

A MODEL OF PERSON-PAY INTERACTION: HOW EXECUTIVES VARY IN THEIR RESPONSES TO COMPENSATION ARRANGEMENTS

ADAM J. WOWAK* and DONALD C. HAMBRICK

Smeal College of Business, The Pennsylvania State University, University Park, Pennsylvania, U.S.A.

A wealth of research indicates that both executive characteristics and incentive compensation affect organizational outcomes, but the literatures within these two domains have followed distinct, separate paths. Our paper provides a framework for integrating these two perspectives. We introduce a new model that specifies how executive characteristics and incentives operate in tandem to influence strategic decisions and firm performance. We then illustrate our model by portraying how executive characteristics interact with a specific type of pay instrument—stock options—to affect executive behaviors and organizational outcomes. Focusing on three individual-level attributes (executive motives and drives, cognitive frame, and self-confidence), we develop propositions detailing how executives will vary in their risk-taking behaviors in response to stock options. We further argue that stock options will amplify the implications of executive ability, such that option-heavy incentive schemes will increase the performance of talented executives but worsen the performance of low-ability executives. Our framework and propositions are meant to provide a starting point for future theorizing and empirical testing of the interactive effects of executive characteristics and incentive compensation on strategic decisions and organizational performance. Copyright © 2010 John Wiley & Sons, Ltd.

INTRODUCTION

Scholars in an array of disciplines have long been interested in understanding how compensation arrangements affect the behaviors of top executives (summarized in Finkelstein, Hambrick, and Cannella, 2009). Since Larcker's (1983) early investigation showed that the introduction of long-term incentive plans was associated with increases in investment outlays, numerous studies have

examined the consequences of executive pay arrangements. Resulting evidence indicates that pay schemes do indeed affect executive actions and organizational outcomes, but also that the relationships can be described—at best—as weak (Devers *et al.*, 2008). Moreover, research has shown that some types of pay plans can yield harmful effects, rather than the beneficial results envisioned by their proponents (e.g., Harris and Bromiley, 2007). In short, the effects of compensation arrangements are not very predictable, and at times are exactly the opposite of their intended purpose.

Researchers have documented many reasons why compensation schemes often fail to achieve their envisioned effects: mismatches between pay design and company strategy (Balkin and Gomez-Mejia, 1990), between pay design and industry characteristics (Hoskisson, Hitt, and Hill, 1993), and between pay design and other administrative

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* Correspondence to: Adam J. Wowak, Smeal College of Business, The Pennsylvania State University, 416A Business Building, University Park, PA 16802, U.S.A.

E-mail: ajw153@psu.edu

[Correction added after online publication 1/30/10: The Brickley *et al.* (1997) reference, cited on page 7, was listed incorrectly in the References section. This has been corrected. The authors apologize for this error.]

systems (Shaw, Gupta, and Delery, 2002). These studies underscore the premise that pay cannot be studied in isolation and that accompanying factors play major roles in influencing executive responses to pay. Missing from all of this discourse, though, has been attention to what may prove to be the most potent explanation for the widely varying outcomes from compensation arrangements: differences among executives.

With rare exceptions, which we will discuss, the literature on executive compensation has ignored the role that individual differences play in shaping, or moderating, the effects of pay arrangements on organizational outcomes. An abundance of research, however, indicates that top executives vary substantially in their personal characteristics in ways that affect their perceptions, motives, and actions. For example, managers vary in their personalities (Peterson *et al.*, 2003), values (Agle, Mitchell, and Sonnenfeld, 1999), experiences (Bigley and Wiersema, 2002), and abilities (Palia, 2000). Any of these domains of individual differences could contribute to substantial variation in how executives respond to compensation arrangements, as well as to marked differences in the efficacy of those responses.

Consider several illustrative types of interactive effects between executive characteristics and incentives. An individual's attributes could dampen the intended effects of incentives, as when an executive has strong values that are at odds with the actions that incentives are meant to engender. Conversely, an executive's characteristics and pay arrangements might be highly symbiotic, such that in tandem they elicit more of the hoped-for outcomes than would have occurred without such a complementarity. Or, the combination of personal attributes and incentives might lead to extreme but unfortunate outcomes, as when an executive who is not very talented takes aggressive risks in response to incentives. Researchers have long emphasized the importance of alignment among the environment, strategy, and executive characteristics (Finkelstein and Hambrick, 1996; Lawrence and Lorsch, 1967), but the idea of fit, or misfit, between executive characteristics and incentive arrangements has received little attention.

Our paper establishes a theoretical platform that we hope will stimulate and orient new attention to the interactive effects of executive characteristics and pay design. The paper has two parts. First, we develop a general model of how

executive characteristics work in tandem with compensation arrangements to affect executive behaviors and organizational outcomes. In constructing this model, we build on the limited, fragmentary research that has addressed person-pay interactions; additionally, we draw from the logic of expectancy theory (Vroom, 1964) and upper echelons theory (Hambrick and Mason, 1984) to develop our line of thought.

Second, we illustrate our model by portraying how chief executive officer (CEO) characteristics interact with a specific type of pay instrument—stock options—to affect CEO behaviors and organizational outcomes.¹ Research has shown that stock options influence executive behaviors, but also that the explained variance is modest; moreover, the effects of options are not necessarily beneficial (e.g., Sanders and Hambrick, 2007). We construct tangible propositions about how executive attributes interact with stock option pay to affect risk taking and subsequent performance, thereby illustrating the logic of our general model in a concrete context.

For the sake of focus and clarity, we limit our attention only to the uppermost level of organizations, specifically top executives. Compared to other organizational members, the behaviors of top managers are not programmable or easily monitored, and therefore outcome-based incentives are often used to stimulate and direct their actions. More importantly, the effects of managerial actions are typically only apparent after the passage of time. This characteristic of executive work is pivotal to our argument, because it means that executives can be stimulated to take actions, including aggressive strategic initiatives, without any immediate indication of the results that will follow.

Our paper makes several contributions, most notably in integrating disparate streams of research in the upper echelons and executive compensation areas. In presenting our model, we develop new insight into the complex relationships among executives, incentives, and organizational outcomes. Accordingly, we hope to open a new pathway for improving predictions about the effects of executive pay arrangements.

¹ We alternate between the terms 'executives' and 'CEOs.' Our theory applies to executives in general, but CEOs represent the potentially most compelling cases for illustrating our arguments.

BACKGROUND ON PERSON-PAY INTERACTION

Strategic management researchers have considered an array of ideas about executive-context fit (summarized in Finkelstein *et al.*, 2009). Similarly, compensation scholars have adopted contingency perspectives on pay, considering such moderators as organizational life cycle stage (Balkin and Gomez-Mejia, 1987), company strategy (Balkin and Gomez-Mejia, 1990), and managerial discretion (Finkelstein and Boyd, 1998). Within these broad arenas, however, there has been little attention paid to the interactive effects of an executive's characteristics and pay arrangements on behaviors or organizational outcomes.

