



CEO pay inequity, CEO-TMT pay gap, and acquisition premiums

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ABSTRACT

This study extends previous research on the influence of CEO pay inequity on CEOs' decision-making by examining the relationship in the acquisition context. Focusing on CEOs' compensation vis-à-vis external and internal referents, we find that underpaid CEOs pay higher acquisition premiums and that overpaid CEOs pay lower premiums, although this tendency is reduced as the level of overpayment increases, creating a U-shaped relationship. We further find that the CEO-TMT pay gap moderates the relationship between CEO under-/overpayment and acquisition premiums by adjusting CEOs' perceptions of pay inequity and motivation to restore inequity through their higher or lower sense of self-importance. The findings of this study suggest that CEOs' decision-making is strongly influenced by their framing of gains and losses and the perception of pay inequity vis-à-vis external and internal referents.

1. Introduction

Chief executive officer (CEO) compensation has received considerable attention over the last four decades. This body of literature has been influenced greatly by agency theory, and scholars often have examined how specific compensation packages affect behaviors and organizational outcomes (Devers, McNamara, Wiseman, & Arrfelt, 2008; Sanders, 2001). More recently, behavioral agency theory has been used to expand and modify many of the assumptions in agency theory (Wiseman & Gomez-Mejia, 1998). These modifications reveal important new insights into CEO compensation which have been summarized by Pepper and Gore (2015). Foremost among these new insights (for our paper) is an understanding from equity theory that agents maintain perceptions concerning equitable compensation. Agents implicitly make judgments concerning their compensation vis-à-vis market norms and personal referents (Pepper & Gore, 2015). The second insight is an understanding regarding agents' risk preference drawing upon prospect theory. Agents are primarily loss averse (as opposed to risk averse) and view gains or losses against a specific reference point. Below the reference point agents frame situations as losses, and above this reference point agents frame situations as gains. These new insights show that a CEO's equity considerations and framing of situations are important elements in CEO compensation that provide a basis for understanding how CEOs behave in any given context.

In this paper, we focus on firms' acquisition decision as one of important managerial risk-taking behaviors and identify the impact of

CEO compensation on acquisition outcomes. While researchers have found that CEOs who are underpaid relative to the market seek to grow the size of their organization (Fong, Misangyi, & Tosi, 2010) and also pursue more acquisitions in attempts to remedy being underpaid (Seo, Gamache, Devers, & Carpenter, 2015), very few researchers have examined the impact of CEO overpayment. Additionally, we are interested in understanding the impact of CEO compensation vis-à-vis internal referents and how it affects acquisition outcomes, and more specifically, the acquisition premiums paid. Acquirers often pay high premiums that exceed a target's pre-acquisition market value and these excessive premiums are one of the critical causes of poor acquisition performance (Hitt, Harrison, & Ireland, 2001; Sirower, 1997). A large body of research provides various explanations for why firms acquire other firms and pay high acquisition premiums (e.g., Berkovitch & Narayanan, 1993; Bradley, Desai, & Kim, 1983; Kaufman, 1988; Laamanen, 2007; Makri, Hitt, & Lane, 2010), and an increasing number of researchers have begun to consider the perspective of the decision maker (e.g., Haunschild, 1994; Hayward & Hambrick, 1997; Kim, Haleblan, & Finkelstein, 2011; Roll, 1986).

Extending this line of research, we focus on a CEO's compensation relative to the CEO labor market and related framing of the relative pay as gains or losses, and examine how CEOs' perceptions of inequity caused by underpayment or overpayment affect the CEOs' decision making, manifested as sizes of acquisition premiums paid. We also explore why and how an internal pay gap between an organization's CEO and top management team (TMT) moderates the focal

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relationships between CEO under-/overpayment and acquisition premiums. We find that when CEOs are underpaid relative to other CEOs, they tend to pay higher acquisition premiums. We also find that a higher internal pay gap between CEO and TMT strengthens this positive relationship and leads to higher premiums. On the other hand, we find a curvilinear, U-shaped relationship between CEO overpayment and acquisition premiums. Moreover, a higher CEO-TMT pay gap moderates and flattens this U-shaped relationship.

Our findings make several contributions. First, our study contributes to behavioral agency theory by showing that equity judgement and risk preference is an important factor that determines a CEO's tendency to take risks or reduce risks in the compensation setting. Second, we extend research on acquisition premiums by proposing that a CEO's relative pay standing vis-à-vis internal and external referents predicts the size of the acquisition premium paid to a target firm. Third, our study contributes to literatures on CEO compensation by showing that overpayment influences the CEOs' decision making, manifested as sizes of acquisition premiums paid. Our findings also show that a higher CEO-TMT pay gap can inflate perceived self-worth and enhance or reduce the effects of pay-related inequity caused by the external comparison on acquisition premiums. These findings yield new insights that reveal which factors affect acquisition premiums, suggesting a more complex process.

2. Theory and hypotheses

2.1. Underpaid CEO and acquisition premiums

Behavioral agency theory provides an important foundation for explaining how CEOs may approach decision making in their companies in light of their compensation. Two elements of behavioral agency theory are particularly germane for understanding how a CEO's compensation may affect acquisition decisions: equity judgement and risk preference. The first element is that CEOs make social comparisons and equity judgments. Extant empirical studies show that the social comparison process operates in the CEO compensation setting (Ezzamel & Watson, 1998; O'Reilly, Main, & Crystal, 1988; Porac, Wade, & Pollock, 1999).¹ Individuals continuously assess the relative fairness of their situation, and when they perceive a situation to be inequitable they are likely to experience cognitive dissonance. Since individuals want to be rewarded fairly for their inputs, they will reduce the dissonance caused by the unfair situation by maintaining a similar ratio of inputs to rewards to others. When faced with an unfair situation, individuals may adjust the perceived inequity either behaviorally (e.g., by changing an input/output or leaving the situation) or cognitively (e.g., by distorting perceptions of inputs and outcomes) (Adams, 1963).

A number of studies provide evidence that a CEO's perceived unfairness regarding his/her pay can lead to various attempts to restore equity. Specifically, CEOs may choose to increase/reduce inputs (Cowherd & Levine, 1992), or try to alter outcomes (Greenberg, 1990). Although modifying rewards may not be an available option for most non-managerial employees (Shin, 2016), it may be possible for CEOs to achieve equity in this way. This may be an option, in part, because CEOs tend to have a high desire for status and prestige as well as the power to influence a firm's decisions through which they can increase their pay (Marris, 1964; McClelland & Boyatzis, 1982). Therefore, it is

¹ A CEO's relative pay level in comparison to that of CEOs at other firms and the associated concerns of fairness can only stand under the assumption that most CEOs are aware of other CEOs' pay levels and are able to compare their pay against that of other CEOs. This assumption is very likely because publicly traded companies are required to disclose CEO compensation data in their proxy statements and because information about CEO pay is publicly available, making the comparison fairly easy. As such, since CEOs are easily able to compare their pay to other CEOs, social comparison naturally leads to judgments concerning compensation fairness or equity.

likely that CEOs who feel underpaid prefer to choose the “increasing outcomes” option to reduce the perceived inequity of unfair compensation. Consistent with this argument, Seo et al. (2015) found that underpaid CEOs tend to pursue more acquisitions in an attempt to increase their compensation.

