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THREE ESSAYS ON CEO CHARACTERISTICS AND CORPORATE DECISIONS

by

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A Dissertation Submitted to the Faculty of Old Dominion University in Partial Fulfillment of the Requirements for the Degree of

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ABSTRACT

THREE ESSAYS ON CEO CHARACTERISTICS AND CORPORATE DECISIONS

Trung Nguyen Old Dominion University, 2019

Director: Dr. John A. Doukas

Recent studies have stressed the importance of managerial fixed effects on firm investment

decisions. Following this stream of research, this dissertation empirically investigates the potential

effects of two major Chief Executive Officer (CEO) characteristics, i.e. risk preferences and

potential mobility, on corporate decisions such as merger and acquisition (M&A) and corporate

social responsibility (CSR) investments.

Essay 1 examines whether the variation of M&A stock returns around the 2008 financial

crisis is associated with shareholders' increased loss aversion as a result of undergoing financial

losses. The results show that acquisitions carried out by CEOs with risk-averse inducing

compensation (inside debt) before and during the financial crisis creates greater shareholder gains

than counterpart M&As by CEOs with risk-seeking (convex) compensation. However, this pattern

is reversed in the post-crisis period, suggesting that equity holders' risk tolerance is amplified after

the financial crisis, consistent with the prospect theory predicting that economic agents become

more risk-seeking subsequent to suffering a financial loss.

Essay 2 investigates shareholder reactions to CSR investments undertaken by firms under

the helm of CEOs with risk-averse (risk-seeking) inducing compensation contracts. The evidence

shows that CSR announcements carried out by CEOs with risk-averse (risk-seeking) inducing

compensation generate higher (lower) cumulative abnormal returns and post-CSR long-term

performance. This pattern holds under a battery of robustness checks. In addition, firms led by

CEOs with risk-averse (risk-seeking) inducing compensation contracts are less (more) likely to engage in excessive CSR decisions and associated with greater (lower) CSR information disclosure and improved financial performance.

Essay 3 explores the impact of CEO mobility on M&As. Using ability and willingness to switch jobs as a proxy for CEO mobility, the evidence shows that acquiring CEOs' mobility has a positive effect on the propensity to engage in value-increasing M&A deals. In addition, acquiring firms led by more (less) mobile CEOs are associated with higher (lower) short-term shareholder gains, realize better (worse) post-M&A long-term performance, and tend to use cash (stock) to finance M&A transactions. The empirical results are robust to potential omitted variable bias and self-selection bias.

Overall, this dissertation contributes to the finance and business literature by reconciling some of the gaps left by prior studies based on unexplored thus far key managerial characteristics that truly matter in corporate decision making. Furthermore, this work empirically validates and refines recently proposed measures of CEO potential mobility that can potentially be used to address additional research issues in the future.

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This dissertation is dedicated to my grandparents, my parents, my parents-in-law, my older sister and brother-in-law, and especially my wife. With their unconditional love and sacrifices, relinquishing has never been an option.

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ESSAY 1: SHAREHOLDER REACTIONS TO ACQUISITIONS AROUND THE REALM OF HIGH UNCERTAINTY

INTRODUCTION

A key focus of research in corporate finance is whether mergers and acquisitions (M&A) create or destroy value. A considerable body of research concludes that most mergers do not create value for anyone, except perhaps the investment bankers that negotiate the deals. This study examines whether chief executive officers' (CEOs) risk preferences can provide new insights into the motives and the likelihood of creating value though M&As. This is inspired by the welldocumented fact that CEO heterogeneous traits do matter to firm corporate policies and performance (e.g., Williamson 1963; Shleifer and Vishny 1989; Aghion and Tirole 1997; Shivdasani and Yermack 1999; Bertrand and Schoar 2003). Among these characteristics, CEO risk preferences have drawn extraordinary amounts of research attention in recent years (Coles, Daniel, and Naveen 2006; Edmans and Liu 2011; Wei and Yermack 2011; Cassell, Huang, Sanchez, and Stuart 2012; Liu, Mauer, and Zhang 2012; Phan 2014; Srivastay, Armitage, and Hagendorff 2014; Caliskan and Doukas 2015; Graham, Harvey, and Puri 2015). On average, a manager is believed to be risk-averse because his or her portfolio is generally less diversified than that of stockholders. From a theoretical standpoint, standard agency theory suggests that CEO risk preferences can be affected by the nature of CEO compensation packages (Jensen and Meckling 1976; Jensen 1986; Jensen and Murphy 1990). Specifically, a typical CEO will become more risk-averse (riskseeking) and be less (more) likely to engage in risky projects in accordance with the CEO's compensation design. From a practical perspective, a recent survey-based research by Graham, Harvey, and Puri (2013) finds that CEO risk preferences are indeed tied to the CEO's own level of compensation. Furthermore, this survey demonstrates that CEO risk preferences are closely related to corporate financial policies.

Consistent with this evidence, Cassell et al. (2012) investigate the effects of CEO risk preferences on corporate policies and find that generally CEO inside debt holdings (i.e., risk-averse encouraging compensation packages) induce them to pursue less risky investment and financial policies. In addition, Liu, Mauer, and Zhang (2014) find that inside debt helps resolve agency cost of debt but at the detriment of shareholders' interests by encouraging CEOs to maintain excess cash holdings. Major investment decisions made by risk-seeking CEOs are expected to be favored by equity holders, but disfavored by bondholders. Wei and Yermack (2011) find evidence consistent with this argument, with the bond (equity) market perceiving inside debt disclosure by U.S. firms in 2007 positively (negatively). Several other studies also find a negative relation between CEO risk aversion (i.e., inside debt) and accounting conservatism, the cost of debt, the issuance of convertible bonds, and the usage of restrictive covenants in debt contracts (Chava, Kumar, and Warga 2010; Chen, Dou, and Wang 2010; Wang, Xie, and Xin 2010, 2013; Li, Rhee, and Shen 2018). Furthermore, firms with higher CEO inside debt holdings are likely to have greater firm liquidation value and narrower credit default swap spreads (Chen et al. 2010; Bolton, Mehran, and Shapiro 2015). In terms of dividend policies and payouts, Caliskan and Doukas (2015) document that dividend payouts are positively associated with higher CEO inside debt while convex CEO compensation decreases dividend payouts. In other words, it seems that riskaverse CEOs are willing to forgo growth (risky) opportunities in favor of more dividend payouts as their compensation is loaded with greater inside debt. Srivastav et al. (2014), in the regulated banking industry, instead report that CEOs with higher relative leverage (risk aversion) are more likely to reduce payouts to shareholders, which supports the view that inside debt aligns CEO

interests with the interests of bondholders, since the distribution of dividends to shareholders is against creditors' interests.

In this study, we add to the current stream of research by examining the impact of CEO risk preferences on the nature and outcomes of M&As, the most visible and important investment decisions CEOs can make. The Institute for Mergers, Acquisitions and Alliances has documented that over 44,000 transactions have been announced worldwide with a total market value of more than 4.5 trillion USD in 2015. Highlighting the risks associated with M&A decisions, Furfine and Rosen (2011) argue that such investments tend to intensify the acquirer's default risk, on average. Given the vital importance of this form of corporate investment, research scholars have investigated its potential antecedents.

Although a larger number of M&A studies over the last three decades has identified several determinants of acquirer performance, the overall variation in acquisition returns remains largely unexplained. Specifically, a widely cited study by Moeller, Schlingemann, and Stulz (2004) examines over 12,000 M&A deals and, despite employing an extensive list of determinants, is able to explain just over 5% of the variation in acquirer returns (as judged by the adjusted R² values of their main regression models). Similarly, studies with smaller samples such as those of Masulis, Wang, and Xie (2007) and Harford, Humphery-Jenner, and Powell (2012) report comparably low explanatory powers. In contrast to the common belief that mergers fail to deliver value, anecdotal evidence indicates persistent acquisition successes. For example, Cisco Systems, Berkshire Hathaway, IBM, General Electric, and Diageo are some noteworthy examples of frequent acquirers that most observers consider as having been consistently successful in their acquisitions.

¹ More information is available at https://imaa-institute.org/statistics-mergers-acquisitions/.

Therefore, we examine whether CEO risk preferences, gauged through the manager's unfunded and unsecured inside debt holdings, in addition to the exhaustive list of factors mentioned above, can potentially explain the variation of M&A stock returns documented in the previous literature. Moreover, while CEO risk preferences could play an important role, changes in investors' risk tolerance in response to a rare event such as the 2008 financial crisis could also influence market reactions to M&A announcements. Cognizant of and motivated by recent studies (Wei and Yermack 2011; Phan 2014; Campbell, Galpin, and Johnson 2016) documenting that shareholders discern and react to disclosure of CEO inside debt compensation, we argue that shareholder reactions to M&As consummated by high (vs. low) inside debt CEOs could also change after the financial crisis in response to realizing financial losses during the crisis in accord with the prediction of prospect theory. The importance of changes in investor risk preferences around the crisis (financial loss) is suggested by prospect theory which predicts that economic agents when suffering a financial loss, tend to increase their risk tolerance (Kahneman and Tversky 1979; Kahneman and Tversky 1984). That is, shareholders are expected to be much more riskseeking in the realm of losses where they are much more likely to take risks in order to recoup previous losses or to recover from a loss in order to revert to a previous position by favoring M&A decisions carried out by CEOs with risk-seeking (convex) compensations. Hence, the 2008 financial crisis allows us to directly examine whether investor risk tolerance changed by focusing on equity market reactions to M&A decisions before, during and after the financial crisis.

Our study extends the discussion in the literature in two directions. First, recent studies on inside debt are subject to the pre-2006 limitation of pension and deferred compensation data. More important, they rely on post-2006 pension and deferred compensation data rather than the compensation portion of supplemental executive retirement plans (SERPs), a more accurate

indicator of the unfunded component of inside debt. Anantharaman, Fang, and Gong (2013) show that total inside debt may not be able to serve its intended purpose - the incentive-alignment effect - because the three components of inside debt can be starkly different. Specifically, only the compensation portion of SERPs is considered unfunded and unsecured, whereas rank-and-file plans and other deferred compensation plans are more secure or can be withdrawn at a more convenient time. If a significant portion of a manager's inside debt is based on SERPs, one would expect this to be a better measure of risk aversion. Otherwise, a CEO might still exhibit riskseeking behavior despite being exposed to a high level of overall inside debt holdings. Consistent with this view, Kabir, Li, and Veld-Merkoulova (2013) document a negative association between defined benefit pensions and bond yield spread. Similarly, Choy, Lin, and Officer (2014) find that freezing only defined benefit pension plans is still associated with higher firm equity risk and firm credit risk in subsequent periods. In addition, there is theoretical and empirical evidence against the effectiveness of deferred compensation in mitigating risk-taking behavior (Wang et al. 2010; Lee and Tang 2011; Inderst and Pfeil 2012; Leisen 2015). For instance, with respect to bonus compensation, according to the conceptual model of Leisen (2015) a deferral could inherently increase risk-taking.

Second, although a negative relation between CEO risk aversion and shareholder reactions to M&A announcements has been reported in previous studies (Liu et al. 2012; Phan 2014), how changes in both managers' and shareholders' risk preferences due to an extreme exogenous shock influence the nature of M&A decisions and shareholder reactions to such corporate events remains relatively unexplored and warrants further investigation. In this study we address this issue by focusing on the recent financial crisis, undoubtedly a rare and major exogenous financial event that forced the global financial market to cave in resulting in huge firm and shareholder financial

losses. The intuition behind this examination is that economic agents' risk preferences, according to the prospect theory, are shaped by their past economic gains or losses. Hence, the recent financial crisis offers a unique testing ground to examine the validity of this prediction in the context of M&A decisions. Therefore, it is not unreasonable to argue that an extremely rare and catastrophic economic event such as the 2008 financial crisis can alter CEO attitudes towards risk, and subsequently affect their investment and other corporate decisions. Similarly, investors' risk perception and risk tolerance are unlikely to remain unchanged after the financial crisis (Campello, Graham, and Harvey 2010; Duchin, Ozbas, and Sensoy 2010; Campello, Giambona, Graham, and Harvey 2011; Bucher-Koenen and Ziegelmeyer 2013; Hoffmann, Post, and Pennings 2013; Kuppuswamy and Villalonga 2015). Recent empirical evidence documents that people who experienced a major shock in their life tend to become more risk-averse (e.g., Kuhnen and Knutson 2011; Malmendier and Nagel 2011; Cohn, Fehr, and Maréchal 2012). For instance, according to Malmendier and Nagel (2011), individuals who went through periods of low stock market returns during their early years are less likely to take financial risks. They are more likely to be pessimistic about future stock returns, more reluctant to participate in the stock market, and allocate a smaller portion of their liquid assets to stocks (if they decide to participate). Similarly, CEOs that grew up during the Great Depression are averse to debt and excessively in favor of internal finance (Malmendier, Tate, and Yan 2011). Using German Sparen und AltersVersorgE (SAVE) survey data, Necker and Ziegelmeyer (2016) find households that experienced financial losses as a result of the 2008 financial crisis tend to be less risk tolerant. Hence, while our study relates to the previous literature that examines the impact of agents' negative past experiences on their current decisions, we use the recent financial crisis as the focal point of our analysis to investigate whether the risk-tolerance of corporate managers and investors changed subsequent to the financial crisis

in line with the conjecture of prospect theory. More specifically, we are interested in examining the premise of prospect theory which predicts that economic agents who experience major financial losses tend to increase their risk tolerance (Kahneman and Tversky 1979; Kahneman and Tversky 1984).

Jointly, the research question whether CEO and investor risk preferences matter in the context of M&As deserves additional empirical investigation conditional on an exogenous event such as the 2008 financial crisis. In this paper, to address the two above concerns, we adopt and employ two SERP-based measures of CEO risk aversion in conjunction with the traditional ones that depend on both SERP and deferred compensation, and jointly examine whether equity holders' reactions to M&A announcements were influenced by their exposure to the 2008 financial crisis. Our M&A sample is restricted to 2003–2015², mainly due to the time and cost of manually collecting pension data via the companies' annual proxy statements. Furthermore, the start of the sample period is justified by the need to exclude any potential effects caused by the 2001 tech bubble. Using a comprehensive sample of 1,929 takeover bid announcements by 417 unique public U.S. firms, we find that CEO risk preferences are significantly associated with acquisition announcement cumulative abnormal stock returns conditional on the financial crisis. Specifically, the results of the univariate analysis, show that M&A carried out by risk-seeking and risk-averse CEOs led to short-term shareholder gains before the financial crisis. However, equity investors reacted positively (negatively) to M&A announcements associated with risk-averse (risk-seeking) CEOs during the wake of the financial crisis. In stark contrast with the widely accepted notion that shareholders are less likely to favor risk-reducing CEO compensation packages (i.e., inside debt), because they motivate the undertaking of risk averse corporate decisions, our evidence suggests

² For data merging procedure, the pension data is from 2002 to 2015.

that CEO inside-debt compensation acts to the benefit of shareholders in devastating financial times, such as the recent global financial crisis.

After 2009, more importantly, the equity market's reaction to M&A announcements linked with risk-averse (risk-seeking) CEOs is less (more) positive. Collectively, the evidence suggests that the post-2009 behavior of both risk-seeking CEOs and equity investors seems to defy the view in the literature that individuals who were exposed to exceptionally bad times tend to act cautiously (conservatively) subsequently. Rather, their behavior is more likely to be consistent with prospect theory (betting behavior). Specifically, equity investors appear willing to place bets on post-2009 M&A activities pursued by risk-seeking CEOs, since they hope that these investment decisions will not only restore but also substantially grow bidders' future value, resulting in positive announcement excess returns considerably greater than those in the pre-2009 period.

These results also survive a battery of robustness tests such as alternative proxies of M&A short-term stock performance, CEO risk aversion, and subsample analyses. Additionally, empirical investigation of acquirers' buy-and-hold abnormal stock returns post-2009 lends further support to the betting attitude story, since M&As pursued by risk-seeking CEOs lead to lower long-term performance than the ones initiated by risk-averse CEOs. Collectively, our results are consistent with prospect theory predicting that economic agents who experience a financial loss tend to become more risk tolerant afterwards (Kahneman and Tversky 1979; Kahneman and Tversky 1984) by betting on the outcomes of riskier investment decisions. Furthermore, we replicate the analysis of Wei and Yermack (2011) for the 2009–2015 period and find that, after the financial crisis, equity investors also react negatively to firm annual proxy statement disclosures, indicating an increase in CEO relative leverage ratios (i.e., when CEOs become more risk-averse) among firms with at least 1 billion USD in market capitalization.

In summary, we document that equity market reactions to M&As are not uniform but vary with CEO risk preferences and changes in shareholder risk preference around the 2008 financial crisis. More importantly, our evidence demonstrates that equity holders who experienced the financial calamity of the 2008 financial crisis, exhibited more risk-tolerant (gambling) behavior in the post-2008 financial crisis than before with equity investors betting on and overestimating the future gains of M&A deals announced by risk-seeking CEOs after the financial crisis. On the other hand, unreported results show bondholders consistently placed a premium (discount) on M&A announcements made by risk-averse (risk-seeking) CEOs before, during and after the 2008 financial crisis.³

The remainder of this paper is structured as follows. Section 2 describes the research methodology. Section 3 reports the univariate and multivariate results of acquirers' cumulative abnormal stock returns as well as additional robustness tests. Section 4 presents supplemental analyses. Section 5 concludes the paper.

METHODOLOGY

Data collection

We utilize different secondary sources to compile the data of our sample. From the Thomson One M&A database, we extract M&A deals announced by U.S. public firms with nonnegative common equity between 2003 and 2015. To construct the final sample of successful M&A announcements, we impose the following restrictions (Dong, Hirshleifer, Richardson, and Teoh 2006; Liu et al. 2012; Phan 2014): First, the emphasis of our empirical analysis is on M&A activities conducted by non-financial and non-utility firms in the United States; therefore, we do not consider announcements made by acquirers with Standard Industrial Classification (SIC) codes

³ These results are available upon request.

that range from 4900 to 4999 or from 6000 to 6999. Second, an announcement is included in the final sample only if the transaction value is at least 5 million USD and the transaction value scaled by acquirers' total assets is greater than or equal 0.1%. (Cai and Sevilir 2012; Huang and Tung 2016). This restriction ensures that our M&A sample only comprises successful announcements that are likely to have a tangible impact on acquirers and their shareholders. The final M&A sample consists of 1,929 successful deal announcements made by 417 unique acquirers (or 586 unique CEOs).

Variable description

Cumulative abnormal stock returns

For each M&A deal, we follow the standard event study procedure to estimate acquirer cumulative abnormal returns (CARs) around the announcement (Eckbo 2009; Wei and Yermack 2011). The cumulative abnormal stock return is calculated as the sum of several daily abnormal returns for a two-day window (i.e., from t = 0 to t = 1) around the announcement date. We estimate daily abnormal stock returns using the one-factor model (Sharpe 1964).

$$R_{i,t} - R_{f,t} = \alpha + \beta (R_{m,t} - R_{f,t}) + \varepsilon_{i,t}$$

The acquirers' daily stock returns are obtained from the Center for Research in Securities Prices (CRSP). We calculate the coefficient estimate (β) of the market risk premium ($R_{m,t} - R_{f,t}$), using the estimation period from t = -251 to t = -11 relative to the M&A announcement date for each acquirer. The daily abnormal stock return ($AR_{i,t}$ or $\varepsilon_{i,t}$) is the difference between the actual return and the return predicted by the one-factor model.⁴

⁴ The results are similar when we employ the four-factor model and are available upon request.

CEO risk preferences

Since pension and deferred compensation data became publicly available after the U.S. Securities and Exchange Commission's 2006 disclosure requirement, previous studies (Sundaram and Yermack 2007; Edmans and Liu 2011; Wei and Yermack 2011) have recommended the use of such information to better estimate the degree of CEO risk preferences. Because of the unfunded and unsecured nature of pension and deferred compensation (or so-called inside debt), a CEO whose compensation structure tilts toward these two debt-based components is exposed to default risk comparable to that faced by bondholders, and the CEO is expected to display a higher level of risk aversion. Accordingly, previous studies have used CEO relative leverage and CEO relative incentive to identify whether a manager is risk averse or risk seeking. A CEO is expected to be more risk-averse if exposed to a higher level of relative leverage or relative incentive (Edmans and Liu 2011; Wei and Yermack 2011). Specifically, CEO relative leverage equals CEO inside debt divided by CEO inside equity scaled by firm leverage while CEO relative incentive is the ratio of the change in CEO inside debt to the change of CEO inside equity scaled by the change in firm leverage.

However, information about CEO pension and deferred compensation was not made available until 2006, which further limits the estimation of CEO risk preferences prior to 2006 from the Securities and Exchange Commission data source. A possible remedy is the collection of this information from the listed companies' annual proxy statements (i.e., form DEF 14A). In an ideal scenario, we should be able to compute both pension and deferred compensation values for a CEO, using information from such statements. Because deferred compensation was disclosed with extremely limited information prior to 2006, we can only construct CEO risk preferences

measures by relying on the estimation of pension values from 2002 to 2005.⁵ To estimate the CEO pension data for 2002–2005, we strictly adopt the methodology proposed by Sundaram and Yermack (2007). All the necessary inputs are extracted directly from the company's annual proxy statements. Given this information, we calculate the annual actuarial present value of each CEO's pension for 2002–2005.

Another problem with these two inside debt measures of CEO risk preferences is that they do not address the opposing effects of the components of inside debt, that is, pension versus deferred compensation. According to Anantharaman et al. (2013), despite sharing similar characteristics, deferred compensations differ from SERPs in terms of withdrawal flexibility and payment form. Essentially, deferred compensations are less likely to align CEO interests with those of creditors. Following Anantharaman et al. (2013), we use CEO relative leverage (SERP) and CEO relative incentive (SERP), as alternative measures, to control for this issue. As the terms indicate, these two alternatives are identical to the proxies above, that is, CEO relative leverage and CEO relative incentive, except that deferred compensation is excluded from the numerator. Throughout our empirical analysis, CEO relative leverage (SERP) and CEO relative incentive (SERP) serve as our primary proxies of CEO risk preferences.⁶

Control variables

In the multivariate analysis, we include several control variables. Specifically, the *Precrisis* dummy is set equal to one if the M&A announcement occurred before 12/31/2007, and zero otherwise. The *During-crisis* dummy takes the value of one if a takeover deal is announced between 12/31/2007 and 06/30/2009, and zero otherwise. The *Post-crisis* is a dummy that takes

⁵ A comprehensive and exhaustive discussion of this issue is provided by Sundaram and Yermack (2007).

⁶ Following previous studies, we only consider acquiring CEOs with positive values for these two proxies (Wei and Yermack 2011; Cassell et al. 2012; Phan 2014).

the value of one if a M&A deal is announced after 06/30/2009, and zero otherwise. In terms of CEO characteristics, we control for *CEO age* and *CEO compensation* after logarithmic transformation. Following previous studies (Andre, Kooli, and L'her 2004; Coles et al. 2006; Cassell et al. 2012; Phan 2014), for firm characteristics, we incorporate *firm size*, the firm's *market-to-book ratio*, and the firm's *financial leverage* into the model specifications. The related items are extracted directly from the Compustat database. Concerning deal characteristics, in addition, we control for the method of payment, that is, *stock deal, friendly deal, private target, public target*, as well as *industry* and *international diversifications*. Additionally, we account for the effect of *the relative deal value*, which is defined as the deal transaction in U.S. dollars, scaled by the acquirer's total assets. A detailed description of these variables is provided in Appendix 1.1.

Descriptive statistics

Table 1.1 reports the annual number and percentage of successful M&A announcements made by U.S firms in our sample. The number of successful M&A announcements is evenly spread across the sample period. However, the total number of M&A announcements in our sample slightly declines from 208 deals in 2006 to 124 deals in 2009. If the financial crisis leaves a bad impression among managers, we would expect a major decline in the ratio of M&As conducted by risk-seeking CEOs to the total after the financial collapse of the markets. However, closer examination reveals that the annual number of M&As conducted by risk-seeking CEOs does not seem to drop dramatically, even after the financial crisis. Rather, the average percentage of annual M&A activities of risk-seeking CEOs are maintained at more or less the same level, that is, around 76% pre-2007 as opposed to 71% post-2009.

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⁷ 12/31/2007 (06/30/2009) indicates the first (last) date of the 2008 financial crisis according to the business cycles of the National Bureau of Economic Research (NBER). The related information can be retrieved from: http://www.nber.org/cycles.html.

[Insert Table 1.1 about here]

In addition, the table shows the average of several items in terms of the CEO's compensation structure. As in previous studies, the majority of CEO compensation portfolios in our sample consist of stock and option holdings. For instance, in 2008, CEO inside debt constituted less than approximately 20% of CEO inside equity. Consistent with the number of M&A announcements, average CEO stock and option holdings also experienced a significant drop in 2007 – 2009 period.

[Insert Table 1.2 about here]

Table 1.2 reports the descriptive statistics of all the right-hand side variables used in our empirical analysis. Panel A reports acquirer and M&A characteristics while Panel B shows the statistics for CEO characteristics. According to Panel A, 35.04% of our M&A sample consists of internationally diversified deals, while around 45.20% of the sample represents industrially diversified deals. About 39.40% of the deals are made before 12/31/2007 while approximately 50.60% of the M&A announcements occurred after 06/30/2009. The average transaction value is around 10.08% of the acquirer's total assets. Consistent with previous studies, more than 30% (27%) of the announcements involve private (public) targets whereas less than 43% of the sample involves other form of targets as specified by Thomson One. Of the final sample, there are only 4.15% of the takeover deals whose at least 30% of transaction value is finalized with stock. Similar to previous studies, the average acquirer in our sample is overvalued and has a market-to-book ratio of 1.8155 (Liu et al. 2012; Phan 2014). The average of the logarithm of CEO age is 4.0290, that is, slightly higher than its median (4.0254). The means of our two primary measures of CEO risk preferences are 0.8152 and 0.6807, respectively. Including CEO deferred compensation into

the calculation, the means of *CEO relative leverage* and *incentive* are 1.1014 and 0.9243, respectively.