A few fragmentary pieces of evidence point to the promise of considering the interactive effects of individual characteristics and incentive arrangements. From the micro perspective, experimental studies indicate that individuals vary in their preferences and performance under different types of pay arrangements. Cable and Judge (1994) found that risk-averse individuals preferred salary over contingent plans (even when the contingent plans provided considerably higher upside pay potential). Similarly, Cadsby, Song, and Tapon (2007) found that risk-averse individuals were relatively unresponsive when forced to operate under incentive plans. In field research, Deckop, Merriman, and Blau (2004) showed that consistency between an individual's degree of preference for variable pay and the actual presence (or absence) of such a pay policy was positively associated with the individual's organizational citizenship behaviors. And Pappas and Flaherty (2006) found that individual differences among salespeople affected attitudes toward pay arrangements, specifically the extent to which the salespeople believed that their efforts would lead to rewards.

At the more macro level, Sanders (2001) found that CEO tenure mitigated the link between stock option pay and firm acquisition and diversification activity. He concluded that the risk-inducing effects of stock options were reduced by the risk-dampening effects of CEO tenure. Relatedly, in a study of strategic adaptation following deregulation of the airline industry, Cho and Hambrick (2006) found that both changes in the composition of top management teams (TMTs) and increased use of incentive pay for executives were associated with subsequent strategic change. But there was

a further interactive effect: when TMT composition changed *and* there was an increased emphasis on performance-based pay, the resulting change in strategy was greater than occurred through the additive effects of the two elements alone.

Thus, studies from both micro and macro perspectives indicate considerable promise in a new emphasis on the interactive effects of individual characteristics and pay plans. Lacking, however, has been a comprehensive model detailing how these combined influences might affect executive behaviors and performance.

GENERAL MODEL OF PERSON-PAY INTERACTION

Executive pay arrangements, which can be considered in terms of the amounts, specific instruments (e.g., salary, bonus, etc.), and mix of instruments (Finkelstein and Hambrick, 1988), are thought to exert two main types of influence, known as 'sorting' and 'incentive' effects (Gerhart and Rynes, 2003). The sorting effect, which we discuss below, refers to the tendency for executives to be drawn to specific types of pay packages while avoiding others. The incentive effect, which is our primary focus, refers to the ways in which pay arrangements influence the task behaviors of incumbent executives. According to agency theory, executives who are paid 'like bureaucrats' (i.e., primarily salary) will shirk, avoid risks, and take the short-term view (Jensen and Meckling, 1976). The ideal executive pay package, then, will stimulate extraordinary effort, encourage aggressive but prudent risk taking, and promote a long-term horizon. These behaviors, in turn, will influence company performance. This straightforward logic—pay arrangements affect executive behaviors, which in turn affect performance—is shown across the top of our model presented in Figure 1.

As noted earlier, however, the associations among pay arrangements, executive behaviors, and performance have proven to be modest in empirical studies. As a result, researchers have added an array of contextual considerations to explain how executive compensation affects company outcomes (e.g., Balkin and Gomez-Mejia, 1990). We acknowledge the importance of these factors, but for the sake of clarity and focus we hold them outside our scope. Instead, we devote our attention to

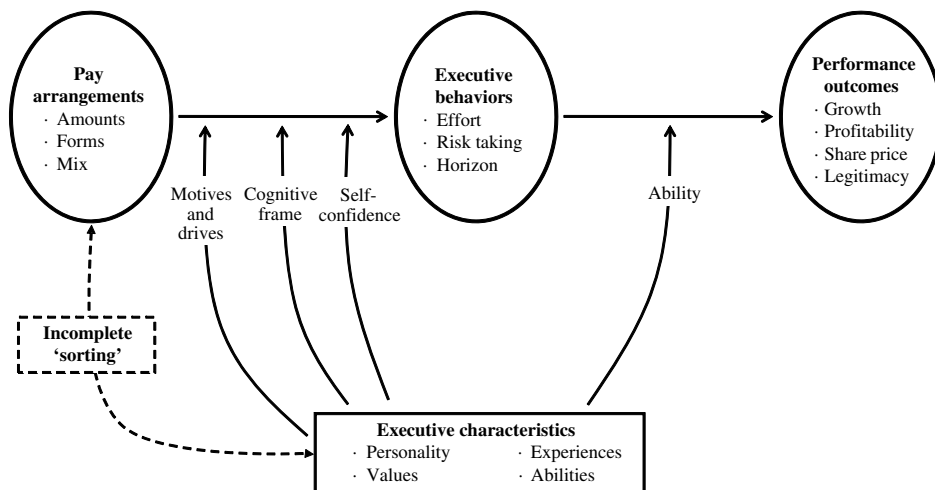


Figure 1. A model of person-pay interaction, as applied to top executives

a relatively overlooked factor that may substantially strengthen predictions about the effects of executive pay arrangements: the varying characteristics of the executives themselves.

Among the many personal attributes that might shape executive responses to incentives, how do we specify those that matter the most? Expectancy theory, an enduring and widely recognized perspective on motivation, provides us some guidance (Vroom, 1964). Additionally, upper echelons theory, the perspective that executive attributes become reflected in organizational outcomes (Hambrick and Mason, 1984), further supplements our thinking. Specifically, as we justify below, the most potent personal factors that moderate, or shape, the effects of pay arrangements are the executive's: 1) motives and drives, 2) cognitive frame, 3) self-confidence, and 4) ability (as shown in Figure 1).

These individual characteristics emanate from an array of more general attributes, such as personality, values, experiences, and abilities (at the bottom of Figure 1). For instance, an executive's self-confidence might stem from personality (e.g., locus of control) and from experiences (sense of mastery of a task or condition); similarly, an executive's motives and drives—what the person most wants and fears—could arise from several of the underlying categories, including values, personality, and experiences. These underlying attributes include relatively enduring traits (e.g., values) and more conditional attributes (e.g., age). As such, we are not asserting that only stable dispositions are

relevant to our theory. Indeed, some of the most important implications may arise when an executive's characteristics change over time.

Incomplete sorting

For our interactionist logic to be valid, various combinations of executive characteristics and compensation arrangements must exist on the business scene. If top managers gravitate to companies that offer pay plans exactly matching their personal preferences and dispositions, or if incumbent executives are readily able to reengineer their pay arrangements to perfectly match their preferences, then the two constructs covary to a degree that eliminates any variance. Therefore, it is important to address the 'sorting effect,' or the tendency for individuals to be drawn to pay plans that suit them (Gerhart and Rynes, 2003).

We acknowledge that some amount of sorting does occur. Individuals consider pay arrangements when deciding whether to accept a job, and incumbent executives (particularly CEOs) can use various tactics to persuade boards to modify their pay plans (e.g., Westphal, 1998). But there is ample reason to believe that such co-alignment is far from complete, as we indicate by the dashed line in Figure 1. As preliminary evidence, we would point to the considerable variance in person-pay combinations that were observed in the field studies (Deckop *et al.*, 2004; Pappas and Flaherty, 2006) and archival studies (Cho and Hambrick, 2006; Sanders, 2001) noted earlier.

We envision that variance in person-pay combinations occurs primarily through redesign of pay plans for incumbent executives. For example, boards might revise pay arrangements for executives simply because other companies are doing so, in a form of herd behavior (Abrahamson, 1991). Boards may install new incentives for incumbent executives following poor performance in the hopes of motivating major change (Carpenter, 2000). Moreover, when industry deregulation occurs, many incumbent managers remain in their jobs, but typically under modified compensation plans (Rajagopalan and Finkelstein, 1992). The same is likely to occur under other instances of major changes in managerial discretion or job complexity, as when a state-owned enterprise is privatized or a major technological shift alters an organization's environment. Under these and many other instances, pay arrangements may be revised for a given executive (or set of executives); when this occurs, we can logically assume that person-pay alignment might have been present either *before* or *after* the pay change, but not *both*.