The second element of behavioral agency theory that is relevant to understanding how CEO's compensation may affect acquisition decisions and premiums is CEOs' risk preference. Decision makers are primarily loss averse (rather than risk averse) and they frame a situation as a gain or loss based on a specific reference point which is constructed by their aspiration level: their own experience (i.e., historical aspiration) and their observation of similar others (i.e., social aspiration) (Cyert & March, 1963). The social aspiration level is likely created from a social comparison process, and the reference point constructed by the social aspiration level is particularly relevant to the compensation context. Given the premise that most CEOs are cognizant of other CEOs' pay levels, CEOs may compare their compensation with that of referent groups of other CEOs and consider their relative compensation as overpaid (gains) or underpaid (losses). Pepper and Gore (2015: 1048–1049) note that “gains and losses are calculated by each individual agent in relation to a reference point that he or she subjectively determines. Risk preferences differ in gains and losses, resulting in an “S-shaped” value function, with losses looming larger than gains. This means that, below a reference point, agents will be loss averse, resulting in an increase in their appetite to take short-term risk. Above the reference point agents will generally be risk averse”. From a behavioral agency perspective, underpaid CEOs are likely to frame their situation as losses, and thus be willing to take riskier actions to ameliorate the condition of being underpaid. In the context of an acquisition, this means that these CEOs are willing to pursue riskier deals that are costlier to close and require higher premiums.

A growing body of recent research shows that a CEO's compensation generally increases after completing an acquisition deal, regardless of acquisition performance (e.g., Harford & Li, 2007), even when the acquiring firm's stock price declines (Bliss & Rosen, 2001). Many CEOs also receive financial benefits such as an M&A bonus on the completion of a successful deal. Besides this direct form of extra compensation given as a result of acquisition, becoming the CEO of a large firm by acquiring other firms presents an opportunity for greater compensation (Tosi, Werner, Katz, & Gomez-Mejia, 2000). Therefore, given that completing an acquisition deal may be viewed as an attractive option to earn extra wealth, underpaid CEOs who are motivated to reduce their perceived pay inequity may have a strong incentive to close a deal regardless of the acquisition premium that needs to be paid. Thus, we hypothesize that underpaid CEOs are more likely to pay high acquisition premiums than CEOs who are not underpaid.

Hypothesis 1. There is a positive relationship between CEO underpayment and acquisition premiums.

2.2. Moderating role of CEO-TMT pay gap on the underpayment-acquisition premium relationship

CEO-TMT pay gap, or pay disparity within the top management team, has long been studied in the strategic management field with a focus on how the gap would affect TMT behaviors and organizational performance (Fredrickson, Davis-Blake, & Sanders, 2010; Ridge, Aime, & White, 2015). Yet, there is very little research that theoretically predicts how the CEO would be affected by this pay gap. While a CEO's motivation and subsequent risk-taking behaviors are affected by the magnitude of dissonance caused by perceived pay inequity vis-à-vis external referents (i.e., other CEOs), we argue that he or she may also be affected by pay comparisons with internal referents (i.e., TMT).

Although external peers are deemed a more appropriate and relevant referent for CEOs with regard to their pay, internal comparison with members of the TMT is also likely to be the driver of individual

concerns because internal comparisons are socially and physically proximate (i.e., Festinger, 1954). CEOs are likely to be sensitive to the internal social context and potential comparisons with those executives. Specifically, CEOs would likely want their pay to be significantly higher than other members of the TMT because the pay should reflect their highest status, power and authority, and ability in the firm.

Higher relative CEO compensation in an organization is indicative of more power and status of the CEO (Finkelstein, 1992; Finkelstein & Hambrick, 1996) and the CEO's high sense of self-importance and perceived value to the company given that the CEO has substantial influence over an organization's compensation structure (Hambrick & Cannella, 1993). Hayward and Hambrick (1997) argued that CEOs are likely to have a greater sense of self-importance when their relative pay is greater. Specifically, a CEO who enjoys much higher pay relative to the TMT may view herself or himself as “distinct” rather than “similar” to other top executives in terms of power, status, and performance. According to tournament theory, the pay gap between the CEO and TMT is what differentiates the winner and the loser, and thus CEOs ought to be proud of and feel good about themselves when this pay gap is larger.

Building on the link between the CEO-TMT pay gap and CEO's perception of self-worth, we argue that underpaid CEOs with a higher sense of self-worth and/or self-importance may have an inflated perception of inequity, which in turn gives rise to a greater motivation and willingness to prove their superior self-worth and to resolve their pay inequity concerns. In other words, underpaid CEOs would have stronger motivation than non-underpaid CEOs to complete acquisition deals even if they may have to pay high premiums.

In contrast, when a low internal pay gap between the CEO and TMT exists, the CEO may view herself or himself as essentially “similar” to other members of the TMT and not particularly deserving excessive compensation. In this situation, underpaid CEOs (relative to external referents) are less likely to be acutely sensitive to the pay inequity and may implicitly rationalize the inequity to a lower sense of self-importance. The internal relative pay equality may therefore justify the external pay inequity, and thus weakens the motivation to take extra risks in acquisition deals as a way to capture greater wealth deemed lost. Taken together, we hypothesize the following for the moderation effect of CEO-TMT pay gap on the relationship between underpaid CEOs and the size of acquisition premiums.

Hypothesis 2. The CEO-TMT pay gap moderates the relationship between a CEO's underpayment and acquisition premiums in such a way that a high internal pay gap strengthens the positive relationship between CEO underpayment and acquisition premiums.

2.3. Overpaid CEO and acquisition premiums

For the CEO who is overpaid vis-à-vis external referents, equity considerations may also come into play. One likely scenario, in the situation where CEOs enjoy higher compensation relative to their peers, is that these overpaid CEOs may choose to increase their effort. We posit that overpaid CEOs put more effort into upholding their firms' and/or shareholders' interests to justify being over-rewarded or to prove that they are worthy of such high pay. Theoretically, overpaid CEOs have two possible options (Adams, 1963)—increasing effort or reducing rewards—but research has revealed that the former option is more likely. High compensation often reflects a CEO's power and prestige; thus, reducing rewards would not be an attractive option for CEOs to address overpayment because they often have a high need for power and status (March, 1984; McClelland, 1975). Considerable empirical research provides support for this outcome. For example, Fong et al. (2010) suggested that overpaid CEOs would increase their efforts to enhance firm profitability as a means to reduce pay inequity associated with overpayment. Also, Carpenter and Sanders (2002) found that firms had higher performance when their top executive members

received higher pay than expected. In contrast, firms in which the executives were underpaid had lower performance. In the context of making an acquisition, the CEO's increased effort will likely be manifested as stronger due diligence and concern for executing good deals.

CEOs' risk preference may also influence the CEO who is overpaid vis-à-vis referent groups of other CEOs. Given the argument that CEOs may compare their pay levels with those of referent groups of other CEOs, CEOs who receive higher compensation relative to other similar groups of CEOs are likely to be gain-framed (Pepper & Gore, 2015). According to behavioral agency theory, agents who are gain-framed will be more risk averse. Acquisition is inherently risky and paying a high acquisition premium simply amplifies the risk of an acquisition. For this reason, we believe that these CEOs would try to minimize premiums in order to reduce risk. They are likely to perform more careful and thorough analyses of target firms and to maintain an objective or more conservative point of view in assessing the potential value of an acquisition. They also may utilize advice from experts who can help the acquiring firm limit premiums (Kim et al., 2011). CEOs who are more interested in completing an acquisition deal rather than doing it right may be delinquent during negotiations, which can result in higher acquisition premiums. Extra effort put toward leading an effective negotiation can help avoid this problem. In sum, CEOs who are overcompensated are likely to pay lower acquisition premiums because they expend greater effort to justify their higher compensation and because they are likely to be risk averse.

While overpaid CEOs may pay lower premiums in general, social comparison processes may undermine the mechanisms that motivate lower premiums. In particular, we believe that CEOs who enjoy much higher levels of relative pay experience hubris, which can be an undermining force. Executive compensation studies grounded on the behavioral approach have suggested that higher executive compensation boosts CEO overconfidence (Hayward & Hambrick, 1997; Paredes, 2005) since these executives have enjoyed positive feedback and praise for their previous successes. Hubris may also reduce the risk aversion that might normally arise when a CEO is gain-framed. Overpaid CEOs may take their high pay for granted and discount the riskiness of decisions since they may overvalue their own abilities. This overvaluing of abilities is likely to result in reduced effort as well. Drawing on Roll's (1986) work on the “hubris hypothesis,” considerable empirical research has shown that overconfident executives tend to take more risk (Brown & Sarma, 2007; Malmendier & Tate, 2005), and pay high premiums in acquisitions (Hayward & Hambrick, 1997).