EMPIRICAL RESULTS

Univariate analyses

Acquirer CARs and CEO risk preferences: Risk-seeking versus risk-averse CEOs

In this section, we first investigate the average reaction of equity holders to M&A announcements estimated by the one-factor model for the entire sample period. Column (A1) of Table 1.3 reports the means, standard deviations and number of observations for the full sample. The acquirers' CAR[0,+1] is positive and significant at 1% for the entire sample period. In particular, acquirers earn 0.63% cumulative abnormal stock returns during the two days around the event. Although the figure is generally consistent with recent papers (Liu et al. 2012; Phan 2014), it differs from previous empirical work (e.g., Doukas and Travlos 1988; Dong et al. 2006) reporting that M&As are, on average, value-destroying events. Therefore, we conduct an additional analysis to address this issue and find that the difference is mainly due to the uneven distribution of the method of payment in our sample. According to the literature, M&As financed with stock tend to have lower or even negative cumulative abnormal stock returns than cash acquisitions. As reported in Table 1.2, however, less than 5% of the deals included in our sample whose at least 30% of transaction value is paid with stock. Hence, our results and most likely those of recent work are probably attributed to the lower use of the stock method of payment (Fuller, Netter, and Stegemoller 2002; Masulis et al. 2007; Netter, Stegemoller, and Wintoki 2011; Duchin and Schmidt 2013; John, Knyazeva, and Knyazeva 2015; Schmidt 2015).8 To confirm this, we

⁸ In their comprehensive analysis of U.S. M&As from 1992 to 2009, Netter et al. (2011) intensively discuss how sample screenings can affect acquirers' short-term performance.

examine acquirers' cumulative abnormal stock returns by method of payment (not tabulated here for brevity but available upon request) and find the average CAR[0,+1] to be positive for cash deals, whereas the corresponding average for stock acquisitions is negative, which is consistent with the earlier acquisition literature. For instance, the average CAR for stock acquisitions is - 1.49% (statistically significant at 5%), whereas that of cash deals is 0.72% (statistically significant at 1%).

[Insert Table 1.3 about here]

Following the previous literature (Liu et al., 2012; Phan 2014), we also examine how the equity market reacts to M&A announcements conditional on acquirers' CEO risk preferences for the entire period. Previous studies suggest that pension value or inside debt compensation would induce managers to be more risk averse with respect to M&A decisions, since these compensation packages will not be distributed until several years later or, even worse, until retirement (Sundaram and Yermack 2007; Edmans and Liu 2011; Wei and Yermack 2011; Cassell et al. 2012). Managers loaded with inside debt compensation are more likely to engage in risk-reducing M&A activities that might not be in the best interests of shareholders. Therefore, our a priori expectation is that equity investors will react more positively to M&A announcements made by risk-seeking CEOs relative to those pursued by risk-averse CEOs. To test this prediction, we partition the M&A sample into two groups based on CEO relative leverage (SERP). A CEO-year observation is classified as a risk-seeking (risk-averse) if its CEO relative leverage (SERP) is lower (higher) than the sample median. Accordingly, we compute the means and standard deviations of cumulative abnormal stock returns as well as the number of observations for the two groups, namely, riskseeking CEOs that is, low CEO relative leverage (SERP) and risk-averse CEOs that is, high CEO relative leverage (SERP). In addition, we perform the difference-in-means test between these two

CEO groups. As shown in columns (A2) to (A4) of Table 1.3, takeover deals initiated by risk-seeking CEOs earn marginally higher, though insignificantly so, cumulative abnormal stock returns than M&A deals associated with risk-averse CEOs. In line with our prediction, M&A deals announced by risk-seeking CEOs seem to deliver slightly better equity returns than those pursued by risk-averse CEOs for the entire period from 2002 to 2015. This evidence is similar to the findings of recent empirical work (Liu et al. 2012; Phan 2014).

Acquirer CARs around the 2008 financial crisis

Given the nature and consequences of the 2007–2009 financial crisis, many common beliefs in business and economics have been questioned and challenged. For instance, Kuppuswamy and Villalonga (2015) show that conglomerates, in contrast to the general consensus that they are traded at a discount, outperform single-segmented firms by a considerable margin during periods of financial distress. In the context of M&As, we also expect that the disastrous event of the financial crisis would dramatically change the behavior of managers which, in turn, affects corporate decisions and investors, for two particular reasons (Duchin et al. 2010; Hoffmann et al. 2013). First, due to limited access to external capital and exogenously driven bottlenecks on the demand side, firms are faced with additional constraints in selecting and financing potential growth opportunities, which result in underinvestment (Campello et al. 2010; Campello et al. 2011; Balakrishnan, Watts, and Zuo 2016; Gunn, Khurana, and Stein 2018). Second, recent behavioral studies have shown that extreme events, such as the recent financial crisis, can alter investors' risk perception and tolerance thanks to their salience, in turn dictating investors' trading and investing behavior during and after such events (Malmendier and Nagel 2011; Bucher-Koenen and Ziegelmeyer 2013; Hoffmann et al. 2013; Gerrans, Faff, and Hartnett 2015; Necker and Ziegelmeyer 2016). For instance, Kuhnen and Knutson (2011) find that emotional states (positive versus negative) can dictate individuals' subsequent beliefs and behavior. Hence, the "characteristics of markets, economic policies, or organization design that have an impact on emotional brain circuits may influence decision making under risk by changing both risk preferences, and the learning process" (Kuhnen and Knutson 2011, p. 623). Therefore, the financial crisis presents itself as an ideal setting to investigate whether investors' exposure to such a catastrophic event altered their risk tolerance, through their reaction to M&A announcements conditional on CEO risk preferences (risk averse versus risk seeking).

Accordingly, we examine shareholders' reactions to M&A announcements before, during, and after the 2007–2009 financial crisis. Columns (A5) to (A7) of Table 1.3 report the means and standard deviations of cumulative abnormal stock returns as well as the number of observations for each period. Means difference tests among the three periods are also reported in column (A8) to (A10). Shareholder reactions are positive and statistically significant at 1% for the pre-and postcrisis, yet negative and insignificant during the crisis. More important, although M&A announcements are associated with positive cumulative abnormal stock returns in the pre- and post-crisis periods, those occurring after 2009 result in higher short-term economic gains, suggesting that investor reactions were highly optimistic about the future performance of these deals. For the two-day window, the short-term performance of post-crisis M&As is 0.38% higher than that of pre-crisis M&As and statistically significant at 5% as shown in column (A10). This implies that the equity market reacted to M&A news more positively after the financial crisis, which seems to indicate that investors favored risky investments in the post-crisis period to recover financial losses realized during the crisis. An alternative explanation for this result could be that acquirers may engaged in more positive NPV acquisitions after the crisis, which triggered the positive shareholder reactions. If this is the case, post-crisis targets should have a higher Tobin's

Q value, on average, than pre-crisis targets. Nevertheless, additional inspection of the data show that there is no statistical difference in the public targets' Tobin's Q before (i.e., 1.8238) and after the crisis (i.e., 1.6719). To put it differently, investors' greater positive reaction to M&A deals after the crisis is probably because they endorse risky investments to recover losses realized during the crisis, not because acquirers engaged in superior deals after the crisis. Therefore, the evidence documented so far is more consistent with prospect theory predicting a decrease in equity investors' risk aversion after the crisis as a result of having suffered financial losses due to the financial crisis.

Acquirer CARs and CEO risk preferences around the 2008 financial crisis

The evidence so far has shown that equity investors do pay attention to CEO risk preferences when evaluating M&A announcements and the 2008 financial crisis has affected the market reactions to such corporate events. In this section, we directly compare shareholders' reactions around M&A announcements for risk-seeking and risk-averse CEOs before (before 12/31/2007), during (12/31/2007 – 06/30/2009), and after (after 06/30/2009) the crisis. The empirical findings are reported in panel B of Table 1.3. Before 12/31/2007, the M&A announcements of firms run by both risk-seeking and risk-averse CEOs elicited positive shareholder reactions and there is no statistical difference between the two groups. However, during the crisis period (12/31/2007 – 06/30/2009), the average shareholder reaction to M&As announced deals by risk-seeking CEOs is -0.98% and statistically significant at 1% while M&As pursued by risk-averse CEOs triggered a positive but insignificant short-term shareholder reaction. However, the difference between these two groups of CEOs is statistically significant at 5%. Thus,

⁹ We observe that acquirers in the post-crisis period allocated more capital resources in research and development and capital expenditures. For brevity, these results are not tabulated here but are available upon request.

this pattern reveals that equity investors seem to endorse the M&A decisions of risk-averse CEOs when firms have to operate under tighter financial constraints and higher uncertainty during the crisis which tends to amplify firms' underlying risk (Hoffmann et al. 2013; Kuppuswamy and Villalonga 2015). Furthermore, in contrast to previous studies arguing that IOU (inside debt) compensation helps align managers' interests with the interests of bondholders at the expense of shareholders, the reported evidence suggests that inside debt appears to be beneficial to shareholders as well, especially in high uncertainty times.

In the post-crisis period (after 06/30/2009), equity investors continue to react positively to the acquisitions of risk-averse CEOs (i.e., 0.57% and significant at 1%) as in the pre-crisis and during the crisis periods. However, shareholder reactions are even more positive to M&As made by risk-seeking CEOs and the difference in terms of short-term shareholder gains is 0.65% and statistically significant at 1%. In addition, as shown in columns (B2) and (B8), the difference in acquirer CAR between the post- and pre-crisis periods for risk-averse CEOs is (i.e., 0.58% as opposed to 0.57%) statistically insignificant. However, as shown in columns (B1) and (B7), takeover bids pursued by risk-seeking CEOs after 06/30/2009 generated approximately 1.22% -0.45% = 0.77% (significant at 1%) higher abnormal returns than the ones conducted before 12/31/2007. Taken together, although equity investors preferred risk-reducing investments and stayed away from investments made by risk-seeking CEOs during the crisis, in the post-crisis period, shareholders on average exhibited a strong preference for M&As carried out by riskseeking CEOs than the ones pursued by risk-averse CEOs. Overall, the positive reaction of shareholders in the post-2009 period suggests that the financial crisis amplified their risk tolerance. Jointly, these findings do not appear to be consistent with the literature postulating that past severe economic experiences (events) tend to reduce investors' risk tolerance (i.e., increase risk aversion).

A plausible explanation for the patterns reported thus far is that equity investors' strong post-crisis endorsement of risk-seeking CEOs' heightened merger activity could be driven by shareholders' betting attitude with the aim to recuperate losses realized during the crisis period. This pattern is in line with the premise of prospect theory according to which investors' risk tolerance increases when previously they have experienced a financial loss. To ensure that the above reported results are not biased by the interval of estimated CARs, we replicated the analysis using *CAR*[-1,+1] window and the *CEO relative incentive (SERP)* instead of *CEO relative leverage (SERP)* to measure CEO risk preferences and find that the new findings remain consistent with the reported ones. These results provide additional support of shareholders' increased risk tolerance in the post-2009 period as a result of the financial losses they incurred during the crisis period.¹⁰

Multivariate analyses

CEO risk preferences and shareholder reactions to acquisition announcements

Next, we examine the equity market's reactions to acquisition announcements carried out by CEOs with different levels of risk preferences controlling for other effects. We employ ordinary least squares (OLS) regressions with robust standard errors to test the effect of CEO risk preferences on acquirers' *CARs* around the announcement dates. The main dependent variable is the acquirers' cumulative abnormal stock returns for the two-day event window. As mentioned in Section 2, our research design controls for firm and deal characteristics such as *the logarithm of the CEO' age*, *the firm's financial leverage*, *the firm's market-to-book ratio*, *firm size*, *methods of payments*, *diversification indicators*, *target status*, and *relative deal value*. In addition, we employ both *CEO relative leverage* (SERP) and CEO relative incentive (SERP) based on pension value,

¹⁰ These additional findings are available upon request.

¹¹ We arrive at the same conclusion regardless of the event windows and factor models used to estimate the cumulative abnormal stock returns.

as alternative measures, to capture the effect of CEO risk preferences on acquirer *CARs*. The baseline regression model of our study is as follows.

$$CAR_{i} = \beta_{0} + \beta_{1}X_{i} + \beta_{2}(Pre\ Crisis)_{i} + \beta_{3}(Post\ Crisis)_{i} + \beta_{4}[X_{i}*(Pre\ Crisis)_{i}] +$$

$$\beta_{5}[X_{i}*(Post\ Crisis)_{i}] + \sum_{j=1}^{k} \gamma_{j}Z_{i,j} + \varepsilon_{i}$$

$$(1)$$

According to equation (1), the emphasis in this study is to examine the effect of CEO risk preferences X_i (i.e., β_1) on acquirer CARs as well as the moderating effects of the 2008 financial crisis on this relationship (i.e., β_4 and especially β_5). ¹² Specifically, if neither CEO risk preferences nor the financial crisis matters to investors, we expect these coefficients to be statistically insignificant. Alternatively, if equity holders place a premium on M&A decisions made by riskaverse CEOs relative to those made by risk-seeking CEOs during the crisis, as found in the univariate results, β_1 is expected to be significantly greater than zero. More importantly, if shareholders' risk tolerance increases subsequent to the financial crisis, due to losses realized as a result of the financial crisis, the interaction coefficient β_5 is expected to be statistically less than zero in accordance with the prediction of prospect theory. That is, a negative value implies that shareholders, after experiencing severe losses due to such a catastrophic event, become more risk seeking after the crisis, as they gamble on the success of M&As initiated by risk-seeking CEOs than risk-averse CEOs (Hoffmann et al. 2013). The empirical findings are presented in Table 1.4. Regressions (1) and (3) show that the coefficients of CEO relative leverage (SERP) and CEO relative incentive (SERP, for the entire sample period from 2003 to 2015, are 0.0006 and 0.0008 respectively. However, they are not statistically significant at conventional levels. This result indicates that M&A decisions made by risk-averse and risk-seeking CEOs triggered roughly the

¹² The base category is the during-crisis period.

same market reaction, suggesting that in the eyes of equity investors, these decisions appeared to be fairly similar.

[Insert Table 1.4 about here]

However, accounting for the 2008 financial crisis, we find empirical evidence consistent with the reported pattern in Table 1.3. First, as inferred from regression (2), the marginal effect of CEO relative leverage (SERP) on acquirer CARs before 12/31/2007 is 0.0057 - 0.0029 = 0.0028 and it is not statistically different from zero, suggesting that shareholders are indifferent between M&A decisions made by risk-averse CEOs and those consummated by risk-seeking CEOs prior to the financial crisis. Second, during the 2008 crisis, equity investors responded positively, instead of negatively as documented in previous studies, to M&A announcements pursued by risk-averse CEOs. Specifically, the coefficient of *CEO relative leverage (SERP)* is 0.0057 and statistically significant at 5% level, as reported in regression (2). Inconsistent with previous studies arguing that inside debt motivates managers to be risk-averse that creates agency costs for shareholders, our evidence points out that shareholders during financial distressed periods prefer M&As made by risk-averse CEOs as they tend to be more prudent and behave conservatively.

Third, as shown in column (2), the coefficient estimate of the interaction term (*CEO* relative leverage (*SERP*) * Post-crisis) is -0.0080 (statistically significant at 1%), and the net effect of *CEO* relative leverage (*SERP*) after the 2008 financial crisis becomes negative and equals - 0.0080 + 0.0057 = -0.0023 (statistically significant at 5%), suggesting that M&As announced by risk-averse CEOs are no longer favored by equity investors after the crisis. That is, while equity investors favored risk-averse CEOs' merger decisions during to the crisis ($\beta_1 = 0.0057$), in the post-crisis period, they endorsed the M&A decisions carried out by risk-seeking CEOs ($\beta_5 = -0.0080$). To put it differently, shareholders' post-crisis behavior seems to be consistent with

gambling behavior, as they bet on the success of M&As initiated by risk-seeking CEOs. This evidence is in line with the prediction of prospect theory that investors who experienced major financial losses tend to exhibit more risk-seeking behavior, i.e., favoring risky investments to outweigh losses realized during the crisis period. We find consistent results, as shown in column (4), when we use *CEO relative incentive (SERP)* as an alternative measure of CEO risk-aversion.

With respect to the effects of other control variables, our multivariate regressions yield consistent coefficient estimates with those documented in previous studies (Travlos 1987; Doukas and Travlos 1988; Phan 2014; Cai, Kim, Park, and White 2016). Specifically, we find that undervalued firms with smaller size are associated with higher short-term stock performance. In addition, takeover bids announced before and after the crisis earns significantly higher returns than those made public during the crisis. Regarding other deal characteristics, *stock deals* incur additional loss to acquirers' shareholders. In terms of diversification effects, we document that both industrial and international diversifications are value-destroying activities and their coefficient estimates are statistically significant at least at 5% across different specifications.

Alternative measures of acquirer cumulative abnormal stock returns

In this section, we continue to check if our multivariate results are robust to different measures of acquirer short-term market performance. First, there is a possibility that a portion of equity investors may know about the announcement before it is made public. To control for this issue, we recapture shareholder reactions to M&A announcements using CAR[-1,+1] estimated from the one-factor model and use it in place of the two-day CAR in the regressions. Columns (1) and (2) of Table 1.5 provide consistent findings with what have been documented in the previous sections. For brevity, the coefficient estimates of other controls are suppressed.

[Insert Table 1.5 about here]

Second, a potential concern with the acquirer CARs based on the one-factor model used thus far is that the CARs estimated for a number of M&A events after 06/30/2009 may be subject to an upward bias because the chosen estimation period (i.e., from t = -251 to t = -11) can overlap with the crisis period during which acquirer daily stock returns were abnormally low. Consequently, we may draw inappropriate inferences from regression results based on these one-factor model CARs. To overcome this methodological problem, instead of using the one-factor model, we simply compute abnormal returns for acquirer i on date t as follows.

$$AR_{i,t} = R_{i,t} - R_{m,t}$$

The acquirer CARs estimated from this method are unlikely to suffer from the upward bias in the post-crisis period. We repeat the multivariate analysis using this simple market-adjusted CAR[0,+1] and report the findings in column (3) and (4) of Table 1.5. These results are consistent with the reported evidence in Table 1.4 suggesting that our prior inferences remain robust to the above concern.

Alternative measures of CEO risk preferences and crisis period classifications

In addition to CEO relative leverage (SERP) and CEO relative incentive (SERP) estimated using only pension data, we also examine if our previous reported results hold with the two commonly used debt-based measures of CEO risk preferences. Therefore, we repeat our empirical analysis by employing CEO relative leverage and CEO relative incentive measures, which are computed using both pension and deferred compensation. Since deferred compensation data were not available until 2006, we restrict our sample to the post-2006 period in this section. Table 1.6 reports the multivariate results of regressing shareholders' short-term reactions on these alternative measures of CEO risk preferences. Overall, we consistently find that M&As conducted by risk-

seeking CEOs earn higher short-term gains than M&As made by risk-averse CEOs in the postcrisis period, confirming the gambling behavior of equity investors.

[Insert Table 1.6 about here]

Beside NBER's crisis classification, we also follow Kuppuswamy and Villalonga (2015) and divide the sample into four sub-periods: *pre-crisis* (2002Q1–2007Q2), *early-crisis* (2007Q3–2008Q3), *late-crisis* (2008Q4–2009Q1), and *post-crisis* (2009Q2–2015Q4), where the pre-crisis period serves as the baseline period in our regression models. In line with the previous analyses, we are interested in the interaction terms between CEO risk preferences and these crisis periods, or whether the effect of CEO risk preferences on equity market's reaction to M&A announcements differs across the above four sub-periods around the crisis.

[Insert Table 1.7 about here]

Specifically, in regression (1) of Table 1.7 for instance, the net effect of *CEO relative leverage (SERP)* during the late-crisis period is 0.0031 + 0.0133 = 0.0164 and statistically significant at 5% while such an effect in the post-crisis period is 0.0031 - 0.0052 = -0.0021 and statistically significant at 10%. Overall, the regression results based on Kuppuswamy and Villalonga's (2015) crisis classification, shown in Table 1.7, continue to lend empirical support to our arguments that CEO debt-based compensation appears to be beneficial to shareholders during tough times, but they seem to become more risk tolerant after the crisis by engaging in gambling as exhibited through their robust preference of riskier M&As undertaken by risk-seeking CEOs with the expectation of recovering financial losses realized during the catastrophic event of the global financial crisis.

Effects of better corporate governance after the 2008 financial crisis

One may argue that the different equity reactions to M&A announcements made by risk-seeking CEOs vs. risk-averse CEOs after the crisis may simply be due to better exerted corporate governance in firms with lower inside debt. To address this concern, we repeat our multivariate analysis with the inclusion of corporate governance measures as well as their interaction with the *post-crisis* dummy. Specifically, corporate governance characteristics are captured using the % of female directors on board and % of independent directors on board that are both retrieved from the Bloomberg database. These results, as shown in Table 1.8, indicate that our main results do not change after controlling for corporate governance. In addition, the effects of corporate governance measures and their interaction terms are not statistically significant. Collectively, these findings rule out the view that the different equity reactions to M&A announcements made by risk-seeking CEOs vs. risk-averse CEOs after the crisis could be attributed to better corporate governance after the crisis. This evidence lends additional support that investor risk preferences changed as a result of the shock of the crisis.

[Insert Table 1.8 about here]

Subsample analyses using retained CEO sample and U.S. targets only sample

Although we provide sufficient theoretical as well as empirical evidence in support of the argument that the exogenous shock of the financial crisis led to the shift in investors' risk tolerance, this does not completely rule out the possibility that the financial crisis endogenously affected the risk preferences of corporate managers (e.g., via CEO turnover or lower compensation) and the market's reaction to M&A announcements. To address this concern, we focus only on a subsample of takeover deals made by the same acquiring firms led by the same CEOs who appeared in at least two crisis periods. If the empirical evidence remains robust for this subsample, we can safely

conclude that the different shareholder reaction to merger announcements around the crisis is attributed to a shift in shareholders' risk tolerance as a result of this exogenous shock. These findings are reported in Table 1.9. According to columns (1) and (2), the multivariate results for the same CEO sample before and after the crisis remain consistent with our previously reported findings in support of investors' increased risk tolerance after the financial crisis.

Similarly, there is also a chance that the more positive reactions to M&As made by risk-seeking CEOs (relative to risk-averse CEOs) post-2009 may be simply because this sample period contains more new CEOs with lower inside debt compensation. Therefore, in an unreported analysis, we exclude M&A deals during 2010-2012 made by CEOs who first appeared in our original sample only after 2009 and replicate our analysis. The findings are still consistent with our original evidence implying that there was a systematic increase, instead of a decrease, in equity investors' risk tolerance after the financial crisis.

[Insert Table 1.9 about here]

Furthermore, we check the sensitivity of our results by excluding foreign targets (35% of the original sample). Columns (3) and (4) of Table 1.9 show the OLS regression results for the sample of U.S. targets. These findings point out that our original results are not affected by the M&A sample of international targets.

In summary, in contrast to previous studies suggesting that IOU compensation only help align managers' interest with that of bondholders at the expense of shareholders, the reported evidence implies that inside debt can be beneficial to shareholders as well during the financial crisis. More importantly, the post-crisis evidence is also in line with the prediction of prospect

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¹³ For brevity, these results are not reported, but are available upon request.

theory that investors who experienced major financial losses tend to exhibit more risk-seeking behavior, i.e., favoring risky investments to outweigh losses realized during the crisis period.

ADDITIONAL ANALYSES

CEO risk preferences and post-acquisition returns

While the univariate result has shown that equity investors' reactions to acquisitions carried out by risk-averse CEOs around the crisis were essentially uniform, the post-2009 overreactions of equity investors to acquisitions performed by risk-seeking CEOs relative to their acquisitions undertaken during-crisis suggest increased investor risk tolerance in favor of risky investments. To examine whether the more positive and significant reactions of equity investors to the acquisition announcements of risk-seeking CEOs post-2009 reflect investors' speculative overestimation of the future outcomes of these acquisitions, we focus on the post-acquisition performance of such deals. According to the increased risk tolerance (gambling) hypothesis, we expect the post-2009 acquisitions consummated by risk-seeking CEOs to be associated with a negative and significantly lower performance than those by risk-averse CEOs. To address this, we estimate the acquirers' buy-and-hold abnormal returns (BHARs) as follows:

$$BHAR[+1,+T]_i = \prod_{t=1}^{T} (1+R_{i,t}) - \prod_{t=1}^{T} (1+R_{benchmark,t})$$

where $BHAR[+1, +T]_i$ is the buy-and-hold abnormal stock return of acquirer i over the next T trading days after the announcement date. We examine acquirers' long-term performance either 18 months (T = 375 trading days) or 24 months (T = 500 trading days) after the announcements. Furthermore, $R_{i,t}$ is the actual daily stock return of firm i and $R_{benchmark,t}$ is the daily benchmark return predicted by the one-factor model. Table 1.10 documents the multivariate results for acquirers' BHARs.

[Insert Table 1.10 about here]

Consistent with the gambling story, more risk-seeking behavior is consistently associated with acquirers' long-term value losses across most of the model specifications. According to model (1) and (2), for instance, the coefficient of *CEO relative leverage (SERP)* (*CEO relative incentive (SERP)*) is 0.0341 (0.0395) and statistically significant at 10%. In brief, these results are consistent with the conjecture that shareholders generally exhibit gambling attitudes in the post-crisis period and bet on risky M&A investments that eventually result in long-term value loss.

