Pay Dispersion among the Top Management Team and Outside Directors:

Its impact on Firm Risk and Firm Performance

PANKAJ C. PATEL*
Villanova University

MINGXIANG LI
Florida Atlantic University

MARIA DEL CARMEN TRIANA
The University of Wisconsin – Madison

HAEMIN DENNIS PARK
University of Texas at Dallas

*Corresponding author

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ABSTRACT

Two key groups central to improving firm performance are the top management team (TMT) and the board of directors. Executives undertake strategic actions, whereas board members fulfill their resource provision and monitoring roles. Drawing on tournament theory and equity theory, we propose that high pay dispersion among outside directors and the TMT is positively associated with strategic risk, whereas high (low) TMT pay dispersion and low (high) outside director pay dispersion are positively associated with firm performance. Our predictor is the unexplained component of horizontal pay dispersion, or the residual of pay dispersion resulting from regressing pay on observable firm, industry, period, and individual characteristics. Our results highlight the importance of unexplained pay dispersion for TMTs, but not for boards of directors, in improving firm performance.

Keywords: dual agency framework; tournament theory; relative deprivation; pay dispersion; performance; strategic risk

Introduction

An important question facing companies today is how to incentivize organizational leaders to improve firm performance. Two key groups leading organizations are the top management team (TMT) and the board of directors. Prior work on executive compensation has drawn on tournament theory to explain the relevance of pay dispersion among top-level executives in driving firm performance (Connelly, Haynes, Tihanyi, Gamache, & Devers, 2013). Disproportionate differences in pay induce executive tournaments. Referred to elsewhere as CEO pay slice (Bebchuk, Cremers, & Peyer, 2011), CEO and average executive pay gap (Henderson & Fredrickson, 2001), or pay variation among TMT executives (Ji & Oh, 2014), pay dispersion in the upper echelons is the mainstay in the executive compensation literature (Gabaix & Landier, 2008).

By contrast, the horizontal variation in pay among board members is less explored and could interact with TMT pay dispersion to influence strategic risk or firm performance. Although board members fulfill both resource provision and monitoring roles, it is unclear whether individual board member pay is sufficient or whether horizontal pay dispersion among board members could further improve firm performance. Board members are less likely to compete with one another in a tournament setting, and therefore, the tenets of tournament theory may not apply for board members. However, two complementary theories to tournament theory that could explain the value of pay disparity among board members are equity theory and relative deprivation theory (Crosby, 1976, 1984), which have been widely used to study pay dispersion (Downes & Choi, 2014). Equity theory (Adams, 1963, 1965) contends that individuals evaluate the ratio of their outputs relative to inputs compared to that of similar persons referred to as referent others. If the individual making the comparison perceives their ratio to be lower than that of their referent others, they initiate efforts to equalize the inequity by changing their level of inputs (e.g., working harder) and/or changing their

level of outputs (e.g., asking for a raise). Similar to equity theory, relative deprivation theory calls for parity.

Although past work has found mixed support for the association between TMT pay dispersion and firm performance (Henderson & Fredrickson, 2001), incentivizing outside board members who may strive to lower inequity relative to other similar board members could influence the association between TMT pay dispersion and firm performance. Social comparison induced by outside director (i.e., board members who are not firm executives) pay dispersion could be a theoretical undergird to developing a deeper understanding of the association between TMT pay dispersion and firm performance. As such, we pose two research questions based on tournament theory, equity theory, and relative deprivation theory.

First, we posit that having higher pay dispersion for both the TMT and outside board members could exacerbate strategic risk. Greater pay dispersion among TMT members induces greater risk taking (Boyd, Franco Santos, & Shen, 2012; Kini & Williams, 2011). If pay dispersion is greater among board members, board members could strive to increase their value by focusing more on resource provision roles. It could generally be presumed that board members would weigh their time and effort between their monitoring role by watching executives' actions and their resource provision role by offering resources and advice to executives (Hillman & Dalziel, 2003). Although we do not posit that pay dispersion reduces the board members' focus on monitoring, we propose that incentive differences may prime the board members' resource provision role, because those who have earned the greatest amount from incentives over time will be motivated to use their networks to provide resources for firms that have increased their wealth. Likewise, those who have not earned as much in total compensation may hope to help the firm so that they may have better prospects for wealth in the future. Dispersion in pay among the board of directors could, therefore, prime board members across the pay dispersion scale to more actively search for information and resources to improve their odds of

reducing pay gaps. Such priming also puts additional pressure on high ranking board members (in both pay and status) to 'up the ante' in their resource provision roles. Pay dispersion among board members thus primes competitive behavior – continued cooperation in monitoring, but also provides necessary competition to fulfill resource provision roles.

Second, we propose that high (low) TMT pay dispersion and low (high) outside director pay dispersion will be positively associated with firm performance. When pay dispersion is high in the TMT, executives may undertake more strategic actions to improve their chances of advancing in pay, leading to increased firm risk (Conyon, Peck, & Sadler, 2001; Kini & Williams, 2011). Although outside directors do not compete with executives for pay, low pay dispersion among outside directors should limit the sense of relative deprivation or inequity within the board, reduce conflict among directors, and improve cohesion and communication. This in turn can improve the monitoring and control function of the board when TMT pay dispersion is high. In contrast, when TMT pay dispersion is low, greater pay dispersion among directors could shift the focus of outside directors from monitoring and controlling to improving their relative pay through the resource provision and promotion of strategic actions (cf. Festinger, 1954) that can improve firm performance.

In testing the above research questions, we operationalize "unexplained" pay dispersion. As recommended by Downes and Choi (2014) a "statistical process that objectively evaluates "explained" pay dispersion and creates a residual term that is useful for measuring "unexplained" pay dispersion … is excellent for dealing with panel or archival data" (page 63). To measure unexplained dispersion Mahy, Rycx, and Volral (2011) computed a residual from an individual-worker regression using individual-level characteristics as predictors, and included the residual to predict plant-level productivity. The intuition for using residual is as follows. Publicly traded firms used in the current sample must meet performance expectations. The principals can observe outcomes (performance) and given low effort-outcome correlation contexts, such as the upper echelons, individual performance

cannot be clearly attributed. As such, factors such as executive (e.g., education, tenure), firm, industry and period-related drivers of compensation can be explained by institutional, political, and social factors. A residual derived after controlling for observable firm, industry, period, and executive/board characteristics captures unobserved effort, talent, and abilities that drive performance from one year to another. Although the residual also includes noise and luck, the share of these factors would be lower in the upper echelons due to institutional and social pressures on pay limits and incentives to reduce perceptions of noise or luck explaining pay dispersion among high-profile individuals competing in corporate labor markets.

The proposed framework makes two contributions. First, drawing on equity theory (Adams, 1963, 1965) and relative deprivation theory (Crosby, 1976, 1984), we provide novel insights on board pay dispersion. Although retainers are a major component of board member compensation, recent work shows that awarding stock options to directors increases firm risk (Lim & McCann, 2013 a, b). For instance, a study by Yermack (2004) finds that for a $1,000 change in shareholder wealth, compensation of outside directors goes up by 11 cents after controlling for board and board member characteristics. Moving from the influence of individual to group-level board member compensation dynamics, we propose and test the influence of pay dispersion at the board level by examining how pay (total rewards) dispersion among the board and TMT jointly affect firm strategic risk-taking behavior and firm performance.

Second, based on the dual agency framework, high TMT and low board pay dispersion interact to improve firm performance. In contrast to prior work focusing on TMT pay dispersion, this study assesses the influence of pay dispersion among outside directors on firm performance and risk. Because both groups have been shown to influence firm performance, it is important to understand the joint relationship between TMT pay and director pay on firm risk-taking and performance. Considering incentives of both groups of agents (board and TMT) through the dual agency lens may

help us understand when firms improve performance and how to manage incentives among the elites who run organizations.

Theory Development and Hypotheses

Compensation is central to eliciting effort and risk bearing (Eisenhardt, 1989; Jensen & Murphy, 1990). Agency theory focuses on incentivizing individual agents, whereas tournament theory and relative deprivation/equity theory explain the influence of relative incentives on performance (Connelly et al., 2013; Henderson & Fredrickson, 2001). Pay dispersion, or the differences in relative pay, are classified into vertical and horizontal pay dispersion (Shaw, 2014). Vertical pay dispersion refers to differences in relative pay between the highest paid executive and an average employee. Vertical pay dispersion is elemental to inducing promotion tournaments among low- and mid-level managers. Further, horizontal pay dispersion refers to differences in relative pay among individuals in the same group or at the same level. A significant body of work in the upper echelons literature has focused on horizontal pay dispersion among TMT members.