To reconcile these opposing predictions, we propose a curvilinear relationship between CEO overpayment and acquisition premiums. We hypothesize that overpaid CEOs are more risk averse and increase their efforts to perform successful acquisitions, as reflected in lower acquisition premiums. However, at higher levels of overcompensation, CEOs develop hubris and a concomitant overconfidence in their own abilities. This has the dual effect of reducing the perceived riskiness of decisions as well as the perceived need to expend more effort in acquisition deals, leading to higher acquisition premiums.

Hypothesis 3. There is a U-shaped curvilinear relationship between CEO overpayment and acquisition premiums.

2.4. Moderating role of CEO-TMT pay gap on the overpayment-acquisition premium relationship

We believe that internal social comparisons may weaken or strengthen overpaid CEOs' perceived self-importance and hubris, thereby affecting their decision making. Specifically, a CEO who is rewarded with very large pay disparity in comparison to the TMT may consider the gap a recognition of performance or status, given the implications of pay for power, status, ability, or performance, which in turn contributes to the CEO's belief that he or she is inherently different from other members of the TMT and superior to them. Therefore, CEOs'

heightened sense of power and self-worth may likely lead to an internalized justification for this overpayment rather than increased effort as a way to resolve pay inequity. This expected effect of high internal pay gap in the case of CEO overpayment is quite contrasting to the underpayment situation in which CEOs' heightened sense of self-worth contributes to enhancing their motivation to earn back what they think they deserve.

Overpaid CEOs (relative to external referents) that are also compensated much higher relative to the TMT are less likely to be engaged in the process of proving their value than overpaid CEOs whose pay is marginally higher than top executives in the TMT. Such lack of effort and engagement will likely be manifested as imperfect due diligence regarding potential acquisition risks, often resulting in paying high premiums. Furthermore, we posit these CEOs are overconfident and likely discount the risk involved in acquisitions. They are willing to take aggressive actions and can be excessively optimistic about the outcomes. In addition, since overpaid CEOs with relatively higher pay in comparison to TMT members may be much more confident about their acquisition preferences and related decisions, the TMT's group decision making process for the acquisition deal can be affected. In effect, these CEOs feel that they are more important to their company than other top managers; accordingly, they tend to undervalue the contributions of others and discount any calls for prudence. Inputs from TMT members recommending the need for caution or concerns about revealed information in the due diligence process may be discounted during the decision-making process. Thus, we expect this situation to result in higher premiums *ceteris paribus*.

Hypothesis 4. The CEO-TMT pay gap moderates the U-shaped curvilinear relationship between a CEO's overpayment and acquisition premiums in such a way that a high internal pay gap weakens the U-shaped curvilinear relationship between CEO overpayment and acquisition premiums.

3. Methods

3.1. Data and sample

To test our hypotheses, we used a sample of all firms excluding finance and insurance companies in the Compustat® ExecuComp database for the years 2000–2012. We obtained acquisition data from the SDC Mergers and Acquisitions database and applied several criteria to select our sample. We only included completed acquisition deals with transaction values greater than \$10 million leading to > 50% ownership of the target firm. We also required that both the acquirer and target be U.S. publicly traded firms and that the acquisition premium be disclosed. We used Compustat and CRSP tapes to obtain financial information for all firms. Finally, by matching the ExecuComp database against the SDC database, we identified firms in the ExecuComp database that were involved in acquisitions during the 2000–2012 period. After implementing these criteria and excluding observations with missing values, we obtained a final sample of 715 acquisitions made by 484 CEOs. We used a 1-year lag in the compensation variables based on the expectation that prior pay inequity affects current acquisition activity. Lastly, we adjusted all CEO compensation data to 1999 dollars using the consumer price index from the U.S. Bureau of Labor Statistics.

3.2. Dependent variable

Acquisition premium is commonly measured as the difference between the purchase price paid by the acquiring firm and the target's pre-announcement market value, divided by the target's pre-acquisition market value. Calculating the acquisition premium based on a longer-term window as a basis for the target's pre-announcement stock price may introduce noise caused by confounding events during the period

(Laamanen, 2007). Thus, we used announcement day premium² in order to reduce the effects of potential distracting events. Calculating the acquisition premium based on a shorter-term window may underestimate the acquisition premium due to the market's pre-acquisition anticipation (Laamanen, 2007). In our sample, this pattern occurs as well; announcement day premiums were 35.5%, 1-week average premiums were 38.6%, and 4-week average premiums were 44.2%. Since there are studies that have applied longer time periods to reduce the potential effect of leakage of information right before the announcement (Hayward & Hambrick, 1997; Reuer, Tong, & Wu, 2012), we also calculated the acquisition premium based on longer-term windows (i.e., 1 week and 4 weeks) in order to test the robustness of our results.

3.3. Independent and moderating variables

CEO underpayment and overpayment is the difference between a CEO's actual pay and his/her predicted pay based on market norms. Following previous studies (Fong et al., 2010; Seo et al., 2015; Wade, O'Reilly, & Pollock, 2006; Watson, Storey, Wyncarczyk, Keasey, & Short, 1996; Wowak, Hambrick, & Henderson, 2011), we constructed a CEO wage equation for total compensation in year $t - 1$, where t represents the year that the acquisition premium was measured.³ To estimate CEOs' predicted pay, we ran ordinary least squares (OLS) regression with the cluster option for 19,505 observations associated with 4297 CEOs in the ExecuComp database between 1999 and 2012. We regressed the natural log of total compensation on a set of relevant factors that have been shown to influence CEO compensation in previous literature including the CEO's total pay, firm sales, the firm's return on assets (ROA), the CEO's tenure as CEO and tenure with the firm, CEO/Chairman duality, the CEO's age, the CEO's ownership in the firm, and whether the CEO was hired from inside the firm. The equation is as follows:

$$\begin{aligned} \ln(\text{CEO total pay}) = & \beta_0 + \beta_1 \ln(\text{firm sales}) + \beta_2 (\text{firm ROA}) \\ & + \beta_3 (\text{CEO tenure}) + \beta_4 (\text{firm tenure}) \\ & + \beta_5 (\text{CEO/chair duality}) + \beta_6 (\text{CEO age}) \\ & + \beta_7 (\text{CEO ownership}) + \beta_8 (\text{insider hire}). \end{aligned}$$

We also included year, industry, and S&P size index dummies. The model explained 40% of the variance.⁴ We then measured CEO under-/overpayment using the residuals from the CEO wage equation: a negative residual indicated that the CEO was underpaid because the CEO's actual pay was less than the predicted pay. Conversely, a positive residual suggested that the CEO was overpaid. We set *CEO underpayment* equal to the CEO residual term if the residual was negative, and 0 otherwise. We set *CEO overpayment* equal to the CEO residual value if the residual was positive, and 0 otherwise. We reversed the negative signs of the CEO underpayment variable, thus a higher positive value represents a higher degree of underpayment.

CEO-TMT pay gap. Given that CEOs have considerable influence over the setting of their own pay and the pay of other executives in their firms (Tosi & Gomez-Mejia, 1989), prior studies have used the CEO-TMT pay gap as a proxy for the CEO's self-importance or dominance (e.g., Hambrick & D'Aveni, 1992; Hayward & Hambrick, 1997). Similar to previous studies (e.g., Henderson & Fredrickson, 2001), we calculated *CEO-TMT pay gap* as the ratio of the CEO's total compensation to

²We used the SDC Mergers and Acquisitions database's "Date Announced (DA)" field as the event date. The announcement day is the date on which material and information regarding a deal is disclosed to the market by one or both of the merging parties.

³Total compensation, reported in the ExecuComp as item TDC1, includes salary, bonus, other annual awards, total value of restricted stock granted, total value of stock options granted (calculated using the Black-Scholes methodology), long-term incentive payouts, and all other compensation.