Shareholder reactions to annual changes in CEO risk preferences

The empirical evidence documented so far has confirmed that CEO risk preferences matter in the context of M&As. More importantly, we have shown that acquisitions carried out by CEOs with risk-averse inducing compensation during the financial crisis created greater shareholder gains, compared with the ones performed by CEOs with risk-seeking (convex) compensation. However, this pattern is reversed in the post-crisis period despite the severe impact of such a risky event. If this is the case, we should also observe a similar result in the context of shareholder reactions to a significant increase (decrease) in CEO risk aversion on an annual basis, before, during and after the crisis. To test our conjecture, we replicate the results of Wei and Yermack (2011) for all ExecuComp companies (excluding financial and utility firms) during 2007–2015. In addition, we focus only on observations with a market capitalization of at least 1 billion USD since these are more visible to general equity investors. Specifically, we investigate investors' shortterm reactions to a shift in CEO risk preferences around the official filing dates of a company' proxy statements (i.e., DEF 14A forms). The CEO-year sample comprises 4,684 observations and is partitioned into two groups, risk-seeking vs. risk-averse CEOs. A CEO-year observation is classified as a risk-seeking (risk-averse) if its change in CEO relative leverage greater than or equal to (less than) zero.¹⁴ During 2007–2009, despite being consistent with our expectation, the difference is not statistically different from zero (not tabulated for brevity). However, for 2010–2015, the findings reported in Table 1.11 provide evidence consistent with our main prediction and that of Wei and Yermack (2011), that equity investors experience increased risk tolerance (or, rather, gambling attitudes) in the post-crisis period and therefore dislike (prefer) firms run by risk-averse (risk-seeking) CEOs.

[Insert Table 1.11 about here]

Specifically, equity investors generally react more negatively (positively) to an increase (decrease) in CEO risk aversion after the crisis. On one hand, for the risk-seeking CEO group, the average of cumulative abnormal stock returns is consistently positive and statistically significant at 5% across different event windows. For the risk-averse CEO groups, on the other hand, the market reactions are consistently negative across all measures of cumulative abnormal stock returns, and it is statistically significant at 10% in the case CAR[-1,+1]. For instance, a proxy statement disclosure indicating a risk-averse CEO is associated with 0.15% deductions in short-term performance. More importantly, the reported difference-in-means tests show that the average of cumulative abnormal stock returns for the risk-seeking CEO group is statistically higher than that of the risk-averse CEO group.

CONCLUSION

This study examines and sheds light on the variation of M&A announcement stock returns conditional on CEO risk preferences and investors' risk tolerance changes around the 2008 financial crisis. Previous studies have shown that CEO risk preferences gauged by compensation

¹⁴ Using *changes in CEO relative incentive*, or *changes in inside debt* in place of *changes in CEO relative leverage* does not materialistically alter our empirical findings. In addition, substituting CEO inside debt with only CEO pension value in the computation of *CEO relative leverage* and *CEO relative incentive* does not affect our results either.

packages play an important role in corporate investment decisions. Motivated by this strand of research, we examine whether risk aversion-inducing CEO compensation, in addition to an exhaustive list of factors documented in the literature, can explain M&A outcomes. In addition to the commonly used measures of CEO risk preferences based on both pension and deferred compensation values to capture the level of CEO risk aversion, in this study, we use only the unsecured and unfunded supplemental executive retirement plans (SERPs) to estimate more accurate measures of CEO risk aversion. We also investigate whether the variation of M&A announcement stock returns observed before, during and after the exogenous 2008 financial crisis is linked to changes in shareholders' risk preferences, and more importantly, whether such a relation is in line with prospect theory postulating that investors make decisions based on potential values of losses and gains rather than expected outcomes, and that their asymmetric (i.e., steeper for losses than for gains) value functions imply loss aversion.

The empirical findings show that takeover bids announced by firms under the helm of risk-averse (risk-seeking) CEOs are associated with higher (lower) cumulative abnormal stock returns before, and especially during the financial crisis. These results suggest that CEO inside-debt compensation appears to be favored by shareholders in states of high economic uncertainty. Regarding the post-crisis period, however, equity investors switch their preferences to M&A deals pursued by risk-taking CEOs, indicating increased risk tolerance among equity investors after the catastrophe. Consistent with the prediction of prospect theory, the observed pattern suggests that equity investors bet on risky investments to outweigh losses realized during the crisis period. These results are robust to different model specifications, alternative measures of CEO risk preferences and M&A performance, as well as subsample tests.

Additional analyses of acquirer long-term performance, and shareholder reactions to changes in CEO inside debt in the post-crisis period provide supportive evidence to the aforementioned conclusion. Specifically, despite being preferred by the equity market in the short-run, the acquirers led by risk-seeking CEOs consistently underperform their counterparts in the long run. Furthermore, shareholders also reacted negatively to proxy statement disclosures associated with an increase in CEO risk aversion as they did to M&A announcements made by risk-averse CEOs after 2009. Taken together, these results imply that equity investors endorse increased managerial risk-taking M&A decisions in the post-crisis period. In other words, the documented empirical evidence supports prospect theory positing that economic agents when suffering significant financial losses, tend to increase their risk tolerance, and that their decisions are based on the potential value of losses and gains.

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Table 1.1 M&A announcement distribution by year from 2003 to 2015

This table reports successful M&A announcements made by U.S. firms annually during the 2003–2015 period. The means of CEO Option Holdings, CEO Stock Holdings, CEO Inside Equity, CEO Inside Debt, CEO Pension, and CEO Deferred Compensation are shown in columns 2 to 7. More specifically, CEO Inside Equity is equal to CEO Stock and Option Holdings while CEO Inside Debt equals CEO Pension and Deferred Compensation (reported in thousands). For the post-2006 period, CEO Pension and CEO Deferred Compensation are extracted directly from ExecuComp. For the pre-2006 period, CEO Pension is estimated using Sunderam & Yermack's (2007) approximation method. The necessary inputs are manually collected from the companies' DEF 14A proxy statements. The next two columns show the number of M&As announced by risk-seeking and risk-averse CEOs, respectively. A CEO-year observation is classified as a risk-seeking (risk-averse) if its CEO relative leverage (SERP) is less than (greater than or equal to) one. The last two columns show the annual number and percentage of M&A deals.

Acquisition Year	CEO Option Holdings	CEO Stock Holdings	CEO Inside Equity	CEO Inside Debt	CEO Pension	CEO Deferred Compensation	Risk-Averse CEOs	Risk-Seeking CEOs	M&As	M&As (%)
2003	25,585.83	68,983.38	94,569.21	•	4,811.41	•	5	14	19	0.98%
2004	25,795.62	35,843.09	61,483.32		7,498.74	•	47	119	166	8.61%
2005	32,768.49	36,911.30	69,508.23		7,886.75	•	42	149	191	9.90%
2006	36,821.72	74,652.50	110,589.08		7,576.29		37	171	208	10.78%
2007	31,482.94	47,050.53	77,639.06	21,813.41	8,117.49	13,292.85	40	136	176	9.12%
2008	25,185.07	51,624.31	75,922.58	14,834.71	8,912.14	5,922.57	52	90	142	7.36%
2009	43,209.40	41,377.05	83,192.59	15,739.08	7,934.59	7,804.49	25	99	124	6.43%
2010	13,807.75	84,788.72	97,897.34	14,378.75	9,677.08	4,701.67	46	112	158	8.19%
2011	16,348.38	44,005.47	59,826.48	15,595.48	9,470.86	6,124.62	60	126	186	9.64%
2012	18,331.01	40,411.34	58,305.90	14,053.36	9,793.39	4,259.97	55	113	168	8.71%
2013	15,369.41	31,262.87	45,222.25	18,161.17	12,096.20	6,064.97	33	76	109	5.65%
2014	20,351.81	66,440.33	84,470.12	15,645.90	11,339.21	4,306.69	40	109	149	7.72%
2015	40,683.05	128,548.39	163,419.57	19,900.97	11,863.91	8,037.06	34	99	133	6.89%
Total						_	516	1413	1929	100.00%

Table 1.2 Descriptive statistics of firm, M&A and CEO characteristics

This table shows the total number of observations, mean, median, standard deviation, and the 25th and the 75th percentile values of all independent variables for the final M&A's sample from 2003 to 2015. Panel A reports the statistics for M&A and firm characteristics while Panel B shows the statistics for CEO variables. For the post-2006 period, the items used to estimate CEO variables are extracted and estimated directly from ExecuComp. For the pre-2006 period, in addition to other items available in ExecuComp, CEO Pension is computed using Sunderam & Yermack's (2007) approximation method. The necessary inputs are manually collected from the companies' DEF 14A proxy statements. Appendix 1.1 provides the variable descriptions.

Variable	Observations	Mean	Standard Deviation	25%	50%	75%
	Panel A: M&A &	Firm Character	istics			
International Diversification	1,929	0.3504	0.4772	0.0000	0.0000	1.0000
Industrial Diversification	1,929	0.4520	0.4978	0.0000	0.0000	1.0000
Relative Deal Value	1,929	0.1008	0.2245	0.0086	0.0287	0.0945
Stock Deal	1,929	0.0415	0.1994	0.0000	0.0000	0.0000
Pre-crisis	1,929	0.3940	0.4888	0.0000	0.0000	1.0000
During-crisis	1,929	0.1001	0.3001	0.0000	0.0000	0.0000
Post-crisis	1,929	0.5060	0.5001	0.0000	1.0000	1.0000
Private Target	1,929	0.3090	0.4622	0.0000	0.0000	1.0000
Public Target	1,929	0.2794	0.4488	0.0000	0.0000	1.0000
Friendly Deal	1,929	0.9025	0.2967	1.0000	1.0000	1.0000
Firm Size	1,929	8.8187	1.6589	7.5947	8.601	10.0086
Firm Financial Leverage	1,929	0.9395	4.1531	0.316	0.5113	0.812
Firm Market-To-Book Ratio	1,929	1.8155	0.8172	1.2826	1.5864	2.0838
	Panel B: CEO	Characteristics	5			
CEO Pension (in \$ thousands)	1,929	9,133.39	12,823.01	1,498.42	4,549.71	11,509.83
CEO Deferred Compensation (in \$ thousands)	1,182	5,880.71	13,438.91	95.57	1,263.41	4,772.76
CEO Inside Debt (in \$ thousands)	1,182	15,933	22,714.30	2,903.57	8,119.13	18,647.74
CEO Age	1,879	4.0290	0.1102	3.9512	4.0254	4.0943
CEO Compensation	1,929	8.7541	0.9309	8.2212	8.7956	9.3863
CEO Relative Leverage	1,182	1.1014	1.0791	0.4352	0.8312	1.4480
CEO Relative Leverage (SERP)	1,929	0.8152	0.9509	0.2187	0.5622	1.0427
CEO Relative Incentive	1,182	0.9243	1.0074	0.3214	0.6478	1.1870
CEO Relative Incentive (SERP)	1,929	0.6807	0.8835	0.1714	0.4279	0.8377

Table 1.3 Acquirer abnormal stock returns: risk-seeking vs. risk-averse CEOs and pre- vs. during- vs. post-crisis periods

This table reports the univariate tests for acquirer CARs for different M&A subsamples over the 2003-2015 period. CARs are estimated using the one-factor model. In panel A, column (A1) reports the results for the full sample. Column (A2), (A3) and (A4) show the statistics for different groups of CEOs (risk-seeking vs. risk-averse) as well as their difference-in-means test. A CEO-year observation is classified as a risk-seeking (risk-averse) if its *CEO relative leverage (SERP)* is lower (higher) than the sample median. *CEO relative leverage (SERP)* equals CEO pension divided by CEO inside equity scaled by the firm leverage. Column (A5) – (A10) report similar statistics for the pre-, during-, and post-crisis subsamples as well as their difference-in-means test. The pre-crisis subsample comprises M&A announcements made prior to 12/30/2007. The during-crisis subsample comprises M&A announcements made between 12/31/2007 and 06/30/2009 while the post-crisis subsample includes deals announced after 06/30/2009. Panel B provide the statistics of different groups of CEOs for each crisis period. ***, ***, and * are used to indicate significant levels at 1%, 5% and 10% respectively.

					Panel A					
Group	Full Sample	Risk- Seeking CEOs (RS)	Risk- Averse CEOs (RA)	RS - RA	Pre- Crisis	During- Crisis	Post- Crisis	Pre - During	Post - During	Post - Pre
	(A1)	(A2)	(A3)	(A4)	(A5)	(A6)	(A7)	(A8)	(A9)	(A10)
Mean	0.0063***	0.0070***	0.0055***	0.0015	0.0052***	-0.0030	0.0090***	0.0082***	0.0120***	0.0038**
Standard Deviation	0.0345	0.0375	0.0312	0.0345	0.0323	0.0399	0.0347	0.0339	0.0356	0.0336
Observations	1,929	964	965		760	193	976			
					Panel B					
		Pre-Crisi	s (Before 12/31.	/2007)	During-Crisi	s (12/31/2007 -	- 06/30/2009)	Post-C	Crisis (After 06/30	/2009)
Group		Risk- Seeking CEOs (RS)	Risk- Averse CEOs (RA)	RS - RA	Risk- Seeking CEOs (RS)	Risk- Averse CEOs (RA)	RS - RA	Risk- Seeking CEOs (RS)	Risk-Averse CEOs (RA)	RS - RA
		(B1)	(B2)	(B3)	(B4)	(B5)	(B6)	(B7)	(B8)	(B9)
Mean		0.0045***	0.0058***	-0.0012	-0.0098**	0.0037	-0.0136**	0.0122***	0.0057***	0.0065***
Standard Deviation		0.0342	0.0303	0.0323	0.0440	0.0342	0.0394	0.0375	0.0313	0.0345
Observations		380	380		96	97		488	488	

Table 1.4 CEO risk preferences and shareholder reactions to acquisition announcements

This table reports the results of regressing acquirer CAR[0,+1] on CEO risk preferences, CEO relative leverage (SERP) and CEO relative incentive (SERP). CAR[0,+1] is estimated from the one-factor model. The two key independent variables are CEO relative leverage (SERP) and CEO relative incentive (SERP). CEO relative leverage (SERP) equals CEO pension divided by CEO inside equity scaled by the firm leverage while CEO relative incentive (SERP) is the ratio of the change in CEO pension to the change of CEO inside equity scaled by the change in the firm leverage. The pre-crisis dummy takes a value of one if the M&A deal was made before 12/31/2007, and zero otherwise. The post-crisis dummy takes a value of one if the M&A deal was made after 06/30/2009, and zero otherwise. Other independent variables are defined in Appendix 1.1. Models (2) and (4) include the crisis dummies and their interaction terms with CEO risk preferences. The standard errors are adjusted for heteroskedasticity and t-statistics are reported in parentheses. ***, **, and * indicate significant levels at 1%, 5% and 10% respectively.

Variable	(1)	(2)	(3)	(4)
CEO Relative Leverage (SERP)	0.0006	0.0057**		,
	(0.6001)	(2.2207)		
CEO Relative Leverage (SERP)*Pre-crisis	` ,	-0.0029		
		(-0.9401)		
CEO Relative Leverage (SERP)*Post-crisis		-0.0080***		
		(-2.8379)		
CEO Relative Incentive (SERP)		,	0.0008	0.0061**
			(0.6782)	(2.1904)
CEO Relative Incentive (SERP)*Pre-crisis			,	-0.0030
				(-0.8660)
CEO Relative Incentive (SERP)*Post-crisis				-0.0084***
				(-2.7363)
Pre-crisis		0.0106**		0.0102**
		(2.4496)		(2.4418)
Post-crisis		0.0196***		0.0187***
		(4.5733)		(4.5774)
CEO Age	-0.0033	-0.0058	-0.0035	-0.0061
č	(-0.4398)	(-0.7669)	(-0.4601)	(-0.8012)
CEO Compensation	0.0002	-0.0003	0.0002	-0.0003
1	(0.1325)	(-0.2224)	(0.1462)	(-0.2215)
Firm Size	-0.0023***	-0.0023***	-0.0022***	-0.0023***
	(-3.8819)	(-4.0284)	(-3.8613)	(-4.0362)
Firm Financial Leverage	0.0001	0.0001	0.0001	0.0001
	(0.9369)	(0.7268)	(0.9399)	(0.7210)
Firm Market to Book Ratio	-0.0021**	-0.0015	-0.0021**	-0.0015*
	(-2.2916)	(-1.6321)	(-2.3100)	(-1.6882)
Stock Deal	-0.0245***	-0.0239***	-0.0245***	-0.0239***
	(-3.6357)	(-3.5925)	(-3.6341)	(-3.5932)
Industrial Diversification	-0.0035**	-0.0030**	-0.0035**	-0.0030**
	(-2.2420)	(-1.9885)	(-2.2446)	(-2.0005)
International Diversification	-0.0036**	-0.0032**	-0.0036**	-0.0032**
	(-2.4209)	(-2.1666)	(-2.4266)	(-2.1832)
Private Target	-0.0005	-0.0009	-0.0005	-0.0010
č	(-0.2837)	(-0.5505)	(-0.2903)	(-0.5544)
Public Target	0.0002	-0.0003	0.0002	-0.0003
	(0.0994)	(-0.1462)	(0.0952)	(-0.1270)
Friendly Deal	-0.0045	-0.0055*	-0.0045	-0.0054*
·	(-1.4584)	(-1.7649)	(-1.4487)	(-1.7507)
Relative Deal Value	0.0050	0.0041	0.0050	0.0040
	(0.5606)	(0.4594)	(0.5605)	(0.4533)
Intercept	0.0488	0.0485	0.0491	0.0501
•	(1.5387)	(1.4993)	(1.5504)	(1.5513)
R^{2} (%)	4.09%	5.99%	4.10%	5.98%
Observations	1,879	1,879	1,879	1,879

Table 1.5 CEO risk preferences and shareholder reactions to M&A announcements with different CAR measures

This table reports the results of regressing acquirer *CARs* on CEO risk preferences, *CEO relative leverage (SERP)* and *CEO relative incentive (SERP)*. The dependent variables are *CAR*[-1,+1] estimated from the one-factor model and *CAR*[0,+1] estimated from the market model. The two key independent variables are *CEO relative leverage (SERP)* and *CEO relative incentive (SERP)*. *CEO relative leverage (SERP)* equals CEO pension divided by CEO inside equity scaled by the firm leverage while *CEO relative incentive (SERP)* is the ratio of the change in CEO pension to the change of CEO inside equity scaled by the change in the firm leverage. In addition, the *pre-crisis* dummy takes a value of one if the M&A deal was made before 12/31/2007, and zero otherwise. The *post-crisis* dummy takes a value of one if the M&A deal was made after 06/30/2009, and zero otherwise. Other independent variables are defined in Appendix 1.1. The standard errors are adjusted for heteroskedasticity and t-statistics are reported in parentheses. ***, **, and * indicate significant levels at 1%, 5% and 10% respectively.

Variable	One-factor	CAR[-1,+1]	Market-adjus	justed CAR[0,+1]	
Variable -	(1)	(2)	(3)	(4)	
CEO Polotivo I avanono (CEDP)	0.0074**		0.0050*		
CEO Relative Leverage (SERP)	(2.1537)		(1.6601)		
CEO Relative Leverage (SERP)*Pre-crisis	-0.0045		-0.0024		
CEO Relative Levelage (SERI) Tie-clisis	(-1.1871)		(-0.6830)		
CEO Relative Leverage (SERP)*Post-crisis	-0.0094***		-0.0069**		
CEO Relative Levelage (SERF) Fost-clisis	(-2.6174)		(-2.1341)		
CEO Deletive Incentive (SEDD)		0.0082**		0.0055*	
CEO Relative Incentive (SERP)		(2.1640)		(1.7148)	
CEO Relative Incentive (SERP)*Pre-crisis		-0.0049		-0.0027	
CEO Relative incentive (SERI) Tie-clisis		(-1.1567)		(-0.6916)	
CEO Relative Incentive (SERP)*Post-crisis		-0.0101**		-0.0074**	
CEO Relative incentive (SERI) Tost-clisis		(-2.5621)		(-2.1096)	
Pre-crisis	0.0130***	0.0126***	0.0117**	0.0115**	
1 16-011818	(2.9915)	(3.0142)	(2.3325)	(2.4167)	
Post-crisis	0.0217***	0.0208***	0.0205***	0.0198***	
1 08t-011818	(5.0644)	(5.1112)	(4.0955)	(4.2029)	
Other Control Variables	Yes	Yes	Yes	Yes	
R^{2} (%)	6.67%	6.69%	5.56%	5.55%	
Observations	1,879	1,879	1,879	1,879	

Table 1.6 Alternative measures of CEO risk preferences and shareholder reactions to acquisition announcements

This table reports the multivariate results for different model specifications. In all specifications, the main dependent variable is acquirer CAR[0,+1] estimated from the one-factor model. The two key independent variables are (1) CEO relative leverage, and (2) CEO relative incentive for the post-2006 period. CEO relative leverage equals CEO inside debt divided by CEO inside equity scaled by the firm leverage while CEO relative incentive is the ratio of the change in CEO inside debt to the change of CEO inside equity scaled by the change in the firm leverage. In addition, the precrisis dummy takes a value of one if the M&A deal was made before 12/31/2007, and zero otherwise. The post-crisis dummy takes a value of one if the M&A deal was made after 06/30/2009, and zero otherwise. Other independent variables are defined in Appendix 1.1. The standard errors are adjusted for heteroskedasticity and t-statistics are reported in parentheses. ***, **, and * indicate significant levels at 1%, 5% and 10% respectively.

Variable	(1)	(2)
CEO Relative Leverage	0.0062**	
	(2.4102)	
CEO Relative Leverage*Pre-crisis	-0.0064**	
	(-2.0699)	
CEO Relative Leverage*Post-crisis	-0.0083***	
	(-3.0436)	
CEO Relative Incentive		0.0066**
		(2.3694)
CEO Relative Incentive*Pre-crisis		-0.0068**
		(-2.0448)
CEO Relative Incentive*Post-crisis		-0.0088***
		(-2.9458)
Pre-crisis	0.0123	0.0113
	(1.4819)	(1.3781)
Post-crisis	0.0217***	0.0206***
	(4.5632)	(4.5409)
Other Control Variables	Yes	Yes
R^{2} (%)	8.13%	8.07%
Observations	1,172	1,172

Table 1.7 CEO risk preferences and shareholder reactions to acquisition announcements with alternative crisis periods

This table reports the multivariate results for different model specifications. In all specifications, the main dependent variable is acquirer CAR[0,+1] estimated from the one-factor model. The two key independent variables are CEO relative leverage (SERP) and CEO relative incentive (SERP). CEO relative leverage (SERP) equals CEO pension divided by CEO inside equity scaled by the firm leverage while CEO relative incentive (SERP) is the ratio of the change in CEO pension to the change of CEO inside equity scaled by the change in the firm leverage. The early-crisis dummy takes a value of one if the M&A deal was made during 06/30/2007 and 09/30/2008, and zero otherwise. The late-crisis dummy takes a value of one if the M&A deal was made during 09/30/2008 and 03/31/2009, and zero otherwise. The post-crisis dummy takes a value of one if the M&A deal was made after 03/31/2009. Other independent variables are defined in Appendix 1.1. The standard errors are adjusted for heteroskedasticity and t-statistics are reported in parentheses. ***, **, and * indicate significant levels at 1%, 5% and 10% respectively.

Variable	(1)	(2)
CEO Relative Leverage (SERP)	0.0031	
	(1.4332)	
CEO Relative Leverage (SERP)*Early-crisis	-0.0013	
	(-0.5116)	
CEO Relative Leverage (SERP)*Late-crisis	0.0133*	
	(1.7088)	
CEO Relative Leverage (SERP)*Post-crisis	-0.0052**	
	(-2.1273)	
CEO Relative Incentive (SERP)		0.0036
		(1.4502)
CEO Relative Incentive (SERP)*Early-crisis		-0.0015
		(-0.5174)
CEO Relative Incentive (SERP)*Late-crisis		0.0138
		(1.5321)
CEO Relative Incentive (SERP)*Post-crisis		-0.0056**
		(-2.0471)
Early-crisis	-0.0032	-0.0032
.	(-0.8370)	(-0.8868)
Late-crisis	-0.0233**	-0.0211**
	(-2.4607)	(-2.3122)
Post-crisis	0.0085***	0.0081***
	(3.4118)	(3.3981)
Other Control Variables	Yes	Yes
R ² (%)	6.08%	6.02%
Observations	1,879	1,879

Table 1.8 CEO risk preferences and shareholder reactions to acquisition announcements with corporate governance

This table reports the results of regressing acquirer CAR[0,+1] on CEO risk preferences, CEO relative leverage (SERP) and CEO relative incentive (SERP). CAR[0,+1] is estimated from the one-factor model. The two key independent variables are CEO relative leverage (SERP) and CEO relative incentive (SERP). CEO relative leverage (SERP) equals CEO pension divided by CEO inside equity scaled by the firm leverage while CEO relative incentive (SERP) is the ratio of the change in CEO pension to the change of CEO inside equity scaled by the change in the firm leverage. The pre-crisis dummy takes a value of one if the M&A deal was made before 12/31/2007, and zero otherwise. The post-crisis dummy takes a value of one if the M&A deal was made after 06/30/2009, and zero otherwise. In addition, % of independent directors on board and % of female directors are used to capture acquirer's corporate governance. Other independent variables are defined in Appendix 1.1. The standard errors are adjusted for heteroskedasticity and t-statistics are reported in parentheses. ***, **, and * indicate significant levels at 1%, 5% and 10% respectively.