Pay dispersion increases necessary effort as agents strive to receive disproportionately high rewards (Becker & Huselid, 1992). Disproportionate rewards with higher pay rank order not only increase effort from executives but also motivate low ranked executives to increase their effort. However, empirical results have been mixed. Although some studies found a positive relationship between pay dispersion and firm performance (Kale, Reis, & Venkateswaran, 2009; Lee, Lev, & Yeo, 2008; Main, O'Reilly, & Wade, 1993), others have found a negative (Carpenter & Sanders, 2004; Fredrickson, Davis-Blake, & Sanders, 2010; Siegel & Hambrick, 2005), a marginally significant (Conyon et al., 2001), mixed (Henderson & Fredrickson, 2001), or a non-significant (Ang, Hauser, & Lauterbach, 1998) relationship.

We propose that analyzing pay dispersion among the outside directors may help disentangle these inconsistent effects in executive pay disparity and firm performance. Although the nature of pay

dispersion among board members is less explored, we do not propose that directors' sensitivity to pay dispersion is as strong as traditionally construed for TMT members. Board members do not partake in the tournaments in the upper echelons nor do they compete directly with their peer directors. Unlike executives, a directorship is not the director's full-time day job and boards only meet a few times a year. Moreover, many directors serve on multiple boards. Nonetheless, through the lens of equity theory applied to executive compensation literature and increasing board compensation in recent years, pay dispersion could prime social comparison that results in behaviors that could influence the TMT pay dispersion to firm performance relationship.

As outside director compensation is less studied in compensation research, we first review theoretical literature and draw on practitioner reports to understand the nature of director compensation.

Outside Director Compensation and Evaluation.

In conjunction with increasing interest in board compensation in the academic literature, institutional shareholders are paying increasing attention to board compensation. *The Global Principles of Accountable Corporate Governance* from *CalPERS* states that "[a]lthough non-employee director compensation is generally immaterial to a company's bottom line and small relative to executive pay, director compensation is an important piece of a company's governance" (CalPERS, 2011, page 52). Outside directors generally act as monitors and advisors, yet they are central to corporate governance and actively participate in governance committees. Traditionally, outside directors are construed to have non-pecuniary reasons such as prestige and status for fulfilling their governance roles. However, compensation is critical for outside director performance (Adams & Ferreira, 2008). For instance, Andreas, Rapp, and Wolff (2012) found that pay-for-performance is increasing among boards of directors and is associated with free cash flow and investment

opportunities. To fulfill the monitoring role, cash compensation would be desired, whereas to fulfill the resource provision role stock compensation would be desired.

With increasing demands on outside directors in meeting governance standards, high director compensation is increasingly necessary to compensate for their time commitment (Linck, Netter, & Yang, 2009) and attract more talented and judicious outside directors (Cordeiro, Veliyath, & Eramus, 2000). For additional functions and responsibilities (e.g., chairing committees), outside directors receive a higher cash remuneration. Based on agency theory, an optimal contract for outside directors would balance both monitoring and value increase. Larger firm size, investment opportunities, and higher firm risk would require higher performance related compensation (Linn & Park, 2005). Studies drawing on US samples have found support for optimal contracting, requiring pay-for-performance for board members (Cornett, Marcus, & Tehranian, 2008).

The optimal agency contract – a combination of cash and stock – (Ryan & Wiggins, 2004) is supported in practitioner reports showing that board pay has been steadily increasing in recent years. A 2016 *Wall Street Journal* article[1] sampled 4,300 non-executive (outside) board members in S&P 500 firms and showed that pay increased by 50% between 2006 and 2014. In a recent study of 300 small-, mid-, and large-cap firms, Graves, Kohn, and Winikoff (2016)[2] found that average non-executive compensation in 2016 for these firms was $144,625, $200,000 and $260,000, respectively. According to their report, 57% of the pay is in the form of equity, with large firms also providing stock deferral programs. Moreover, the majority of firms award stock, instead of stock options, whereas about three quarters of firms use retainers, or cash compensation for board services, ranging from $50,000 at small-cap firms to $85,000 at large-cap firms. In addition to retainers, two-thirds of the firms provide additional compensation for serving on board committees. Outside directors who

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[1] https://www.wsj.com/articles/corporate-directors-pay-ratchets-higher-as-risks-grow-1456279452
[2] http://www.fwcook.com/content/documents/publications/11-30-16_FWC_2016_Director_Comp_Report.pdf

serve as chairman of the board, are compensated from $70,000 at small-cap to $142,500 at large-cap firms. Although there are increasing calls for limiting director compensation, 40%, 30%, and 20% of large-, mid-, and small-cap firms have annual limits to director compensation.

With equity increasingly representing a significant portion of compensation, board members would be motivated to fulfill resource provision roles and thereby increase their wealth through increase in stock prices. Increasing the equity pay in board compensation seems to support the dual agency framework, suggesting that equity ownership could align director's interests with those of the principals. That is, owning shares in the company, directors would facilitate and implement actions that increase firm value.

Boards of many large corporations also conduct annual self-reviews of board effectiveness to ensure they are performing their governance duties. The New York Stock Exchange (NYSE) requires its listed firms to conduct an annual performance review of the board (New York Stock Exchange, 2017). This includes an opportunity for directors to give one another feedback, and for board leadership (typically the chair of the governance committee or an outside consultant hired to conduct phone interviews with directors) to inquire about what is going well on the board, what can be improved, and how directors can better perform their roles. The director interviews usually cover how the board has performed its tasks, whether meeting agendas and strategic focus are appropriate, whether directors are provided helpful information before board meetings, as well as the effectiveness of board priorities, meeting dynamics, and time allocation in meetings (Bowen, 2008; Charan, 2005) (Bowen, 2008; Charan, 2005). Directors have an opportunity to provide feedback on these items as well as performance of individuals through these individual interviews. The person(s) conducting the interviews summarize the key findings for the board, and the board then decides whether changes are needed for the following year (Bowen, 2008; Charan, 2005).

This annual review process is also a mechanism to provide feedback that can help directors be more effective in performing their board duties. Indeed, the best directors will want to know how they can better serve the firm (Charan, 2005). Feedback is helpful in identifying board members who may not contribute much to the firm or detract from meetings in some way. For instance, according to PricewaterhouseCoopers (2016), 35% of directors say some directors should be replaced, because they lack the right expertise and preparedness for meetings. If some directors do not seem well-prepared for meetings, the chair of the governance committee may address this feedback privately with that director and encourage them to better prepare for meetings. If some directors are causing awkward team dynamics on boards, or are too busy to be helpful, they can also be encouraged to improve their behavior or to leave the board at the end of their term. Another possibility is that the nominating committee will not nominate them for re-election at the end of their term (Bowen, 2008). These are ways that directors can be evaluated, either indirectly or directly, as part of the board's annual evaluation process at large firms, and this would surely influence some compensation decisions (e.g., whether to give a director an additional stock grant to reward them or encourage further service).

Equity Theory and Pay Dispersion.

Relative deprivation theory is used to analyze issues ranging from pay satisfaction to gender-based pay inequities and other forms of discrimination in organizations (Crosby, 1984; Erdogan & Bauer, 2009; Fine & Nevo, 2008; Johnson & Johnson, 2000). When rewards are lower than the comparison group, individuals attempt to diminish the gap. Relative deprivation, and the associated proactive behaviors to close the gap, have found support in a wide range of studies at multiple levels of analyses (Walker & Pettigrew, 1984). Relative deprivation theory applied to a variety of contexts, is similar to equity theory (Adams, 1963), a theory widely used in studying executive compensation.