⁴This value of the variance is in line with those in prior studies using a similar estimation approach (e.g., 38% for 1679 CEOs; Wowak et al., 2011).

the average total compensation for the next four highest-paid TMT members. Since CEO-TMT pay gap may vary by industry, we regressed CEO-TMT pay gap on four sets of industry dummies (one-digit, two-digit, four-digit SIC code, and high-tech industry dummy⁵) to see if there is a significant industry effect. However, the results did not provide meaningful evidence for the effect of industry types on CEO-TMT pay gap. We also measured the pay gap using only the cash portion of the total compensation (salary and bonus) in order to test the robustness of our results.

3.4. Control variables

Following existing research on acquisition premiums, we controlled for factors that may potentially influence the acquisition premium. At the organizational level, we first included several acquirers' organizational characteristics. Since larger acquirers might be able to pay a higher premium, *Acquirer size*, measured by the natural log of the total assets of an acquirer, was controlled for the potential effect of firm size. We added *Acquirer profitability*, which was measured by the acquirer's return on assets, to control for the impact of acquirers with strong financial performance on acquisition premium. *Acquirer stock performance* is defined as the acquirer's 360-day returns minus CSR value-weighted index. Similarly, *Acquirer slack resources*, measured by the ratio of current assets divided by current liabilities, was included in the model. Since firms with prior acquisition experience may more effectively manage the current acquisition (Haleblian, Kim, & Rajagopalan, 2006), we also controlled for *Acquirer acquisition experience*, as measured by the number of acquisitions made during the previous five years.

Second, we controlled for three of the targets' characteristics that could affect the attractiveness of a target: *Target size*, which was measured by the natural log of a target's total assets and *Target profitability*, which was measured by the return on assets of a target. Acquirers may take a target's high market to book ratio into account and pay low premiums since the high capital market valuation reduces the likelihood of additional growth opportunities that an acquirer can realize after an acquisition (Laamanen, 2007). Thus, we also controlled *Target growth opportunity*, which was measured by the ratio of target pre-acquisition market value to its book value.

With regard to acquisition transaction characteristics, we included *Competing bidders* in the model because the presence of competing bidders can increase the target firm's bargaining power and thus influence the acquisition premium (Giliberto & Varaiya, 1989). It is a dummy variable equal to 1 if there were two or more bidders for the same target and 0 otherwise. An acquisition through tender offer may result in a higher acquisition premium because management of a target tends to resist the tender offer (Raghavendra & Vermaelen, 1998). Thus, we controlled for *Tender offer*, coded 1 if an acquisition was a tender offer and 0 otherwise. Acquiring firms may pay higher premiums to overcome the resistance of the target firm management to the acquisition (Baron, 1983; Laamanen, 2007). Accordingly, we included *Target resistance*, which was measured with a dummy variable equaling to 1 if a target employed defensive tactics, and 0 otherwise. *Payment method* can also influence acquisition premiums (Loughran & Vijh, 1997). Thus, we included a dummy variable coded as 1 if the deal was all cash, and 0 otherwise. Relationships with acquisition professional firms have also been shown to influence acquisition premiums (Haunschild, 1994).

⁵ We constructed the "high-tech industry" dummy using SIC codes (Hagedoorn & Duysters, 2002; Zaheer, Hernandez, & Banerjee, 2010): Drugs and medicines (SIC 2833–2836); computers and office equipment (3571–3579); electrical equipment (3612–3652); communications equipment (3661–3699); aerospace and aircraft (3721, 3724, 3728, 3761, 3764, 3769); measuring, photo equipment, and clocks (3821–3899); computer programming, data processing, etc. (737×); engineering services (8711); and R&D and testing services (873×).

Thus, we controlled for *Acquirer use of an advisor* and *target use of advisor*, measured as the total number of advisors used by the acquirer and target, respectively.

Corporate governance characteristics of an acquiring firm have been shown to have an effect on strategic decisions due to potential agency problems. Therefore, we controlled for several CEO-level variables that may influence firms' acquisition decisions. *CEO tenure* was measured as the number of years the CEO has held his or her current position and *CEO/Chairman Duality* was measured with a dummy variable equal to 1 if the CEO holds both the chief executive officer and chairman of the board positions, and 0 otherwise. *CEO ownership* represents the percentage of stock held by the CEO of the acquiring firm. The structure of CEO compensation of the acquiring firm may affect the acquisition premium. Datta, Iskandar-Datta, and Raman (2001) found that CEOs with high equity-based compensation pay lower acquisition premiums, and Bliss and Rosen (2001) also showed CEOs with more contingent pay were less likely to make an acquisition. Hence, we controlled for *Cash/Total compensation*, measured by the ratio of the CEO's cash compensation to total compensation, and *In-the-money options*, measured by the estimated value of in-the-money unvested stock options for the CEO at fiscal year-end. *Outsider CEO* is a dummy variable where 1 denotes that the CEO is hired from outside the firm and 0 denotes the CEO was hired from inside. Industry and year dummies are included but not reported.

Finally, other potentially confounding factors were included as control variables. Following Chatterjee and Hambrick (2011), we controlled for the financial and product relatedness that potentially influence acquisition premiums. *Financial synergy* was measured as the debt-to-equity ratio of the target less the debt-to-equity ratio of the acquirer. The relative size of an acquisition can also influence the acquisition premium that an acquirer is willing to pay (Asquith, Bruner, & Mullins, 1983; King, Dalton, Daily, & Covin, 2004). Accordingly, we controlled for *Relative size of target*, measured by dividing the target firm's sales by the acquirer's sales. We measured *Product relatedness* using a four-point scale: 4 points if acquirer and target shared identical 4-digit SIC codes; 3 points if acquirer and target shared identical 2-digit SIC codes; 2 points if acquirer and target shared some intangible commonalities and 1 point if acquirer and target were unrelated.

3.5. Method of analysis

We used the generalized estimation equations (GEE) method developed by Liang and Zeger (1986) to analyze our data.⁶ This method has been widely used to analyze longitudinal and nested data, particularly when outcome variables are highly correlated within a subject since the GEE method controls for non-independent observations. In our sample, many firms were engaged in more than one acquisition and so observations by the same firm are likely to be correlated and share common variances. We specified a Gaussian (normal) distribution for the dependent variable, with an identity link function and exchangeable correlation structure, and used a robust variance estimator (White, 1980).

4. Results

4.1. Regression results

Table 1 presents the means, standard deviations and correlations of all variables used in this study. Analysis of the variance inflation factor

⁶ We also estimated our regression models using the simpler models—fixed- and random-effects models. The results from Hausman's (1978) specification test indicated that the random-effects model is a more appropriate choice for our sample (chi-squared = 32.05, $p = 0.8898$), thus the analysis was estimated with the *xtreg* function with the random effect (re) option in STATA. The regression results for all our hypotheses were almost identical to those from the GEE analysis.