To demonstrate that incumbent CEOs often experience major changes in their pay arrangements, we conducted a limited empirical analysis. Using the Execucomp database, which provides executive pay data on major public firms, we examined the degree of within-tenure consistency in one specific pay element, stock options, which constitute the single largest component of CEO pay in the United States (Sanders and Hambrick, 2007). For a sample of 167 CEOs who started their tenures in 1993 or later and who served for at least eight years (to allow an extended examination of their pay), we calculated the proportion of each CEO's total pay that comprised stock options (*ex ante* value, using Black-Scholes) during the first two years of tenure, and then compared this initial proportion to the same proportion over subsequent two-year periods for each CEO. (We used two-year totals because companies sometimes grant options in two-year cycles rather than uniformly every year.)

As Figure 2 indicates, the correspondence between initial use and subsequent use of stock option pay (as a proportion of CEO total annual pay) was only partial, and it predictably diminished over time. Even in years three and four, a number of CEOs received stock option pay that bore little correspondence to their initial arrangements (as shown in Figure 2a). By years seven

and eight, stock option pay for individual CEOs, in general, bore only a faint resemblance to initial levels (as shown in Figure 2c). While this is a limited analysis, it supports our assertion that pay arrangements for individual CEOs can change dramatically during their tenures, thus giving rise to an array of combinations of pay arrangements and executive characteristics on the contemporary business landscape.

Another necessary condition for our theorizing is that CEO pay designs must be heterogeneous enough within industries as to preclude a widespread, or consensual, understanding of 'pay conventions'; if all companies in an industry pay similarly, executives will have great clarity about whether they wish to work in that industry, and sorting will be enhanced. As a way to demonstrate that considerable within-industry heterogeneity exists, we used Execucomp data to examine CEO pay arrangements in nine distinct industry sectors (those two-digit Global Industry Classification Standard [GICS] codes with a minimum of 50 firms) for CEOs who held office during the period 2003 to 2005.

As our results in Table 1 show, CEO pay packages varied widely, even within industry sectors. In the financial sector, for example, stock option pay averaged 23.2 percent of total compensation and had a standard deviation of 20.9 percent. To give this indication of variance more meaning, consider the following: 20 percent of all CEOs in this sector received zero stock options over these three years; 38 percent received between 1–25 percent of their pay in options; 31 percent received between 26–50 percent of their pay in options; and the remaining 11 percent received more than half of their pay in the form of options. This considerable heterogeneity, coupled with the above evidence that pay packages often change dramatically during a given CEO's tenure, suggests that CEO pay arrangements are sufficiently varied and dynamic as to thwart efficient sorting. Thus, we anticipate that diverse combinations of executive characteristics and pay arrangements exist, and therefore our model of person-pay interaction—which we now develop in detail—is justified.

Motives and drives

Executives differ in what they most want and fear (summarized in Finkelstein *et al.*, 2009). These differences in motives especially pertain to the

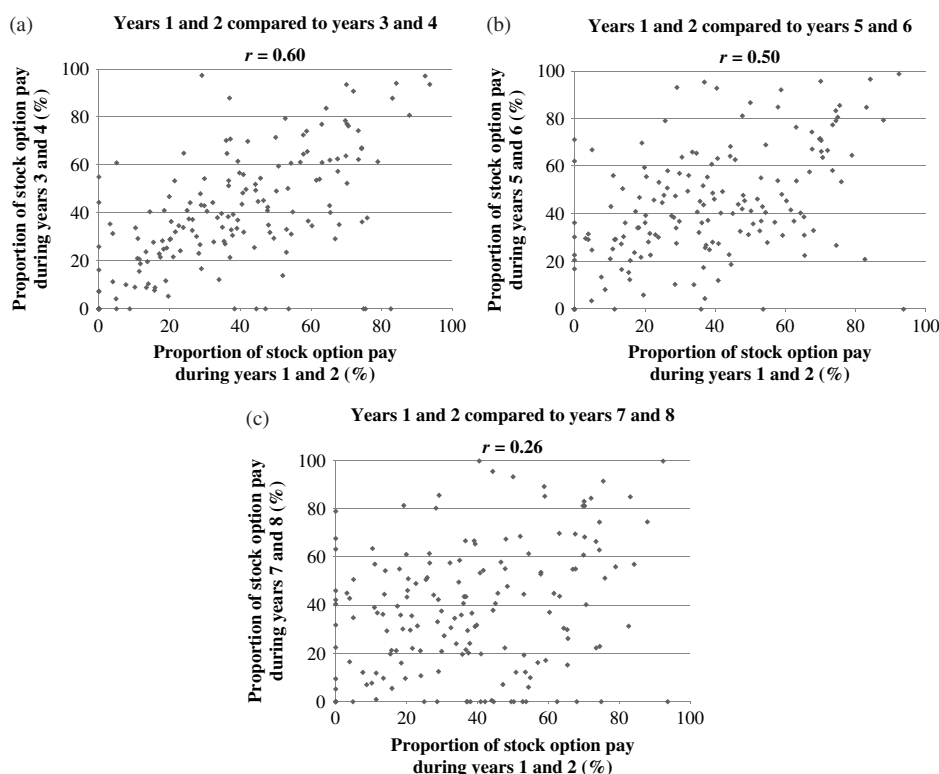


Figure 2. Within-tenure variation in CEO stock option pay for sample of 167 CEOs serving a minimum of 8 years

types of outcomes that executives seek (e.g., money, acclaim, security, etc.), which expectancy theorists refer to as 'valences.' An individual with a high valence for a particular outcome is more likely to take actions to attain it. Beyond having motives for certain types of outcomes, individuals also have drives for certain types of behaviors or decision styles (e.g., novelty, deliberateness) (Rokeach, 1973).

An executive's motives stem from multiple personal factors noted at the bottom of Figure 1, including one's values, personality, and experiences. Values are relatively enduring preferences for certain states of affairs over others (Hofstede, 1980). They are inculcated by family, community, religion, and nation-state (England, 1967); by adulthood, values are relatively set and not subject to major change (Rokeach, 1973). Examples of values that might regulate an executive's response to pay arrangements include materialism, uncertainty avoidance, and collectivism. Such values could greatly influence an executive's valences for various outcomes (e.g., maximizing personal income, protecting employee interests, etc.).

Motives also stem from personal attributes other than values. For instance, theorists have shown that many personality traits have motivational features, causing individuals to greatly prefer some outcomes and behaviors over others (Barrick, Stewart, and Piotrowski, 2002). Thus, a person's degree of conscientiousness or need for achievement might affect responses to pay plans (cf. Judge and Ilies, 2002). More transitory personal factors, such as one's age or tenure, also can give rise to certain motives in ways that affect an executive's response to a pay scheme (MacCrimmon and Wehrung, 1990), as Hambrick and Snow (1989) suggested in their distinction between the motives of 'emergent' and 'established' general managers.