In a recent review of pay dispersion literature, Downes and Choi (2014) find that equity theory is the most widely used framework to study pay disparity. Proposed by Adams (1963), equity theory

posits that individuals compute a ratio of their inputs (e.g., effort, skill, ability) to their received outputs (e.g., pay, benefits, work environment) and compare their ratios with other individuals, or referent others, whom they perceive to be similar to themselves. Equity exists when individuals perceive their ratio (outcomes/inputs) to be equal to the ratio of others. If ratios are lower than those of referent others, individuals adjust their inputs and/or seek other outputs. By contrast, if ratios are above those of referent others individuals, they generally do not adjust inputs or outputs to make their ratios equitable with others. Adams (1963) proposed six modes to reduce inequity: (i) changing one's inputs; (ii) changing one's outputs; (iii) distorting perceptions of inputs and/or outputs; (iv) changing the inputs or outputs of others; (v) changing one's referent other to a more appropriate/comparable referent; and (vi) leaving the position.

Pay dispersion could influence TMT and board members differently. As pay differences increase among TMT members, executives with lower relative pay would perceive higher inequity and would be motivated to increase their input. Although pay dispersion could lower job satisfaction and increase conflict (Bloom, 1999), the basis of tournament theory is that such disproportionate differences could increase motivation and effort. Executives are also known to influence their outcomes (i.e., pay) through influence over boards.

Pay dispersion could influence the board of directors as follows. Outcomes for board members could be status and income. Inputs for board members are governance/monitoring and resource provision roles. Board members perceiving lower relative ratios cannot generally influence status in the short-to-medium term and can influence income levels by managing, specifically, through the resource provision roles. Related to input, board members could increase their governance and monitoring efforts, but these avenues are generally not within the control of a single board member. Therefore, board members can increase their inputs through the resource provision role to improve income (thereby, indirectly, status in the long-term).

Explained and unexplained components of pay dispersion.

Recent work on pay dispersion has increasingly shown the distinction between explained and unexplained pay dispersion. Trevor, Reilly, and Gerhart (2012) call for modeling explained (productivity-relevant component of pay) and unexplained (non-productivity-relevant component of pay) components of pay disparity (Downes & Choi, 2014). However, the Trevor et al. (2012) measure is based on National Hockey League (NHL) data, where player performance can be directly observed. Individual performance cannot be easily measured in most other contexts, and as such, the productivity-relevant component cannot be captured from observable individual, firm, industry, or period effects. Downes and Choi (2014) distinguish "non-performance-based pay dispersion is pay dispersion that is not based on individual differences in performance [from] performance-based pay dispersion attributed to individual differences in performance" and say that "a statistical way to conceptualize these differences is to consider performance-based pay dispersion equal to the overlap between variance in individual performance and variance in individual pay" (page 57).

Based on the logic from Downes and Choi (2014), firm performance varies from year-to-year and industry and period specific factors could influence pay based on luck (Bertrand & Mullainathan, 2001). As such, observable characteristics such as education, experience, tenure or position do not capture observable predictors of pay, because these characteristics do not directly drive performance, but a complex combination of skills, abilities, and talent necessary to address emerging threats and exploiting opportunities does. As such, we focus on the unexplained component of pay dispersion, derived after regressing individual pay on individual, firm, industry, and year effects. Although noisy, this residual pay dispersion is not too limiting for several reasons.

First, as we focus on boards or TMTs, the political factors driving non-productive pay would influence the pay of all the members. Coalitions in the upper echelons generally work together to improve their pay (Baixauli-Soler & Sanchez-Marin, 2011; Carpenter & Sanders, 2004), and

therefore, the noise from such factors would be systematic for a given board or TMT. Second, with

greater oversight from institutional blockholders, non-productivity related pay would be significantly

lower as pay is increasingly tied to firm performance (Deutsch, Keil, & Laamanen, 2011; Misangyi &

Acharya, 2014). Third, the non-productive pay component may not be large for the board of directors

or TMT members competing in corporate labor markets, where they would strive to reduce

perceptions of non-productive pay and work toward increasing their compensation.

Theoretical Framework.

Compared to the traditional agency theory that proposes a dual relationship between the TMT

(agents) and shareholders (principals), the dual agency theory framework proposes a trilateral

relationship among principals, the TMT, and directors. The dual agency framework therefore requires

a joint assessment of the compensation design between these two groups of agents – the TMT and

board members. The two agent groups are interdependent, and therefore, pay dispersion among board

members in interaction with TMT pay dispersion could be central to improving firm performance. We

draw on the dual agency framework to combine tournament theory (applicable to TMT pay

dispersion) and relative deprivation theory (applicable to board of directors pay dispersion).

Specifically, we propose that pay dispersion among TMT members and outside directors increases

strategic risk (Hypothesis 1) and that firm performance is greater either when TMT pay dispersion is

high and outside board directors' pay dispersion is low *or* when TMT pay dispersion is low and

outside board directors' pay dispersion is high (Hypothesis 2).

Outside Director, TMT Pay Dispersion, and Strategic Risk.

Although there are different types of risks – performance volatility, stock price volatility,

among others—we focus on strategic risk (Devers, McNamara, Wiseman, & Arrfelt, 2008). Strategic

risk has been used in a wide range of studies. Miller and Bromiley (1990) identify three indicators of

strategic risk – R&D spending, capital expenditures, and long-term debt. High R&D intensity is

indicative of "greater dynamic efficiency, or more flexibility than its competitors adapting to changes in input prices and technology," whereas an increase in capital expenditure is indicative of "lower average costs than a more labor-intensive competitor" (Miller & Bromiley 1990, p. 764). A high long-term debt ratio suggests that firms expect a higher return to meet its long-term obligations. We focus on the role of executive compensation in managing risk-taking propensities to create value (cf. Baird & Thomas, 1985). Strategic change requires risk-taking from executives, and shareholders desire strategic change that increases firm value.

TMT Pay Dispersion and Risk-taking. The positive relationship between pay dispersion and risk is supported in the broader tournament theory literature. Members with high or low relative pay prefer increased 'gambling' (Chevalier & Ellison, 1997). The optimal strategy for players with poor performance relative to team members is to use a high variance strategy (Tsetlin, Gaba, & Winkler, 2004). Indeed, players with a low chance of winning money in professional poker games were more risk seeking (Lee, 2004).

Executives with different abilities assign a subjective probability of advancing in the rank order of pay (Eriksson, 1999). Increasing firm risk through increased strategic actions would increase performance extremeness that results in different probabilities of advancement and recalibration of pay. Under low risk-taking, executives lack the opportunity to improve the probability of advancement. That is, lowering or maintaining current levels of risk will lead to lower chances of improvements in relative pay and instead strengthen positions of executives with higher relative pay.

Board Pay Dispersion and Risk-taking

Based on equity theory, the board of directors would increase inputs to close gaps between output-input ratios with others when pay dispersion is high. Limited ability to influence status calls for focus on increasing inputs that increase resource provision roles to enable strategic actions. According to Johnson, Schnatterly, and Hill (2013), demographic characteristics, human capital, or social capital

are key inputs to fulfilling the resource provision role. Older directors who are more experienced may provide better advice, whereas less risk-averse younger directors initiate strategic change (Ahn & Walker, 2007). Likewise, more educated board members increase risky R&D and innovation activities (Dalziel, Gentry, & Bowerman, 2011).

Executives with longer industry experience have superior information processing that can in turn help them provide strategic interpretations to other executives and improve strategic actions (Kor & Sundaramurthy, 2009). As a result, directors with longer tenure can leverage their firm specific knowledge to influence strategic change (Golden & Zajac, 2001). To facilitate strategic change, outside directors rely on their social capital by sharing vicarious experiences (Tuschke, Sanders, & Hernandez, 2014), providing contacts, and connecting executives with resource providers in the environment (Borch & Huse, 1993; Hillman, Cannella, & Paetzold, 2000; Hillman & Dalziel, 2003). Through their status and standing, outside directors could increase advising and influence strategic issues and processes (Westphal, 1999). Overall, board members could leverage a variety of demographic, human capital, and social capital components to increase inputs and thereby influence strategic change.

Studies show that directors support and promote variegated strategic actions by the TMT through their resource provision and advice roles (Hillman et al., 2000). Board members are generally highly experienced executives who have comparable status, experience, and career success (Daily, Dalton, & Cannella, 2003; Dalton, Daily, Ellstrand, & Johnson, 1998). As such, their comparison group (referent others) are similar other board members (cf. Miller & del Carmen Triana, 2009). As board compensation is public information, board members could assess their pay relative to similar others. Although one could argue that board members received fixed pay and could be less sensitive to incentives, recent work shows that board members are sensitive to stock incentives (Deutsch, Keil, & Laamanen, 2007). Increases in current option grants of outside directors compared with those of

previous years primes greater risk-taking (Lim & McCann, 2013a, 2013b) and this finding is robust to three alternate specifications of firm risk (Deutsch et al., 2011). Stock compensation differentials are shown to improve the board member's resource provision and counseling roles (Hillman & Dalziel, 2003) by providing advice or resources to help the firm (and distinguish themselves in the process).