Table 1
Descriptive statistics and correlation matrix between variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1. Acquisition premiums	1													
2. Acquirer size	0.02	1.00												
3. Acquirer profitability	0.05	0.29	1											
4. Acquirer stock performance	0.02	-0.24	-0.10	1										
5. Acquirer slack resource	0.03	-0.41	-0.15	0.19	1									
6. Acquirer acquisition experience	0.00	0.48	0.14	-0.07	0.24	1								
7. Acquirer R&D intensity	0.01	-0.28	-0.49	0.23	0.00	0.00	1							
8. Target size	-0.12	0.37	0.06	-0.10	-0.25	-0.05	-0.20	1						
9. Target profitability	-0.19	0.09	0.14	0.00	-0.15	-0.06	-0.12	0.41	1					
10. Target growth opportunity	-0.07	0.00	0.00	0.10	0.06	0.10	0.04	-0.03	0.01	1				
11. Financial synergy	-0.02	-0.04	0.03	-0.03	-0.06	-0.06	0.01	0.19	0.08	0.20	1			
12. Relative size of target	-0.09	-0.24	-0.13	0.18	0.07	-0.17	0.12	0.33	0.10	-0.02	0.10	1		
13. Product relatedness	-0.04	-0.28	-0.09	0.08	0.12	-0.08	0.09	0.09	-0.05	0.02	0.09	0.09	1	
14. Competing bidders	0.12	0.03	0.04	-0.04	-0.01	0.00	-0.03	0.09	0.03	-0.04	-0.06	0.02	0.03	1
15. Tender offer	0.15	0.03	0.10	-0.09	-0.02	0.06	-0.03	-0.07	-0.07	-0.06	0.04	-0.11	-0.08	0.15
16. Target resistance	0.01	-0.07	0.01	0.15	0.06	0.01	0.09	0.01	-0.02	0.06	0.02	0.07	0.06	0.02
17. Payment method	0.12	0.23	0.17	-0.22	-0.08	0.19	-0.06	-0.22	-0.08	-0.05	-0.11	-0.28	-0.15	-0.01
18. Acquirer use of advisor	-0.04	0.03	-0.05	0.00	0.02	-0.12	-0.04	0.45	0.12	0.03	0.07	0.21	0.09	0.09
19. Target use of advisor	-0.07	0.17	0.02	-0.02	-0.11	0.03	-0.07	0.37	0.07	-0.01	0.06	0.18	0.04	0.06
20. CEO/chairman duality	0.00	0.24	0.09	0.04	-0.09	0.08	0.01	0.10	0.10	0.06	0.05	0.00	-0.11	0.03
21. CEO age	-0.03	0.20	0.12	-0.09	-0.08	0.09	-0.07	0.12	0.11	-0.07	-0.02	0.01	-0.08	0.03
22. CEO tenure	-0.05	0.00	0.00	0.00	-0.01	0.08	0.04	0.01	0.03	-0.02	0.00	0.01	0.03	0.01
23. CEO ownership	-0.02	-0.03	0.05	0.08	0.04	0.09	0.01	0.02	0.02	0.02	0.03	0.03	0.06	0.02
24. Cash/total compensation	-0.06	-0.17	-0.02	-0.03	-0.03	-0.11	-0.01	-0.07	0.03	-0.01	0.00	0.04	-0.02	0.02
25. CEO in-the-money options	-0.08	0.12	0.21	0.20	-0.04	0.15	-0.05	0.00	0.06	0.05	0.04	-0.03	-0.01	-0.03
26. Outsider CEO	0.00	-0.22	-0.08	0.07	0.08	-0.04	0.10	-0.16	-0.11	0.03	-0.05	0.00	0.05	0.07
27. CEO underpayment	0.06	0.06	0.00	-0.03	0.01	-0.02	0.00	0.01	-0.04	-0.01	-0.07	0.01	0.02	-0.01
28. CEO overpayment	-0.08	-0.15	-0.02	0.16	0.22	0.04	0.07	-0.02	-0.01	0.01	0.10	0.04	0.11	-0.03
29. CEO-TMT pay gap	0.03	-0.07	0.00	0.11	0.04	-0.04	-0.01	0.02	0.01	0.04	0.09	0.03	0.00	-0.02
Mean	35.48	8.18	0.06	0.21	2.44	1.26	0.10	5.39	-0.06	3.34	-0.05	0.25	2.34	0.05
S.E.	25.07	1.86	0.10	0.52	2.53	1.81	0.33	1.87	0.30	12.05	0.50	0.57	1.66	0.22

1.	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
2.															
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
11.															
12.															
13.															
14.															
15.	1														
16.	0.04	1													
17.	0.29	-0.09	1												
18.	-0.02	0.01	-0.23	1											
19.	-0.07	-0.06	-0.11	0.29	1										

(continued on next page)

Table 1 (continued)

	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)
20.	-0.07	0.03	0.03	-0.01	0.07	1	1	1	1	1	1	1	1	1	1
21.	0.03	-0.05	0.03	0.03	0.10	0.22	0.38	1	1	1	1	1	1	1	1
22.	0.03	0.07	0.04	-0.08	-0.01	0.09	0.06	0.41	1	1	1	1	1	1	1
23.	0.00	0.04	0.01	-0.07	-0.02	-0.03	0.08	0.00	0.12	1	1	1	1	1	1
24.	-0.03	-0.02	-0.06	-0.04	-0.02	-0.02	0.02	0.02	0.22	0.01	1	1	1	1	1
25.	-0.04	0.04	0.08	-0.10	-0.05	0.10	0.07	0.26	0.18	0.40	0.05	1	1	1	1
26.	0.00	0.10	-0.02	-0.11	-0.13	-0.06	0.05	0.03	0.19	0.43	0.21	0.18	1	1	1
27.	-0.03	0.11	-0.01	-0.01	0.07	0.03	0.05	0.19	0.18	0.29	0.21	0.18	0.20	1	1
28.	-0.01	0.07	-0.08	-0.06	-0.05	-0.10	-0.06	0.00	0.19	0.29	0.06	0.00	0.28	0.41	1
29.	0.00	0.14	0.25	0.00	-0.06	0.05	-0.06	0.00	0.01	0.32	0.06	0.00	0.28	0.41	3.22
	0.27	0.04	0.57	0.99	1.24	0.64	54.70	6.77	0.01	0.32	5.98	0.20	0.28	0.41	3.22
	0.44	0.19	0.50	0.86	0.57	0.48	6.52	6.93	0.05	0.26	3.77	0.40	0.96	0.60	2.60

N = 715.
p < 0.05 for correlations in bold.

(VIF) shows that the mean level of VIF scores is 1.79 and VIF scores range from 1.08 to 5.98, demonstrating no issues concerning multicollinearity (Cohen, Cohen, West, & Aiken, 2003). The results of the GEE analysis for the relationship among CEO under-/overpayment, CEO-TMT pay gap, and acquisition premiums are shown in Table 2.

In Hypothesis 1, we predicted a positive relationship between CEO underpayment and acquisition premiums. The coefficient for CEO underpayment in Model 2 is positive and significant ($\beta = 1.92$, $p = 0.014$), suggesting that underpayment motivates CEOs to pay larger acquisition premiums for target firms. Model 3 shows that the positive linear relationship between CEO underpayment and acquisition premiums becomes stronger when the CEO-TMT pay gap is high, thus supporting Hypothesis 2 ($\beta = 4.42$, $p = 0.022$).

In Hypothesis 3, we predicted a U-shaped curvilinear relationship between CEO overpayment and acquisition premiums. As shown in Model 2, CEO overpayment is associated with lower acquisition premiums ($\beta = -3.79$, $p = 0.041$), and the significant and positive coefficient of the square term for CEO overpayment in Model 4 supports the U-shaped relationship ($\beta = 4.18$, $p = 0.002$). Although Fig. 2 seems to demonstrate only the left half of the curve,⁷ the results in Model 4 and Fig. 2 suggest that overpaid CEOs tend to pay lower acquisition premiums for target firms, and this tendency becomes weaker as the level of overpayment increases.⁸ On the other hand, the results from Model 5 indicate the U-shaped relationship between a CEO's overpayment and acquisition premiums becomes flatter when the CEO-TMT pay gap is high. In other words, the CEOs who are overpaid tend to pay lower acquisition premiums when the CEO-TMT pay gap is lower but higher acquisition premiums when the CEO-TMT pay gap is high; these results support Hypothesis 4. Results are illustrated graphically in Figs. 1 and 2.

4.2. Robustness tests

We further tested our hypotheses using alternative measures of the dependent and moderating variables, and most of our results remain the same. First, we ran analyses using a continuous measure of CEO relative payment, a focal CEO's regression residual (Wowak et al., 2011). The coefficient for CEO relative payment is negative and statistically significant ($\beta = -4.03$, $p = 0.05$), suggesting that underpaid CEOs pay higher acquisition premiums and that overpaid CEOs pay lower premiums. The square term of CEO relative payment was also significant ($\beta = 0.17$, $p = 0.05$), consistent with the results of our original analysis.⁹

Second, we used the acquisition premiums calculated based on longer-term windows (1 week and 4 weeks) and found a similar pattern of both main and moderating effects although the moderating effect of CEO underpayment on 4 weeks premium was not significant.