As a result of differing motives, executives will vary in their responses to incentive arrangements. In some cases, personal motives might affect simply the *strength* of the relationship between pay plans and executive behaviors. Alternatively, personal motives might alter the basic *form* of the relationship between pay arrangements and executive actions (cf. Venkatraman, 1989). Let us briefly consider the latter possibility.

Table 1. Evidence of variety in CEO pay packages, by industry sector for 2003–2005^{(a)(b)}

Pay component	Energy		Materials		Industrials		Consumer discretionary		Consumer staples		Healthcare		Financials		Information technology		Utilities	
	Mean (%)	SD (%)	Mean (%)	SD (%)	Mean (%)	SD (%)	Mean (%)	SD (%)	Mean (%)	SD (%)	Mean (%)	SD (%)	Mean (%)	SD (%)	Mean (%)	SD (%)	Mean (%)	SD (%)
Salary	19.3	14.3	28.2	15.5	28.9	19.4	26.8	19.0	23.5	19.0	23.5	17.3	23.3	16.4	24.8	19.9	31.8	19.0
Bonus	20.5	11.2	22.9	12.3	23.3	15.8	21.6	17.1	21.8	14.2	15.9	10.4	24.9	16.2	14.1	10.1	22.1	10.1
Stock options	26.9	21.8	23.6	16.6	23.8	19.4	32.2	22.8	27.6	20.8	46.1	22.2	23.2	20.9	50.5	25.5	13.0	13.4
Restricted stock	21.0	19.6	13.8	14.3	14.4	16.9	10.3	15.0	17.9	18.4	8.7	14.0	16.9	21.2	7.6	14.5	13.0	16.6
LTP	8.2	17.5	6.0	11.6	5.3	11.8	3.0	8.8	3.8	8.4	1.7	6.3	5.5	12.9	0.4	2.6	14.1	17.6
Other income	4.1	8.5	5.5	8.6	4.3	7.4	5.9	10.7	5.5	7.3	4.0	6.8	6.1	12.6	2.6	5.2	6.1	9.0
Total	100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0	
Companies	62		77		179		215		53		128		165		211		59	

^(a) Three-year means and standard deviations shown.

^(b) Mean pay component percentages may not sum to exactly 100% because of rounding.

At one extreme, there may be some executives whose personal motives are at odds with the intended purposes of incentive arrangements, and hence who do not respond as hoped for. These might include, for instance, executives who value security over money, those who value their employees' welfare over money, or those who are extremely averse to large losses. At the other end of the spectrum are those executives whose personal drives propel them to engage in exactly the behaviors that a given incentive plan is meant to stimulate, but who would do so with or without the incentives. For these executives, the incentives are largely redundant. In this category, we can envision executives who have very strong need for achievement or conscientiousness, and who, hence, would exert themselves fully—rather than shirk—regardless of compensation arrangements (Finkelstein and Hambrick, 1988). Similarly, incentives might be redundant for executives whose personalities drive them to take risks (e.g., MacCrimmon and Wehrung, 1990) or engage in bold actions (e.g., Chatterjee and Hambrick, 2007).

Under this logic, then, incentive arrangements will have their biggest effect on those executives 'in the middle,' who have moderate or malleable motives. Executives whose preexisting, intrinsic drives are neutral rather than extreme, or flexible rather than firm, will be most susceptible to the influence of extrinsic incentives; these individuals will be most likely to alter their behaviors upon the injection of incentive inducements.

In this vein, it is important to note that agency theorists, and economists more broadly, have customarily avoided paying much attention to individual preferences. Brickley, Smith, and Zimmerman explain this reluctance:

[T]he usefulness of focusing on personal preferences is often limited. Preferences are generally not observable, and virtually anything can be explained as a matter of tastes. . . The focus [should be] on aggregate behavior or what the typical person tends to do. . . (Brickley *et al.*, 1997: 27)

Such a view would have us ignore constructs that cannot be easily measured, no matter how important they are to understanding human behavior. It would also have us assume homogeneity of human attributes, rather than the heterogeneity that has been well documented in management and

psychology research. Recently, economists have become more interested in examining executive attributes and their effects on firm outcomes (e.g., Malmendier and Tate, 2005).

Cognitive frame

Since the seminal work by Carnegie School theorists (Cyert and March, 1963; March and Simon, 1958), research has shown that managerial cognition affects strategic decision making and organizational outcomes (e.g., Stephan *et al.*, 2003). Although much of the work on managerial cognition addresses general human tendencies (e.g., Salancik and Meindl, 1984), scholars have also examined how managers differ in their cognitive processes. For example, research has shown that executives vary in their interpretations of industry conditions (Lant, Milliken, and Batra, 1992), beliefs about the viability of current strategies (Geletkanycz and Black, 2001), and assessments of opportunities (Tyler and Steensma, 1998).

One particular research stream has focused on how individuals, including managers, differ in the degree to which they positively versus negatively view decision situations (e.g., Thomas and McDaniel, 1990). Some individuals see opportunities or upside in decision situations, while others see threats and potential risks (Higgins, 1998). To some extent, one's perception of opportunities versus threats depends on the person's experiences (Starbuck and Milliken, 1988). But individuals also have ingrained dispositional tendencies to see the glass as half full versus half empty. For example, levels of dispositional optimism (i.e., the degree to which one has generalized positive expectations about future events) have been shown to influence individuals' work behaviors, saving habits, and investing patterns (Puri and Robinson, 2007). The overarching idea in this stream of research is that people differ in how they cognitively frame and act upon information surrounding decisions.

An executive's cognitive frame will affect his or her responses to pay schemes. Incentives are ultimately meant to generate certain types of behaviors. When deciding on a course of action, an executive's cognitive framing of the potential outcomes—and the subjective weights given to each—will influence the magnitude and direction of the response. For instance, an executive who positively frames risky decisions, and who dwells on potential gains, may be very responsive to

risk-inducing incentives; in contrast, an executive who negatively frames decisions, and who dwells on potential threats, may not be at all responsive to risk-inducing incentives. In sum, an executive's perceptions or assumptions about future events will affect how, and even whether, the executive will respond to certain pay arrangements.

Self-confidence

An executive's response to incentives also depends on his or her self-confidence, the subjective belief that one has the capability to generate outcomes that will yield a payoff. Highly confident executives will act vigorously in their attempts to attain rewards; those who lack confidence, or are unsure about whether their initiatives will bear fruit, may not respond to incentives as doing so entails extra effort, chances of setbacks, and career risks. In the framework of expectancy theory, one's belief that action will translate into performance is referred to as 'expectancy' (Vroom, 1964). An individual's level of expectancy plays an important role in the decision to pursue a given goal. It follows that an executive will only pursue a given goal to the extent that he or she has a positive expectation of success.

As a point of distinction, self-confidence refers to an executive's assessment of his or her *personal* abilities, while cognitive frame refers to perceptions of *contextual* conditions. Camerer and Lovallo (1999) highlighted this distinction when, in an experimental study, they found that subjects generally overestimated their own skill levels, while consistently underestimating the skill levels of opponents in an economic game. Accordingly, cognitive frame and self-confidence can be distinguished from each other; they both play a role in our model of how personal attributes interact with pay arrangements in influencing executives' actions.