Priming social comparison, pay dispersion induces gaps that may surreptitiously suggest differences in power, status, or the potential to make more money from fluctuations in stock price over time. Based on the logic from egoistic deprivation, or individual perceptions of comparative deprivation (Crosby, 1984), pay dispersion could increase perceptions of relative deprivation that, in turn, elicit behaviors to increase the resource provision. Although monitoring controls for the downside of firm performance, compensation differences provide additional incentives for board members to provide resources and information to take credit for improving firm performance, thereby closing relative deprivation gaps.

TMT and board pay dispersion. We propose that when TMT pay dispersion is high, TMT members will take greater risks. As TMT members seek more resources and advice to manage reallocation of R&D, capital, and leverage, outside directors with greater pay dispersion complement such pursuits to further risk-taking. In an effort to close deprivation gaps, both outside directors with higher and lower relative pay would more actively provide access to resources and knowledge, for firms (Provan, 1980) and allow access to important stakeholders in the their personal and professional networks (Boyd, 1990; Hillman et al., 2000). As TMT members seek to increase risk, outside directors aiming to improve (outsiders with lower total rewards) or maintain (outsiders with higher total rewards) their relative rewards will further exacerbate risk-taking. This suggests that under conditions of high pay dispersion among outside directors together with high TMT pay dispersion, risk-taking will be greater. Thus,

Hypothesis 1: When TMT pay dispersion is high, high director unexplained pay dispersion increases strategic risk.

Dual Agency Theory, Pay Dispersion, and Firm Performance

From the dual agency perspective, we discuss two possible between-group pay dispersion configurations: (i) low outside director pay dispersion and high TMT pay dispersion; and (ii) low TMT pay dispersion and high outside director pay dispersion.

We first consider low outside director pay dispersion and high TMT pay dispersion. Outside directors, "at the apex of the firm's decision control systems" (Fama & Jensen, 1983: 311) face the complex and multidimensional task of monitoring and control. In terms of shareholder priorities, boards are the first line of defense (Kroll, Walters, & Wright, 2008) in monitoring and controlling executive actions and they also provide resources and advice (Hermalin & Weisbach, 1998). When TMT pay dispersion increases, TMT members are incentivized to propose increasing numbers of high risk projects that make the outside directors' monitoring and controlling role necessary to monitor risk. In this case, low pay dispersion among outside directors allows better monitoring of risk from the TMT. This is because low pay dispersion generally increases cooperation and lowers agency costs (Lee et al., 2008). It also encourages less social comparison between directors and improves monitoring and control as cooperating board members engage in "coalition building, selective channeling of information, and dividing and conquering" (Alexander, Fennell, & Halpern, 1993: 79). With increasing TMT pay dispersion, the need for vetting strategic actions is important to control for decline in firm performance.

We also consider the case of low TMT pay dispersion and high outside director pay dispersion. Work in tournament theory related to TMTs has advocated for the benefits of pay compression (Levine, 1991; Milgrom & Roberts, 1990). Low pay dispersion improves coordination and communication (Henderson & Frederickson, 2000), lowers turnover (Messersmith, Guthrie, Ji, &

Lee, 2011), and improves firm performance (Fredrickson et al., 2010). Given higher incentives to increase risk when pay dispersion is greater for the board and TMT, we posit that pay dispersion in the TMT would be more efficacious in improving firm performance when outside directors have lower pay dispersion.

We propose that high pay dispersion among outside directors can increase firm performance when pay dispersion in the TMT is low. Pay compression in the TMT ensures improved coordination and communication but could reduce the willingness to undertake risk (Hypothesis 1). If the TMT has little incentive to initiate novel strategic actions, high pay dispersion among outside directors can promote director engagement. This can improve the resource provision, facilitate better interpretation of the environment, promote organizational learning and functioning, and improve short- and long-term strategy (Daily et al., 2003). Outside directors facilitate strategic changes (Deutsch et al., 2011), increase strategic investments (Baysinger, Kosnik, & Turk, 1991), identify valuable acquisition targets (Brickley & James, 1987), and improve firm performance (Rhoades, Rechner, & Sundaramurthy, 2000). Outside directors with greater pay differences are incentivized to take calculated risks which could mitigate potential underinvestment from the TMT due to low pay dispersion in the TMT.

> *Hypothesis 2: Either high unexplained TMT pay dispersion and low outside director unexplained pay dispersion or low unexplained TMT pay dispersion and high outside director unexplained pay dispersion increase firm performance.*

Methods

Sampling Approach

The measure of strategic risk is based on variations in strategic allocations by the firm. As firms in the service industry do not have resource allocation patterns that lend to the proposed measures of strategic risk, we draw on firms in the manufacturing industry. We merge Standard and

Poor's Execucomp database on executive compensation (salary, bonus, stock options, other long-term incentive pay, and all other payments) with BoardEx data on board compensation and other board member characteristics[3]. The merged data is then merged with COMPUSTAT data. BoardEx provides an International Securities Identification Number (ISIN), a unique identifier for firms and provides an ISIN-CUSIP concordance table to link BoardEx information with the CUSIP identifier in COMPUSTAT and ExecuComp. The resulting sample includes 722 firms with 4,285 firm-year observations (2000-2010) from all manufacturing industries (SIC between 20 and 39). We conducted a t-test to compare firms included and excluded in our sample on our dependent variables and found no significant difference ($t_{risk} = 1.01$, $p = 0.31$; $t_{ROA} = -0.65$, $p = 0.50$).

Dependent Variables

Strategic risk. Following prior research (Devers et al. 2008, Lim & Mccann 2013), we measure risk-taking using three risk dimensions: R&D investments, capital investments, and long-term debt. Devers et al. (2008) use the measure of strategic risk to assess the relationship between executive compensation on strategic risk, and Lim and McCann (2013) assess the relationship between option grants to boards of directors and firm-risk taking. Miller and Bromiley (1990) provide a review on this measure. Data for the three indicators of strategic risk were collected from COMPUSTAT. A factor analysis showed that the first factor explained 69.8 percent of the variance with an Eigenvalue of 2.12. We compute the factor score by using an equally weighted measure of these three dimensions and scaled this score using firm annual sales to obtain the measure of strategic risk.

Firm performance. We measure firm performance as *return on assets* (ROA), or earnings before interest, taxes, depreciation, and amortization (EBITDA) divided by total assets. ROA has been

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[3] Based on Securities and Exchange Commission guidelines, salary and cash compensation are expensed in the same year. However, for board members, stock-options are granted at end of the year stock price, whereas for executives, stock options are valued at grant date. Despite these different valuations of stock options between boards and executives, the within group valuation of stock options is consistent.

widely used by management scholars to measure firm performance (Barnett & Salomon 2012,

McNamara, Haleblian, & Dykes 2008), and in tournament theory related studies on upper echelons

(Carpenter & Sanders, 2002; Fredrickson et al., 2010; Henderson & Frederickson, 2000).

Independent Variables

Pay dispersion. In line with prior literature (Certo, Lester, Dalton, & Dalton, 2006), we define

the TMT as the top-five highest paid executives. For outside directors, we use a variable from

BoardEx indicating whether a director is an outside director. ExecuComp and BoardEx report total

compensation of executives and outside directors. Total compensation includes salary, bonus, and all

other long-term oriented incentives. Because compensation is a skewed distribution, we took a log

transformation of compensation before calculating the pay dispersion.

Using the conventional approach (e.g., the coefficient of variation) to calculate pay dispersion

does not differentiate pay related to systematic factors (e.g., executive rank, tenure). We extend our

results by differentiating pay related to systematic factors from pay related to unobserved

characteristics. Because pay dispersion also implies differences in relative pay based on unobserved

ability, recent work has increasingly called for parsing the influences of factors that explain

differences in pay related to observable factors, and include unexplained differences in pay as the

measure of pay dispersion (Brick, Palmon, & Wald, 2006; Kini & Williams, 2011; Trevor et al.,

2012; Wade, Porac, Pollock, & Graffin, 2006). Therefore, we calculated pay dispersion after

removing effects of observed factors that drive differences in executive pay. Specifically, we took the

following steps to compute pay dispersion.