Variable	(1)	(2)	(3)	(4)
CEO Relative Leverage (SERP)	0.0107***		0.0099***	
	(3.4109)		(3.5217)	
CEO Relative Leverage (SERP)*Pre-crisis	-0.0104**		-0.0096**	
	(-2.3737)		(-2.2731)	
CEO Relative Leverage (SERP)*Post-crisis	-0.0130***		-0.0124***	
	(-3.9500)		(-4.1840)	
CEO Relative Incentive (SERP)		0.0122***		0.0111***
		(3.7140)		(3.7333)
CEO Relative Incentive (SERP)*Pre-crisis		-0.0119**		-0.0109**
		(-2.4946)		(-2.3627)
CEO Relative Incentive (SERP)*Post-crisis		-0.0144***		-0.0136***
		(-4.2218)		(-4.3518)
% of Independent Directors	0.0005	0.0005		
	(0.9033)	(0.9121)		
% of Independent Directors*Post-Crisis	-0.0005	-0.0005		
	(-0.9060)	(-0.9287)		
% of Female Directors			-0.0001	0.0000
			(-0.3058)	(-0.0190)
% of Female Directors*Post-Crisis			0.0001	0.0000
			(0.2981)	(0.0223)
Pre-crisis	0.0256***	0.0246***	0.0240***	0.0230***
	(3.8067)	(3.8210)	(3.9301)	(3.9307)
Post-crisis	0.0641	0.0636	0.0215***	0.0214***
	(1.3856)	(1.3820)	(2.7939)	(2.7945)
Other Control Variables	Yes	Yes	Yes	Yes
R^{2} (%)	9.72%	9.71%	9.77%	9.74%
Observations	1,029	1,029	1028	1028

Table 1.9 CEO risk preferences and shareholder reactions to acquisition announcements using the retained CEO sample and the U.S. targets sample

This table reports the results of regressing acquirer CAR[0,+1] on CEO risk preferences, CEO relative leverage (SERP) and CEO relative incentive (SERP) only for the sample of M&A deals made by CEOs who retained in the position for at least two crisis periods, and the U.S. M&As sample. CAR[0,+1] is estimated from the one-factor model. The two key independent variables are CEO relative leverage (SERP) and CEO relative incentive (SERP). CEO relative leverage (SERP) equals CEO pension divided by CEO inside equity scaled by the firm leverage while CEO relative incentive (SERP) is the ratio of the change in CEO pension to the change of CEO inside equity scaled by the change in the firm leverage. The pre-crisis dummy takes a value of one if the M&A deal was made before 12/31/2007, and zero otherwise. The post-crisis dummy takes a value of one if the M&A deal was made after 06/30/2009, and zero otherwise. Other independent variables are defined in Appendix 1.1. The standard errors are adjusted for heteroskedasticity and t-statistics are reported in parentheses. ***, ***, and * indicate significant levels at 1%, 5% and 10% respectively.

Variable	Retained C	Retained CEO Sample		
variable	(1)	(2)	(3)	(4)
CEO Relative Leverage (SERP)	0.0069**		0.0042	
- , , ,	(2.2881)		(1.3348)	
CEO Relative Leverage (SERP)*Pre-crisis	-0.0062*		-0.0013	
	(-1.9207)		(-0.3364)	
CEO Relative Leverage (SERP)*Post-crisis	-0.0085**		-0.0079**	
	(-2.5315)		(-2.2167)	
CEO Relative Incentive (SERP)		0.0073**		0.0048
		(2.1843)		(1.3827)
CEO Relative Incentive (SERP)*Pre-crisis		-0.0066*		-0.0015
		(-1.8347)		(-0.3472)
CEO Relative Incentive (SERP)*Post-crisis		-0.0090**		-0.0084**
		(-2.4070)		(-2.1834)
Pre-crisis	0.0133***	0.0126***	0.0078	0.0076
	(2.9027)	(2.8720)	(1.2756)	(1.2928)
Post-crisis Post-crisis	0.0174***	0.0164***	0.0180***	0.0172***
	(3.7348)	(3.7241)	(2.9620)	(2.9692)
Other Control Variables	Yes	Yes	Yes	Yes
R^{2} (%)	7.63%	7.59%	6.42%	6.41%
Observations	1,077	1,077	1,230	1,230

Table 1.10 CEO risk preferences and acquirer post-merger performance after the 2008 financial crisis

This table reports the multivariate results for acquirers' buy-and-hold abnormal stock returns after the financial crisis. Acquirers' BHAR[+1, +375] and BHAR[+1, +500] are estimated from the one-factor model. Consecutive M&A announcements within 30 days by the same firm are excluded to mitigate the impacts of firms with multiple acquisitions. The two main independent variables are CEO relative leverage (SERP) and CEO relative incentive (SERP). CEO relative leverage (SERP) equals CEO pension divided by CEO inside equity scaled by the firm leverage while CEO relative incentive (SERP) is the ratio of the change in CEO pension to the change of CEO inside equity scaled by the change in the firm leverage. Other independent variables are defined in Appendix 1.1. The standard errors are adjusted for heteroskedasticity and t-statistics are reported in parentheses. ***, ***, and * indicate significant levels at 1%, 5% and 10% respectively.

Variable	BHAR[-	+1,+375]	BHAR[+1,+500]			
Variable	(1)	(2)	(3)	(4)		
CEO Relative Leverage (SERP)	0.0341*	`,	0.0409	, ,		
	(1.7376)		(1.6200)			
CEO Relative Incentive (SERP)		0.0395*		0.0466*		
		(1.8565)		(1.6984)		
CEO Age	0.0705	0.0658	0.2073	0.2027		
•	(0.3659)	(0.3416)	(0.7035)	(0.6884)		
CEO Compensation	0.0710	0.0728	0.1408	0.1428		
•	(1.1038)	(1.1293)	(1.2955)	(1.3111)		
Firm Size	-0.0077	-0.0069	-0.0232	-0.0223		
	(-0.3606)	(-0.3258)	(-0.6819)	(-0.6578)		
Firm Financial Leverage	-0.0143	-0.0143	-0.0245	-0.0245		
_	(-1.0204)	(-1.0203)	(-0.9505)	(-0.9504)		
Firm Market to Book Ratio	0.0505*	0.0512*	0.0722*	0.0733*		
	(1.9097)	(1.9482)	(1.8486)	(1.8858)		
Stock Deal	0.0211	0.0208	0.0755	0.0751		
	(0.2326)	(0.2286)	(0.6504)	(0.6454)		
Industrial Diversification	0.0573	0.0572	0.0633	0.0633		
	(1.3724)	(1.3701)	(0.9848)	(0.9841)		
International Diversification	0.0077	0.0071	0.0628	0.0622		
	(0.1957)	(0.1795)	(1.0657)	(1.0547)		
Private Target	0.1468***	0.1465***	0.1866**	0.1862**		
_	(3.0130)	(3.0081)	(2.5488)	(2.5455)		
Public Target	0.1374***	0.1369***	0.1596**	0.1591**		
-	(2.9064)	(2.9003)	(2.3334)	(2.3276)		
Friendly Deal	-0.0513	-0.0498	-0.0709	-0.0693		
•	(-0.7565)	(-0.7354)	(-0.7599)	(-0.7425)		
Relative Deal Value	-0.0710	-0.0706	-0.1887*	-0.1882*		
	(-0.9854)	(-0.9796)	(-1.6928)	(-1.6819)		
Intercept	-1.1290	-1.1337	-2.2953	-2.3037		
	(-1.0498)	(-1.0539)	(-1.3163)	(-1.3199)		
R^{2} (%)	5.36%	5.41%	5.56%	5.58%		
Observations	907	907	907	907		

Table 1.11 Shareholder reactions to changes in CEO risk preferences reported in DEF 14A filings

This table shows the univariate tests for the cumulative abnormal returns (*CAR*) two days, and three days around the DEF 14A's annual filing dates across different groups of CEOs for the 2010–2015 fiscal period. The sample includes only non-financial and non-utility firms whose market capitalization are at least one billion dollars. The final sample comprises of 3,078 CEO-year observations. A CEO-year observation is classified as a risk-averse (risk-seeking) if its change in *CEO relative leverage* greater than or equal to (less than) zero. The change in *CEO relative leverage* equals the current period's value minus the previous period's. The cumulative abnormal returns are estimated using the one-factor model. The number of observations, mean and standard deviation are reported for each group of CEOs. In addition, the table also reports the statistical significance for the difference-in-means test. ***, **, and * are used to indicate significant levels at 1%, 5% and 10% respectively.

	P	Panel A: CAR[0,+1]		
Group	Full Sample	Risk-Seeking CEOs (RS)	Risk-Averse CEOs (RA)	RS - RA
	(A1)	(A2)	(A3)	(A4)
Mean	0.0005	0.0012**	-0.0006	0.0017**
Standard Deviation	0.0226	0.0222	0.0231	0.0226
Observations	3,078	1,859	1,219	N/A
	P	anel B: CAR[-1,+1]		
Group	Full Sample	Risk-Seeking CEOs (RS)	Risk-Averse CEOs (RA)	RS - RA
	(B1)	(B2)	(B3)	(B4)
Mean	0.0001	0.0012**	-0.0015*	0.0028**
Standard Deviation	0.0301	0.0299	0.0303	0.0301
Observations	3,078	1,859	1,219	N/A

ESSAY 2: WHEN DOES CORPORATE SOCIAL RESPONSIBILITY PAY OFF? INTRODUCTION

Investments in corporate social responsibility (CSR) have become more prevalent in recent years. According to the U.S. Social Investment Forum Foundation's 2018 report, around \$12 trillion were invested in sustainable, responsible, and impact investing (SRI) funds, an approximately 38% increase from \$8.7 trillion in 2016. In addition, a recent PricewaterhouseCoopers (PwC) global CEO survey indicated that more than 60% of chief executive officers (CEOs) consider CSR a core business, rather than just stand-alone activity (Horoszowski 2016). The recent surge in CSR investments is due to the common belief shared among giant corporations (e.g., Google, Walt Disney, Lego) that views CSR as a means to help create a competitive advantage over their competitors (Kramer and Porter 2011; Flammer 2015). Given its growing importance to businesses in practice, CSR has become a major topic of interest in academic research.¹⁵ For example, prior studies (e.g., Jiao 2010; Deng, Kang, and Low 2013; Becchetti, Ciciretti, and Hasan 2015; Flammer 2015; Ferrell, Liang, and Renneboog 2016) have investigated whether CSR truly enhances firm value by examining the underlying drivers at the firm and industry levels. Nevertheless, empirical evidence on the effect of CSR on firm financial performance is still equivocal at best (Renneboog, Ter Horst, and Zhang 2008).

Some studies argue that CSR investments boost firm financial performance (Jiao 2010; Edmans 2011; Deng et al. 2013; Cheng, Ioannou, and Serafeim 2014; Flammer 2015; Ferrell et al. 2016) whereas others find CSR investments have the opposite effect on firm value (Mahoney and Thorne 2005; Frye, Nelling, and Webb 2006; Fabrizi, Mallin, and Michelon 2014; Becchetti et al.

¹⁵ For a detailed discussion of this topic, see https://hbr.org/2018/02/more-and-more-ceos-are-taking-their-social-responsibility-seriously.

2015). On one hand, proponents of CSR contend that moderate levels of CSR investment should enhance corporate financial performance and/or shareholder value through improved relationships with other key stakeholders or by CSR's underlying hedging feature in the form of goodwill (Boutin-Dufresne and Savaria 2004; Heal 2005; Goss and Roberts 2011; Humphrey, Lee, and Shen 2012). However, if excessive amounts of scarce resources are allocated to CSR activities, they could produce the opposite effect due to potential agency problems between managers and other parties whose interests are aligned with the company's long-term performance. Specifically, CEOs could have an incentive to overinvest in irrelevant CSR activities for their own private benefits (e.g., raise their reputation as global citizens) or personal agenda (Cronqvist, Heyman, Nilsson, Svaleryd, and Vlachos 2009; Borghesi, Houston, and Naranjo 2014; Kang and Han Kim 2017; Liu, McConnell, and Xu 2017). Consequently, CSR activities can potentially harm shareholder value in the long run. For example, Cronqvist et al. (2009) find that entrenched CEOs pay higher wages to workers than what would be optimal instead of distributing residual corporate cash flows back to shareholders. Therefore, whether CSR investments pay off remains a largely unresolved question that warrants investigation.

Motivated by the studies of Hambrick and Mason (1984) and Bertrand and Schoar (2003) that stress the importance of managerial fixed effects regarding firm investment decisions, a recent stream of research has emerged proposing that the success of CSR and its effects on corporate financial performance chiefly depend on CEO traits and behaviors. Employing the fixed effects model of Abowd, Kramarz, and Margolis (1999), Davidson, Dey, and Smith (2018) show that CEO fixed effects can explain approximately 63% of the variation in CSR performance, whereas firm and other unobserved fixed effects only account for less than 30%. In particular, this branch of literature has examined a variety of CEO fixed effects, including demographics, hubris, political

viewpoint, and managerial ability, on CSR (e.g., Di Giuli and Kostovetsky 2014; Tang, Qian, Chen, and Shen 2015; Petrenko, Aime, Ridge, and Hill 2016; Yuan, Tian, Lu, and Yu 2017). For instance, McCarthy, Oliver, and Song (2017) show that CEO overconfidence is negatively associated with the degree of CSR investment as measured by the ratings of Kinder, Lydenberg and Domini (KLD) because overconfident managers tend to underestimate firm risks and are less likely to use CSR as a goodwill hedging strategy. Nevertheless, the impact of CEO risk preferences, induced by the structure of compensation packages, on the nature of CSR decisions and the valuation effects of CSR remain largely unexplored, although recent empirical studies emphasize the importance of different CEO compensation packages on several corporate decisions (e.g., Cassell, Huang, Sanchez, and Stuart 2012; Phan 2014; Caliskan and Doukas 2015). In this study, we therefore empirically investigate the valuation effects of CSR decisions by focusing on CEOs' compensation contracts designed to influence their risk preferences. The balance of our study focuses on understanding whether the nature and valuation effects of CSR investment decisions are related to CEO risk-averse (risk-seeking) inducing compensation.

Consistent with the previous literature arguing that risk-averse inducing compensation (i.e., high inside debt) motivates the undertaking of risk-averse decisions that increase the firm long-term performance, we also expect CEOs with higher inside debt holdings to engage in socially responsible management practices that will ultimately add value to the firm. Because of the unfunded and unsecured nature of pensions and deferred compensation, a CEO whose compensation structure tilts toward such instruments is exposed to default risk akin to that faced by creditors. Therefore, a CEO with debt-like compensation is expected to display a higher level of risk aversion and pursue corporate decisions that enhance the long-term performance of the firm. For example, Cassell et al. (2012) find that debt-like compensation discourages CEOs from

investing in research and development (R&D) and leveraging firm capital structure while motivating them to focus on operational hedging. Following this logic, we argue that CEOs with risk-averse (risk-seeking) inducing compensation—that is, CEOs with high (low) inside debt—are more (less) likely to be prudent in CSR spending. Specifically, CEOs with risk-averse (risk-seeking) inducing compensation are more (less) likely to allocate funds to CSR investments that are beneficial to firm long-term performance in accord with shareholder expectations. Therefore, we predict that CSR investments decisions made by CEOs with risk-averse (risk-seeking) inducing compensation are expected to be more (less) beneficial to firm value.

We examine the valuation effect of CSR investments conditional on CEO risk-averse (risk-seeking) inducing compensation on a sample of 843 CSR events announced by 155 U.S. listed companies (and/or 188 unique CEOs) from 2007 to 2015. Following previous studies, we gauge CEO risk aversion using the variables *CEO relative leverage*, *CEO relative leverage* ≥ 1 , *CEO relative incentive*, *CEO relative incentive* ≥ 1 , and *CEO vega-to-delta ratio*. The results show that cumulative abnormal stock returns around CSR announcement dates are positively associated with the degree of CEO risk aversion inferred from CEO compensation contracts. Moreover, firms led by CEOs with risk-averse inducing compensation generate higher buy-and-hold abnormal stock returns after CSR announcements than their counterparts with risk-inducing compensation contracts. Consistent with the view that risk-averse (risk-seeking) CEOs are more cautious with CSR spending, we find that CEOs with risk-averse (risk-seeking) inducing compensation are less (more) likely to engage in CSR activities. In the additional analyses, using Bloomberg's Environmental, Social, and Governance (ESG) disclosure score, which measures a firm's CSR

¹⁶ In a separate untabulated analysis, we also find similar results with respect to bondholder reactions. Specifically, CSR investments announced by CEOs with risk-averse (risk-seeking) inducing compensation yield higher (lower) cumulative abnormal returns in the bond market. The evidence is available upon request.

disclosure quality, we find that CEOs with high (low) inside debt holdings are also more (less) transparent in terms of non-financial information disclosure.¹⁷ Furthermore, we document a positive relation between financial performance and ESG scores only for firms led by CEOs with risk-averse inducing compensation. Finally, our main results hold for a battery of robustness tests, such as omitted variable bias (i.e., CEO power and CSR categories), self-selection bias, and endogeneity concerns.

Overall, our evidence demonstrates that CEO risk preferences, gauged through risk-averse (risk-seeking) inducing compensation, influence the nature of CSR activities and the impact CSR exerts on firm outcomes as documented through shareholder reactions to CSR announcements and firm long-term performance.

The remainder of the paper is organized as follows. Section 2 reviews the literature and presents the main hypothesis. Section 3 describes the research methodology. Sections 4 and 5 report the main findings, additional tests, and robustness checks. Section 6 concludes the paper.

LITERATURE REVIEW AND MAIN HYPOTHESIS DEVELOPMENT

CSR and corporate financial performance

Over the past 50 years, CSR has become widely accepted as "a multidimensional construct that encompasses the economic, legal, ethical and discretionary expectations that society has of organizations at a given point in time" (Carroll 1979, p. 500). It covers activities such as corporate philanthropy, cause-related marketing, minority support programs, and socially responsible employment, to name a few (Sen and Bhattacharya 2001). Given its growing importance in practice to businesses, CSR has become an increasingly important research topic among

¹⁷ According to Bloomberg, this aggregate measure captures how well a company is evaluated in the three categories (ESG) in terms of disclosure. Throughout the paper, we consider Bloomberg's ESG score a measure of firm CSR disclosure quality.

academics. Specifically, prior studies have investigated whether CSR truly enhances firm value by examining the underlying drivers at the firm and industry levels.

According to stakeholder theory, a firm's financial performance depends on not only explicit contracts, such those involving shareholder dividends or bondholder payments, but also implicit contracts, such as those concerning product quality and protection of the environment (Cornell and Shapiro 1987; Freeman 2010). When firms breach implicit contracts, stakeholders will convert those contracts into explicit claims (e.g., stricter regulations from government agencies). These explicit claims are generally costlier for firms to satisfy than their implicit counterparts. Since CSR activities are designed to fulfill implicit contracts, such as improving the community or society, firms with a stronger CSR reputation are believed to incur lower costs in conducting their operations and, accordingly, are expected to enjoy better financial performance (Cornell and Shapiro 1987). Consistent with this viewpoint, prior research has shown that CSR investments result in positive stock returns through enhanced productivity and analyst recommendations (Antunovich, Laster, and Mitnick 2000; Filbeck and Preece 2003). Using the KLD database, Jiao (2010) finds that stakeholders' welfare score is positively associated with firms' Tobin's Q. Other studies also show that firms engaging in CSR have easy access to external capital markets and face lower costs of equity, as well as lower costs of debt (El Ghoul, Guedhami, Kwok, and Mishra 2011; Goss and Roberts 2011). According to Edmans (2011), a value-weighted portfolio comprising firms with high employee satisfaction outperforms industry benchmarks by approximately 3.5% based on the annual four-factor alpha. In the context of mergers and acquisitions, Deng et al. (2013) document that high CSR acquirers, relative to low CSR acquirers, earn higher merger and acquisition announcement returns as well as positive long-term stock returns, collectively suggesting that CSR is an important antecedent of merger and acquisition equity performance and in support of stakeholder theory. Thanks to increased transparency and enhanced stakeholder engagement, Cheng et al. (2014) also show that socially responsible firms face fewer capital constraints. Employing a regression discontinuity approach, Flammer (2015) reports a positive association between the adoption of "close call" CSR proposals and their announcement returns as well as firms' subsequent accounting performance (e.g., return on assets). A recent study by Ferrell et al. (2016) suggests a similar pattern at an international scale.

Meanwhile, opponents of stakeholder theory believe that CSR investments are a source of expenses instead of value creation. Thus, investing in CSR is believed to divert a firm's ability from conducting its core business activities that yield much better earnings for shareholders (Friedman 1970; Jensen and Meckling 1976; McWilliams and Siegel 2001). In line with this view, previous studies (Brammer, Brooks, and Pavelin 2006; Di Giuli and Kostovetsky 2014; Becchetti et al. 2015 among others) find that CSR investments are not associated with positive abnormal stock returns, implying that they fail to elicit positive market reactions. In particular, a metaanalysis of 167 studies during the 1972–2007 period conducted by Margolis, Elfenbein, and Walsh (2009) concludes that, although CSR is positively correlated with firm financial performance, the effect is rather small in terms of economic significance. Consistently, earlier work by Alexander and Buchholz (1978) finds that firms with higher CSR rankings as perceived by the respondents in their surveys did not outperform other firms in terms of stock returns. Even worse, Brammer et al. (2006) show that CSR investments, especially those related to employment, were negatively correlated with abnormal stock returns. Di Giuli and Kostovetsky (2014) report similar effects of CSR on future stock performance and return on assets. According to Becchetti et al. (2015), the underpricing anomaly of high idiosyncratic volatility portfolios can also be explained by CSR. Specifically, they document that idiosyncratic volatility is positively correlated with aggregate

CSR scores, which is consistent with their argument that CSR reduces firm flexibility in addressing the negative productivity shocks associated with a decrease in stakeholder well-being.

Collectively, the effect of CSR on firm financial performance documented in the literature is still considered ambiguous at best (Renneboog et al. 2008). Therefore, it is reasonable to assume that the effect of CSR on corporate financial performance might be non-monotonic and that not all CSR activities are detrimental to firm value (Barnea and Rubin 2010). On one hand, when the investment is at a moderate level, CSR should enhance corporate financial performance and/or shareholder value through improved relationships with other key stakeholders or through its hedging feature in the form of goodwill (Boutin-Dufresne and Savaria 2004; Heal 2005; Lee and Faff 2009; Humphrey et al. 2012). Consistent with this view, Smith and Stulz (1985) and Smith (2003) suggest that risk-hedging activities should benefit shareholders through violations of perfect market assumptions. If investors are generally unable to diversify the underlying risks associated with socially irresponsible firms, CSR investments should be beneficial to shareholders. On the other hand, if excessive amounts of scarce resources are allocated to CSR activities, they can produce the opposite valuation effect due to potential agency problems between managers' and shareholders' interests. In particular, CEOs can have an incentive to overinvest in irrelevant CSR activities for their own private benefits (e.g., raising their reputation as global citizens) or personal agenda (Cronqvist et al. 2009; Borghesi et al. 2014; Kang and Han Kim 2017; Liu et al. 2017) at the expense of shareholder interests. Consequently, these activities can harm a firm's social as well as financial performance in the long run. Hence, shareholder reactions to such CSR announcements are expected to elicit negative shareholder reaction. Despite the insights of the previous literature, whether shareholders assess the credibility of a certain CSR activity based on CEO risk preferences

deduced through risk-averse (risk-seeking) inducing compensation contracts remains largely unresolved and warrants investigation.

CSR and managerial fixed effects

Since Hambrick and Mason (1984) and Bertrand and Schoar (2003) stress the importance of managerial fixed effects regarding firm investment decisions, a recent stream of research has emerged proposing that the success of CSR and its effect on corporate financial performance chiefly depend on CEO traits and behaviors. Employing the fixed effect model of Abowd et al. (1999), Davidson et al. (2018) show that CEO fixed effects can explain approximately 63% of the variation in CSR performance, whereas firm and other unobserved fixed effects only account for less than 30% of such variation. In addition, their study shows that CEO materialism (significant ownership of luxury goods) is negatively associated with firm social performance in terms of KLD scores. More importantly, empirical findings of their research show that higher KLD scores are significantly associated with higher accounting profits only in firms run by frugal CEOs, whereas such an effect is nonsignificant in firms run by materialistic CEOs.

This branch of literature has also examined the potential influences of other CEO characteristics on CSR. For instance, CEOs with a rich career experience or a bachelor's degree in the humanities and female CEOs tend to improve firm social performance (Manner 2010). Furthermore, Tang et al. (2015) argue that hubristic CEOs are likely to overestimate their problemsolving skills while underestimating the essential role of stakeholders in providing resources and support to the firm's operation. Consequently, these managers are less likely to engage in socially responsible activities and more likely to engage in socially irresponsible ones. These authors find empirical support for their theoretical predictions in a longitudinal dataset of Standard & Poor's 1500 index firms during 2001–2010. Using a sample of Fortune 500 CEOs and a video-based

measure of CEO narcissism, Petrenko et al. (2016) document that firms run by narcissistic CEOs tend to have higher profiles in corporate philanthropy, a major form of CSR, than their counterparts. In addition, the positive relation between CSR and firm performance is negatively moderated by CEO narcissism. Using a newly proposed measure of managerial ability estimated by data envelopment analysis (Demerjian, Lev, and McVay 2012), Yuan et al. (2017) demonstrate that firms with more capable CEOs are likely to engage in socially responsible activities that ultimately enhance firm social performance.

CSR and **CEO** risk preferences

Nevertheless, the impact on CSR of CEO risk aversion resulting from risk-averse inducing compensation contracts remains largely unexplored, although recent empirical studies emphasize the importance of CEO inside debt compensation in other corporate decisions (Cassell et al. 2012; Phan 2014; Caliskan and Doukas 2015). Previous literature suggests that inside debt holdings (compensation) motivate CEOs to be risk averse and to hold a long-term view of the firm's financial performance (Sundaram and Yermack 2007; Edmans and Liu 2011; Wei and Yermack 2011). Accordingly, risk-averse inducing compensation contracts are expected to motivate CEOs to engage in more socially responsible management practices to increase firm social performance and ultimately add value to the firm than compensation contracts designed to motivate the undertaking of riskier decisions. Specifically, because of the unfunded and unsecured nature of pension and deferred compensation, CEOs with high inside debt compensation contracts are exposed to default risk analogous to that faced by creditors. Hence, a CEO with high inside debt compensation is expected to display a higher level of risk aversion and to be motivated to focus on upholding the company's long-term performance. Supporting this view, White (2012, p.2) argues that inside debt CEOs "seek to reinvest firm income to preserve the long-term viability of the firm and their future pension benefits." In addition, according to Cassell et al. (2012), debt-like compensation discourages CEOs from investing in R&D and leveraging firm capital structure while motivating them to focus on operational hedging.