A significant body of research by Bandura (1977, 1982, 1986) has addressed how a belief in one's ability to execute a task ('self-efficacy') shapes human behaviors; closer to our domain, self-efficacy has been found to influence risk taking at the executive level (Krueger and Dickson, 1994). Conceptually related constructs, including locus of control (Miller, Kets de Vries, and Toulouse, 1982), hubris (Hayward and Hambrick, 1997), narcissism (Chatterjee and Hambrick, 2007), and core self-evaluation (Halebian,

Markoczy, and McNamara, 2007) have also been found to influence executive behaviors and resulting organizational outcomes. These studies address, in various ways, how executives' differing beliefs in their abilities affect their actions.

When presented with an incentive arrangement offering a payoff for achieving specified benchmarks, an executive will implicitly ask, 'Am I capable of doing this?' and will take actions (or, perhaps, little action) based on this self-assessment. Executives with pronounced beliefs in their abilities will tend to favor aggressive actions, even in the face of significant objective risk (Hayward and Hambrick, 1997), while those with less confidence will favor more incremental or timid actions. Thus, an executive's response to a given pay plan will depend on the strength of that particular person's belief that he or she can successfully achieve a certain outcome.

Ability

Thus far we have discussed three domains of executive characteristics that moderate the effects of pay arrangements on executive behaviors. Now we introduce the idea that an executive's ability moderates the association between executive actions and the efficacy of those actions, or organizational performance. The premise that executives vary widely in their ability levels is supported by multiple literatures. For example, a series of studies have shown that approximately 10 to 20 percent of the variance in company profit margins is traceable to the effects of individual CEOs (e.g., Crossland and Hambrick, 2007; Lieberman and O'Connor, 1972). Similarly, psychology-oriented research has shown that executive leaders vary widely in their effectiveness (e.g., Peterson *et al.*, 2003). The skills and abilities of executives have been described as bundles of resources that allow firms to generate rents (Castanias and Helfat, 2001), and differences in executive ability are assumed to translate into differences in performance between organizations.

Variation in executive talent might arise because of differences in general ability due to such characteristics as intellect or leadership skills (Palia, 2000; Smith, Carson, and Alexander, 1984). Additionally, executives may vary in their situational ability for the specific contexts they are managing. Managerial repertoires are finite, context-specific,

and not necessarily transferable across environments (Bailey and Helfat, 2003). For instance, Gupta and Govindarajan (1984) found that division managers with a high tolerance for ambiguity performed better when running growth businesses than when running mature businesses. Carpenter, Sanders, and Gregersen (2001) found that multinational corporations performed better when led by CEOs with international experience, especially when the firms were aggressively pursuing global strategies. More recently, Henderson, Miller, and Hambrick (2006) found that CEOs in a stable industry performed better as their tenures advanced (up to about 13 years), whereas CEOs in a highly dynamic industry performed worse as their tenures mounted. Together these studies suggest that the fit between an executive's repertoire and the specific managerial context has an important influence on organizational performance.

Although boards are charged with appointing suitable executives, they may depart from this ideal for any of several reasons. The selection process can become politicized, resulting in sub-optimal hires (Zald, 1965). Departing CEOs and directors may favor candidates similar to themselves, which may lead to faulty selection (Zajac and Westphal, 1996). Finally, a board may simply apply imprudent criteria when selecting a new CEO, particularly by favoring charismatic candidates over those who are less colorful but better equipped for the substantive requirements of the job (Khurana, 2002).

Bearing in mind that pay arrangements are designed to encourage specific types of behaviors (e.g., risk taking, adopting long-term investment horizons), it follows that executive ability will influence the outcomes of these behaviors; and, particularly to the extent that pay plans encourage executives to take bigger or riskier actions than they otherwise would take, incentive arrangements will tend to magnify the effects of an executive's ability. If incentives prompt highly talented managers to behave more aggressively, the outcomes will tend to be more beneficial than if the same managers had acted timidly or incrementally. But when incentives encourage inferior managers to engage in bold actions, the outcomes will tend to be worse than if these untalented leaders had been paid—and had behaved—like bureaucrats.

In this vein, it is essential to note that low-ability CEOs not only perform *less well* than their more talented peers, but rather can deliver *absolutely*

bad performance. Through their actions and inaction, untalented CEOs can harm their organizations (Finkelstein, 2003). The broad authority that CEOs tend to possess, coupled with the lag between actions and results, means that CEOs can—and sometimes do—engage in behaviors that only later prove to be serious mistakes. In some instances, major mistakes are the products of untalented executives who have been stimulated by incentives to take large, risky actions. As the adage goes, ‘Few are as troublesome as the person who is eager but inept.’

ILLUSTRATION: HOW CEOS VARY IN THEIR RESPONSES TO STOCK OPTIONS

To make our theoretical model more tangible, we now present an in-depth illustration of how the outcomes of one particular type of executive pay arrangement—stock options—hinge on the characteristics of the executives to whom the options are given. We start with a brief background on stock options. Then we develop concrete propositions about how the individual attributes of CEOs shape their behavioral responses to stock options. Among the many potentially relevant executive characteristics, we highlight—for illustrative purposes—one specific construct for each of the three individual attributes that our model posits as moderating the effects of pay arrangements on executive behaviors: materialism (as representative of motives and drives), regulatory focus (cognitive frame), and self-efficacy (self-confidence).

Finally, in line with the ultimate element of our model, we consider how an executive’s ability level interacts with stock option pay to affect performance. Here, we propose that high levels of stock options tend to amplify the effects of CEO ability—heightening the payoffs from the most talented CEOs and worsening the losses from the least talented CEOs.

The logic and institutional context of stock options

Stock options give the recipient the right to purchase company shares at a prespecified price over a certain period of time. In the eyes of agency theorists, stock options align the interests of managers and shareholders in three ways: 1) they reduce

the likelihood of shirking by rewarding managers for share gains; 2) they promote a long-term horizon by placing restrictions on when options can be exercised; and 3) they encourage risk taking by allowing managers to reap benefits from share gains while limiting downside losses (Jensen and Meckling, 1976).

Compared to other forms of incentives, stock options are particularly expected to propel increased risk taking (Sanders, 2001). Evidence indicates that options do tend to bring about greater executive risk taking, in the forms of higher investment spending, more and bigger acquisitions, riskier acquisitions, and less hedging behavior (Rajgopal and Shevlin, 2002; Sanders, 2001; Sanders and Hambrick, 2007). However, these tendencies are far from uniform or total (Devers *et al.*, 2008), suggesting that moderating factors are at work.

Because stock options engender increased risk taking, they also tend to bring about extreme performance outcomes; specifically, they increase the likelihoods of large gains *and* large losses (e.g., Coles, Daniel, and Naveen, 2006). But here, too, the effects of stock options on performance are not highly predictable (Sanders and Hambrick, 2007). Our expectation is that the effects of stock options hinge greatly on the individual characteristics of the CEOs to whom the options are granted.