First, to estimate unexplained pay, we fit individual-level data into this equation: $Y_{ij,t} =$

$F_{j,t-1}A + I_{ij,t-1}B + D_{it}C + e_{ij,t}$, where Y_{ijt} is the log of total compensation for individual i in firm j at

year t, F_{jt-1} is a vector of firm-level systematic differences (including firm performance [ROA and

Tobin's Q] and firm size [number of employees]), I_{ijt-1} refers to the set of variables capturing

individual level difference (for the TMT equation, we included a CEO dummy variable and tenure; for the outside board member equation, we included a committee chair dummy variable and tenure), and D_{it} represents a vector of industry and year dummy variables. A, B, and C are regression coefficient vectors.

Second, we calculate pay dispersion at the individual level as residuals ($e_{ij,t}$) of the equation. According to Trevor et al. (2012), using unexplained pay calculated from the regression will partial out strategically relevant reasons (e.g., firm difference, individual difference, and industry and year difference) that systematically explain pay dispersion. The resulting predictors are Director pay dispersion (residual) and TMT pay dispersion (residual).

Control Variables

We included a number of control variables to rule out alternative explanations. First, we used the log of total employees to proxy for *firm size*. Although total assets is sometimes used to measure firm size, Wiseman (2009) argues that including ROA and total assets in a regression analysis might overestimate the relationships of interest and confound the interpretation of results. Based on the behavioral theory of the firm, performance feedback could alter risk-taking propensity. According to the behavioral theory of the firm, a firm is less likely to make strategic change if their performance increases relative to past performance (Greve, 2003). By contrast, negative performance feedback increases risk-taking. If there is a positive (negative) value of an *ROA change*, we expect the firm is less (more) likely to take risks. To account for the influence of performance change, we calculated and controlled for *ROA change* in the prior years (ROA [t-1] minus ROA [t-2]). *Potential slack*, or long-term debt divided by book value of equity, could affect investments in R&D and other investments. To show its effect size in the regression model, we rescaled the slack resource value by dividing it by 1000. We also included *operating cash flow* from COMPUSTAT. Again, we divided this value by 1000 to show the effect size in the regression models.

We also included four TMT-related controls. We controlled for *TMT size*, or the number of

executives reported in the Execucomp database. TMT pay dispersion and firm performance will be

affected by the relative power of the TMT and board directors. Hence, we controlled for *CEO duality*

(coded 1 if the CEO is also chairman of the board, or = 0 otherwise). As older CEOs are less likely to

take risks, CEO age might also explain the likelihood of risk-taking (Barker & Mueller, 2002). We

included *CEO age* to examine the age effect on firm risk-taking and performance. Finkelstein and

Hambrick (1990) suggest that managerial tenure has important implications for risk-taking. Therefore,

we controlled for *CEO tenure*.

Because we examine the interaction between the TMT and board directors, board

characteristics might also affect risk and firm performance. We controlled for *board size* which was

measured by the number of directors reported by BoardEx. Relatively high TMT power may reduce

the effectiveness of board monitoring. Earlier studies (Westphal & Zajac, 1995) have used the

percentage of inside directors (i.e., firm executives on the board) to capture the relative power

imbalance between inside and outside directors. We controlled for *percentage of insiders* on the board

to rule out biases due to bargaining power between executives and outside directors. As the important

means to obtain resource and knowledge, *outside director's social standing*, defined as the number of

board directorships that an outside director has, could also influence risk taking and firm performance

(He & Huang, 2011). Accordingly, we controlled *outside director's social standing* by counting the

average number of board affiliations a director holds. We finally controlled for average total

compensation at the TMT level and board level, which tend to be confounding factors. Moreover, we

also control for *average outside director pay* and *average TMT pay*. In addition, we included 10 year-

dummies to control for year fixed-effects.

All independent and control variables are lagged by one-year (measured at time t-1). Table 1

provides summary statistics and correlations. The variance inflation factor (VIF) test shows that the

range of VIFs is between 1 (potential slack) and 13 (average outside director pay), lower than the problematic cut value of 20, suggesting multicollinearity is not a concern (Belsley, Kuh, & Welsch, 2005). Our results remain unchanged after dropping average outside directors' compensation.

INSERT TABLE 1 ABOUT HERE

Analytical Methods and Results

Addressing endogeneity in studies involving executive compensation is not straightforward. First, there is sorting between executives and firms and between boards and firms. Unobserved factors that attract executives and board members to a firm are endogenous to firm characteristics. Second, recruitment occurs in thin markets for executives and through networks for board members (Davis, Yoo, & Baker, 2003). There could be economic or non-economic motives in selection. Such omitted variable bias is not straightforward to address. As there are no policy experiments in this context, natural experiments cannot be used to assuage concerns for endogeneity. One way to deal with this is to introduce lagged effects (Little, Preacher, Selig, & Card, 2007), controlling for past performance could capture a wide range of unobserved factors that drive firm behavior in selecting, compensating, and improving firm performance. However, because pay dispersion is not exogenous to risk taking and firm performance, a better approach is to apply the dynamic panel regression (Roodman, 2014), a generalized method of moment GMM estimator developed by Arellano and Bond (1991). For all of our analyses, we used GMM (*-xtabond-* in Stata) to test our hypotheses. Based on King and Roberts (2015) we do not use the robust standard error option, but use the default *vce(gmm)* option.

Table 2 provides a summary of our regression models using mean centering. As for control variables (Model 1), we found outside director's social standing, average outside director pay, average TMT pay, TMT pay dispersion (residual), and outside director pay dispersion (residual) all positively

and significantly predict strategic risk. By contrast, firm size negatively and significantly predicts strategic risk.

INSERT TABLE 2 AND FIGURE 1 ABOUT HERE

Model 2 of Table 2 presents the test for Hypothesis 1 predicting a positive moderating relationship of outside director pay dispersion (residual) on the relationship between TMT pay dispersion (residual) and strategic risk. As hypothesized, there is a positive interaction between outside director pay dispersion (residual) and TMT pay dispersion (residual) on a firm's strategic risk ($\beta = 0.129$, $p < 0.05$). Specifically, holding TMT pay dispersion (residual) at one standard deviation above the mean (0.55), increasing outside director pay dispersion (residual) from the mean (0) to one standard deviation above the mean (1.66) increases risk from 0.22 (= 0.55*0.4) to 0.34 (= 0.55*0.4+0.55*1.66*0.129). This represents a 0.12 increase in strategic risk (around 3.5% of a standard deviation of risk). Figure 1(a) presents the interaction effect (at +1 and -1 standard deviations). This supports Hypothesis 1.

Model 3 of Table 2 shows that outside director pay dispersion (residual) weakens the positive relationship between TMT pay dispersion (residual) and ROA ($\beta = -0.11$, $p < 0.01$). More specifically, when TMT pay dispersion (residual) is one standard deviation above the mean (0.55), decreasing outside director pay dispersion (residual) from 0 to one standard deviation below the mean (-1.66) will increase firm performance (ROA) from -0.011(= -0.02*.55) to 0.001 (= -0.02*.55+.55*1.66*0.011) (increase ROA by 0.01, around 10% of a standard deviation of ROA). By contrast, when TMT pay dispersion (residual) is one standard deviation below the mean (-0.55), increasing outside director pay dispersion (residual) from 0 to one standard deviation above the mean (1.66) increases firm performance from 0.011 (= 0.02*.55) to 0.021 ((= 0.02*.55+.55*1.66*0.011) (increases ROA by 0.01, about 9% of ROA). Figure 1(b) shows that high TMT pay dispersion (residual) and low outside

director pay dispersion (residual) or low TMT pay dispersion (residual) are positively associated with ROA.

Robustness Checks

We conducted additional robustness checks to assess whether our findings are robust to alternate specifications.