Following this logic, we argue that managers with risk-averse inducing compensation are expected to be more selective in their CSR investments. They are particularly less likely to engage in CSR activities for their own personal agenda that could hurt the firm's social performance and eventually dampen its future value. Rather, risk-averse CEOs are expected to invest in CSR initiatives that act as goodwill hedging instruments to enhance both the social and financial performance of the firms they manage. Thus, CEOs with high inside debt compensation are more likely to be perceived as hybrid stakeholders who strive for a compromise/balance in terms of CSR investments that benefit both equity investors and other stakeholder groups (Caliskan and Doukas 2015). Therefore, we conjecture that shareholders react more positively to CSR investments initiated by high inside debt CEOs than to those initiated by low inside debt CEOs. In short, investors will consider inside debt holdings to distinguish between a CSR initiative that is trustworthy and beneficial to the firm's long-term performance and its counterpart that does not. In short, the foregoing discussion leads to our main prediction that shareholders are expected to react more positively to CSR announcements made by CEOs with high (low) risk-averse inducing compensation.

METHODOLOGY

Data collection

We utilize different secondary sources to derive the data for our sample. We collect CSR announcements from news releases from CSRwire (CSRwire.com), a leader in publishing CSR news (Griffin and Sun 2013). CSR wire has been providing huge samples of CSR investment

disclosures for a wide range of industries since 1999. In particular, its syndicated distribution has more than 87 million monthly views and reaches more than 200 countries and territories. Furthermore, we rely on CSRwire announcements instead of KLD ratings because the markets immediately utilize new information and, thus, investor reactions to CSR investment disclosures through CSRwire are more relevant than overall year-based KLD ratings. In addition, as mentioned by Krüger (2015), KLD newsletters can suffer from selective reporting bias, since KLD could intentionally focus on certain news that draws the public's attention.

When screening news releases, unlike previous research, we include only news related to firm CSR initiatives, that is, commitments to expend a certain amount of money or effort on CSR. Potential increases in money outflows or decreases in profitability caused by such CSR investments are expected to induce investors to re-evaluate firm prospects and thus elicit market reactions. For example, in 2013, 1,200 employees of Newell Rubbermaid Inc. spent hours building homes for low-income families. Even though their effort was not explicitly monetized, these employees could have increased production and thus profits for Newell Rubbermaid Inc. had these hours been used for production rather than CSR activities. Therefore, such news is included in our sample. On the other hand, we exclude from our analysis news about such events as awards and certifications that involve a firm's achievements and not its future money outflows or expenses on CSR activities. To emphasize the magnitude of the dollar amount, we also include in our analysis a dummy variable for CSR financial commitment that takes the value of one if the disclosed value is greater than or equal to \$200,000. Different thresholds, such as \$500,000 and \$1,000,000, still provide consistent results (not tabulated).

Further, we classify CSR initiatives into three categories, as mentioned in the previous section: environmental concerns, corporate philanthropy, and socially responsible investing

(CSRwire 2016). Environmental concerns refer to activities that aim to protect an organism or an ecological community. This category also includes activities that help to satisfy a firm's current needs without compromising resources for its future needs. An example of this is Walmart's announced investments in renewable wind power in 2008. Corporate philanthropy activities refer to donations to charities, communities, and nonprofit organizations, such as Holland American Line's donation of \$25,000 to Seattle Children's Hospital in 2015. Socially responsible investing initiatives are those that integrate personal values and societal concerns with investment decisions. For example, in 2011, Entergy Corporation committed \$1 million to help the elderly and disabled cope with high utility bills.

It should be noted that there are some other CSR categories identified in KLD ratings that have been used in prior research. Examples are corporate governance, diversity, and human rights (Krüger 2015). However, these relate to policy adjustments and generally do not involve efforts or monetary investments that could incur additional expenses to the firm. Hence, we do not consider such initiatives in our empirical analysis. Our CSR taxonomy is in line with the main categories identified as CSR drivers of market returns in the literature. Each of these three types is distinctly different from the other and they have therefore been investigated independently in prior research. Griffin and Sun (2013) focus exclusively on green investments when investigating stockholder reactions to CSR news. Similarly, Godfrey (2005) examines the relation between corporate philanthropy and shareholder wealth. To capture the potential effects of CSR characteristics, we include these three categories with separate dummy variables in the robustness tests.

Variable description

Cumulative abnormal returns

We use the cumulative abnormal returns (CARs) for the five days around the announcement date (*CAR*[-2,+2]) to capture shareholder reactions to CSR investment announcements. We estimate the daily abnormal stock return using the three-factor model (Fama and French 1996).¹⁸ The corresponding inputs are the *market risk premium*, *SMB*, and *HML*, respectively:

$$R_{i,t} - R_{f,t} = \alpha + \beta (R_{m,t} - R_{f,t}) + \gamma (SMB_t) + \delta (HML_t) + \varepsilon_{i,t}$$

Daily stock prices are extracted directly from the Center for Research in Security Prices (CRSP) database. We calculate the coefficient estimates of each factor, using the estimation period from t = -315 to t = -15 relative to the CSR announcement date of each firm in the sample. Changing the estimation period (e.g., t = -220 to t = -20) does not affect the overall results of our study. The daily abnormal return is simply the difference between the actual return and the return predicted by the three-factor model.

CEO risk preferences and other control variables

Regarding CEO risk preferences, we use several proxies that have been used in previous studies. A manager is identified as more risk averse if he or she experiences a higher level of relative leverage or relative incentive (Edmans and Liu 2011; Wei and Yermack 2011). Specifically, *CEO relative leverage* equals the natural logarithm of CEO inside debt divided by CEO inside equity scaled by firm leverage, while *CEO relative incentive* is the natural logarithm of the ratio of the change in CEO inside debt to the change of CEO inside equity scaled by the

¹⁸ Estimation of the cumulative abnormal returns based on the four-factor model yields similar results. The findings are available upon request.

change in firm leverage. In addition, we include the two dummies CEO relative leverage ≥ 1 and CEO relative incentive ≥ 1 , respectively. Alternatively, the literature also suggests the use of managers' stock and option portfolios to infer their risk aversion (e.g., Coles, Daniel, and Naveen 2006). Therefore, we use the natural log of CEO vega-to-delta ratio multiplied by CEO inside debt to inside equity in the multivariate analysis as another proxy for CEO risk preferences (Cassell et al. 2012). A higher (lower) value for CEO vega-to-delta ratio indicates a CEO is more (less) risk seeking.

We also account for CEO, firm, and CSR characteristics in the multivariate analyses. CEO characteristics include the logarithmic transformations of the variables CEO age, CEO tenure, and CEO cash compensation. In one of our robustness tests, we investigate if our results are affected by CEO power or not. To examine the effect of CEO power, we use the following four proxies of CEO power used in the literature: CEO pay slice, CEO relative ownership, CEO relative tenure, and CEO duality (Bebchuk, Cremers, and Peyer 2011; Han, Nanda, and Silveri 2016). Regarding firm characteristics, we include the variables firm size, firm sales growth, firm market-to-book ratio, firm financial leverage, firm R&D expenses, and firm free cash flows in our regression specifications. To control for the potential effect of a firm making more than one announcement per year, we also use the dummy multiple announcements. In the robustness section, we also add the following binary variables for CSR characteristics: CSR financial commitment, CSR environmental concern, CSR corporate philanthropy, and CSR socially responsible investment. Continuous variables are winsorized at the 1% and 99% levels to control for potential outliers (Cassell et al. 2012). All required items to compute these variables are drawn from the ExecuComp, Compustat, and CRSP databases. Appendix 2.1 provides detailed descriptions of the variables.

Descriptive statistics

Because data on executive pensions and deferred compensations have been explicitly available since 2006, we first start with an initial sample of CSR events collected from CSRwire for the period June 30, 2007, to December 31, 2015. We retrieve 1,841 CSR news releases that match our definition of CSR initiatives. Of these events, 1,456 CSR investments were announced by U.S.-based companies with an available GVKEY identifier. We then merge this sample with the other data sources to extract firm characteristics, CEO characteristics, and security price information. Companies with Standard Industrial Classification (SIC) codes in the ranges 6000–6999 and 4900–4999 are excluded due to their unique capital structure and different regulatory standards. Our final sample comprises 843 CSR events announced by 155 unique U.S. companies (or 188 unique CEOs) from 2007 to 2015. Table 2.1 reports the distribution of our CSR sample by year and by the 10 Fama–French industries

[Insert Table 2.1 about here]

According to Panel A of Table 2.1, most CSR events occurred between 2009 and 2013. Specifically, more than 23% and 18% of CSR announcements were made in 2010 and 2011, respectively. Regarding firm *financial commitments*, only 291 CSR events disclosed a monetary amount greater than \$200,000. In addition, a significant number of CSR observations (568 CSR events) are corporate philanthropy related, whereas only 84 announcements are identified as firm socially responsible investments. The rest are investments related to environmental concerns. As reported in Panel B, the distribution of CSR initiatives illustrates that CSR is mostly related to the manufacturing, shops, and other Fama–French industries. For instance, almost 30% of the announcements are from the shops industry, with only 0.36% from the energy industry.

[Insert Table 2.2 about here]

Descriptive statistics are reported in Panel A of Table 2.2. The mean and standard deviation of *CEO relative leverage* are 0.7903 and 0.7159, respectively, while the mean and standard deviation of *CEO relative incentive* are 0.7448 and 0.6781, respectively. Furthermore, more than 45% of the CSR-CEO sample is identified as risk averse based on the dummies *CEO relative leverage* ≥ 1 and *CEO relative incentive* ≥ 1 . The average of *CEO age* and *CEO tenure* (in logarithmic form) are approximately 4.0245 and 1.5842, respectively. In addition, the average value of *CEO cash compensation* (i.e., salary plus bonus) after logarithmic transformation is around 7.1972. With respect to firm characteristics, the average value of *firm size*, that is, the natural logarithm of firm market capitalization, is 10.2562. Similar to Krüger's (2015), our sample is skewed toward large firms. In addition, the mean of *firm market-to-book ratio* is 1.8357, indicating that the average firm in the sample is overvalued by the market. On average, the ratio of R&D spending to firm total assets after logarithmic transformation is 0.2956. The table also shows that average firm sales grow by more than 6% per year. The average firm in our sample can convert around 5.77% of its total assets into free cash flows.

Although our sample size is smaller than that of Krüger (2015) due to the elimination of missing CEO compensation data, the two samples share comparable statistics for various firm variables. Around 77% of the events belong to firms making more than one announcement per year. In terms of CSR initiative events, the mean of *financial commitment* is 0.3452, which shows that almost 65.48% of the news releases do not publicize investment amounts greater than or equal to \$200,000. Among the three CSR categories, CSR corporate philanthropy is more popular than the other two (i.e., CSR environmental concerns and CSR socially responsible investment) as shown by their respective shares, 67.38% versus 22.66% and 9.96%.

EMPIRICAL RESULTS

CSR announcement cumulative abnormal returns and CEO risk preferences

Univariate results of the cumulative abnormal stock returns of CSR investments for the five-day period around the announcement day (CAR[-2,+2]) are reported in Panel B of Table 2.2. The second column of Panel B shows the mean and standard deviation of CAR[-2,+2] for the full sample. The next four columns report the means and standard deviations of CAR[-2,+2] for the CEO relative leverage quartiles. For ease of interpretation, we define the first quartile (Q1) as the risk-seeking CEO group and the fourth quartile (Q4) as the risk-averse CEO group. The last column shows the results of the difference-in-means tests of CAR[-2,+2] between risk-averse CEOs (Q4) and risk-seeking CEOs (Q1). For the full sample, according to Panel B, short-term equity market reactions to CSR announcements are not statistically different from zero, which seems to indicate that CSR investment announcements do not generally have a significant effect on firm value.

However, we find that CSR announcements associated with firms run by CEOs compensated with less inside debt (i.e., risk-seeking CEOs, in the bottom quartile) elicit negative stock market reactions (CAR[-2,+2] < 0). On the other hand, equity market reactions to the CSR announcements of firms managed by CEOs with high inside debt compensation (i.e., risk-averse CEOs, in the top quartile) are positive and statistically significant at 5%. Specifically, CSR investments for firms run by high inside debt CEOs are associated with a 0.35% shareholder gain, suggesting that CSR announcements by more risk-averse CEOs are viewed favorably by equity investors. In addition, the far-right column in Panel B of Table 2.2 shows that the cumulative

¹⁹ Using CEO relative leverage ≥ 1 , CEO relative incentive, CEO relative incentive ≥ 1 , and CEO vega-to-delta ratio to classify risk-averse versus risk-seeking CEOs does not qualitatively change our overall findings. The results are available upon request.

abnormal stock returns of the top quartile (i.e., risk-averse CEOs) are significantly larger than those of the bottom quartile (i.e., risk-seeking CEOs) at the 5% level. Thus, the difference-in-means tests show that equity market reactions support our hypothesis that posits that CSR activities carried out by CEOs compensated with inside debt are viewed by investors as more appropriate and more favorable in terms of improving the firm's long-term prospects than the CSR investments of these CEOs' risk-seeking counterparts (i.e., CEOs with low inside debt compensation).

We continue to examine the impact of CEO risk preferences on market reactions to CSR announcements through multivariate regression analysis by controlling for other variables. The following table presents the results of empirical tests of the effect of CEO risk preferences on CSR cumulative abnormal returns using the following five proxies of CEO risk preferences: *CEO relative leverage*, *CEO relative leverage* ≥ 1 , *CEO relative incentive*, *CEO relative incentive* ≥ 1 , and *CEO vega-to-delta ratio*. Specifically, we employ the following cross-sectional ordinary least squares (OLS) regression model with clustered standard errors at the firm level:

CAR_i =
$$\beta_0 + \beta_1 X_i + \sum_{i=1}^{k} \gamma_i Z_{i,j} + \epsilon_i$$
 (1)

The dependent variable is the short-term cumulative abnormal return (CAR[-2,+2]) in response to market reactions based on the five-day window around the announcement. All independent variables are lagged by one fiscal period relative to the CSR event dates. As shown in equation (1), the emphasis of our study is to assess the effect of CEO risk preferences on CSR cumulative abnormal returns. A significant positive value of β_1 for the first four proxies (and a significant negative value for CEO vega-to-delta ratio) will indicate that investors generally react more (less) positively to CSR announcements made by CEOs with risk-averse (risk-seeking) inducing compensation. This result would validate the view that CEO packages designed to

motivate more risk-averse (risk-tolerant) management practices work as expected. Meanwhile, if the coefficient β_1 is insignificant, it would imply that investors do not rely on CEO risk preferences to draw inferences about the credibility of CSR investments on the social and financial performance of the announcing firm. Alternatively, it would mean that CEO compensation contracts intended to encourage more risk-averse (risk-tolerant) management practices do not work. For brevity, we do not report the intercepts in the subsequent analysis.

Table 2.3 reports regressions of *CAR*[-2,+2] estimated from the three-factor model on the five proxies of CEO risk preferences, respectively. Consistent with the univariate results, the multivariate findings provide additional support to our main prediction that equity investors react more positively to CSR investments pursued by CEOs with high inside debt compensation (more risk-averse CEOs) than those announced by low inside debt CEOs (more risk-tolerant CEOs). The coefficient estimates of the first four proxies are positive and statistically significant at either 5% or 1%. For instance, a one standard deviation surge in *CEO relative leverage* (i.e., CEOs with more risk aversion) is associated with an increase of 30 basis points in the shareholders' short-term reaction to CSR announcements.²⁰ Similarly, CSR announcements made by CEOs with a low value for *vega-to-delta ratio* (risk-averse CEOs) are associated with stronger shareholder reactions as measured by *CAR*[-2,+2] than those initiated by CEOs with a high value of *vega-to-delta ratio* (risk-seeking CEOs. The corresponding coefficient is also statistically significant at 10%.

[Insert Table 2.3 about here]

With respect to the control variables, we observe a significant negative relation between R&D spending and cumulative abnormal stock returns. This piece of evidence suggests that

²⁰ An increase of 30 basis points in CAR[-2,+2] is estimated by multiplying the coefficient estimate of *CEO relative leverage* (0.0042) by its standard deviation (0.7159).

shareholders dislike CSR initiatives by firms with high R&D spending commitments because they view CSR investment decisions a misallocation of capital resources.

Post-CSR long-term performance and CEO risk preferences

If CEOs with risk-averse inducing compensation engage in CSR activities with the aim of improving firm long-term performance, we should also expect a positive relationship between CEO risk aversion and the buy-and-hold abnormal returns (BHARs) of the CSR announcing firm. Therefore, we re-estimate the baseline equation (1) by replacing the dependent variable with firm BHARs, estimated as follows:

$$BHAR_{i,1-125} = \prod_{t=1}^{125} (1 + R_{i,t}) - \prod_{t=1}^{125} (1 + R_{benchmark,t})$$

We compute the BHARs over the period of 125 trading days (approximately six months) after the announcement date.²¹ Table 2.4 reports the multivariate results of regressing six-month BHARs on the five proxies of CEO risk preferences. For brevity, we suppress the coefficients of the other control variables and report only the coefficients of the main independent variables.

[Insert Table 2.4 about here]

Consistent with our conjecture, we find that CSR investments announced by high inside debt CEOs (more risk-averse CEOs) that triggered positive and significant announcement market reactions are also associated with higher long-term firm performance, suggesting that shareholders did not overestimate the valuation effects of CSR announcements. Most importantly, this result demonstrates that CSR investment decisions under the helm of risk-averse CEOs improve firm's long-term performance. All the coefficients of the first four proxies of CEO risk preferences are

²¹ We find similar results when we extend the holding period to 180 trading days (i.e., nine months). These results are available upon request.

consistently positive and significant (at 5%), indicating that the relation between risk aversion—inducing CEO compensation contracts and value-increasing CSR investment decisions is robust. For instance, a one standard deviation increase in *CEO relative leverage* is associated with a 2.88% increase in the long-term market performance of the CSR announcing firm. Despite being negative, as expected, the coefficient of *CEO vega-to-delta ratio* is not statistically different from zero. Additionally, we find that CSR announcing firms with higher *CEO cash compensation*, smaller *firm size*, and higher *firm sales growth* seem to improve firm post-CSR announcement performance.

As a robustness check, for each firm in the sample, we exclude consecutive CSR announcements within the 50-day period after the first announcement to mitigate the influence of firms with frequent CSR activities. This restriction ultimately reduces the sample size from 843 to 528 observations. However, we still find similar results with respect to the effect of CEO risk-averse inducing compensation on post-CSR long-term performance. In brief, the six-month BHAR analysis shows that shareholders are better off with CSR activities carried out by risk-averse CEOs in the long run. These results suggest that the post-announcement improved BHARs of CSR announcing firms are also in line with shareholders' short-term market reactions. Overall, the reported evidence so far demonstrates that CSR announcements by firms managed by CEOs with risk-averse inducing compensation contracts (i.e., high inside debt) are beneficial to shareholders not only in the short run but also in the long run.

Propensity to engage in CSR and CEO risk preferences

On one hand, due to the unsecured and unfunded nature of pension and deferred compensation, high (low) inside debt CEOs are more (less) concerned with the firm's long-term

²² For brevity, these results are not tabulated here but are available upon request.

survival and, thus, are willing to lower its overall risk. Thanks to the goodwill hedging feature of CSR discussed in the literature (e.g., Goss and Roberts 2011), CEOs with risk-averse (riskseeking) inducing compensation are expected to have more (fewer) incentives to engage in CSR investments. If this conjecture holds, we expect a positive relation between CEO risk-averse inducing compensation and firms' propensity to invest in CSR. On the other hand, other studies (e.g., Servaes and Tamayo 2013; Di Giuli and Kostovetsky 2014) suggest that CEOs with riskaverse (risk-seeking) inducing compensation contracts will be more (less) prudent in allocating resources to CSR activities, since they have greater (less) incentive to maintain the long-term performance of the companies they manage. In this case, CEOs with risk-averse inducing compensations, as opposed to CEOs with risk-inducing compensations, are not anticipated to exhibit higher CSR propensity unless these investments are truly beneficial to firm value. Based on these opposing views, the potential relation between CEO risk aversion and the propensity to engage in CSR is an empirical issue that warrants investigation. Therefore, we further investigate the probability of engaging in CSR investments for firms led by CEOs with different levels of riskaverse inducing compensation contracts.

For this empirical test, the sample of interest consists of firm—year observations with CEO information available from the ExecuComp database for the period from 2007 to 2015. By merging this sample with our CSR sample, we are able to determine whether a CEO with a given level of risk-averse inducing compensation will decide to engage in CSR investments in a particular year. The merged sample comprises 11,640 firm—year observations and the dependent variable is a dummy that takes a value of one if the company in a given year makes at least one CSR investment and zero otherwise. In particular, there are 404 firm—year observations that have at least one CSR event per year, which constitutes 3.47% of the whole sample. The main independent variables are

CEO risk preferences, measured by CEO relative leverage, CEO relative leverage ≥ 1 , CEO relative incentive, CEO relative incentive ≥ 1 , and CEO vega-to-delta ratio. In addition to the previous set of controls, we also account for industry and year fixed effects.

[Insert Table 2.5 about here]

Table 2.5 reports the logistic regressions of the propensity to engage in CSR on CEO risk preferences while controlling for other CEO and firm characteristics. Across the five model specifications, we find empirical evidence that CEOs with higher inside debt (risk-averse CEOs) exhibit a lower, instead of higher, propensity to engage in CSR activities. Although the coefficient of CEO risk preferences in the second model is not statistically significant, it is still negative. Consistently, the positive and statistically significant coefficient of CEO vega-to-delta ratio also suggests that risk-seeking CEOs have a higher propensity to engage in CSR activities. Therefore, because risk-averse CEOs' welfare is more aligned with their firms' future fortunes, the empirical evidence shows that they do not have a strong incentive to excessively engage in CSR investments; they appear to be interested only in CSR investments that truly matter to their firms' long-term performance. Jointly, the evidence in this section advocates that risk-reducing CEO compensation packages (e.g., high inside debt) tend to curb excessive CSR spending and/or the misallocation of corporate resources, whereas the opposite pattern is observed for CEOs with risk-inducing compensation contracts.

CSR information disclosure and CEO risk preferences

The findings reported so far support our central argument that investors rely on the nature of CEO compensation contracts and, in particular, on CEO inside debt type that is designed to motivate risk-averse decision making to draw inferences about the credibility of CSR investments on the financial performance of the announcing firm. Another interesting implication of our

findings is that CEOs with risk-averse inducing compensation are likely to be more transparent than their counterparts with risk-seeking inducing compensation with respect to the degree to which CSR-related information is conveyed to the general public. Undoubtedly, greater disclosure can reduce the degree of information asymmetry between investors and corporate executives, which, in turn, should help investors to better assess the credibility of firms' CSR decisions. Additionally, several empirical studies in the business literature show a significant relation between CSR disclosure and managerial characteristics. For instance, Jizi, Salama, Dixon, and Stratling (2014) find that powerful CEOs are associated with greater CSR disclosure. Therefore, in this section, we extend our empirical analysis by examining the potential connection between firm CSR disclosure and CEO risk preferences. From a theoretical standpoint, we expect CEOs with risk-averse (risk-seeking) inducing compensation to disclose more (less) CSR-related information to the markets.

To address this issue, we measure CSR disclosure using firms' ESG scores as covered and reported by Bloomberg. Specifically, this aggregate measure captures how well a company is evaluated in these three categories in terms of disclosure. In accordance with Bloomberg's definition, ESG disclosure score is the firm's weighted average of the environmental, social and governance scores. The ESG values range from 0.1 to 100, depending on the firm's public disclosure in terms of CSR. The higher the ESG score, the better a company's CSR disclosure transparency. For this empirical test, we first extract our ESG sample by merging the ExecuComp database with the Bloomberg database for the period from 2007 to 2015. The final sample size comprises 6,412 firm—year observations with complete information on all variables except CEO vega-to-delta ratio. In this analysis, we use two alternative proxies for CSR disclosure: the three-year average of the firm ESG disclosure score and a dummy that takes a value of one if a firm—

year observation exhibits an increase in ESG score in the next period and zero otherwise. We also include the same set of control variables as in the previous tests and account for industry and year fixed effects. We cluster standard errors at the firm level. For brevity, the coefficient estimates of the controls are omitted here.

[Insert Table 2.6 about here]

Table 2.6 shows the multivariate regression results of CSR information disclosure, based on the ESG disclosure score, on CEO risk preferences for the five proxies used in the previous tests. As shown in Panel A, the coefficient estimate of CEO relative leverage is 0.0736 and statistically significant at 1%. A similar pattern is observed with respect to the other proxies of CEO risk preferences. As expected, the coefficient estimate of CEO vega-to-delta ratio is negative and significant at conventional levels. This pattern, as reported in Panel B, holds even when the three-year average of the ESG score is used as the dependent variable. Hence, the positive (negative) and significant shareholder reaction to CSR announcements carried out by CEOs with risk-averse (risk-seeking) inducing compensation contracts, documented in Panel B of Table 2.2, is consistent with the higher (lower) credibility of the CSR information disclosure reported in Table 2.6. Overall, the evidence reported in Table 2.6 is consistent with our conjecture that CEO risk-averse inducing compensation is significantly and positively (negatively) related to the firm ESG disclosure measure, implying that risk-averse (risk-seeking) CEOs are more (less) likely to disclosure CSR-related information to the public to reduce information asymmetry and improve the credibility of their CSR investment decisions in the eyes of investors.

