 09–096. Harvard Business School: Boston, MA.
- Englmaier F. 2010. Managerial optimism and investment choice. *Managerial and Decision Economics* **31**(4): 303–310.
- Faulkender MW, Yang J. 2010. Inside the black box: the role and composition of compensation peer groups. *Journal of Finance Economics* **96**(2): 257–270.
- Fehr E, Gächter S. 2000. Cooperation and punishment in public goods experiments. *American Economic Review* **90**: 980–994.
- Fehr E, Goette L. 2007. Do workers work more if wages are high? Evidence from a randomized field experiment. *American Economic Review* **97**(1): 298–317.
- Fehr E, Schmidt K. 1999. A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics* **114**: 817–868.
- Festinger L. 1954. A theory of social comparison processes. *Human Relations* **7**(2): 117–140.
- Frey B, Meier S. 2004. Social comparison and pro-social behavior: testing conditional cooperation in a field experiment. *American Economic Review* **94**: 1717–1722.
- Gächter S, Nosenzo D, Sefton M. 2012. The impact of social comparisons on reciprocity. *Scandinavian Journal of Economics*, forthcoming.
- Galasso A, Simcoe TS. 2011. CEO overconfidence and innovation. *Management Science* **57**(8): 1469–1484.
- Gerhart BA, Milkovich GT. 1990. Organizational differences in managerial compensation and financial performance. *Academy of Management Journal* **33**(4): 663–692.
- Gerhart B, Rynes S. 2003. *Compensation: Theory, Evidence, and Strategic Implications*. Sage: Thousand Oaks, CA.
- Gerhart B, Rynes S, Fulmer IS. 2009. Pay and performance: individuals, groups, and executives. *Academy of Management Annals* **3**: 251–315.
- Gino F, Pierce L. 2009. Dishonesty in the name of equity. *Psychological Science* **20**(9): 1153–1160.
- Gino F, Pierce L. 2010a. Robin Hood under the hood: wealth-based discrimination in illicit customer help. *Organization Science* **21**(6): 1176–1194.
- Gino F, Pierce L. 2010b. Lying to level the playing field: why people may dishonestly help or hurt others to restore equity. *Journal of Business Ethics* **95**(1): 89–103.
- Gladwell M. 2009. Cocksure: banks, battles, and the psychology of overconfidence. *New Yorker* 27 July: 24.
- Goel AM, Thakor AV. 2008. Overconfidence, CEO selection, and corporate governance. *Journal of Finance* **63**: 2737–2784.
- Gomez-Mejia LR. 1992. Structure and process of diversification, compensation strategy, and firm performance. *Strategic Management Journal* **13**(5): 381–397.
- Gomez-Mejia LR, Balkin DB. 1992. *Compensation, Organizational Strategy and Firm Performance*. Southwestern: Cincinnati, OH.
- Greenberg J. 1988. Equity and workplace status: a field experiment. *Journal of Applied Psychology* **73**: 606–613.
- Hamilton BH, Nickerson JA, Owan H. 2003. Team incentives and worker heterogeneity: an empirical analysis of the impact of teams on productivity and participation. *Journal of Political Economy* **111**(3): 465–497.
- Holmstrom B. 1979. Moral hazard and observability. *Bell Journal of Economics* **10**: 74–91.
- Hossain T, List J. 2012. The behavioralist visits the factory: increasing productivity using simple framing manipulations. *Management Science* **58**: forthcoming.
- Jensen MC, Meckling W. 1976. Theory of the firm: managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics* **11**(4): 5–50.
- Jurgensen CE. 1978. Job preferences (what makes a job good or bad?) *Journal of Applied Psychology* **63**: 267–76.
- Kahneman D, Tversky A. 1979. Prospect theory: an analysis of decision under risk. *Econometrica* **47**(2): 263–292.
- Kelly Services. 2010. *Performance pay and profit sharing entice high-performance workers*. Kelly Global Workforce Index. Kelly Services: Troy, MI.
- Kerr S. 1975. On the folly of rewarding A, while hoping for B. *Academy of Management Journal* **18**(4): 769–783.