CEO attributes influence responses to stock options

Motives and drives: materialism

We begin our illustration by considering one particular motive that is known to vary widely among individuals: materialism, or the deeply held value that an individual places on wealth and tangible possessions. Essentially all major values theorists have included materialism (or one of its variants) in their typologies (cf. England, 1967; Hofstede, 1980; Rokeach, 1973). Importantly, one’s degree of materialism (or any other value) can only be assessed relative to one’s other values. In this regard, Rokeach (1973) argued that every individual has a values hierarchy; some values are at the top and of central importance, whereas others—while present—are of lesser importance. This relational nature of materialism was highlighted by Richins and Dawson (1992: 304): ‘it is the pursuit of happiness through acquisition rather

than through other means (such as personal relationships, experiences, or achievements) that distinguishes materialism.'

If individuals—including executives—differ in their drives for monetary wealth, it follows that they will differ in their responses to stock options. Compared to other types of incentives, stock options provide the greatest potential for considerable financial reward, but without downside risk; thus, options will clearly capture the interest of the executive with strong materialistic values. Recognizing that the potential for an increased share price is proportional to the risks taken (Sanders and Hambrick, 2007), the executive with strong materialistic values, when given a large dose of stock options, will engage in substantial risk taking. By comparison, executives with less pronounced materialist values may respond only moderately to stock options; they are not averse to the prospect of wealth gains, but maximization of such gains is not essential for them. As shown in Figure 3a,

we expect that an executive's degree of materialism affects the strength of the relationship between stock options and risk taking.

Proposition 1: An executive's degree of materialism interacts with stock option pay in affecting risk-taking behaviors. Specifically, the greater an executive's materialism, the stronger the positive association between stock option pay and risk-taking behaviors.

Cognitive frame: regulatory focus

We turn next to the executive's cognitive frame, which plays an important role in shaping CEO responses to stock options. One of the main tenets of upper echelons theory is that managers vary in how they notice and interpret information (Hambrick and Mason, 1984). In this section, we highlight a theoretical perspective that specifically deals with how executives differ in the

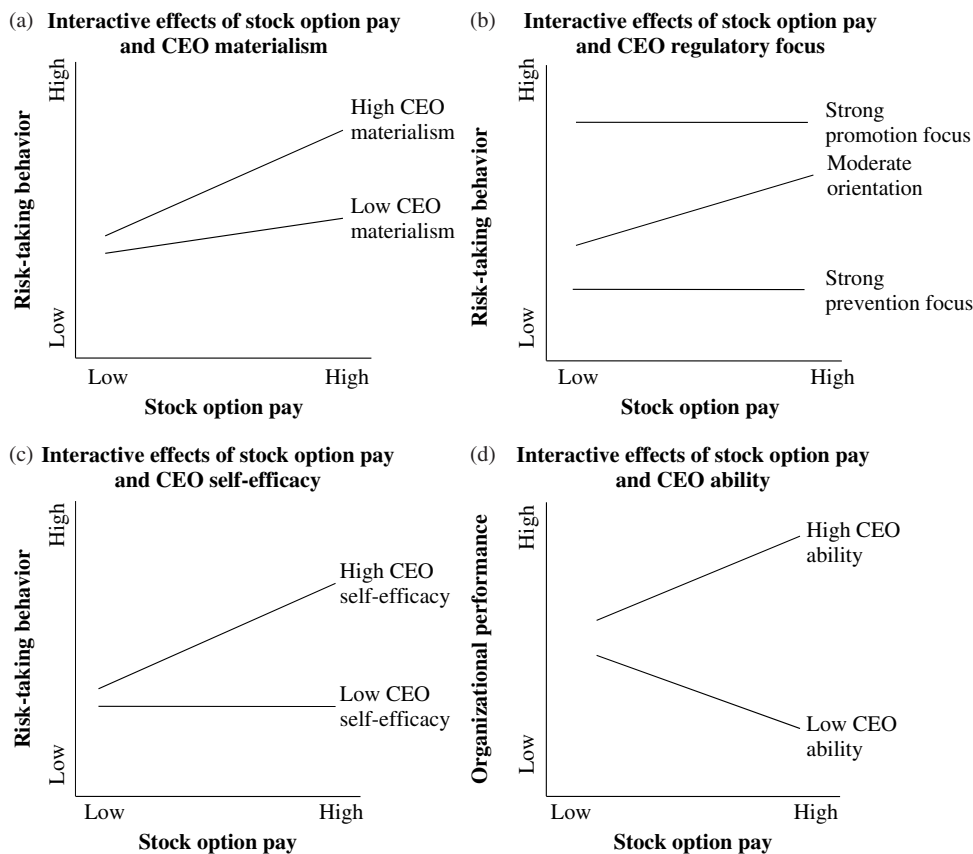


Figure 3. The interactive effects of executive characteristics and stock option pay on risk-taking behavior and company performance

extent to which they frame decision situations in positive versus negative terms: regulatory focus theory (Higgins, 1998).

At the core of this theory is the premise that individuals vary in their tendencies to frame decisions as potential gains as opposed to losses. Following from the assumption that humans abide by the basic hedonic principle of approaching pleasure and avoiding pain (Atkinson, 1964), regulatory focus theory argues that people differ in their relative motivations to achieve (or, in the case of pain, avoid) each end state. These differences become manifested in how people cognitively frame situations; some individuals have a 'promotion focus,' while others have a 'prevention focus' (Higgins, 1997, 1998). Those with a promotion focus tend to frame situations positively, consider novel options, and take greater risks (Crowe and Higgins, 1997; Liberman *et al.*, 1999). One might say that these individuals see the glass as half full and dwell (possibly overly) on the potential upside in decision situations. Those with a prevention focus tend to fixate on potential negatives, concentrate their efforts on avoiding mistakes, and resist alternatives that have high probabilities of large losses. These people see the glass as half empty and tend to dwell on downside risks.

Given that stock options are intended to motivate increased risk taking, it follows that the ways in which CEOs frame risky decisions will influence whether stock options will have much of an effect on their behaviors. We propose that regulatory focus will influence the fundamental form, and not merely the strength, of this relationship (cf. Venkatraman, 1989). CEOs with a strong promotion focus will approach a risky choice—say, an acquisition—by focusing on potential synergies, optimistic forecasts, and market assessments that point to future success. Conversely, CEOs with a strong prevention focus will dwell on the negatives; for such CEOs, potential acquisitions raise concerns about integration difficulties, pessimistic stock market responses, and lack of relevant expertise. For these two subgroups—those who frame situations either strongly positively or strongly negatively—stock options will have a minimal effect. The extreme optimists will be inclined to take risky actions even without a dose of stock options, and the extreme pessimists will not overcome their strong sense of caution even if presented with stock options.

For executives with a more intermediate orientation, however, stock options will have a pronounced influence. Unlike the CEOs described above, who consistently approach risky decisions from either an extreme promotion or an extreme prevention orientation, CEOs with a more moderate orientation (or a more malleable orientation) will be inclined to respond to stock options by taking more risks. As shown in Figure 3b, these CEOs will be influenced by stock options, whereas CEOs with more extreme orientations will be relatively unaffected by them.

Proposition 2: An executive's regulatory focus orientation interacts with stock option pay in affecting risk-taking behaviors. Specifically, for an executive with either a strong promotion focus or a strong prevention focus, stock options will have little to no effect on risk-taking behaviors. For an executive with a more moderate or malleable orientation, there will be a positive association between stock option pay and risk-taking behaviors.