CSR information disclosure, financial performance, and CEO risk preferences

Empirical evidence has produced mixed results with respect to the relation between CSR information disclosure and firm financial performance (Richardson and Welker 2001; Al-Tuwaijri,

Christensen, and Hughes 2004; Clarkson, Li, Richardson, and Vasvari 2008; Dhaliwal, Li, Tsang, and Yang 2011; Clarkson, Fang, Li, and Richardson 2013; Dhaliwal, Li, Tsang, and Yang 2014; Plumlee, Brown, Hayes, and Marshall 2015). For example, Dhaliwal et al. (2014) report a negative relation between CSR information disclosure and the cost of equity capital based on an empirical analysis of 31 countries. Plumlee et al. (2015) find that voluntary environmental disclosure indicating a firm has done something good for the environment is not only negatively associated with the cost of equity capital, but also positively related to expected future cash flows. On the contrary, according to Richardson and Welker (2001), greater CSR disclosure is significantly associated with higher, instead of lower, costs of equity capital. In addition, other studies even document a nonsignificant relation (e.g., Clarkson et al. 2013) between CSR information disclosure and firm financial performance. Therefore, the lack of empirical consensus on the relation between CSR information disclosure and firm financial performance motivates this section. The documented inconsistency can be potentially explained through managerial risk preferences influenced by the design of CEO risk-averse (risk-seeking) inducing compensation contracts.

Having documented thus far that firms led by CEOs with risk-averse inducing compensation are associated with CSR information disclosure, make better CSR investments in terms of market-based performance, and do not engage in excessive CSR investments, it can be reasonably argued that the mixed empirical evidence on the relation between CSR information disclosure and firm financial performance could be attributed to unexplored CEO risk preferences. To empirically address this conjecture, we regress firm financial performance on the firm ESG disclosure score for the CEO groups with high (risk aversion) and low (risk tolerance) inside debt

based on *CEO relative leverage* ≥ 1 and *CEO relative incentive* $\geq 1.^{23}$ In other words, we examine whether the relation between firm performance and CSR information disclosure varies with CEO compensation contracts intended to motivate risk-averse (risk-seeking) behavior. To capture firm performance, we use the three-year-average of the measures *market-to-book ratio* and *return on equity*.²⁴ The main independent variable of interest is the firm ESG score reported by Bloomberg. We also include the same set of control variables used in previous tests and account for industry and year fixed effects. We cluster standard errors at the firm level. For brevity, the coefficient estimates of the controls are omitted.

[Insert Table 2.7 about here]

Across all regression specifications, as shown in Table 2.7, we find a positive relation between a firm's financial performance and its ESG disclosure score. Consistent with our prediction, the positive association between firm financial performance and a firm's ESG disclosure score is statistically significant (at least at 10%) only for the risk-averse CEO subsample (i.e., CEO relative leverage (incentive) ≥ 1), but not for the risk-seeking CEO subsample. That is, risk-averse inducing compensation contracts help strengthen the effect of CSR information disclosure on firm financial performance, while risk-seeking inducing compensation contracts do not appear to have any influence on firm financial performance. Jointly, these results show that the CEO's degree of risk preference, based on risk-averse (risking) inducing compensation contracts, appears to influence the relation between firm performance and CSR information disclosure. Regarding the other controls, smaller firms with higher growth opportunities, higher

²³ Using median splits based on CEO relative leverage and CEO relative incentive yields similar results. The analysis is not tabulated but available upon request.

²⁴ We also use the three-year average return on assets as another dependent variable. However, the results are inconclusive.

sales growth, higher R&D expenses, and more free cash flows are associated with better future financial performance.

ROBUSTNESS TESTS

CSR announcement returns conditional on different CSR type

To ensure the robustness of our results, we examine whether market reactions to CSR investment announcements are sensitive to CSR characteristics. ²⁵ Specifically, we re-estimate the baseline OLS regressions, controlling for the three CSR categories, environmental concerns, corporate philanthropy, and socially responsible investing, respectively. For brevity, we suppress the coefficients of the other control variables and report the results in Table 2.8. Consistent with our previous evidence, these empirical results show that the firm *CAR*[-2,+2] conditional on CEO risk preferences remains intact, even after controlling for the three different types of CSR investments; that is, shareholder reactions to CSR investments per se are insensitive to all three CSR categories. The rest of the control variables remain consistent with the previous findings. Additional test results (not tabulated) also suggest that our results remain robust to whether firms explicitly disclose the monetary amounts they commit to CSR activities.

[Insert Table 2.8 about here]

CSR announcement returns conditional on CEO power

In addition to the different categories of CSR investments, we also check the robustness of our main empirical findings controlling for CEO power. The rationale behind this test is that one could argue that the market reactions to CSR investments are driven by CEO power rather than CEO risk preferences. From a theoretical point of view, CEOs with more power are more likely to make decisions subject to greater conflicts of interest with shareholders. Therefore, they are

²⁵ In untabulated test results, we also find that the post-CSR long-term performance of announcing firms is unaffected by the three different CSR categories. The findings are available upon request.

expected to react more negatively to CSR investments made by more powerful CEOs with discretionary influence.

To test this conjecture, we regress the cumulative abnormal returns obtained from the three-factor model (*CAR*[-2,+2]) on CEO risk preferences, CEO power, and the other control variables. The effect of CEO risk preferences is captured by using *CEO relative leverage*. We employ the following proxies of CEO power in our baseline OLS regressions previously used in the literature: *CEO pay slice, CEO relative ownership, CEO relative tenure,* and *CEO duality*. Specifically, *CEO pay slice* equals one if the ratio of CEO total compensation to that of the top five executives is greater than the industry median and zero otherwise, *CEO relative ownership* equals one if CEO stock ownership is above the industry median and zero otherwise *CEO, relative tenure* equals one if CEO tenure is above the industry median and zero otherwise, and *CEO duality* equals one if the CEO is also the chair of the company's board of directors and zero otherwise. The results are reported in Table 2.9.

[Insert Table 2.9 about here]

Across all regression specifications, we find that the coefficients of *CEO relative leverage* are positive and strongly significant, whereas the influence of *CEO power* on CSR announcement returns is statistically nonsignificant. These findings indicate that our main empirical results on the relation between CEO risk preferences and CSR investments are not sensitive to CEO power.

Self-selection bias test

Next we use Heckman's (1976, 1979) two-step approach to address the potential self-selection bias in our CSR sample. Specifically, we first run a probit regression of a firm's

²⁶ We find similar results when the other four proxies (*CEO relative leverage* \geq 1, *CEO relative incentive*, *CEO relative incentive*, *CEO relative incentive* \geq 1, and *CEO vega-to-delta ratio*) are used. These results are available upon request.

propensity to engage in CSR in a given year, similar to the model specification reported in Table 2.5, and calculate the inverse Mills ratio (IMR). In the second step, we augment the OLS regressions of market short-term reactions (CAR[-2,+2]) and post-CSR long-term performance (six-month BHARs) on CEO risk preferences with the IMR. We expect the main empirical findings to hold with the inclusion of the IMR in the second step. Specifically, if the IMR's coefficient is statistically insignificant, this would imply that our results are not sensitive to self-selection bias. In line with the main analysis, we perform this test using the five following proxies to gauge CEO risk preferences as before: CEO relative leverage, CEO relative leverage ≥ 1 , CEO relative incentive, CEO relative incentive ≥ 1 , and CEO vega-to-delta ratio. The dependent variables are the cumulative abnormal returns for the five-day window around the CSR announcement (CAR[-2,+2]) and firm post-CSR long-term performance (six-month BHARs). For brevity, the coefficient estimates of the controls are not reported. The results of Heckman's test are reported in Table 2.10.

Overall, the IMR's coefficients in all the regression specifications are not statistically significant, suggesting that our sample is not sensitive to self-selection bias. More important, our main results remain robust, even after including the IMR in the regressions, since all the coefficients of CEO risk preferences remain statistically significant at either 10%, 5%, or 1%.

[Insert Table 2.10 about here]

Reverse causality test

An issue that could raise concerns about the validity of our empirical results is reverse causality. Specifically, self-interested managers, who anticipate that the CSR activities they plan to choose will certainly benefit their firms in the long run, could demand greater risk-averse inducing compensation. This possibility could lead to endogeneity problems. To ensure that our main findings of shareholder reactions to CSR events and firm post-CSR long-term performance

are robust to possible reverse causality concerns, we follow previous studies and employ two-stage least squares models (Cassell et al. 2012; Anantharaman, Fang, and Gong 2013; Phan 2014). In the first stage, we run OLS regressions of *CEO relative leverage*, *CEO relative incentive*, and *CEO vega-to-delta ratio* on a group of potential instruments that are considered important determinants of CEO risk-averse (risk-seeking) inducing compensation. Specifically, we include *CEO age*, *new CEO* dummy, *firm size*, *firm leverage*, *firm market-to-book ratio*, *firm cash flows from operation* scaled by total assets, *firm tax loss carry-forward* scaled by total assets, *maximum state tax rate on individual income*, and the industry–year median *CEO relative leverage* (*incentive*) value (or *CEO vega-to-delta ratio*).²⁷

[Insert Table 2.11 about here]

Consistent with previous studies, we document that the first-stage *F-statistic* is greater than 22 in all three models, suggesting rejection of the null hypothesis of weak instruments (Stock and Yogo 2005). According to Table 2.11, we also find that around 36.51%, 26.87%, and 36.09% of the variation in *CEO relative leverage*, *CEO relative incentive*, and *CEO vega-to-delta ratio*, respectively, in our sample can be explained by the above list of instrumental variables.²⁸ For instance, the industry–year median and maximum state tax rates are positively (negatively) associated with *CEO relative leverage* and *CEO relative incentive* (*CEO vega-to-delta ratio*) and the effects are statistically significant at either 1% or 5%.

In the second stage, we re-estimate our baseline equation (1) using the predicted values of *CEO relative leverage*, *CEO relative incentive*, and *CEO vega-to-delta ratio*, estimated from the

²⁷ The maximum state tax rate on individual income is retrieved from http://www.nber.org/~taxsim/state-rates/. These tax rates are calculated using the TAXSIM model (Feenberg and Coutts 1993).

²⁸ Our sample size in this test is smaller because of missing values in the tax loss carryforward variable. Excluding this instrument does not change the overall results of our analyses.

first-stage regressions, as the independent variables. These results are reported in Table 2.12.

[Insert Table 2.12 about here]

Having addressed potential endogeneity concerns due to reverse causality, consistent with our previously documented results, we continue to find that equity holders endorse CSR announcements initiated by CEOs with risk-averse inducing compensation contracts. In the first three columns of Table 2.12, the coefficient estimates of the instrumented values (i.e., predicted values from the first-stage regressions) of CEO relative leverage and CEO relative incentive (and CEO vega-to-delta ratio) are positive (negative) and statistically significant at least at 5%. Similarly, as reported in the last three columns, our previously reported findings of post-CSR long-term performance are not sensitive to potential reverse causality problems either.

CONCLUSION

The CSR literature remains inconclusive about the valuation effects of CSR investments. Motivated by previous studies that stress the importance of managerial fixed effects in corporate investment decisions, we posit that the impact of CSR investments on firm value could be related to CEO compensation contracts designed to induce risk averse (risk-seeking) behavior (decision making). Our evidence shows that CSR announcements made by firms run by CEOs with risk-averse inducing compensation (i.e., high inside debt) contracts elicit strongly positive market reactions. That is, the strong and favorable reaction to announced CSR investments indicates that investors view CSR corporate decisions as value increasing when initiated by CEOs with risk-averse inducing compensation contracts, whereas the opposite reaction is documented for CEOs with risk-seeking inducing (convex) compensation contracts. In addition, our evidence suggests that risk-averse inducing compensation motivates CEOs to allocate capital resources to CSR decisions more efficiently that significantly improves firm performance not only in the short-run

but also in the long-run. To put it differently, our results point out that CSR decisions made by high inside debt (or low vega-to-delta ratio) CEOs help increase and preserve firm value rather than enhance CEOs' myopic self-interests at the expenses of shareholder value. Low inside debt (or high vega-to-delta ratio) CEOs, however, engage in more CSR investments that are consistently associated with negative announcement abnormal returns and lower post-CSR firm performance. Jointly, equity investors appear to strongly endorse CSR investments initiated by CEOs with risk-averse inducing compensation contracts as value-increasing decisions, whereas they tend to reject CSR investments pursued by CEOs with risk-seeking inducing compensation.

Our findings remain consistent in a battery of robustness checks, including additional CSR and CEO characteristics, self-selection bias, and endogeneity concerns. Additional analysis with respect to CSR information disclosure and firm performance shows that CEO risk-averse inducing compensation (i.e., high inside debt) ensures that CSR investment decisions are trustworthy and beneficial to firm value. In sum, our evidence highlights the role of different CEO compensation contracts in explaining the divergent valuation effects of CSR investment decisions reported in the literature.

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Table 2.1 CSR announcement distribution by year during the 2007 – 2015 period

Telecommunication

Shops

Health

Other

6

8

10

This table reports the annual distribution of 843 CSR announcements made by 155 U.S. public firms (financial and utility firms are excluded) during the 2007 – 2015 period. In panel A, the second and third columns show the annual number of and percentage of CSR announcements for the full sample. The next five columns show the number of events for each the five subcategories. Panel B reports the number of CSR announcements and the corresponding percentages across the 10 Fama & French industries. Information about these announcements is manually collected from https://www.CSRwire.com.

Panel A: CSR announcement distribution by year										
Year	CSR events	Percentage	Financial commitment ≤ \$200,000	Financial commitment ≥ \$200,000	Environmental concern	Corporate philanthropy	Socially responsible investment			
2007	40	4.74%	21	19	8	31	1			
2008	80	9.49%	36	44	15	64	1			
2009	87	10.32%	54	33	20	66	1			
2010	196	23.25%	116	80	43	143	10			
2011	159	18.86%	117	42	41	98	20			
2012	99	11.74%	76	23	21	55	23			
2013	92	10.91%	64	28	21	60	11			
2014	38	4.51%	29	9	10	21	7			
2015	52	6.17%	39	13	12	30	10			
Total	843	100.00%	552	291	191	568	84			
		Panel B: CSR an	nouncement distril	oution by Fama &	French 10 industries					
Code	Industry descript	ion				CSR events	Percentage			
1	Consumer Non-Du	ırables				81	9.61%			
2	Consumer Durable	12	1.42%							
3	Manufacturing					118	14.00%			
4	Energy					3	0.36%			
5	Business Equipme	nt				95	11.27%			

73

247

58

156

8.66%

29.30%

6.88%

18.51%

Table 2.2 Descriptive statistics and univariate analysis

The table presents the descriptive statistics of the independent variables and the univariate analysis of cumulative abnormal returns (CAR[-2,+2]) around the CSR announcements. The sample comprises 843 CSR events announced by U.S public firms from 2007 to 2015. Utilities and financial firms are excluded. Panel A shows the number of observations, means, standard deviations, the 25th, 50th, and 75th percentiles. Panel B reports average shareholder reactions (as measured by CAR[-2,+2]) to CSR events for the full sample and the four quartiles based on CEO relative leverage. *CEO relative leverage* equals CEO inside debt to CEO inside equity scaled by firm market leverage. The last column of panel B shows the difference-in-means test of CAR[-2,+2] between risk-averse and risk-seeking CEO groups. All related information to derive or estimate the variables are from the following databases: ExecuComp, CSRwire, CRSP, and Compustat. Continuous variables are winsorized at 1% extreme. Variable descriptions are provided in Appendix 2.1. ***, **, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

		Panel A: Descrip	tive statistics			
Variable	CSR events	Mean	Standard deviation	25%	50%	75%
CEO relative leverage	843	0.7903	0.7159	0.1565	0.6535	1.3081
CEO relative leverage ≥ 1	843	0.4911	0.5002	0.0000	0.0000	1.0000
CEO relative incentive	843	0.7448	0.6781	0.1460	0.5772	1.3282
CEO relative incentive ≥ 1	843	0.4508	0.4979	0.0000	0.0000	1.0000
CEO vega-to-delta ratio	707	1.0010	1.0329	0.3908	0.6805	1.3218
CEO age	843	4.0245	0.0979	3.9512	4.0431	4.0943
CEO tenure	843	1.5842	0.8244	1.0986	1.6094	2.1972
CEO cash compensation	843	7.1972	0.4317	6.9745	7.1685	7.3406
Firm size	843	10.2562	1.4469	9.3530	10.4247	11.3356
Firm leverage	843	0.7734	1.1960	0.2613	0.4970	0.9066
Firm market-to-book ratio	843	1.8357	0.7148	1.2977	1.6530	2.2144
Firm sales growth	843	0.0632	0.1505	0.0007	0.0451	0.1048
Firm R&D	843	0.2956	0.3235	0.0000	0.0000	0.6397
Firm free cash flows	843	0.0577	0.1135	0.0062	0.0652	0.1192
Multiple announcements	843	0.7722	0.4196	1.0000	1.0000	1.0000
CSR financial commitment	843	0.3452	0.4757	0.0000	0.0000	1.0000
CSR environmental concern	843	0.2266	0.4189	0.0000	0.0000	0.0000
CSR corporate philanthropy	843	0.6738	0.4691	0.0000	1.0000	1.0000
CSR socially responsible investment	843	0.0996	0.2997	0.0000	0.0000	0.0000
-	Panel B: Univ	variate analysis of c	umulative abnorm	al returns		
	Full sample	Q1	Q2	Q3	Q4	Q4 - Q1
Variable		Risk-seeking			Risk-averse	
		CEOs			CEOs	
Mean	-0.0001	-0.0026	-0.0015	0.0001	0.0035**	0.0061**
Standard deviation	0.0273	0.0320	0.0279	0.0250	0.0233	0.0280

Table 2.3 CSR announcement cumulative abnormal returns and CEO risk preferences

This table reports the regression analysis of firm CAR[-2,+2] on different proxies of CEO risk preferences including CEO relative leverage, CEO relative leverage ≥ 1 , CEO relative incentive, CEO relative incentive ≥ 1 , and CEO vegato-delta ratio. CEO relative leverage equals CEO inside debt to CEO inside equity scaled by firm market leverage after logarithmic transformation. CEO relative incentive equals CEO inside debt to change in CEO inside equity scaled by the ratio of firm debt to change in firm equity after logarithmic transformation. CEO vega-to-delta ratio is CEO vega to CEO delta scaled by CEO debt-to-equity ratio after logarithmic transformation. All models include the constant term as well as other controls with firm clustered standard errors shown in parentheses. Continuous variables are winsorized at 1% extreme. Variable descriptions are provided in Appendix 2.1. ***, ***, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

			CAR[-2,+2]		
Variable	(1)	(2)	(3)	(4)	(5)
CEO relative leverage	0.0042*** (0.0015)				
CEO relative leverage ≥ 1	` ,	0.0061** (0.0025)			
CEO relative incentive		,	0.0041*** (0.0015)		
CEO relative incentive ≥ 1				0.0052** (0.0023)	
CEO vega-to-delta ratio					-0.0019* (0.0011)
CEO age	-0.0108 (0.0145)	-0.0105 (0.0146)	-0.0105 (0.0146)	-0.0099 (0.0146)	-0.0207 (0.0145)
CEO tenure	0.0007 (0.0012)	0.0004 (0.0012)	0.0007 (0.0012)	0.0006 (0.0012)	0.0014 (0.0015)
CEO cash compensation	0.0054 (0.0034)	0.0060* (0.0034)	0.0053 (0.0034)	0.0058* (0.0034)	0.0054 (0.0036)
Firm size	-0.0015 (0.0010)	-0.0017 (0.0011)	-0.0013 (0.0010)	-0.0015 (0.0011)	-0.0017 (0.0011)
Firm leverage	0.0000 (0.0008)	-0.0001 (0.0008)	-0.0001 (0.0008)	-0.0001 (0.0008)	0.0002 (0.0009)
Firm market-to-book ratio	0.0001 (0.0019)	0.0000 (0.0019)	0.0002 (0.0019)	0.0002 (0.0019)	0.0016 (0.0022)
Firm sales growth	-0.0054 (0.0060)	-0.0039 (0.0061)	-0.0050 (0.0060)	-0.0033 (0.0061)	-0.0027 (0.0059)
Firm R&D	-0.0108*** (0.0037)	-0.0099*** (0.0038)	-0.0105*** (0.0037)	-0.0097** (0.0038)	-0.0090** (0.0038)
Firm free cash flows	-0.0009 (0.0109)	-0.0017 (0.0111)	-0.0007 (0.0109)	-0.0016 (0.0112)	0.0095 (0.0138)
Multiple announcements	0.0032 (0.0026)	0.0029 (0.0026)	0.0031 (0.0026)	0.0030 (0.0026)	0.0041 (0.0026)
R^{2} (%)	2.60%	2.58%	2.51%	2.37%	2.20%
Observations	843	843	843	843	707

Table 2.4 Post-CSR long-term performance and CEO risk preferences

This table reports the regression analysis of six-month BHARs on CEO risk preferences. CEO risk preferences are captured using CEO relative leverage, CEO relative leverage ≥ 1 , CEO relative incentive, CEO relative incentive ≥ 1 , and CEO vega-to-delta ratio. CEO relative leverage equals CEO inside debt to CEO inside equity scaled by firm market leverage after logarithmic transformation. CEO relative incentive equals CEO inside debt to change in CEO inside equity scaled by the ratio of firm debt to change in firm equity after logarithmic transformation. CEO vega-to-delta ratio is CEO vega to CEO delta scaled by CEO debt-to-equity ratio after logarithmic transformation. All models include the constant term as well as other controls with firm clustered standard errors shown in parentheses. Continuous variables are winsorized at 1% extreme. Variable descriptions are provided in Appendix 2.1. ***, **, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

		S	ix-month BHA	ARs	
Variable	(1)	(2)	(3)	(4)	(5)
CEO relative leverage	0.0290**	, ,	, ,	•	, ,
C	(0.0116)				
CEO relative leverage ≥ 1		0.0415**			
_		(0.0180)			
CEO relative incentive			0.0277**		
			(0.0118)		
CEO relative incentive ≥ 1				0.0350**	
				(0.0177)	
CEO vega-to-delta ratio					-0.0080
-					(0.0111)
CEO age	-0.0019	-0.0004	0.0002	0.0039	-0.1406
	(0.1057)	(0.1041)	(0.1067)	(0.1049)	(0.1138)
CEO tenure	0.0015	-0.0005	0.0011	0.0003	0.0040
	(0.0129)	(0.0129)	(0.0129)	(0.0130)	(0.0167)
CEO cash compensation	0.0459**	0.0497**	0.0454**	0.0483**	0.0644***
	(0.0226)	(0.0229)	(0.0226)	(0.0224)	(0.0241)
Firm size	-0.0185**	-0.0200**	-0.0172*	-0.0184**	-0.0140
	(0.0093)	(0.0095)	(0.0091)	(0.0091)	(0.0119)
Firm leverage	0.0050	0.0048	0.0049	0.0043	0.0032
	(0.0062)	(0.0062)	(0.0062)	(0.0062)	(0.0085)
Firm market-to-book ratio	0.0019	0.0010	0.0028	0.0021	0.0252*
	(0.0125)	(0.0126)	(0.0125)	(0.0126)	(0.0140)
Firm sales growth	0.0894*	0.0998*	0.0920*	0.1036**	0.1015*
	(0.0521)	(0.0516)	(0.0522)	(0.0511)	(0.0561)
Firm R&D	-0.0471	-0.0410	-0.0455	-0.0396	-0.0589*
	(0.0292)	(0.0303)	(0.0293)	(0.0302)	(0.0318)
Firm free cash flows	0.1364	0.1312	0.1376	0.1316	0.1152
	(0.0884)	(0.0897)	(0.0878)	(0.0886)	(0.0978)
Multiple announcements	-0.0126	-0.0143	-0.0133	-0.0140	-0.0057
	(0.0203)	(0.0201)	(0.0203)	(0.0201)	(0.0222)
R^{2} (%)	3.19%	3.16%	3.07%	2.92%	4.19%
Observations	843	843	843	843	707

Table 2.5 Propensity to engage in CSR and CEO risk preferences

This table reports the regression analysis of propensity to engage in CSR on CEO risk preferences. CEO risk preferences are captured using CEO relative leverage, CEO relative leverage ≥ 1 , CEO relative incentive, CEO relative incentive ≥ 1 , and CEO vega-to-delta ratio. CEO relative leverage equals CEO inside debt to CEO inside equity scaled by firm market leverage after logarithmic transformation. CEO relative incentive equals CEO inside debt to change in CEO inside equity scaled by the ratio of firm debt to change in firm equity after logarithmic transformation. CEO vega-to-delta ratio is CEO vega to CEO delta scaled by CEO debt-to-equity ratio after logarithmic transformation. All models include a constant term as well as other CEO and firm characteristics with standard errors shown in parentheses. The models also control for year and industry fixed effects; the latter is defined using two-digit SIC codes. All independent variables are lagged by one period. Continuous variables are winsorized at 1% extreme. Variable descriptions are provided in Appendix 2.1. ***, **, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

¥7		Propei	nsity to engage i	in CSR	
Variable	(1)	(2)	(3)	(4)	(5)
CEO relative leverage	-0.1637**				_
	(0.0776)				
CEO relative leverage ≥ 1		-0.1352			
		(0.1270)			
CEO relative incentive			-0.1616**		
			(0.0786)		
CEO relative incentive ≥ 1				-0.2571**	
				(0.1269)	
CEO vega-to-delta ratio					0.1542**
					(0.0720)
CEO age	-0.6753	-0.7660	-0.6737	-0.6748	-0.6467
	(0.5696)	(0.5698)	(0.5699)	(0.5704)	(0.7526)
CEO tenure	-0.1136	-0.1046	-0.1120	-0.1107	0.0692
	(0.0755)	(0.0756)	(0.0755)	(0.0755)	(0.0988)
CEO cash compensation	0.1814*	0.1759	0.1791*	0.1835*	0.1693
	(0.1070)	(0.1076)	(0.1070)	(0.1073)	(0.1717)
Firm size	1.0243***	1.0139***	1.0195***	1.0182***	1.0915***
	(0.0527)	(0.0525)	(0.0523)	(0.0522)	(0.0718)
Firm leverage	-0.0425	-0.0408	-0.0426	-0.0424	-0.0209
	(0.0338)	(0.0339)	(0.0338)	(0.0338)	(0.0490)
Firm market-to-book ratio	-0.3491***	-0.3665***	-0.3537***	-0.3628***	-0.2753***
	(0.0863)	(0.0862)	(0.0863)	(0.0861)	(0.1061)
Firm sales growth	-1.1980***	-1.1783***	-1.1939***	-1.1974***	-1.0589**
	(0.4054)	(0.4052)	(0.4054)	(0.4048)	(0.5159)
Firm R&D	0.3574	0.3447	0.3580	0.3702	-0.1221
	(0.3227)	(0.3228)	(0.3227)	(0.3231)	(0.4210)
Firm free cash flows	-0.4522	-0.4179	-0.4458	-0.4140	-1.7444**
	(0.5326)	(0.5326)	(0.5327)	(0.5322)	(0.6958)
Pseudo R-Squared (%)	9.60%	9.58%	9.60%	9.60%	12.52%
Observations	11,640	11,640	11,640	11,640	6,111