Alternate specifications of risk. We used two alternate specifications of firm risk. Following past research (Deutsch Keil & Laamanen 2010, Fama & French 1995), we used the ratio of *book equity to market equity* (BEME) to capture a firm's risk. (Fama & French, 1995) reasoned that with rational pricing, BEME must be a proxy for sensitivity to common risk factors in returns. As a second alternate specification of risk, we computed *performance extremeness* as an indicator of firm-level risk. Following Sanders and Hambrick (2007), we first estimated predicted performance by regressing ROA on all control variables. We took the residuals from the first regression and then calculated performance extremeness using the absolute value of residuals. The absolute value of the residuals indicated how much actual performance deviated from predicted ROA. Because ROA is an account-based measure, we also utilized a market-based measure, Tobin's Q, to further investigate the robustness of the results. Tobin's Q was calculated as the sum of total assets plus market value of equity minus book value of equity divided by total assets.

Model 4 of Table 2 (BEME) confirms findings for Hypothesis 1 ($\beta = 0.262$, $p < 0.01$). Model 5 of Table 2 shows that outside director pay dispersion (residual) positively moderates the relationship between TMT pay dispersion (residual) and performance extremeness (supporting Hypothesis 1: $\beta = 0.007$, $p < 0.01$). Overall, inferences under alternate specifications of risk support the main findings.

Tobin's Q as an alternate outcome measure. Model 6 of Table 2 provides an additional test for Hypothesis 2 using Tobin's Q as the measure of firm performance. Again, we found a negative

interaction between TMT pay dispersion (residual) and outside director pay dispersion (residual) on

Tobin's Q (supporting Hypothesis 2: $\beta = -0.058$, $p < 0.01$).

INSERT TABLE 3 ABOUT HERE

Alternate measure of pay dispersion. As a proxy for pay dispersion, past work has used the

coefficient of variation (the standard deviation divided by the mean) as a proxy for pay dispersion

(Bloom 1999, Pfeffer & Langton 1993). Recent work also recommended that TMT pay dispersion be

measured as the coefficient of variation in pay among TMT members (Devers, Cannella, Reilly, &

Yoder, 2007; Fredrickson et al., 2010; Henderson & Fredrickson, 2001). Hence, following this

literature, we also operationalized dispersion of board and TMT compensation using the coefficient of

variation and controlling for board characteristics. Models 7 and 8 of Table 2 summarize an additional

test using the coefficient of variation as the proxy of pay dispersion. Again, using a different measure

of pay dispersion provides additional support for our hypotheses.

Inclusion of non-manufacturing firms. In the main analysis, we restricted our sample to the

manufacturing industries, largely because we need investment outlays necessary to operationalize

strategic risk. We conducted additional analyses by investigating whether our predictions of can be

generalized to non-manufacturing industries. We recreated the data set without restricting data to

manufacturing. In the results (not reported here but available upon request), we found consistent

results. This additional robustness check further supports generalizability.

Discussion

Extending the dual agency framework, we considered unexplained pay dispersion between two

different groups of agents, the TMT and the board. Our results show that the interaction of TMT

unexplained pay dispersion and outside director unexplained pay dispersion increases risk, and low

board unexplained pay dispersion and high TMT unexplained pay dispersion are positively associated

with firm performance. Our findings are robust to alternate specifications of pay dispersion and alternate specifications of risk and firm performance.

Theoretical Implications

The positive relationship between outside director pay dispersion and firm performance in the current results extends recent work on outside director stock compensation at the individual director level to pay dispersion at the board level. Deutsch and colleagues (2011) assessed the relationship between outside directors' stock options and firm risk as "book value of common equity to its market value" and used an alternative measure by running "analyses with beta and capital expenditure per employee" (p. 217). We extend their work by including board-level and TMT-level pay dispersion and assessing its relationship with firm risk and firm performance. Whereas Deutsch et al. (2011) found that awarding stock options to individual board members increases firm risk, we find that pay dispersion among board members complements TMT pay dispersion in increasing firm risk. Lim and McCann (2013a, 2013b) assessed the influence of changes in relative stock option value of outside directors on strategic risk taking intensity index based on factor analysis of: "R&D investments (a firm's aggregate R&D spending), capital investments (a firm's capital expenditures), and long-term debt (a firm's total long-term debt)" (p. 1576). We extend the work by Lim and McCann (2013a, 2013b) by showing that director's pay dispersion will moderate the relationship between TMT pay dispersion and strategic risk taking.

Our findings make several contributions to the dual agency framework and the board compensation literature through the lens of relative deprivation theory (Crosby, 1984). The dual agency framework has received limited attention in the compensation literature. Pay dispersion between outside directors and the TMT is pivotal to improving firm performance in the dual agency context. Corporate governance mechanisms involving the board of directors exist to manage conflict resulting from diverging goals between principals (shareholders) and agents (executives). With

increasing regulations and liability for failures in monitoring (e.g., financial misrepresentation) and the resulting threat to their reputation and status, board members may increasingly overlook their role in value maximization. The Sarbanes-Oxley Act of 2002 imposes large fines and prison sentences in case of accounting fraud. It requires that at least half the members on the Audit Committee in the board of directors be outside directors, and at least one outside director must have a finance background. Subtitle G of the Dodd-Frank Act allows for more active involvement of shareholders in appointing directors through proxy solicitation and requires explanations on the presence or absence of CEO duality. Since the passage of the Sarbanes-Oxley and Dodd-Frank Acts, conflict between value maximization and monitoring is exacerbated as directors may increasingly promote and approve low risk strategies that could be more easily monitored and controlled. The proposed framework suggests that dispersion in outside director compensation is relevant.

Pay dispersion among outside directors has several benefits. Pay dispersion sorts outside directors based on their ability and their willingness to protect and enhance their external reputation. High-ranked outside directors have greater chances of receiving better directorships at other firms. This possibility of enhancing value in director labor markets also motivates low-ranked outside directors to increase their effort and reputation with the expectation of moving up the pay rank-order. If there is pay compression, all board members assign similar gains from their efforts and would, therefore, be less motivated to align with shareholder's interests. Further, pay dispersion among outside directors motivates them to effectively fulfill their resource provision and strategic control functions. In sum, pay dispersion among outside directors is an important topic for future research.

We discussed explained and unexplained components of director pay. Among the observable predictors of board compensation, Tobin's Q ($\beta = 0.150$, $p < 0.01$) and log of sales ($\beta = 0.767$, $p < 0.01$) were positively associated with board member compensation. However, ROA ($\beta = -0.693$, $p > 0.10$) was not associated with board member compensation and firm size is negatively associated with

board compensation (β = -0.006, p < 0.01). Based on observable characteristics, firms with higher growth prospects and sales are more likely to have higher compensation for directors. Holding a board chair position positively and significantly explains directors' compensation (β = 0.405, p < 0.01). This finding is in line with Graves et al. (2016) board compensation report where firms offer additional compensation to non-executive directors for chairing committees. Longer board tenure has a small but positive effect on compensation (β = 0.005, p < 0.05). Continuing from our previous discussion on explained and unexplained components of board compensation the explained part is based on firm performance, board member function (chairing a committee), and tenure.

We used the lens of relative deprivation, rooted in equity theory, to explain the role of board pay dispersion. Tournament theory is not likely to apply to boards, as this is not the board members' full-time job, and boards have limited strategic discretion in influencing firm performance. Our key contribution is that board pay dispersion interacts with TMT pay dispersion to predict firm performance. Motivated to improve their standing relative to similar others, pay dispersion could increase strategic risk when TMT pay dispersion is higher, and it may not result in improved firm performance.

Adding to the mixed findings on the influence of pay dispersion in the upper echelons (Fredrickson et al., 2010; Kale et al., 2009; Lee et al., 2008), our findings show support for a positive effect of TMT pay dispersion on firm performance. This is in line with past findings on the influence of tournaments in large samples from publicly traded firms (Kale et al., 2009; Lee et al., 2008). Recent work has also shown that pay dispersion lowers productivity and collaboration (Devers et al., 2007), and lowers satisfaction (Pfeffer & Langton, 1993). Moreover, because pay dispersion and firm performance are likely to be endogenous, we call for future studies to identify possible exogenous variations in pay to assess the impact of pay dispersion on firm performance. Recent regulations in several European countries imposing caps on executive pay could allow tests of such relationships.

Furthermore, the effects of pay dispersion could be context dependent. For example, Fung (2009)

finds that lower pay dispersion is prevalent among high risk ventures, whereas Siegel and Hambrick

(2005) find that pay disparity is more beneficial in low-tech industries than in high-tech industries.

We call on future research to further untangle the link between pay disparity and firm performance in

different contexts.