Third, we re-estimated all regression models using a new moderating variable to address the possibility that CEO overpayment (independent variable) and CEO-TMT pay gap (moderator) may be

⁷ We speculate that one possible explanation for the insufficient upward slope in the right end is that CEOs may develop hubris or overconfidence at only a very high level of overpayment, which may have not been captured in our sample. We are appreciative of this idea provided by an anonymous reviewer.

⁸ Additionally, we followed a guideline for testing U-shaped relationships by Haans, Pieters, and He (2016) to further examine the curve. Our analysis shows that a turning point was 1.45 and the 95% confidence interval of the turning point was [1.007; 2.529]. Although the slope of the curve is not sufficiently steep at the right end, the turning point is located well within the data range, and both the minimum and maximum value of overpayment were outside the confidence interval of the turning point (the minimum value of overpayment was 0 and maximum value was 3.95).

⁹ In terms of the goodness-of-fit statistics, the original model employing separate measures of CEO under-/overpayment reported a higher R-square and lower RMSE than the model with the continuous measure of CEO relative payment, which suggests that the original model fits the data slightly better.

Table 2
GEE analysis for the relationship among CEO relative pay, CEO-TMT pay gap, and acquisition premiums.

DV = acquisition premiums	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Constant	28.50	(4.72) ***	30.65	(4.84) ***	26.47	(4.98) ***	31.18	(4.85) ***	31.38	(5.13) ***	29.39	(5.33) ***
Acquirer size	-0.27	(1.22)	-0.61	(1.19)	-0.67	(1.12)	-0.70	(1.18)	-0.73	(1.16)	-0.78	(1.10)
Acquirer profitability	1.44	(1.02)	1.44	(0.99)	1.67	(1.01) †	1.62	(0.99) †	1.70	(1.00) †	1.85	(1.00) †
Acquirer stock performance	2.20	(1.06) *	2.32	(1.04) *	2.33	(1.03) *	1.91	(1.04) †	2.05	(1.06) *	2.23	(1.05) *
Acquirer slack resource	-0.05	(0.89)	0.31	(0.99)	0.28	(0.99)	-0.60	(1.00)	-0.27	(1.03)	-0.19	(1.04)
Acquirer acquisition experience	-0.38	(1.14)	-0.31	(1.11)	-0.35	(1.10)	-0.72	(1.12)	-0.52	(1.12)	-0.55	(1.11)
Acquirer R&D intensity	0.07	(0.92)	0.02	(0.90)	0.21	(0.86)	0.20	(0.96)	0.16	(0.92)	0.21	(0.86)
Target size	-0.23	(1.42)	-0.15	(1.44)	-0.26	(1.43)	-0.51	(1.45)	-0.41	(1.44)	-0.46	(1.42)
Target profitability	-4.34	(1.15) ***	-4.18	(1.16) ***	-4.20	(1.18) ***	-4.16	(1.15) ***	-4.11	(1.15) ***	-4.14	(1.16) ***
Target growth opportunity	-1.22	(0.62) *	-1.33	(0.59) *	-1.36	(0.59) *	-1.35	(0.61) *	-1.28	(0.60) *	-1.28	(0.60) *
Financial synergy	0.91	(0.95)	1.23	(0.96)	1.34	(0.96)	1.28	(0.96)	1.19	(0.96)	1.36	(0.96)
Relative size of target	-1.46	(0.67) *	-1.46	(0.66) *	-1.51	(0.66) *	-1.29	(0.66) *	-1.44	(0.69) *	-1.52	(0.71) *
Product relatedness	-0.93	(0.97)	-0.96	(0.98)	-1.05	(0.97)	-0.96	(0.98)	-0.81	(0.98)	-0.96	(0.97)
Competing bidders	14.37	(4.42) ***	14.19	(4.43) ***	14.28	(4.43) ***	14.45	(4.48) ***	14.64	(4.48) ***	14.78	(4.43) ***
Tender offer	3.20	(2.32)	3.30	(2.29)	3.53	(2.30)	3.08	(2.26)	2.75	(2.25)	2.95	(2.26)
Target resistance	-0.45	(4.33)	-1.85	(4.29)	-2.04	(4.48)	-1.34	(4.28)	-2.17	(4.45)	-1.59	(4.42)
Payment method	3.56	(2.11) †	3.30	(2.09)	2.96	(2.06)	3.09	(2.08)	3.25	(2.06)	3.09	(2.04)
Acquirer use of advisor	0.50	(1.08)	0.42	(1.07)	0.52	(1.04)	0.36	(1.06)	0.33	(1.06)	0.44	(1.03)
Target use of advisor	-1.07	(0.92)	-1.18	(0.92)	-1.13	(0.91)	-0.99	(0.93)	-0.99	(0.94)	-1.07	(0.93)
CEO/chairman duality	1.13	(2.05)	0.50	(2.05)	-0.13	(2.07)	0.47	(2.01)	0.94	(2.00)	0.70	(2.00)
CEO age	0.05	(1.12)	0.03	(1.12)	-0.07	(1.12)	-0.16	(1.09)	-0.22	(1.07)	-0.28	(1.09)
CEO tenure	-1.26	(1.09)	-0.92	(1.11)	-0.88	(1.09)	-0.45	(1.10)	-0.37	(1.09)	-0.49	(1.08)
CEO ownership	-0.53	(1.08)	-0.49	(1.19)	-0.09	(1.16)	-0.59	(1.13)	-0.76	(1.14)	-0.43	(1.11)
CEO cash/total compensation	-0.38	(1.04)	-2.29	(1.32) †	-3.32	(1.48) *	-2.73	(1.34) *	-2.58	(1.32) *	-3.58	(1.52) *
CEO in-the-money options	-2.16	(1.05) *	-1.90	(1.06) †	-1.58	(1.06) †	-1.85	(1.06) †	-1.89	(1.05) †	-1.73	(1.06) †
Outsider CEO	-1.10	(2.32)	-0.65	(2.35)	-0.78	(2.35)	-0.62	(2.38)	-0.22	(2.37)	-0.50	(2.36)
CEO underpayment			1.92	(0.78) *	1.87	(0.64) **	1.76	(0.73) *	1.59	(0.73) *	1.30	(0.58) *
CEO overpayment			-3.79	(1.86) *	-4.19	(2.09) *	-12.11	(3.34) ***	-19.00	(3.68) ***	-17.31	(3.75) ***
(CEO overpayment) ²							4.18	(1.38) **	6.53	(1.62) ***	5.79	(1.67) ***
CEO-TMT pay gap					0.55	(0.45)			-0.48	(1.01)	-0.81	(0.98)
CEO underpayment × pay gap					4.42	(1.93) *					4.21	(2.07) *
CEO overpayment × pay gap									2.33	(1.07) *	2.70	(0.99) **
(CEO overpayment) ² × pay gap									-0.81	(0.29) **	-0.89	(0.28) ***
Wald chi-squared	6810	***	6904	***	7051	***	6959	***	7183	***	7459	***
R-squared	0.157		0.164		0.176		0.174		0.184		0.191	
N	715		715		715		715		715		715	

Robust standard errors are in parentheses. R-squared are calculated from OLS regression.

Industry and year dummies included but not reported. Non-binary variables (except CEO under/overpayment and pay gap) centered.

† $p < 0.10$.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$, two-tailed tests.

affected by an underlying common factor.¹⁰ Following the procedure in previous research (e.g., Kaul, 2012), we used the residuals from an ordinary least squares (OLS) model predicting CEO-TMT pay gap as a function of CEO overpayment, resulting in a new moderating variable—'residual' CEO-TMT pay gap. The substantive findings of this re-estimation were consistent with the results of the current models.