Table 2.6 CSR information disclosure and CEO risk preferences

This table reports the regression analysis of CSR information disclosure on CEO risk preferences. CEO risk preferences are estimated using CEO relative leverage, CEO relative leverage ≥ 1 , CEO relative incentive, CEO relative incentive ≥ 1 , and CEO vega-to-delta ratio. CEO relative leverage equals CEO inside debt to CEO inside equity scaled by firm market leverage after logarithmic transformation. CEO relative incentive equals CEO inside debt to change in CEO inside equity scaled by the ratio of firm debt to change in firm equity after logarithmic transformation. CEO vega-to-delta ratio is CEO vega to CEO delta scaled by CEO debt-to-equity ratio after logarithmic transformation. In panel A, CSR information disclosure is captured using a dummy indicating the annual change in environmental, social, governance (ESG) score greater than zero. In panel B, CSR information disclosure is captured using the three-year average ESG performance in the next period. All models include a constant term as well as other CEO and firm characteristics. The models also control for year and industry fixed effects; the latter is defined using two-digit SIC codes. Continuous variables are winsorized at 1% extreme. Clustered standard errors at the firm level are shown in parentheses. Variable descriptions are provided in Appendix 2.1. ****, ***, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

Variable		Pai	nel A: ΔESG	> 0				
Variable	(6)	(7)	(8)	(9)	(10)			
CEO relative leverage	0.0736**							
	(0.0347)							
CEO relative leverage ≥ 1		0.1998***						
		(0.0689)						
CEO relative incentive			0.0631*					
			(0.0342)					
CEO relative incentive ≥ 1				0.1684**				
				(0.0704)				
CEO vega-to-delta ratio					-0.0786*			
					(0.0407)			
Other controls	Yes	Yes	Yes	Yes	Yes			
Pseudo R-Squared (%)	13.45%	13.52%	13.44%	13.48%	12.70%			
Observations	6,412	6,412	6,412	6,412	3,657			
Variable	Panel B: Three -year average ESG score of CSR disclosure							
	(1)	(2)	(3)	(4)	(5)			
CEO relative leverage	0.0156							
	(0.0098)							
CEO relative leverage ≥ 1		0.0574***						
		(0.0195)						
CEO relative incentive			0.0126					
			(0.0095)	0.044.455				
CEO relative incentive ≥ 1				0.0414**				
				(0.0192)	0.004.444			
CEO vega-to-delta ratio					-0.0244**			
	***	3.7	37	3 7	(0.0114)			
Other controls	Yes	Yes	Yes	Yes	Yes			
R ² (%)	56.35%	56.51%	56.33%	56.41%	57.34%			
Observations	6,412	6,412	6,412	6,412	3,657			

Table 2.7 CSR information disclosure and firm financial performance for CEOs with different risk preferences

This table reports the regression analysis of firm financial performance on CSR information disclosure (ESG score) for CEOs with different risk preferences based on the *CEO relative leverage* ≥ 1 , and *CEO relative incentive* ≥ 1 . *CEO relative leverage* equals CEO inside debt to CEO inside equity scaled by firm market leverage after logarithmic transformation. *CEO relative incentive* equals CEO inside debt to change in CEO inside equity scaled by the ratio of firm debt to change in firm equity after logarithmic transformation. In the first four models, the dependent variable is the three-year average *market-to-book ratio*. In the last four models, the dependent variable is the three-year average *return on equity*. All models include a constant term as well as other CEO and firm characteristics. The models also control for year and industry fixed effects; the latter is defined using two-digit SIC codes. Continuous variables are winsorized at 1% extreme. Clustered standard errors at the firm level are shown in parentheses. Variable descriptions are provided in Appendix 2.1.

****, ***, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

	Thre	ee-year average o	f market-to-book	ratio	Three-year average of return on equity				
Variable	CEO relative	CEO relative	CEO relative	CEO relative	CEO relative	CEO relative	CEO relative	CEO relative	
Variable	leverage ≥ 1	leverage < 1	incentive ≥ 1	incentive < 1	leverage ≥ 1	leverage < 1	incentive ≥ 1	incentive < 1	
	1	2	3	4	5	6	7	8	
ESG score	0.1033**	0.0447	0.0836*	0.0528*	0.0901**	0.0225	0.0829*	0.0276	
	(0.0457)	(0.0305)	(0.0446)	(0.0318)	(0.0455)	(0.0334)	(0.0458)	(0.0333)	
CEO age	-0.2545	-0.0137	-0.2146	-0.0225	0.0581	0.0551	0.0887	0.0537	
	(0.1884)	(0.1075)	(0.1823)	(0.1078)	(0.1293)	(0.0983)	(0.1273)	(0.0993)	
CEO tenure	0.0401*	0.0261**	0.0404*	0.0253*	0.0005	0.0214	0.0037	0.0212	
	(0.0221)	(0.0133)	(0.0224)	(0.0133)	(0.0175)	(0.0132)	(0.0173)	(0.0133)	
CEO cash compensation	-0.0332	-0.0409*	-0.0398	-0.0390	0.0532	0.0337*	0.0364	0.0347*	
	(0.0413)	(0.0248)	(0.0399)	(0.0247)	(0.0396)	(0.0195)	(0.0361)	(0.0196)	
Firm size	-0.0424**	-0.0363***	-0.0379*	-0.0369***	-0.0187	0.0111	-0.0105	0.0108	
	(0.0203)	(0.0109)	(0.0193)	(0.0109)	(0.0211)	(0.0114)	(0.0207)	(0.0114)	
Firm leverage	0.0042	-0.0029	0.0052	-0.0031	0.0173	0.0226***	0.0326*	0.0203***	
	(0.0084)	(0.0037)	(0.0084)	(0.0037)	(0.0204)	(0.0068)	(0.0170)	(0.0067)	
Firm market-to-book ratio	0.8027***	0.7670***	0.8051***	0.7684***	0.0631***	0.0560***	0.0618***	0.0566***	
	(0.0302)	(0.0216)	(0.0301)	(0.0215)	(0.0196)	(0.0155)	(0.0195)	(0.0154)	
Firm sales growth	-0.3800***	-0.1591***	-0.3716***	-0.1589***	-0.1126**	-0.0452	-0.1213**	-0.0448	
	(0.1056)	(0.0553)	(0.1049)	(0.0555)	(0.0566)	(0.0412)	(0.0552)	(0.0411)	
Firm R&D	0.2143*	0.4062***	0.2125*	0.4027***	0.1885**	-0.0910	0.1634**	-0.0835	
	(0.1120)	(0.0719)	(0.1116)	(0.0720)	(0.0816)	(0.0609)	(0.0792)	(0.0615)	
Firm free cash flows	0.4677***	0.2009*	0.4832***	0.1987*	0.2147	0.1982**	0.2142*	0.1955**	
	(0.1516)	(0.1078)	(0.1507)	(0.1079)	(0.1344)	(0.0986)	(0.1207)	(0.0995)	
R^{2} (%)	79.25%	72.61%	79.10%	72.73%	13.23%	7.28%	14.70%	7.19%	
Observations	1,772	4,250	1,783	4,239	1,772	4,250	1,783	4,250	

Table 2.8 CSR announcement cumulative abnormal returns conditional on different CSR types

This table reports the regression analysis of firm CAR[-2,+2] on CEO risk preferences and CSR categories. CSR categories comprise CSR socially responsible investment, CSR corporate philanthropy, and CSR environmental concern (base category). CEO risk preferences are captured using CEO relative leverage, CEO relative leverage ≥ 1 , CEO relative incentive, CEO relative incentive ≥ 1 , and CEO vega-to-delta ratio. CEO relative leverage equals CEO inside debt to CEO inside equity scaled by firm market leverage after logarithmic transformation. CEO relative incentive equals CEO inside debt to change in CEO inside equity scaled by the ratio of firm debt to change in firm equity after logarithmic transformation. CEO vega-to-delta ratio is CEO vega to CEO delta scaled by CEO debt-to-equity ratio after logarithmic transformation. All models also include a constant term (environmental concern) as well as other controls with firm clustered standard errors shown in parentheses. Continuous variables are winsorized at 1% extreme. Variable descriptions are provided in Appendix 2.1. ***, **, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

W2-11.	CAR[-2,+2]							
Variable	(1)	(2)	(3)	(4)	(5)			
CEO relative leverage	0.0042***							
_	(0.0015)							
CEO relative leverage ≥ 1		0.0061**						
_		(0.0025)						
CEO relative incentive			0.0041***					
			(0.0015)					
CEO relative incentive ≥ 1				0.0053**				
				(0.0023)				
CEO vega-to-delta ratio					-0.0020*			
					(0.0012)			
CSR socially responsible investment	0.0025	0.0028	0.0026	0.0029	0.0021			
	(0.0036)	(0.0036)	(0.0036)	(0.0036)	(0.0040)			
CSR corporate philanthropy	0.0001	0.0003	0.0001	0.0001	0.0000			
	(0.0022)	(0.0022)	(0.0022)	(0.0022)	(0.0024)			
CSR environmental concern (base)	0.0146	0.0127	0.0121	0.0092	0.0578			
	(0.0563)	(0.0566)	(0.0566)	(0.0567)	(0.0583)			
Other controls	Yes	Yes	Yes	Yes	Yes			
R^{2} (%)	2.67%	2.66%	2.58%	2.46%	2.25%			
Observations	843	843	843	843	707			

Table 2.9 CSR announcement cumulative abnormal returns conditional on CEO power

This table reports the regression analysis of firm *CAR*[-2,+2] on CEO risk preferences and *CEO power*. *CEO relative leverage* is used to capture CEO risk preferences, which equals CEO inside debt to CEO inside equity scaled by firm market leverage after logarithmic transformation. The four proxies used to capture CEO power are *CEO duality*, *CEO relative ownership*, *CEO pay slice*, and *CEO relative tenure*. Specifically, *CEO duality* equals one if a CEO is also the chair of the company's board of directors, and zero otherwise. *CEO relative ownership* equals one if CEO stock ownership is above the industry median, and zero otherwise. *CEO pay slice* equals one if the ratio of CEO total compensation to the top five executives' is greater than the industry median, and zero otherwise. *CEO relative tenure* equals one if CEO tenure is above the industry median, and zero otherwise. All models also include a constant term as well as other controls with standard errors clustered at the firm level shown in parentheses. Continuous variables are winsorized at 1% extreme. Variable descriptions are provided in Appendix 2.1. ***, **, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

Variable		CAR[-2,+2]							
Variable	(1)	(2)	(3)	(4)					
CEO relative leverage	0.0042***	0.0041***	0.0042***	0.0043***					
_	(0.0015)	(0.0015)	(0.0016)	(0.0015)					
CEO duality	0.0038	`	` ′	, ,					
•	(0.0025)								
CEO relative ownership	· · ·	-0.0015							
•		(0.0023)							
CEO pay slice			0.0002						
			(0.0023)						
CEO relative tenure			,	-0.0009					
				(0.0031)					
Other controls	Yes	Yes	Yes	Yes					
R^{2} (%)	2.91%	2.59%	2.60%	2.61%					
Observations	843	841	843	843					

Table 2.10 Heckman tests for self-selection bias

This table reports the regression analysis of firm CAR[-2,+2] and six-month BHARs on CEO risk preferences controlling for Heckman self-selection bias. In panel A, the dependent variable is firm CAR[-2,+2]. In panel B, the dependent variable is firm six-month BHARs. CEO risk preferences are captured using CEO relative leverage, CEO relative leverage ≥ 1 , CEO relative incentive, CEO relative incentive ≥ 1 , and CEO vega-to-delta ratio. CEO relative leverage equals CEO inside debt to CEO inside equity scaled by firm market leverage after logarithmic transformation. CEO relative incentive equals CEO inside debt to change in CEO inside equity scaled by the ratio of firm debt to change in firm equity after logarithmic transformation. CEO vega-to-delta ratio is CEO vega to CEO delta scaled by CEO debt-to-equity ratio after logarithmic transformation. All models include the constant term as well as other controls with firm clustered standard errors shown in parentheses. Continuous variables are winsorized at 1% extreme. Variable descriptions are provided in Appendix 2.1. ****, ***, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

Variable	Panel A: CAR[-2,+2]							
Variable	(1)	(2)	(3)	(4)	(5)			
CEO relative leverage	0.0043***							
CEO 14'- 1- > 1	(0.0015)	0.0062**						
CEO relative leverage ≥ 1		0.0063** (0.0025)						
CEO relative incentive		(0.0023)	0.0042***					
CEO relative incentive			(0.0015)					
CEO relative incentive ≥ 1			(0.0013)	0.0053**				
CLO relative meentive = 1				(0.0023)				
CEO vega-to-delta ratio				(0.0023)	-0.0021*			
223 7 5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4					(0.0011)			
Inverse Mills Ratio	0.0190	0.0180	0.0188	0.0180	0.0202			
	(0.0165)	(0.0167)	(0.0166)	(0.0169)	(0.0152)			
Other controls	Yes	Yes	Yes	Yes	Yes			
R^{2} (%)	2.78%	2.75%	2.69%	2.53%	2.50%			
Observations	843	843	843	843	707			
Variable	Panel B: Six-month BHARs							
	(6)	(7)	(8)	(9)	(10)			
CEO relative leverage	0.0297**							
	(0.0118)							
CEO relative leverage ≥ 1		0.0430**						
		(0.0182)	0.000544					
CEO relative incentive			0.0286**					
CEO 1 ()			(0.0119)	0.025644				
CEO relative incentive ≥ 1				0.0356**				
CEO 4- 1-144:-				(0.0179)	0.0000			
CEO vega-to-delta ratio					-0.0089 (0.0109)			
Inverse Mills Ratio	0.1429	0.1332	0.1420	0.1251	0.1002			
mverse wims Ratio	(0.1307)	(0.1241)	(0.1288)	(0.1244)	(0.1123)			
Other controls	Yes	Yes	Yes	Yes	Yes			
R ² (%)	3.42%	3.35%	3.29%	3.09%	4.36%			
Observations	843	843	843	843	707			

Table 2.11 Instrumental variable analysis: first-stage regressions

This table reports the first-stage OLS regressions of CEO risk preferences on the following instruments including the industry medians and maximum tax rates on wages. The dependent variables are CEO relative leverage, CEO relative incentive, and CEO vega-to-delta ratio respectively. CEO relative leverage equals CEO inside debt to CEO inside equity scaled by firm market leverage after logarithmic transformation. CEO relative incentive equals CEO inside debt to change in CEO inside equity scaled by the ratio of firm debt to change in firm equity after logarithmic transformation. CEO vega-to-delta ratio is CEO vega to CEO delta scaled by CEO debt-to-equity ratio after logarithmic transformation. In addition to their industry medians and maximum tax rates on wages, we control for CEO age, new CEO dummy, firm size, firm leverage, firm market-to-book ratio, firm cash flows from operations scaled by firm total assets, and firm tax loss carry forward scaled by firm total assets. All models include a constant term with standard errors shown in parentheses. Continuous variables are winsorized at 1% extreme. Variable descriptions are provided in Appendix 2.1. ***, **, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

	CEO relative	CEO relative	CEO vega-to-
Variable	leverage (1)	incentive (2)	delta ratio (3)
Industry median of CEO relative leverage	0.6896***	(2)	(3)
industry inedian of the femality levelage	(0.0530)		
Industry median of CEO relative incentive	(0.0220)	0.6241***	
mount in the result of the mount of		(0.0600)	
Industry median of CEO vega-to-delta ratio		()	0.8469***
, S			(0.0663)
Maximum state tax rate on income	0.0134**	0.0150**	-0.0250**
	(0.0063)	(0.0065)	(0.0111)
CEO age	0.3148	0.2787	-1.0125**
	(0.2130)	(0.2222)	(0.3990)
New CEO	-0.1692***	-0.1577**	0.4551***
	(0.0633)	(0.0660)	(0.1103)
Firm size	0.0599***	0.0324*	-0.1634***
	(0.0160)	(0.0166)	(0.0271)
Firm leverage	-0.0439**	-0.0418**	-0.1005***
	(0.0183)	(0.0191)	(0.0288)
Firm market-to-book ratio	0.0723*	0.0532	-0.0513
	(0.0383)	(0.0397)	(0.0643)
Firm cash flows from operation	1.7133***	1.6009***	-0.2595
	(0.4813)	(0.5014)	(0.8282)
Firm tax loss carry forward	-0.0240	-0.0026	-1.8771***
	(0.2335)	(0.2433)	(0.5139)
F-statistics	37.54	22.98	30.50
R^2 (%)	37.51%	26.87%	36.09%
Observations	573	573	496

Table 2.12 Instrumental variable analysis: second-stage regressions

This table reports the second-stage OLS regressions of firm CAR[-2,+2] and six-month BHARs on the predicted values of CEO risk preferences generated from the first-stage OLS regressions including instrumented CEO relative leverage, instrumented CEO relative incentive, and instrumented CEO vega-to-delta ratio. All models include the constant term as well as other controls with standard errors shown in parentheses. Continuous variables are winsorized at 1% extreme. Variable descriptions are provided in Appendix 2.1. ***, ***, and * are used to denote significance at 1%, 5%, and 10% levels, respectively.

Variable		CAR[-2,+2]		S	Six-month BHAR	ls .
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Instrumented CEO relative leverage	0.0156***	, ,	. ,	0.0636**	•	`,
_	(0.0044)			(0.0303)		
Instrumented CEO relative incentive		0.0172***			0.0656*	
		(0.0051)			(0.0350)	
Instrumented CEO vega-to-delta ratio			-0.0056**			-0.0077
			(0.0028)			(0.0179)
CEO age	-0.0111	-0.0105	-0.0234	-0.0659	-0.0620	-0.0827
	(0.0138)	(0.0140)	(0.0175)	(0.0954)	(0.0954)	(0.1118)
CEO tenure	0.0007	0.0008	0.0006	-0.0060	-0.0057	0.0009
	(0.0016)	(0.0016)	(0.0019)	(0.0110)	(0.0110)	(0.0120)
CEO cash compensation	0.0047	0.0051	0.0046	0.0671***	0.0685***	0.0827***
	(0.0032)	(0.0032)	(0.0035)	(0.0219)	(0.0219)	(0.0223)
Firm size	-0.0020*	-0.0017	-0.0019	-0.0319***	-0.0304***	-0.0292***
	(0.0011)	(0.0011)	(0.0013)	(0.0078)	(0.0077)	(0.0086)
Firm leverage	0.0007	0.0008	-0.0004	0.0087	0.0089	0.0002
	(0.0012)	(0.0012)	(0.0012)	(0.0083)	(0.0084)	(0.0078)
Firm market-to-book ratio	-0.0045*	-0.0041*	0.0004	0.0064	0.0092	0.0502***
	(0.0024)	(0.0024)	(0.0023)	(0.0164)	(0.0161)	(0.0150)
Firm sales growth	0.0028	0.0039	-0.0006	0.1032	0.1070	0.0940
	(0.0120)	(0.0121)	(0.0128)	(0.0826)	(0.0829)	(0.0822)
Firm R&D	-0.0113***	-0.0106**	-0.0098**	-0.0484*	-0.0454	-0.0563**
	(0.0041)	(0.0041)	(0.0044)	(0.0283)	(0.0283)	(0.0279)
Firm free cash flows	0.0000	0.0009	0.0079	0.1320	0.1352	0.0059
	(0.0127)	(0.0129)	(0.0141)	(0.0877)	(0.0879)	(0.0902)
Multiple announcements	0.0006	0.0006	0.0016	0.0090	0.0088	0.0128
	(0.0030)	(0.0030)	(0.0032)	(0.0204)	(0.0205)	(0.0206)
R^{2} (%)	3.88%	3.63%	2.09%	4.29%	4.14%	5.09%
Observations	573	573	496	573	573	496

ESSAY 3: CEO MOBILITY AND ACQUISITIONS

INTRODUCTION

Mergers and acquisitions (M&As) have been and will likely remain the most visible and crucial form of corporate investments. Indeed, the Institute for Mergers, Acquisitions and Alliances has documented that over 44,000 transactions have been initiated at the global scale, with a total market value of more than \$4.5 trillion in 2015. Given the vital importance of corporate takeover activities, research scholars have investigated their potential antecedents. Although a significant number of large-sample M&A studies over the last three decades have identified a robust set of acquirer performance determinants, the overall variation in the returns to acquisition activity remains largely unexplained (e.g., Moeller, Schlingemann, and Stulz 2004; Masulis, Wang, and Xie 2007; Harford, Humphery-Jenner, and Powell 2012). For instance, despite employing an extensive list of determinants, a widely cited comprehensive study by Moeller et al. (2004) is able to explain just over 5% of the variation in acquirer returns (as judged by the adjusted R² values of their main regression models). Similarly, other studies with smaller sample sizes have been able to explain only a small fraction of the variation in acquisition returns (Masulis et al. 2007; Harford et al. 2012). More importantly, in contrast to the common belief that mergers fail to create value, anecdotal evidence from acquisitions carried out by firms such as Berkshire Hathaway, Cisco Systems, Diageo, General Electric, and IBM suggest persistent acquisition success.

Motivated by the pioneering work of Bertrand and Schoar (2003), a growing number of research studies aim to resolve the puzzle of M&A return variation by focusing on CEO fixed effects (Malmendier and Tate 2008; Goel and Thakor 2009; Yim 2013; Phan 2014; Croci and Petmezas 2015; Jenter and Lewellen 2015). For example, Malmendier and Tate (2008) find that

overconfident CEOs tend to undertake M&A activities that are detrimental to acquirer value and overpay the targets. Croci and Petmezas (2015) report a positive association between CEO risk-inducing compensation (i.e., vega) and bidder announcement returns as well as the propensity to engage in acquisitions. Furthermore, Elnahas and Kim (2017) document a significant negative relation between conservative CEOs—captured by political ideology—and firm propensity to pursue M&As. Recently, Andreou, Doukas, Koursaros, and Louca (2019) show that value-destroying corporate diversification decisions are associated with CEO overconfidence.

Following this emerging stream of research, in this study we examine whether CEO mobility—the manager's ability and willingness to change jobs in the presence of outside career options (Gao, Luo, and Tang 2015; Colak and Korkeamaki 2017) – can explain the return variation of M&A activities documented in the literature. Specifically, from a theoretical standpoint, CEO mobility can affect the outcomes of M&As in two ways. First, due to the nature of job hopping, more mobile CEOs are likely to possess diverse skills as well as experiences from different industries after each transition, which could be beneficial to the current acquiring firm (Song 1982; Hambrick and Mason 1984; Hambrick 2007). Indeed, CEOs with higher mobility are likely to obtain valuable experience in strategy formulation and execution as they switch firms over time. Therefore, more mobile CEOs are deemed better at making corporate decisions than less mobile CEOs. Consistent with this argument, for firms undergoing poor performance, Ryan and Wang (2012) show that more mobile CEOs increase shareholder value and improve operating performance after their appointment. In terms of M&As, Custódio and Metzger (2013) also find that CEOs with accumulated experience in the target industry are able to deliver better returns than those who are relatively new to the target industry. Colak and Korkeamaki (2017) report that higher-mobility CEOs are associated with riskier corporate policies that tend to increase firm equity value.

Second, the potential costs in terms of human capital caused by job loss, in addition to limited external job opportunities, induce immobile or less mobile CEOs to behave more conservatively than what would be optimal for the shareholders of acquiring firms (Jensen and Meckling 1976; Gervais, Heaton, and Odean 2011). In other words, immobile or less mobile CEOs are more likely to be risk averse than mobile CEOs. This point of view is also consistent with organizational behavior and labor economics studies (Pissarides 1974; Harris and Weiss 1984; Nicholson and West 1988; Pfeifer 2008). Essentially, shareholders' interests are more aligned with the interests of mobile CEOs because they are more willing to take risks and implement alternative strategies with uncertain outcomes (Ryan and Wang 2012; Colak and Korkeamaki 2017). In line with the second argument, several studies have also shown that shareholders do not prefer corporate decisions made by CEOs exhibiting risk-averse behavior. For example, Wei and Yermack (2011) find that the stock market generally reacts negatively to a higher level of inside debt (i.e., more risk-averse CEOs) disclosed in a company's proxy statements. Phan (2014) records that M&A announcements made by CEOs with higher (lower) levels of inside debt (i.e., debt like compensation) elicit negative (positive) shareholder reactions.

Based on the above discussion, we hypothesize that acquisitions by CEOs with higher (lower) mobility are more likely to be associated with higher (lower) shareholder gains and we then test this conjecture. We also investigate other important aspects of corporate takeover decisions by more (less) mobile CEOs, including acquirer post-M&A long-term performance, M&A decisions, payment considerations, and diversification strategies. To address these issues, we construct two alternative measures of CEO mobility relying on a comprehensive list of 14

possible mobility determinants suggested in the literature (Gibbons and Murphy 1992; Balsam and Miharjo 2007; Benson and Davidson III 2009; Garmaise 2011; Cremers and Grinstein 2013; Deng and Gao 2013; Eisfeldt and Kuhnen 2013; Serfling 2014; Dittmar and Duchin 2015; Gao et al. 2015; Francis, Hasan, John, and Waisman 2016; Colak and Korkeamaki 2017). The higher the value of our mobility measures, the more likely a CEO is expected to switch jobs in a given year.