- Kim TY, Weber TJ, Leung K, Muramoto Y. 2009. Perceived fairness of pay: the importance of task versus maintenance inputs in Japan, South Korea, and Hong Kong. *Management and Organization Review* **6**(1): 31–54.
- Kole SR, Lehn K. 2000. Workforce integration and the dissipation of value in mergers: the case of USAir's acquisition of Piedmont Aviation. In *Mergers and Productivity*, Kaplan S (ed.) University of Chicago Press: Chicago, IL; 239–279.
- Koszegi B, Rabin M. 2009. Reference-dependent consumption plans. *American Economic Review* **99**(3): 909–936.

- Kwon I, Meyersson-Milgrom E. 2009. Status, relative pay, and wage growth: evidence from M&A. Working paper. Stanford University, Stanford, CA.
- Larkin I. 2007. The cost of high-powered incentives: employee gaming in enterprise software sales. HBS Working Paper. Harvard Business School, Boston, MA.
- Larkin I. 2008. Bargains-then-ripoffs: innovation, pricing and lock-in in enterprise software. *Best Paper Proceedings of the Academy of Management Meeting*, Anaheim, CA.
- Larkin I. 2012. Paying \$30000 for a gold star: an empirical investigation into the value of peer recognition to software salespeople. HBS Working Paper. Harvard Business School, Boston, MA.
- Larkin I, Leider S. 2012. Incentive schemes, sorting and behavioral biases of employees: experimental evidence. *American Economic Journal: Microeconomics* 4(2).
- Lavy V. 2009. Performance pay and teachers' effort, productivity, and grading ethics. *American Economic Review* 99(5): 1979–2011.
- Lawler EE III. 1965. Managers' perceptions of their subordinates' pay and of their superiors' pay. *Personnel Psychology* 18(4): 413–422.
- Lawler EE III. 2003. Pay practices in Fortune 1000 corporations. *WorldatWork Journal* 12(4): 45–54.
- Lazear EP. 1986. Salaries and piece rates. *Journal of Business* 59(3): 405–431.
- Lazear EP, Oyer P. 2011. Personnel economics: hiring and incentives. In *Handbook of Labor Economics (Volume 4B)*, Ashenfelter O, Card D (eds). North Holland: Oxford, UK; 1769–1823.
- Malmendier U, Tate G. 2005. CEO overconfidence and corporate investment. *Journal of Finance* 60: 2660–2700.
- Mas A. 2008. Labor unrest and the quality of production: evidence from the construction equipment resale market. *Review of Economic Studies* 75: 229–258.
- Mas A, Moretti E. 2009. Peers at work. *American Economic Review* 99(1): 112–145.
- Milkovich GT, Anderson PH. 1972. Management compensation and secrecy policies. *Personnel Psychology* 25(2): 293–302.
- Moore DA. 2007. Not so above average after all: when people believe they are worse than average and its implications for theories of bias in social comparison. *Organizational Behavior and Human Decision Processes* 102(1): 42–58.
- Moore DA, Healy PJ. 2008. The trouble with overconfidence. *Psychological Review* 115(2): 502–517.
- Moore DA, Kim TG. 2003. Myopic social prediction and the solo comparison effect. *Journal of Personality and Social Psychology* 85(6): 1121–1135.
- Nelson RR. 1991. Why do firms differ, and how does it matter? *Strategic Management Journal*, Winter Special Issue 12: 61–74.
- Nickerson JA, Zenger TR. 2008. Envy, comparison costs, and the economic theory of the firm. *Strategic Management Journal* 29(13): 1429–1449.
- Nosenzo D. 2010. The impact of pay comparisons on effort behavior. CeDEX Discussion paper n.2010-03, Centre for Decision Research and Experimental Economics at the University of Nottingham, Nottingham, U.K.
- Oliver RL, Swan JE. 1989. Consumer perceptions of interpersonal equity in transactions: a field survey approach. *Journal of Marketing* 53(2): 21–35.
- Oyer P. 1998. Fiscal year ends and non-linear incentive contracts: the effect on business seasonality. *Quarterly Journal of Economics* 113: 149–185.