Self-confidence: self-efficacy

In this section, we feature a well-supported construct in the psychology literature—self-efficacy—and highlight its important role in shaping CEO responses to stock options. Formally defined as 'judgments of how well one can execute courses of action required to deal with prospective situations' (Bandura, 1982: 122), an individual's level of self-efficacy affects the decision to pursue a goal, the intensity of effort expended in pursuit of the goal, and the persistence of effort in the face of difficulties (Bandura, 1986). Assuming that stock options are intended to motivate the pursuit of (risky but potentially profitable) goals, it follows that CEO self-efficacy will influence the magnitude and direction of responses to option incentives (as shown in Figure 3c).

This influence, however, will depend on whether a CEO has sufficiently high self-efficacy to consider risk taking in the first place. As can be seen in Figure 3c, we envision that CEOs with low levels of self-efficacy will not respond to options with increased risk taking. People with low self-efficacy tend to avoid activities that they believe surpass their ability levels (Bandura, 1982); for CEOs with low confidence in their ability to make the 'right' risky bets, stock options will have little or no effect

on risk-taking behaviors. These CEOs will conclude that they do not have the capabilities to succeed in risky initiatives, and no amount of stock options will overcome this lack of confidence.

For CEOs above this threshold, self-efficacy will positively influence the strength of responses to stock options. In support of this assertion, we invoke the premise that higher self-efficacy propels individuals to set higher goals (Locke *et al.*, 1984). In our context, a CEO with high self-efficacy would thus aim for a relatively high target stock price in response to options, and would have confidence in his or her ability to make the smart bets needed to achieve this goal. Indeed, research has shown that high self-efficacy individuals not only set higher goals but also perceive less risk and see more opportunities for gain than those with low self-efficacy (Krueger and Dickson, 1994). These factors (higher goals and less perceived risk) will combine to make CEOs who have moderate to high self-efficacy responsive to stock options, while CEOs with low self-efficacy will not be influenced by the incentives.

Proposition 3: An executive's self-efficacy interacts with stock option pay in affecting risk-taking behaviors. Specifically, for an executive with low self-efficacy, stock options will have little to no effect on risk-taking behaviors. For an executive with at least moderate self-efficacy, the higher the executive's self-efficacy, the stronger the positive association between stock option pay and risk-taking behaviors.

Stock options magnify the effects of CEO ability levels

Among proponents of stock options, the implicit image is of equally talented executives who will tend to deliver better performance in proportion to the magnitude of stock options with which they are presented (e.g., Jensen and Murphy, 1990). But such a view misses a key insight: stock options, which stimulate aggressive risk taking by executives, will magnify the effects of executives' skill levels—for good and for ill. Encouraged by stock options to take bigger risks, talented executives will generate better results, on average, than they otherwise would have under more salary-based compensation plans. Untalented executives, or those who are not adequately skilled for their jobs, will tend to generate much worse results

under option-intensive pay plans than under salary-based plans.

Again, studies have shown that stock options engender risk taking, as reflected in investment spending; number, size, and riskiness of acquisitions; and absence of hedging behavior (Larcker, 1983; Rajgopal and Shevlin, 2002; Sanders, 2001; Sanders and Hambrick, 2007). We can anticipate that option-loaded executives will exhibit risk taking in yet additional ways; they will invest in facilities in advance of proven demand, invest in uncertain technologies, and exhibit in other ways what Miles and Snow (1978) called 'prospector' tendencies.

The logical outgrowth of such risk taking is a high likelihood of extreme company performance (Coles *et al.*, 2006; Sanders and Hambrick, 2007). Executives operating under option-intensive pay plans, who in turn make large and high-variance bets, have a heightened likelihood of generating either big gains or big losses. In contrast, executives paid more as bureaucrats will make smaller and risk-averse bets, tending to deliver more neutral results. Thus, stock options will *amplify* the effects of executive talent. Highly talented executives who make conservative bets will not benefit their firms nearly as much as talented executives who place bigger bets that leverage their abundant skills. Similarly, inferior executives will harm their companies less by making small bets than by engaging in large, risky strategic initiatives.

This effect can be illustrated by Sanders and Hambrick's (2007) study. They found that option-loaded CEOs were much more likely to deliver extreme performance than their peers who received fewer stock options, and that their extreme performance was much more likely to be in the form of a big loss than a big gain. The authors did not consider how their results might have reflected differentials in executive ability, but instead implied that the outcomes of risk taking are stochastic—likening big risk taking to a baseball batter's big swing and its increased likelihood of generating either a home run or a strikeout. But it is entirely possible that those option-loaded CEOs who generated big gains in the Sanders and Hambrick (2007) study were, on average, more talented and/or more suited to their contexts than those who generated big losses. Put differently, stock options prompt executives to take bigger swings, but their ability levels will affect—at least to some

degree—whether the outcomes will be home runs or strikeouts.

When significant quantities of stock options are introduced, and the talented CEO is encouraged to take bigger risks, the effects of his or her talents become amplified. Instead of making smart choices on conservative bets, the CEO is motivated by the options to make (similarly smart) choices among bigger and higher-variance bets. Although there is no assurance that a high-ability CEO will generate positive outcomes under an option-intensive scheme, the upside potential is greater than if the same CEO was paid under a more salary-based plan.

Proposition 4a: Executives of high ability will generate better performance under stock option-intensive pay arrangements than under more salary-based pay arrangements.

An important corollary is that executives who lack ability will tend to deliver much worse performance under option-intensive plans than without such schemes. Stock options will embolden these executives to take bigger risks but will not make them any more capable. Such executives will make large, risky bets; but, because of their shortcomings, their bets will have a disproportionate chance of being flawed—with large negative consequences. Under option-heavy pay arrangements, ineptitude may exact a significant toll on the firm (shown in Figure 3d).

Proposition 4b: Executives of low ability will generate worse performance under stock option-intensive pay arrangements than under more salary-based pay arrangements.

One might speculate that low-ability executives are aware of their deficiencies and thus restrain themselves from making riskier choices than their skills warrant. Or, to use the terminology of our model, one might expect that a CEO's degree of self-confidence corresponds with his or her actual ability level. For at least three reasons, we believe such powers of accurate self-assessment are rare. First, executives typically arrive at their positions following long strings of successes (Lazear and Rosen, 1981) and generally remain in office only if they are performing adequately. Therefore, executives tend to have considerable conviction about their skills and prior formulas, even if they are

obsolete or inappropriate for current conditions (Hambrick and Fukutomi, 1991). Second, CEOs are frequent recipients of flattery and praise, both from subordinates and external parties—including investment bankers and exchange partners who may egg them on to take big risks (Haunschild, 1994). Third, top managers are not immune to the general human tendency to engage in self-serving biases—to be generally confident, take credit for successes, and lay blame elsewhere for any stumbles or failures (e.g., Clapham and Schwenk, 1991). Moreover, if their boards give them a big basket of stock options, executives will perceive an even greater validation of their potential, even though (as noted earlier) boards sometimes install option-heavy plans without any consideration of executive ability levels. Boards might do so out of a belief that stock options will enhance the likelihood of positive outcomes from any executive, which, again, has been an undercurrent of agency theory and U.S. business philosophy over the past 20 years.