Managerial Implications

Our findings also have implications for practitioners. Executives are incentivized to increase

firm performance, whereas outside directors "encourage risk-taking while ensuring that systems and

processes are in place to alert management to threats to the organization" (National Association of

Corporate Directors, 2009, p. 20; as cited in Lim and McCann 2013a). Outside directors focus on

value maximization, monitoring, and control. On the one hand, the value maximization goals overlap

between outside directors and executives. On the other hand, the monitoring and control goals of

outside directors may be in conflict with their resource provision and advice roles. Our results show

that lower board pay dispersion and higher TMT pay dispersion increase firm performance. Increasing

pay dispersion for both agent groups increases risk but not necessarily firm performance.

Recent examples from Corporate America imply that board members can be incentivized to

avoid excessive risk that can lead to failure. An NBC news report about the highest paid boards

describes that four board members at Hewlett-Packard resigned shortly after the former CEO was

fired in 2010 following discrepancies in his expense accounts. This is an example of the reputation

effects that can spill over to board members when the firm performs badly or its executives are

accused of corruption. The report also shows signs of pay variation on the Amazon board as well as

other types of "pay" including substantial perks paid to Northrop Grumman board members that add

greatly to compensation (McIntyre & Weigley, 2012). Therefore, it appears that there is sufficient pay

variation to entice outside directors to work hard in the hopes of improving overall wealth, but

simultaneously, an incentive to preserve one's reputation if executives at the firm are taking too much risk. Our findings imply that structuring total rewards on boards to balance risk with the TMT is best for firm performance.

Limitations and Future Research Directions

Our findings must be interpreted in light of the limitations of the study. First, unobserved heterogeneity in compensation decisions and executive and outside director abilities could impact outcomes from pay dispersion. Mixed findings on pay dispersion also imply a need for caution when interpreting the current findings and replications in other contexts that may or may not support our findings. Moreover, governance factors could also affect our inferences. Future research could assess the relationship between risk and performance goals of the principals in dual agency settings such as family firms or with institutional block shareholders. Limited focus on risk-taking under pay dispersion in the upper echelons points to crucial gaps in the literature. For example, does pay dispersion increase risk-taking? And how do the shareholders draw on the dual agency framework to balance increasing risk-taking that could both lower or increase firm performance?

Second, although explained and unexplained components of board compensation disparity are a better measure than a coefficient of variance type measure drawing on raw compensation, we further elaborate on limitations of explained and unexplained components of pay. As firm and board member characteristics both drive the explained part of pay disparity, there could be shared correlation between firm performance board member quality. That is, more competent and high-status board members would sort into higher performing firms. Similarly, the unexplained component may not be fully based on "unfair" compensation, but it could include two components – unobservable talent and unfair compensation. The unobservable talent component could be parsed from unfair compensation in future studies. Moreover, in contrast to studies drawing on samples from sports that can include player performance as a component of talent, the individual director-firm performance link is not

clearly measurable in our context. We call on future studies to focus on firm and individual components of explained and unexplained components of pay disparity that are driven by institutional, professional, firm, and individual differences.

Third, we could not observe the level of risk-taking preferences at the individual level. Based on the behavioral agency model, in addition to relative pay, managers also consider their current value of stock ownership in comparison to their potential future compensation in making risk-bearing decisions among risk-averse agents (Martin, Gomez-Mejia, & Wiseman, 2013). If the prospects to wealth endowment are framed negatively, executives take lower risk to minimize losses to their wealth endowment. It would be interesting to see whether low-ranking executives are as sensitive to loss aversion as high-ranking executives. Low ranking executives could use multi-temporal frames by considering loss of current wealth endowment and potential gains from increasing relative pay. Conversely, high-ranking executives face 'mixed gambles,' (Martin et al., 2013) as they have greater wealth and taking more risk may jeopardize their position. Understanding how high and low-ranking executives manage the prospects of gain (increasing relative pay) versus loss (decreasing relative pay) could further extend our understanding of executive behavior.

Fourth, boards of directors, shareholders, and executives represent competing and coopting coalitions (Boyd, Haynes, & Zona, 2011). Although we focus on economic goals, additional insight on identification, evaluations of strategic alternatives, and their level of involvement in strategic counsel could further explain relative marginal products of outside directors. Future research could focus on the strategic adaptation process where outside directors and executives may learn from performance feedback with their respective goals in mind and develop problem-solving routines that could be complementary, supplementary, or in conflict.

Future research could also focus on executive and board of director demographic characteristics. Prior work has shown that demographic and functional characteristics affect

information processing, decision-making, and decision comprehensiveness (Carpenter, Geletkanycz, & Sanders, 2004). These characteristics could not only be extended to the context of outside directors, but also to the influence of demographic characteristics on incentives and performance which remain unexplored. For instance, older executives with longer tenures or throughput functional expertise (e.g., accounting, operations) take less risk than younger or shorter tenured executives with output functional expertise (e.g., R&D, marketing) (Barker et al., 2002). Another study shows that older outside directors may be less motivated to improve status and reputation than younger directors (Masulis & Mobbs, 2013). Outside directors with throughput-based expertise could focus more on monitoring and control whereas outside directors with output-based expertise could focus on increasing risk. With greater oversight and scrutiny from the Securities and Exchange Commission and institutional shareholders, such divisions of labor between board members could be an important tool for meeting governance challenges.

Conclusion

Based on the dual agency perspective, there are incentives for both the TMT and the board. The nature of incentives could increase risk-taking. Higher pay dispersion for both groups exacerbates risk-taking. The optimal incentives between the two groups appear to be lower pay dispersion for boards and higher pay dispersion for TMTs but not high pay dispersion for both groups. Our findings can help inform compensation decisions about incentivize high-level decision-makers in organizations.

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Table 1: Summary Statistics and Correlations

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1)	Strategic risk	1																	
(2)	ROA	-0.179	1																
(3)	Firm size	-0.067	0.249	1															
(4)	ROA change	-0.02	0.226	-0.013	1														
(5)	Potential Slack	0	0.014	-0.001	0.017	1													
(6)	Operating cash flow	0.003	0.116	0.386	0.009	-0.001	1												
(7)	TMT size	0.007	-0.044	0.094	-0.015	-0.005	0.041	1											
(8)	CEO duality	-0.015	0.095	0.258	-0.008	0.013	0.114	-0.029	1										
(9)	CEO age	0.01	0.007	0.047	0.003	-0.002	0.028	-0.103	0.298	1									
(10)	CEO tenure	0.003	0.019	-0.175	-0.002	0.033	-0.071	-0.148	0.251	0.451	1								
(11)	Board size	-0.027	0.145	0.625	0	-0.003	0.305	0.087	0.141	0.026	-0.184	1							
(12)	Percentage of insiders	-0.008	-0.01	-0.206	-0.002	-0.005	-0.082	-0.036	-0.081	0.103	0.32	-0.271	1						
(13)	Outside director's social standing	0.024	0.01	0.366	0.016	-0.005	0.183	0.065	0.105	-0.074	-0.205	0.262	-0.199	1					
(14)	Average outside director pay	-0.06	0.142	0.421	0.035	0.008	0.178	0.042	0.099	-0.02	-0.086	0.284	-0.129	0.251	1				
(15)	Average TMT pay	-0.043	0.234	0.648	0.026	-0.008	0.378	-0.011	0.197	-0.033	-0.161	0.481	-0.196	0.403	0.427	1			
(16)	TMT pay dispersion (residual)	0	-0.065	-0.005	-0.047	0.011	-0.004	0.18	-0.072	-0.011	0.014	-0.053	0.002	-0.113	-0.096	-0.435	1		
(17)	Outside director pay dispersion (residual)	0.019	0.004	0.039	-0.005	-0.011	0.036	0.011	0.003	0.001	-0.047	0.051	-0.08	-0.024	-0.794	-0.069	0.131	1	
(18)	Outside director pay dispersion (residual) × TMT pay dispersion (residual)	0.073	-0.176	-0.045	-0.033	0.002	0.001	-0.007	-0.015	-0.028	-0.015	-0.026	0.009	-0.006	-0.031	-0.038	0.074	0.028	1
	Mean	1.227	0.129	1.653	-0.004	0.001	0.735	5.518	0.58	55.802	8.063	9.268	16.072	1.939	3.786	7.255	0.003	0.094	0.12
	S.D.	3.418	0.12	1.568	0.087	0.044	2.646	1.211	0.494	7.08	7.17	2.32	8.256	0.601	1.928	0.83	0.55	1.662	1.043

Notes.