- Paarsch H, Shearer B. 2000. Piece rates, fixed wages, and incentive effects: statistical evidence from payroll records. *International Economic Review* 41: 59–92.
- Porter M. 1996. What is strategy? *Harvard Business Review* 74(6): 61–78.
- Prendergast C. 1999. The provision of incentives in firms. *Journal of Economic Literature* 37(1): 7–63.
- Pruitt DG, Kimmel M J. 1977. Twenty years of experimental gaming: critique, synthesis, and suggestions for the future. *Annual Review of Psychology* 28: 363–392.
- Rabin M. 1996. Daniel Kahneman and Amos Tversky. In *American Economists of the Late Twentieth Century*, Samuels WJ (ed). Edward Elgar: Cheltenham, UK; 111–137.
- Rumelt RP, Schendel DE, Teece DJ. 1994. *Fundamental Issues in Strategy: A Research Agenda*. Harvard Business School Press: Boston, MA.
- Russo J E, Schoemaker PJH. 1991. *Decision Traps*. Simon & Schuster: New York.
- Rynes SL, Gerhart B, Minette KA. 2004. The importance of pay in employee motivation: what people say and what they do. *Human Resource Management* 43(4): 381–394.
- Schwarzwald J, Koslowsky M., Shalit B. 1992. A field study of employees' attitudes and behaviors after promotion decisions. *Journal of Applied Psychology* 77: 511–514.
- Schweitzer ME, Ordóñez L, Douma B. 2004. Goal setting as a motivator of unethical behavior. *Academy of Management Journal* 47(3): 422–432.
- Siegel P, Schraeder M, Morrison R. 2008. A taxonomy of equity factors. *Journal of Applied Social Psychology* 38(1): 61–75.
- Sink E. 2006. *Eric Sink on the Business of Software*. Apress: New York.
- Solow RM. 1979. Another possible source of wage stickiness. *Journal of Macroeconomics* 1(1): 79–82.
- Svenson O. 1981. Are we all less risky and more skillful than our fellow drivers? *Acta Psychologica* 47: 143–48.
- Taylor SE, Brown JD. 1988. Illusion and well-being: a social psychological perspective on mental health. *Psychological Bulletin* 103: 193–210.
- Tversky A, Kahneman D. 1991. Loss aversion in riskless choice: a reference dependent model. *Quarterly Journal of Economics* 106: 1039–1061.
- Tversky A, Kahneman D. 1992. Advances in prospect theory: cumulative representation of uncertainty. *Journal of Risk and Uncertainty* 5(4): 297–323.
- Vallone RP, Griffin DW, Lin S, Ross L. 1990. Overconfident prediction of future actions and outcomes by self and others. *Journal of Personality and Social Psychology* 58: 568–581.

- Van den Steen E. 2005. Organizational beliefs and managerial vision. *Journal of Law, Economics, and Organization* **21**(1): 256–282.
- VanDermey A. 2009. MBA pay: riches for some, not all. *Bloomberg Business Week*, 28 September.
- Wee G. 2010. Harvard endowment chief Mendillo paid almost \$1 million in 2008. *Business Week*, 18 May.
- Weinstein ND. 1980. Unrealistic optimism about future life events. *Journal of Personality and Social Psychology* **39**: 806–820.
- Whittlesey F. 2006. The great overpaid CEO debate. *CNET News*, 1 June.
- Williamson OE. 1985. *The Economic Institutions of Capitalism*. Free Press: New York.
- Wowak AJ, Hambrick DC. 2010. A model of person-pay interaction: how executives vary in their responses to compensation arrangements. *Strategic Management Journal* **31**(8): 803–821.
- Young V. 2010. Missouri pension system to stop giving bonuses. *St. Louis Post Dispatch*, 22 January.
- Zenger TR. 1992. Why do employers only reward extreme performance? Examining the relationship among performance pay and turnover. *Administrative Science Quarterly* **37**: 198–219.
- Zenger TR, Hesterly WS. 1997. The disaggregation of corporations: selective intervention, high-powered incentives, and molecular units. *Organization Science* **8**(3): 209–222.