Fourth, we tested the effects of CEO under-/overpayment and CEO-TMT pay gap using cash compensation instead of total compensation, and the results were similar to our original analysis employing total compensation. We found a significant and positive effect of CEO underpayment on acquisition premiums and a U-shaped relationship between CEO overpayment and acquisition premiums. We also found that the CEO-TMT pay gap strengthens the positive effect of CEO

underpayment on acquisition premiums. However, the moderation effects of CEO-TMT pay gap on the relationship between CEO overpayment and acquisition premiums were not supported in this analysis although they were in the same direction as hypothesized.

Lastly, we examined the effects of CEO under-/overpayment on alternative measures of risk-taking behavior that are often used in the literature to validate that the CEO's relative pay standing has a general, robust effect on CEO risk-taking behavior. We found that CEO under-/overpayment have the same effects on a firm's overall risky spending¹¹ as those on acquisition premiums. Specifically, the results show that the coefficient of CEO underpayment is positive and significant ($\beta = 0.13$, $p = 0.022$), the coefficient of CEO overpayment is negative and

¹⁰ We are grateful for the reviewer's comment on the potential relationship between CEO overpayment and CEO-TMT pay gap. We agree that these two variables may be affected by an underlying common factor (e.g., CEO's negotiating skill) although we were not able to identify it in this study. To address the high correlation between CEO overpayment and CEO-TMT pay gap, we created a new moderating variable, residuals from an ordinary least squares (OLS) model predicting CEO-TMT pay gap as a function of CEO overpayment. The correlation between CEO overpayment and 'residual' CEO-TMT pay gap has dropped to zero while the correlation between CEO-TMT pay gap and 'residual' CEO-TMT pay gap is 0.8744.

¹¹ Following Chatterjee and Hambrick (2011), we collected data on three major forms of spending—research and development (R&D), capital expenditures, and acquisitions, that are known to have highly uncertain returns. They suggested that these different forms of spending are often substitutes for each other; therefore, each spending category provides only a partial picture of overall risky spending. Thus, we used the logged sum of all three forms of spending as an indicator of risk-taking behavior rather than using each spending category individually. Each form of spending in our sample contributed almost equally to an aggregate annual spending (R&D = 31%; capital = 34%; acquisitions = 35%), thus it seems our measure was not overwhelmingly influenced by any of the three forms of spending.

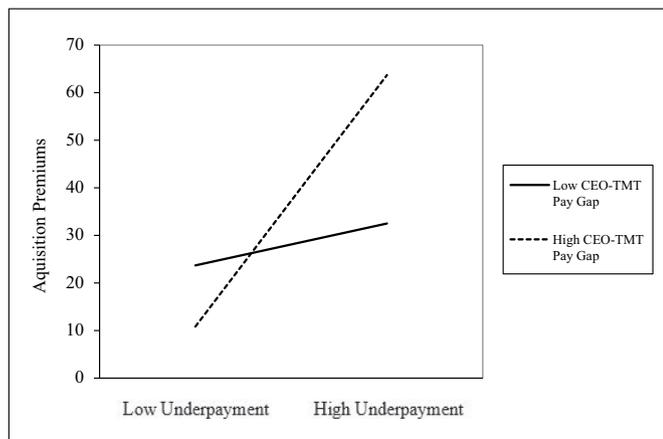


Fig. 1. The interaction effect of underpaid CEOs and CEO-TMT pay gap on acquisition premiums.

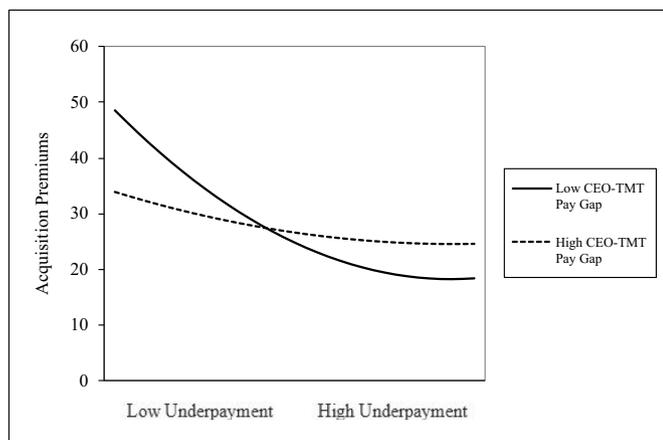


Fig. 2. The interaction effect of overpaid CEOs and CEO-TMT pay gap on acquisition premiums.

significant ($\beta = -0.29$, $p = 0.063$), and the coefficient of the square term of CEO overpayment is significant and positive ($\beta = 0.12$, $p = 0.066$), consistent with our original results. However, the moderating effect of CEO-TMT pay gap was not found in this analysis. In sum, these GEE regressions indicate the robustness of our results.

5. Discussion

In this study, we examine how CEOs' pay inequity vis-à-vis external referents affects their decision making in the context of acquisitions. We then examine how the CEOs' decision making is also affected by pay comparisons with internal referents. We investigate the complex influences of pay inequity vis-à-vis both external and internal referents on CEOs' decision making as pay comparisons shape CEOs' perceptions of inequity and affect their motivation to restore fairness and their decision making to do so. Consistent with our arguments, we find that underpaid CEOs are willing to take higher risks and pay higher premiums for acquisitions. We also find that underpaid CEOs tend to pay even higher premiums when the internal CEO-TMT pay gap is larger. Moreover, we find that when CEOs are overpaid, they tend to pay lower premiums but this tendency becomes weaker as the level of overpayment increases. Our findings also show that the high internal CEO-TMT pay gap weakens the U-shaped curvilinear relationship between CEO overpayment and acquisition premiums.

The present study contributes to several literatures. First, our study contributes to behavioral agency theory by highlighting the important role of equity judgement and risk preference played in a CEO's decision

making. Prior research has shown that equity judgement of decision makers affects their decisions and firm outcomes. For instance, cognitive dissonance engendered by unfairness motivates CEOs to increase the size of their organizations (Fong et al., 2010), undertake more corporate acquisitions (Seo et al., 2014), reduce R&D spending (Fong, 2010a), and decrease future stakeholder management (Fong, 2010b). Consistent with these studies, our study shows that when a CEO's pay negatively deviates from the CEO labor market rate, the CEO is likely to engage in actions in an attempt to remedy pay inequity concern. CEOs' risk preference also strongly influences their decisions and subsequent firm performance. For example, CEO overconfidence (Hayward & Hambrick, 1997; Roll, 1986), CEO celebrity status (Cho, Arthurs, Townsend, Miller, & Barden, 2016), CEO career horizon (Cho & Kim, 2017), and CEO social class background (Kish-Gephart & Campbell, 2015) have been shown to affect CEOs' risk preference and encourage CEOs to avoid or take more risks. Adding to this line of research, our study shows that a CEO's pay deviation from the labor market rate shapes CEOs' risk preference and affects their decisions. A CEO is likely to frame his/her pay deviation as gains or losses and thereby engages in or avoids risk-taking. In sum, our study suggests that fairness concerns and risk preference influence CEOs' behavioral tendencies and subsequent decision making.

Second, our study contributes to literature on the determinants of acquisition premiums. Research has shown that acquisition premiums are determined by several factors, including information asymmetries (Laamanen, 2007), complementary knowledge (Makri et al., 2010), acquirers' financial performance (Kim et al., 2011), board interlocks (Haunschild, 1994), CEOs' cognitive characteristics (Hayward & Hambrick, 1997; Roll, 1986), and CEO celebrity status (Cho et al., 2016). In line with the prior study that focuses on the role of CEOs in influencing acquisition premiums, this study highlights the effects of CEOs' under-/overpayment relative to the CEO labor market rate on the size of acquisition premiums paid to the target firm. Underpaid CEOs seem to have a self-interested motive to increase their compensation in order to resolve the dissonance engendered by their lower compensation relative to their peers. Our results clearly suggest that underpaid CEOs choose to increase outputs and view acquisitions as opportunities to earn extra wealth, which would make their compensation equitable with their external referents; as a result, they are likely to pay high acquisition premiums in order to complete a deal.