All correlations at or above |0.03| are significant at $p < 0.05$; $N = 722$ firms representing 4,285 firm-years.

Table 2: GMM Results*

	Risk		Alternative outcome variables				Alternative predictors	
			ROA	Book-Equity to Market-Equity(BEME)	Performance Extremeness	Tobin's Q	Risk	Performance
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Lagged strategic risk	0.186**	0.177**		-0.018	0.472**		0.180**	
	(0.023)	(0.023)		(0.045)	(0.016)		(0.023)	
Lagged dependent variable (performance)			0.245**			0.289**		0.267**
			(0.019)			(0.017)		(0.017)
Strategic risk			0.002**			-0.021**		-0.016**
			(0.000)			(0.005)		(0.005)
Firm size	-0.547†	-0.549†	-0.010†	0.353	-0.032**	-1.072**	-0.533	-1.153**
	(0.321)	(0.321)	(0.006)	(0.422)	(0.006)	(0.091)	(0.328)	(0.082)
ROA change	-0.074	-0.009	0.078**	0.478	-0.042**	-0.616**	0.159	0.01
	(0.537)	(0.537)	(0.014)	(0.745)	(0.011)	(0.155)	(0.580)	(0.151)
Potential slack	-0.028	-0.064	0.070**	-0.243	0.03	0.066	-0.163	0.034
	(1.061)	(1.060)	(0.020)	(1.427)	(0.020)	(0.299)	(1.078)	(0.272)
Operating cash flow	-0.091	-0.094	-0.004**	-0.208*	-0.001	0.003	-0.121†	-0.006
	(0.067)	(0.067)	(0.001)	(0.090)	(0.001)	(0.019)	(0.068)	(0.018)
TMT size	-0.09	-0.085	-0.001	-0.047	0	0.02	-0.114†	0.012
	(0.060)	(0.060)	(0.001)	(0.081)	(0.001)	(0.017)	(0.062)	(0.016)
CEO duality	-0.232	-0.241	-0.006	-0.315	0.007	0.026	-0.327	0.018
	(0.226)	(0.226)	(0.004)	(0.304)	(0.004)	(0.064)	(0.235)	(0.059)
CEO age	0.014	0.014	0.001*	0.01	0	0.008	0.026	0.006
	(0.021)	(0.021)	(0.000)	(0.028)	(0.000)	(0.006)	(0.022)	(0.005)
CEO tenure	0.029	0.031	-0.001†	0.028	-0.001†	-0.005	0.027	-0.002
	(0.024)	(0.024)	(0.000)	(0.032)	(0.000)	(0.007)	(0.024)	(0.006)
Board size	0.052	0.055	-0.002	0.006	-0.001	0.004	0.068	-0.005
	(0.065)	(0.065)	(0.001)	(0.087)	(0.001)	(0.018)	(0.068)	(0.017)
Percentage of insiders	0.003	0.002	0.001†	-0.023	0	-0.011*	-0.011	0.002
	(0.016)	(0.016)	(0.000)	(0.021)	(0.000)	(0.004)	(0.016)	(0.004)
Outside director's social standing	0.456**	0.452**	0	0.137	-0.003	-0.066	0.485**	-0.056
	(0.173)	(0.173)	(0.003)	(0.233)	(0.003)	(0.049)	(0.177)	(0.045)
Average outside director pay	0.557**	0.542*	0.011**	0.224	0.012**	-0.425**	0.043	-0.005
	(0.213)	(0.213)	(0.004)	(0.281)	(0.004)	(0.061)	(0.059)	(0.015)
Average TMT pay	0.350*	0.347*	0.007*	-0.006	0.004	-0.013	0.105	-0.061
	(0.170)	(0.170)	(0.003)	(0.229)	(0.003)	(0.048)	(0.151)	(0.038)
TMT pay dispersion (residual)	0.413**	0.400**	-0.020**	0.16	0	0.139**	1.847†	0.04
	(0.151)	(0.151)	(0.003)	(0.203)	(0.003)	(0.043)	(0.988)	(0.248)
Outside director pay dispersion (residual)	0.545**	0.531*	0.012**	0.164	0.015**	-0.428**	0.21	-0.051
	(0.209)	(0.209)	(0.004)	(0.276)	(0.004)	(0.060)	(0.483)	(0.122)
Outside director pay dispersion (residual) × TMT pay dispersion (residual)		0.129*	-0.011**	0.262**	0.007**	-0.058**	1.256**	-1.257*
		(0.064)	(0.001)	(0.085)	(0.001)	(0.018)	(0.237)	(0.600)
Constant	-3.934*	-3.919*	-0.02	0.143	0.029	3.956**	-1.309	3.132**
	(1.892)	(1.889)	(0.036)	(2.534)	(0.035)	(0.530)	(1.794)	(0.454)
Chi-square	176.462	181.031	1174.542	152.816	1392.468	1487.794	197.607	1476.789
N	4285	4285	4288	4285	4299	4285	4131	4131

† $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

$N = 722$ firms representing 4,285 firm-years; all time-varying independent variables and control variables are lagged by one year at t-1. Year dummies are included but not reported.

Figure 1
Moderation effects

Figure 1(a): Moderation effect of outside director pay dispersion (residual) on strategic risk
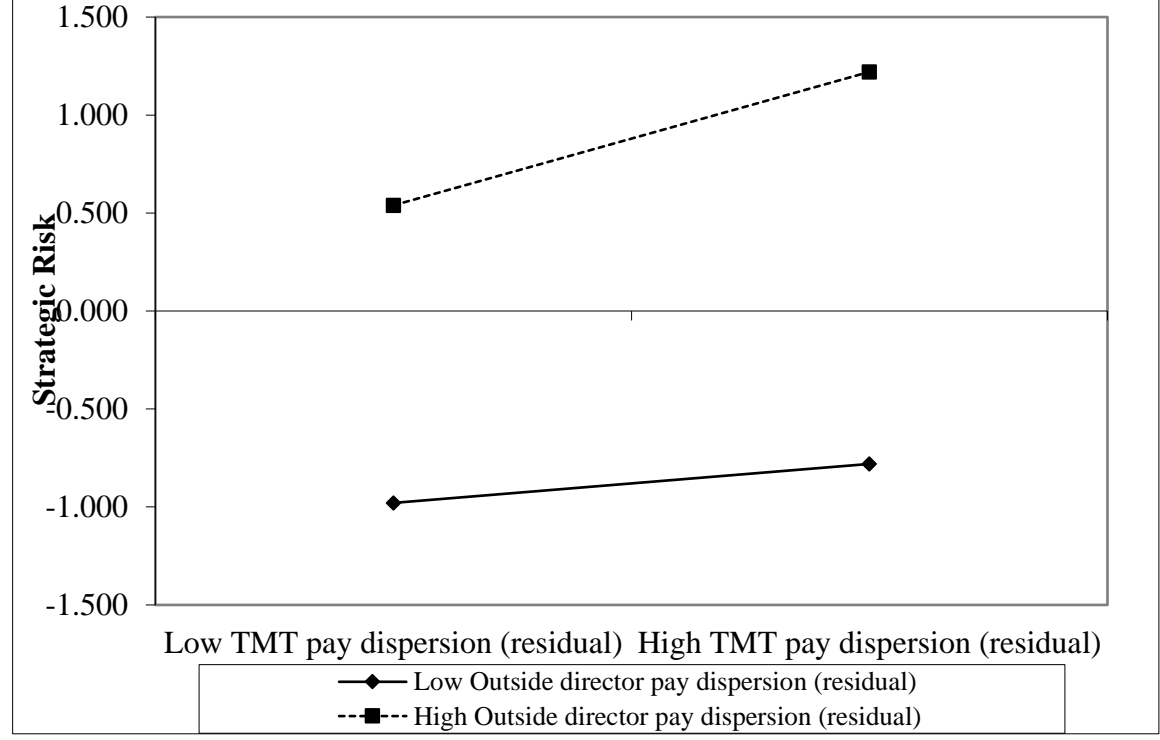

Figure 1(b): Moderation effect of outside director pay dispersion on ROA