THEORETICAL IMPLICATIONS

We have introduced the idea of person-pay interaction as a fertile avenue of inquiry for researchers interested in the effects of pay arrangements and executive behavior on organizational outcomes. Our proposed model complements prior theorizing about executive-context fit (e.g., Gupta and Govindarajan, 1984; Henderson *et al.*, 2006) and context-compensation fit (e.g., Balkin and Gomez-Mejia, 1990; Rajagopalan and Finkelstein, 1992) by arguing that executive characteristics and incentive arrangements interact to generate outcomes that would not be predicted by the two constructs separately. Although we have emphasized person-pay interactions at the executive level, our arguments could be relevant when considering employee behavior at other organizational levels (as we discuss below).

Among our contributions, we offer a new vantage for reassessing a central premise of agency theory: that incentives—especially stock options—provide a relatively uniform impetus for risk taking and performance enhancement, regardless of who is being offered the incentives. Following from our logic, executives' characteristics may greatly affect their responses to incentives, as well as the efficacy of those responses. The nostrums

of agency theory, accordingly, warrant reconsideration.

Our arguments also have implications for upper echelons theory (Hambrick and Mason, 1984), which focuses on the links between top managers and organizational outcomes. Going beyond the mainstay premise that executives' characteristics will be reflected in their choices, we introduce the idea that executives' characteristics interact with compensation arrangements to affect choices and outcomes. Indeed, it may be very illuminating to extend our ideas to the study of entire TMTs. Past research has shown that pay dynamics within TMTs influence organizational outcomes (e.g., Carpenter and Sanders, 2004), and it is possible that consideration of overall TMT characteristics will enhance the explanatory power of our propositions.

Executive compensation scholars commonly voice frustration about the lack of strength and consistency in findings regarding the effects of compensation arrangements (Devers *et al.*, 2007; Gomez-Mejia and Wiseman, 1997). By incorporating a new consideration of differences among executives, researchers may be able to substantially improve their predictions of the effects of incentive plans on strategy and performance.

PRACTICAL IMPLICATIONS

Our model suggests that boards need to consider the characteristics of individual executives when designing their pay plans. Many types of incentives are intended to promote risk taking—and often do—but executives' personal characteristics will affect the magnitude of the risks taken. Depending upon a *given* executive's motives, cognitive frame, and self-confidence, incentives may or may not induce the types of behaviors desired by shareholders.

More importantly, our arguments underscore the importance of selecting the right executive for a given organizational context. In our conceptualization, executive ability is the basic foundation on which incentive arrangements will have their effects; the ramifications of an executive's ability—or lack thereof—will be magnified by certain pay arrangements. Injecting a large dose of stock options, for instance, may indeed prompt an executive to take bigger risks, but it will do nothing to improve his or her ability. Aggressive incentives

will not offset executive ineptitude, but instead will make its harmful effects all the more pronounced. By selecting the right executive in the first place, a board has done its most important job; what then remains is to appropriately motivate *that particular executive*.

Our ideas also may help to explain the widespread observation that today's American executives, particularly CEOs, are more selfish and greedy than their predecessors (e.g., Heron and Lie, 2007). Even though we argued earlier that the 'sorting effect'—the matching of executive attributes and pay plans—is only partial, one can readily envision how 20 years of aggressive use of financial incentives throughout corporate America may have attracted a new breed of executive. If incentive plans offer huge payouts for delivering superior performance, we should not be surprised if money-minded individuals are drawn to these steep reward schemes. This is not to say that all of today's executives are purely money driven, but rather that such traits in executives are highly common, and more common than in the past. Ironically, the agency theorist's assumption of self-interest may have led to an increased prevalence of exactly that trait in today's top managers in a self-fulfilling prophecy (e.g., Ghoshal, 2005).

Our arguments also shed new light on recent well-publicized trends in corporate misconduct, as certain types of incentives may interact with executives' moral standards to produce undesirable outcomes. For instance, studies have linked stock options to corporate misdeeds (e.g., Denis, Hanouna, and Sarin, 2006; Harris and Bromiley, 2007); apparently, some executives have incentive 'tipping points' beyond which ethically dubious behaviors become viable. This possibility also speaks to our earlier point about the importance of selecting the right executives for the job—including ones without price tags on their ethical standards.

FUTURE RESEARCH AND CONCLUSIONS

Future research might explore the overall design of compensation arrangements (e.g., restricted stock versus options, frequency of grants, vesting periods, etc.) and how entire pay packages affect the interactions proposed in this paper. For instance,

studies have shown that executives react differently to restricted stock and stock options (Devers *et al.*, 2008; Sanders, 2001; Sanders and Hambrick, 2007; Wright *et al.*, 2007). Similarly, the question of which individual characteristics are most relevant for our theory is wide open for future research. We have outlined several proposed interactions, but they incorporate only a few of the many executive characteristics that might affect responses to pay. Certainly, data on some types of executive characteristics will be more challenging to obtain than others. Firsthand psychometric data are particularly difficult to gather, but not completely infeasible (e.g., Agle *et al.*, 2006; Westphal, 1998). Some researchers have reliably used secondary data to code CEO personalities (e.g., Chatterjee and Hambrick, 2007; Peterson *et al.*, 2003), and the use of demographic data, often serving as rough proxies for executive orientations, has a long tradition in upper echelons research (e.g., Bantel and Jackson, 1989; Finkelstein and Hambrick, 1990; Wiersema and Bantel, 1992).

The ideas outlined here may also be relevant to studies of executive tenure and the (mis)fit between executives and their environments. Executives often grow 'stale in the saddle' (Miller, 1991) and become less effective over time as their paradigms become outdated. Boards may be tempted to offer more aggressive incentives to such executives in the hope of inducing new behaviors. Our arguments, however, suggest that long-tenured executives might be relatively unlikely to respond to such incentives, and any such responses may have a high likelihood of unfavorable results (as these executives may be unsuitable for their contexts). Future research could explore the tradeoffs a board faces in deciding whether to redesign a long-tenured executive's compensation plan versus simply replacing him or her.

Despite our explicit focus on top executives, our model may be relevant for thinking about person-pay interactions generally. We anticipate that the model would be applicable in explaining the behaviors of employees whose jobs have the following characteristics: task behaviors are not closely monitored or tightly prescribed (i.e., there is considerable task discretion); linkages between task behaviors and performance outcomes are not clear-cut (i.e., there is considerable means-ends ambiguity); and pay arrangements are heterogeneous across employers and susceptible to

occasional or periodic change by individual employers (i.e., there is incomplete sorting between pay arrangements and employee characteristics). Thus, our framework may extend beyond top executives to include upper-middle managers and professional specialists. As such, we anticipate that both microlevel and macrolevel scholars will benefit by exploring—via our general logic—how individuals differ in their responses to pay arrangements, as well as in the efficacy of their responses.

An abundance of literature indicates that executive characteristics and incentives affect organizational outcomes. But these two domains have almost always been considered separately. In offering a framework for analyzing interactions between executive characteristics and pay arrangements, we have introduced the idea that these two elements operate in tandem to influence behaviors and organizational outcomes. Following in the long tradition of research on various types of alignments, our framework provides a foundation for future theorizing and empirical testing of person-pay interactions.

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