Third, our study contributes to the literatures on relative CEO compensation. In particular, our study shows that overpaid CEOs may have similar fairness concerns but behave differently. We note that the idea was widely accepted that individuals do not respond strongly to positive inequity because they tend to rationalize and accept overcompensation while they are less willing to accept underpayment, even though both situations are supposedly "unfair" (Mowday, 1996). Research has provided consistent evidence showing that underpayment triggers stronger reactions than does overpayment (Brown, 2001; Ezzamel & Watson, 1998). We believe that a lack of empirical research exploring the effect of a positive pay deviation has resulted, in part, from a common belief that the extent to which overpaid CEOs are likely to take actions (e.g., increasing their inputs) to balance the equation of inputs and outputs is very limited unless the size of overpayment is extremely large. However, the results of this study confirm our prediction that overpaid CEOs choose to increase their effort as a way to address the perceived inequity related to their overpayment, and their increased efforts are manifested in lower acquisition premiums paid. This is a meaningful finding, given that little research has empirically shown the effect of positive pay deviation on CEOs' behaviors or decisions.

Furthermore, our findings suggest that overpaid CEOs are motivated to change unfair situations by increasing their efforts, but this tendency reverses as the size of overpayment becomes exceptionally large due to CEOs' overconfidence and excessive optimism. In particular, this finding extends the recent work of Fong, Xing, Orman, and Mackenzie (2015) on CEOs' relative compensation and its consequences. They show that,

although CEO overpayment relative to the predicted labor market rate is positively related to long-term firm value, the positive relationship diminishes as overpayment increases. Unlike previous research on CEO compensation, their work clearly indicates that there are potential costs on the long-term firm value of paying CEOs wages in excess of their predicted market rate. Our study contributes to the literature on relative CEO compensation by identifying one type of such cost in the context of acquisitions—paying higher acquisition premiums. Given that paying massive acquisition premiums could cause serious financial problems for the acquirer and even could lead to a bankruptcy (Haunschild, 1994; Kaplan, 1989), this study provides empirical support for the possibility that there is a point beyond which CEO overpayment has a diminishing and eventually negative effect on long-term firm value.

Fourth, the effects of relative CEO compensation in acquisitions are economically significant: 1) when *CEO overpayment* changes from -1 s.d. to $+1$ s.d. (from less overpaid to more overpaid), *acquisition premium* is decreased by about 16.3 percentage points, and 2) when *CEO underpayment* changes from -1 s.d. to $+1$ s.d. (from less underpaid to more underpaid), *acquisition premium* of our sample is increased by about 3.6 percentage points. These results indicate that acquiring firms with overpaid CEOs are more likely to benefit by lowering the average acquisition deal value by \$377.3 million. On the contrary, firms managed by underpaid CEOs in our sample increased the average acquisition deal value by \$83.8 million, which suggests that firms are likely to suffer from the excessive risk-taking of underpaid CEOs. Thus, our study provides practical implications to boards of directors: a CEO's pay is related to the CEO's contribution to the firm and the board can influence firm value with their executive compensation decisions (e.g., Fong et al., 2015). In particular, our study suggests that CEOs' compensation should be compared to the labor market compensation rate and carefully determined by the compensation committee.

Lastly, the results provide supporting evidence for the moderating effects of the CEO-TMT pay gap, and to our knowledge we are among the first to examine the effects of both external market equity and the internal pay gap in the context of acquisitions. We believe this study expands existing executive compensation research by showing that the internal pay gap between the CEO and TMT is a meaningful factor, among others, that affects the extent to which a CEO perceives inequity with his/her pay and motivation to restore equity.

6. Future directions

This study has a few limitations that highlight opportunities for future research. First, although our measures of under-/overpayment follow well-established methods from previous research (Ezzamel & Watson, 1998; Fong et al., 2010; Wade et al., 2006; Watson et al., 1996) in which the CEO labor market rate is used as the reference point for inequity, they are based on the assumption that individual CEOs use the same reference point across industries when they perceive their pay inequity. Prior studies, however, have shown that CEOs' perception of pay equity may vary depending on how the comparison group is selected. For instance, firms' compensation committees typically benchmark peer firms within the same industry to determine their CEO's compensation (Bizjak, Lemmon, & Naveen, 2008; Porac et al., 1999), which means CEOs in each industry may use different reference points. Therefore, it would be interesting to explicitly examine whether the use of different reference groups affect a CEO's perception of inequity regarding underpayment or overpayment.¹²

¹² Since 2006, the Securities and Exchange Commission (SEC) required firms to disclose the peer firms that the compensation committee included for benchmarking purposes in determining a CEO's compensation, so one possibility is that under-/overpayment compared to the actual peer group that was used may inflate a CEO's perception of inequity, and thereby may have greater influence on CEO's behaviors.

A related limitation of our measurement of pay inequity is that we did not directly measure CEOs' perceptions of pay inequity or dissonance. We acknowledge this as a limitation because the possibility that individuals may vary in the extent to which they perceive fairness or unfairness was not considered in our study. With the same amount of pay deviation, individuals may perceive different levels of inequity. For example, founder CEOs who typically possess high psychological ownership toward their firms may not perceive high inequity when they are underpaid compared to non-founder CEOs. Furthermore, there may be important individual characteristics that are related to the extent to which individuals perceive fairness. Given that narcissistic CEOs have an inflated view of self-worth (Campbell, Goodie, & Foster, 2004), a CEO's narcissistic tendencies are likely to make underpaid CEOs perceive greater pay inequity and thus react more strongly to the underpayment. For example, Chatterjee and Hambrick (2011) suggested a similar logic that an executive's narcissistic disposition would moderate the way by which she or he reacts to contextual stimuli, more specifically, recent objective performance. In the future, researchers should consider such individual characteristics that may affect perceptions of inequity or the processes by which CEOs act on perceived inequity.

Another limitation of our study has to do with data. Our sample was limited to the largest U.S. public acquirers that are included in the ExecuComp database. Thus, the impact of under-/overpayment on organizational outcomes in our sample might differ from that of under-/overpayment on a firm's decision making and outcomes in smaller, private acquirers. It is also possible that the findings of our study may reflect an effect that is specific to the U.S. context. Although principles concerning fairness perceptions and the social comparison process may be universal across national boundaries, the process by which CEOs subjectively compare their compensation level to others and the way they would react to the perceived inequity regarding pay may be different depending on a country's national culture or social and economic situation. Future research could benefit from including international data in testing a similar set of hypotheses so as to provide more generalizable findings.

Lastly, although it is generally expected that paying a high acquisition premium is value destroying for shareholders of an acquiring firm and vice versa, we did not examine the impact of under-/overpayment on acquisition performance. This under-/overpaid situation may affect acquisition performance through the levels of acquisition premium paid for the target firms. Therefore, it will be fruitful to investigate how external constituencies would respond to the acquisition taken by an under-/overpaid CEO. It could further enhance our understanding of the mechanisms through which executives' cognitive dissonance influence the quality of their decision-making and subsequent firm performance.

The phenomena of under-/overpayment have been increasingly captured in compensation research, however, its effect was limitedly examined in the CEO's or other executives' compensation setting process (Ezzamel & Watson, 1998; Porac et al., 1999; Wade et al., 2006). The findings from the current study highlight the impact of pay inequity perceived by a CEO on a specific corporate outcome, premiums paid for an acquisition. Furthermore, it appears that the process in which perceptions of inequity affects managerial decisions is much more complex given the role of a CEO's internal pay standing in adjusting his/her fairness concerns as demonstrated in this study. We hope future research extends the line of inquiry set forth in this research by further exploring various outcomes of perceived pay inequity and contexts under which pay inequity affects critical decision making.

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