Using a sample of 2,906 M&A announcements initiated by 1,085 unique U.S. public companies (or 1,444 unique CEOs) between 1994 and 2016, we find that acquisitions announced by highly mobile CEOs are associated with significant positive shareholder reactions. Acquirers managed by CEOs with higher mobility also tend to outperform those run by CEOs with lower mobility in the long run. In addition, we document a positive relation between CEO mobility and the propensity to engage in M&A activities. Consistent with previous studies (e.g., Furfine and Rosen 2011), we find more mobile CEOs (i.e., exhibiting higher risk tolerance) use a higher percentage of cash in financing M&A transactions than immobile or less mobile CEOs. We do not find significant evidence with respect to the effect of CEO potential mobility on acquirers' industry and/or international diversification strategies. Additional tests demonstrate that our overall findings are not sensitive to the inclusion of managerial ability or CEO risk-seeking inducing compensation. Finally, the results remain statistically significant after we correct for self-selection bias.

The contribution of this study to the literature is threefold. First, we add to the literature by showing that CEO mobility, as a distinct managerial attribute (fixed effect), can help explain the puzzle of M&A return variation documented in previous M&A studies. Specifically, we find corporate takeover decisions made by CEOs with higher mobility increase shareholder value relative to M&As carried out by CEOs with lower mobility. In terms of dollar value, more mobile

CEOs are capable of capitalizing roughly \$18.05 million more than less mobile CEOs when engaging in M&As.

Second, this study offers an alternative angle to the criticism of hiring and appointing job-hopping executives. Some researchers argue that CEO potential mobility (e.g., with more outside career options) can be detrimental to the current firm because more mobile CEOs can be myopic, focus on their own interests, and ignore the firm's long-term performance (Liu, Nanda, Onal, and Silveri 2018). However, consistent with other recent studies (Ryan and Wang 2012; Colak and Korkeamaki 2017), our findings suggest the opposite. Specifically, they imply that improving a manager's potential mobility in the current firm (e.g., through lowering restrictions in severance packages) can also alleviate managerial conservatism and increase firm value. In addition, as suggested by recent anecdotal evidence, hiring a new CEO with a history of job hopping can be beneficial as well.²⁹

Third, this paper empirically polishes and validates recently proposed measures of CEO mobility that can potentially be used to address various research issues in the future. To name a few, researchers can investigate the potential effect of CEO mobility on corporate innovation. On one hand, given more available outside career options as well as greater willingness to switch jobs, more mobile CEOs might not see any need for innovation in the current firm. On the other hand, at the same time, CEOs with higher mobility, thanks to their higher risk tolerance, could be induced to innovate, because innovation is also considered risky and intangible yet can raise considerably a firm's upside potential. Similarly, future studies can also examine the effects of CEO mobility on other important areas of corporate finance, including but not limited to dividend policies, capital structure, and cash holdings.

²⁹ For more information on this discussion, see https://www.bluesteps.com/blog/ceo-mobility-on-the-rise.aspx.

The remainder of this paper is structured as follows. Section 2 describes the research methodology. Section 3 reports the empirical results of shareholder reactions to M&A decisions, acquirer post-M&A long-term performance, M&A decisions, payment considerations, and diversification strategies conditional on different levels of CEO mobility. Section 4 presents additional robustness checks for potential omitted variables bias and self-selection bias. Section 5 concludes the paper.

METHODOLOGY

Variable description

Cumulative abnormal returns

For each M&A deal, we follow the standard event study procedure to estimate acquirer cumulative abnormal returns (CARs) around the announcement date. Following previous studies (e.g., Officer 2003; Acharya, Amihud, and Litov 2011), we compute acquirer CARs as the sum of daily abnormal returns estimated from the one-factor model (Sharpe 1964) for the seven-day window (i.e., from t = -3 to t = +3) around the announcement date:³⁰

$$R_{i,t} - R_{f,t} = \alpha + \beta (R_{m,t} - R_{f,t}) + \varepsilon_{i,t}$$

The acquirers' daily stock returns are obtained from the Center for Research in Securities Prices (CRSP). We calculate the coefficient estimate for the market risk premium using the estimation period from t = -211 to t = -11 relative to the M&A announcement date for each acquirer. The daily abnormal stock return $(AR_{i,t} \text{ or } \varepsilon_{i,t})$ is the difference between the actual return and the return predicted by the one-factor model.

³⁰ The results are similar when we employ a four-factor model or different event windows (i.e., CAR[0,+1] or CAR[-1,+1]) and are available upon request.

CEO mobility measures

We label CEO potential mobility as a CEO's unobservable outside job options, as well as the CEO's willingness and ability to exercise these options. Inspired by recent empirical work (Fracassi and Tate 2012; Custódio, Ferreira, and Matos 2013; Colak and Korkeamaki 2017), we employ principal component analysis (PCA) to estimate the first mobility measure. Specifically, CEO PCA mobility is the weighted average of the top five orthogonal principal components whose eigenvalues are greater than one, constructed from a comprehensive list of 14 possible mobility determinants. The literature, as discussed below, suggests that these variables relate to a CEO's job hopping.³¹ The variable CEO age is an important factor, because older CEOs are less likely to change jobs voluntarily due to higher fixed costs to adapt to a new corporate environment (Serfling 2014). The term CEO tenure—the number of years a CEO has been in the position—captures the possible effect that the longer an executive stays with a company, the less likely that executive is to switch jobs (Gibbons and Murphy 1992; Balsam and Miharjo 2007; Benson and Davidson III 2009; Gao et al. 2015). The variable CEO duality could also be influential, since holding the CEO and chair titles at the same time could discourage an executive from changing firms (Serfling 2014). If a manager is currently offered already high compensation relative to other options in the market, the manager might be less likely to switch (or would find it hard to switch) to another firm (Gao et al. 2015). Hence, it is reasonable to include CEO relative pay decile—the decile ranking assigned to a CEO based on the CEO's total compensation relative to other CEOs—in the analysis. Similarly, we also control for CEO cash pay, the natural logarithm of the CEO's salary plus bonus, and CEO equity pay, the ratio of the CEO's equity compensation to total compensation (Balsam and Miharjo 2007). High relative performance (High RPE) indicates whether a firm already

³¹ See Colak and Korkeamaki (2017) for a detailed discussion of CEO mobility estimations.

outperforms others (based on either cash flows or returns on assets) in the same industry in a given year (Eisfeldt and Kuhnen 2013). The rationale for the inclusion of this factor is that, if a CEO already works for a better company relative to others in the industry, the CEO is less likely to switch jobs. Besides, Garmaise (2011) suggests that states with high non-competition enforceability (*NCE index*) could discourage a manager from moving to another firm.

On the other hand, the more connections a CEO has with other firms, generally, the higher the probability and ease in switching jobs. We augment this potential effect using a dummy indicating if an executive has an interlocking membership (CEO interlocking) on the board of another firm. A greater number of firms in the same industry (or geographical region) also provide more opportunities for a CEO to switch jobs. These effects are captured using firms in industry and firms in same MSA (Deng and Gao 2013; Francis et al. 2016). Furthermore, the extent to which a manager wants to change jobs could be affected by the oligopolistic structure of a certain industry, which is estimated by the *Herfindahl index* based on sales (Cremers and Grinstein 2013; Deng and Gao 2013). As suggested by Cremers and Grinstein (2013), it should also be easier for an executive to switch to another company in the same industry if it has been the norm in the industry. We thus include the percent insider CEOs variable to account for the percentage of CEOs hired from within the same industry, which is extracted from Table 3 of Cremers and Grinstein (2013). Motivated by Ryan and Wang (2012) and Dittmar and Duchin (2015), we also add the variable past job moves—the number of times an executive has switched jobs prior to the current CEO position—because managers who have changed jobs in the past could be more likely to move again.

The second measure, *CEO predicted mobility*, is estimated as the predicted value of the following logistic regression:

$$P(Switch jobs_{i,t} = 1 | X) = \emptyset(\beta_0 + \beta_1 X_{1,i,t-1} + \dots + \beta_6 X_{6,i,t-1})$$

where the dependent variable $Switch\ jobs_{i,t}$ takes a value of one if CEO i in year t is associated with a different firm than in year t-1, and zero otherwise. The independent variables X_l to X_6 are CEO specific and include $CEO\ age$, $CEO\ tenure$, $relative\ pay\ decile$, interlocking, $percent\ insider\ CEOs$, and $past\ job\ moves$. We also include industry and year fixed effects in estimating $CEO\ predicted\ mobility$. We standardize the values of $CEO\ predicted\ mobility$ and $CEO\ PCA\ mobility$ to make them comparable across different model specifications. In terms of interpretation, a higher value for $CEO\ predicted\ mobility$ (or $CEO\ PCA\ mobility$) indicates that a CEO has more unobservable outside options, as well as greater willingness plus ability to switch to a better executive position.

Thus far, in line with previous literature, we argue that highly mobile CEOs are assumed to gain more diverse skills and accumulate more experience from different industries after each transition in comparison to immobile or less mobile CEOs. In addition, more (less) mobile managers are expected to exhibit risk-taking (risk-averse) behavior. To justify these assumptions, we calculate a set of Pearson correlations between our proxies of CEO potential mobility and Demerjian, Lev, and McVay's (2012) managerial ability index; Custódio, Ferreira, and Matos's (2013) general ability index; and CEO risk attitudes (captured by a CEO's vega-to-delta ratio). If our assumptions are reliable, *CEO predicted mobility* and *CEO PCA mobility* are expected to be significantly and positively correlated with the two ability indexes and the CEO vega-to-delta ratio. The evidence (significant at 1%) shows that the correlation coefficients are, respectively, 0.0197 and 0.0239 (with respect to the managerial ability index), 0.0602, and 0.2192 (with respect to the

general ability index), and 0.1312 and 0.0579 (with respect to the CEO vega-to-delta ratio). Therefore, these correlation results suggest that our two CEO mobility measures gauge a considerable quantity of managers' unobservable diverse skills, accumulated experience, and risk preferences.

Control variables

In addition to the two proxies of CEO mobility, in line with previous studies (e.g., Doukas and Travlos 1988; Grinstein and Hribar 2004; Dong, Hirshleifer, Richardson, and Teoh 2006; Yim 2013), we also include the following set of control variables in the subsequent multivariate analyses. In terms of CEO characteristics, we control for CEO age, CEO tenure, CEO cash compensation scaled by total assets, and CEO duality, which indicates if the CEO is also the chair of the board. For firm characteristics, we use firm size, firm market-to-book, firm leverage, and firm return on assets. Specifically, firm size is the natural logarithm of the market value of assets, firm market-to-book is the ratio of the market value of equity to the book value of equity, firm leverage is the ratio of long-term debt to total assets, and firm return on assets is the ratio of income before extraordinary items to total assets. Concerning deal characteristics, we control for the method of payment (i.e., 100% cash vs. 100% stock vs. mixed), public target, industry, and international diversifications. The variable 100% cash (100% stock) is a dummy equal to one if the whole transaction was paid with cash (stock), and zero otherwise. The variable public target equals one if a public target was acquired, and zero otherwise. The variable for industry (international) diversification takes a value of one if the target is not in the same two-digit SIC (country) as the acquirer, and zero otherwise. Additionally, we account for the effect of relative deal value (relative deal value), which is defined as the deal transaction in U.S. dollars scaled by

the acquirer's market value of assets. A detailed description of these variables is provided in Appendix 3.1.

Data collection and descriptive statistics

Initially, we retrieve successful M&A deals of private and public targets announced by U.S. publicly listed firms with non-negative common equity between 1994 and 2016 from the Thomson One M&A database. To construct the final sample, following previous studies (Dong et al. 2006; Goel and Thakor 2009; Hasan, Kallberg, Liu, and Sun 2014; John, Knyazeva, and Knyazeva 2015), we impose the following restrictions. First, we exclude announcements made by acquirers with Standard Industrial Classification (SIC) codes that range from 4900 to 4999 or from 6000 to 6999. Second, an announcement is included in the final sample only if the transaction value exceeds \$2 million and the transaction value scaled by the acquirer's market value of assets is greater than or equal to 1%. This restriction ensures that our M&A sample only comprises successful announcements that are likely to have a tangible impact on the acquirers and their shareholders.

We merge the M&A sample with the Compustat and CRSP databases to retrieve all the required items to estimate acquirer CARs, CEO mobility measures, and related control variables. The final sample consists of 2,906 M&A announcements by 1,085 unique companies (or 1,444 unique CEOs). Panel A of Table 3.1 displays the M&A annual distribution of the sample. According to column (1), the number of M&As is spread out quite evenly across the sample period, except for the first year of the sample (1994). In addition, M&A activities reduced from 149 to 98 completed deals during the financial crisis period from 2007 to 2009 but increased afterward. The next three columns report the numbers of M&As based on the method of payment, namely, 100% stock, 100% cash, and mixed, respectively. Generally, most M&A transactions are financed using

100% cash or a mixed form of payment, whereas only 205 acquisitions were paid with 100% stock. A good number of 100% stock-financed acquisitions occurred before 2001, but this method of payment became less popular after the tech bubble (Eckbo, Makaew, and Thorburn 2018). On the other hand, the use of 100% cash or other payment methods turns out to be more prevalent with time during our sample period.

[Insert Table 3.1 about here]

Regarding M&A characteristics, reported in Panel B of Table 3.1, around 45% of the acquisitions involve public targets. In addition, more than 32% of our M&A sample consists of industrially diversified deals, while roughly 20% represent foreign deals. Of the final sample, approximately 46% of the takeover deals are financed completely with cash, whereas only 7.05% are paid with stock. The average transaction value is around 9.74% of the acquirer's market value of total assets. Comparable to previous M&A studies, the mean of the acquirer market value of assets after logarithmic transformation is 7.9375. The average acquirer in our sample has a market-to-book ratio of 3.5811, a financial leverage of 0.1511, and typically yields 6.27% profitability in terms of return on assets. The means of the two proxies of CEO mobility are 0.0333, and -0.0089, respectively. In terms of the other CEO characteristics, roughly 55% of the acquisitions were consummated by CEOs who were also the chair of the board. The average CEO age in the sample is 54.65 years, that is, slightly lower than the median of 55 years, and has a tenure of more than seven years. Finally, average CEO cash compensation scaled by total assets is around 1.1241.

EMPIRICAL RESULTS

Acquirer cumulative abnormal returns and CEO mobility

In this section, we first examine the average acquirer's short-term performance (i.e., CAR[-3,+3]) with respect to CEO mobility in the full sample and in subsamples based on the

method of payment. According to Panel A of Table 3.2, during the sample period, from 1994 to 2016, successful M&A announcements are typically associated with positive announcement abnormal returns (around 0.41%). In addition, 100% cash M&A deals, on average, deliver significant short-term shareholder gains (around 0.87%), whereas 100% stock-financed acquisitions result in significant shareholder short-term losses (roughly -1.63%). With respect to M&As involving a mixture of payments, the average shareholder reactions are not statistically different from zero. Generally, the reported results are consistent with previous studies (Fuller, Netter, and Stegemoller 2002; Masulis et al. 2007; Netter, Stegemoller, and Wintoki 2011; Duchin and Schmidt 2013; Schmidt 2015).

[Insert Table 3.2 about here]

Panel B of Table 3.2 shows the average acquirer short-term performance for different groups of CEOs based on their predicted mobility, *CEO predicted mobility*. Although equity investor reactions are positive for all three categories, they are not statistically significant for the bottom tercile (less mobile CEOs) or the middle tercile, suggesting that acquisitions by less mobile CEOs are not viewed by shareholders as value-increasing investments. On the other hand, takeover deals pursued by more mobile CEOs (top tercile) are associated with significantly positive shareholder gains (approximately 1.13%). More importantly, according to the difference-in-means test results, reported in the last column of Panel B, acquisitions consummated by more mobile CEOs yield considerably higher CARs (statistically significant at 1%) than those initiated by less mobile CEOs. Given that the median acquirer market capitalization is around \$1.687 billion in our sample, during the seven-day window around the announcement, more mobile CEOs are able to capitalize roughly \$18.05 million more than less mobile CEOs when engaging in M&As

activities.³² We also find consistent evidence, as reported in Panel C, when using *CEO PCA mobility* instead of *CEO predicted mobility* to partition the M&A sample. In summary, in line with our expectations, M&A decisions by high-mobility CEOs (with higher ability and more options to change jobs) are associated with significant and positive announcement returns.

Next, we examine the equity market's reactions to acquisition announcements carried out by CEOs with different levels of mobility, controlling for other effects. We employ ordinary least squares (OLS) regressions with heteroskedasticity-robust standard errors to test the effect of CEO mobility on acquirer CARs around the announcement date. The main dependent variable is the acquirers' cumulative abnormal stock returns for the seven-day event window computed from the one-factor model. The key independent variables are the two measures of CEO mobility, that is, CEO predicted mobility and CEO PCA mobility. In addition, our research design controls for manager, firm, and deal characteristics, with CEO duality, CEO age, CEO tenure, CEO compensation, firm size, firm leverage, firm market-to-book, firm return on assets, public target, industry (international) diversifications, 100% cash, 100% stock, and relative deal value. The baseline regression model of our study is

$$CAR_{i} = \beta_{0} + \beta_{1}CEO \ mobility_{i} + \sum_{j=1}^{k} \gamma_{j}Control_{i,j} + \varepsilon_{i}$$
 (1)

According to our main conjecture, M&As consummated by CEOs with higher (lower) mobility are expected to be associated with higher (lower) shareholder gains. Therefore, the coefficient of CEO potential mobility (i.e., β_1) in equation (1) is expected to be positive and statistically significant. Table 3.3 reports the OLS regression results. Across the two regression specifications, the coefficients of CEO mobility measures are positive and statistically significant

 $^{^{32}}$ The sum of \$18.05 million approximates the product of the median market capitalization (\$1.687 billion) and the difference in CAR[-3,+3] between CEOs of high and low mobility (0.0107).

at conventional levels. In terms of economic significance, a one standard deviation increase in *CEO predicted mobility* (*CEO PCA mobility*) is associated with an increase of around 52 basis points (63 basis points) in acquirer *CAR*[-3,+3].³³ Consistent with the univariate results, the multivariate analysis lends additional support to our hypothesis that M&A decisions made by more mobile CEO are associated with better equity market reactions.³⁴

[Insert Table 3.3 about here]

With respect to the effects of other control variables, our multivariate regressions yield consistent coefficient estimates with those documented in previous studies (e.g., Doukas and Travlos 1988; Berger, Ofek, and Yermack 1997; Dong et al. 2006; Masulis et al. 2007; Phan 2014). Specifically, M&As initiated by CEOs awarded greater cash compensation (i.e., CEOs who are more entrenched) are associated with lower CARs. In addition, we find that bigger acquiring firms are associated with lower announcement abnormal returns. Deals paid 100% in stock are associated with negative and significant announcement returns. In terms of diversification effects, the coefficient of industry diversification across all different specifications is negative and statistically significant at 1%, suggesting that such M&A decisions destroy value. Although the coefficient of international diversification is also negative, it is statistically insignificant in all regression specifications.

Acquirer post M&A long-term performance and CEO mobility

The evidence so far suggests that, in the context of M&As, more mobile CEOs outperform less mobile CEOs in terms of delivering short-term shareholder gains, since more mobile CEOs

 $^{^{33}}$ The values 52 basis points and 63 basis points are the product of the coefficients and the variable's standard deviation (i.e., 0.0057 * 0.9078 and 0.0065 * 0.9701).

³⁴ In a separate untabulated analysis, we also check the moderation effects of payment methods (100% cash vs. 100% stock vs. mixed) and industry diversification on the relation between CEO mobility and shareholder reactions to M&As. However, the coefficients of the moderation terms are statistically insignificant. These results are available upon request.

tend to undertake M&A decisions in line with shareholder preferences. Accordingly, it is reasonable to expect acquisitions by more mobile CEOs to continue to have better post-M&A long-term performance than less mobile CEOs. To examine this conjecture, we conduct a set of multivariate regressions of acquirer post-M&A long-term performance on CEO mobility measures and other controls. We estimate acquirer post-M&A long-term performance using buy-and-hold abnormal returns (BHARs), as follows.

$$BHAR[+1,+T]_{i} = \prod_{t=1}^{T} (1+R_{i,t}) - \prod_{t=1}^{T} (1+R_{benchmark,t})$$

where $BHAR[+1, +T]_i$ is the BHAR of acquirer i over the next T trading days after the announcement date. We examine acquirers' long-term performance for the 24 months (T = 500 trading days) after the acquisition announcement. Furthermore, $R_{i,t}$ is the actual daily stock return of firm i and $R_{benchmark,t}$ is the daily benchmark return predicted by the one-factor model. Table 3.4 reports the multivariate results for acquirer BHARs.

[Insert Table 3.4 about here]

As shown in Table 3.4, the coefficients of CEO mobility measures are consistently positive and statistically significant at conventional levels across all models. For instance, a one standard deviation increase in *CEO predicted mobility* (reported in regression (1) of Table 3.4) translates into an increase of around 10.66% in acquirers' BHARs realized over a two-year period.³⁵ That is, acquirers led by more mobile CEOs seem to perform better in the long run than those managed by less mobile CEOs. Overall, consistent with our main conjecture, the empirical results based on short- and long-term market performance imply that corporate decisions made by CEOs with higher potential mobility are more aligned with shareholder interests.

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³⁵ The amount 10.66% is the product of the coefficient and the variable's standard deviation (i.e., 0.1174 * 0.9078).

Acquirer M&A decisions and CEO mobility

Prior studies (e.g., Furfine and Rosen 2011) suggest that M&A decisions largely depend on managers' discretion and, on average, tend to increase acquirers' default risk. This empirical pattern is further highlighted by Graham, Harvey, and Puri (2015) who find that CEOs have a tendency to preserve the power of making decisions with respect to M&As, as opposed to other corporate policies. The survey-based research conducted by Graham, Harvey, and Puri (2013) also reveals that CEO characteristics, or, more specifically, CEO risk preferences, play important roles in corporate takeover activities. Utilizing CEOs' ownership of private pilot licenses to capture their personal risk-taking preferences, Cain and McKeon (2016) find that risk-seeking CEOs are more likely to engage in M&A activities than risk-averse CEOs. Similarly, Croci and Petmezas (2015) report that CEOs with risk-inducing (convex) compensation (i.e., more risk seeking) are more likely to engage in acquisitions. Using CEO pension and deferred compensation to capture CEO risk aversion, Phan (2014) also documents that CEOs with lower relative leverage (i.e., more risk seeking) are more likely to pursue M&A activities. Therefore, we can infer that more mobile CEOs, who are expected to be more risk seeking, should exhibit a higher propensity to initiate acquisitions than immobile or less mobile CEOs, ceteris paribus.

[Insert Table 3.5 about here]

To test this conjecture, we adhere to the literature and implement the following procedures (e.g., Malmendier and Tate 2008; Yim 2013; Phan 2014). Specifically, we cross-check all firms in the ExecuComp database from 1994 to 2016 with the sample of M&A announcements to construct the dependent variable, a dummy that equals one if a firm has engaged in M&A activities in a certain year, and zero otherwise. We then perform logistic regressions of acquisition propensity on the two proxies of CEO mobility and other control variables, plus industry and year fixed

effects. Based on the above discussion, we expect a positive coefficient estimate for CEO mobility. Table 3.5 documents the empirical results. Across the models in Table 3.5, as expected, the two coefficients of CEO mobility are found to be positive, implying that the more mobile a CEO is, the more likely the CEO is to engage in acquisitions. The evidence is statistically significant at 5% and 1%, as shown in columns (1) and (2) respectively. That is, more (less) mobile CEOs who exhibit risk-taking (risk-averse) behavior are more (less) likely to engage in corporate takeovers.

Acquirer payment decisions and CEO mobility

According to Furfine and Rosen (2011), financing M&A transactions with cash tends to increase bidder risk because this sort of acquisition payment method indirectly substitutes bidders' safer and more liquid assets (i.e., cash) with the target's assets. Alternatively, financing M&As with stock provides bidders insurance in the sense that the potential gains and losses are co-shared with the targets. For these reasons, acquirers led by managers exhibiting risk-taking behavior should be more likely to facilitate takeover bids with cash, whereas acquirers controlled by risk-averse and/or conservative CEOs should opt for other forms of payment (e.g., stocks). Consistent with this view, Phan (2014) reports that CEOs with higher levels of inside debt (i.e., more risk averse) tend to use less cash in their acquisition decisions than those with higher levels of inside debt (i.e., more risk seeking). In addition, according to Malmendier and Tate (2008), the use of cash implicitly suggests that managers tend to be more confident and have stronger belief in the synergy gains of a merger and its post-M&A performance. Therefore, we argue that more mobile CEOs, who have accumulated experience based on their past corporate decisions, are more likely to close a deal with cash than less mobile CEOs.

[Insert Table 3.6 about here]

Accordingly, we expect a positive relation between CEO mobility measures and the proportion of cash used in financing M&A transactions. To perform this test, following previous studies (e.g., Faccio and Masulis 2005; Fu and Tang 2016), we run a Tobit regression of the cash proportion used by the acquirers (bounded between 0% and 100%) on CEO mobility and other control variables. The dependent variable, *cash proportion*, is the percentage of deal value acquirers financed with cash. The findings are reported in Table 3.6. Consistent with our prediction, as shown in Table 3.6, the coefficients of the CEO mobility proxies are strongly positive (statistically significant at 5% and 1%) implying that CEOs with higher mobility tend to use more cash instead of stock to finance M&A transactions. In summary, CEO mobility is significantly related to acquirer payment decisions (cash vs. stock).

Acquirer diversification decisions and CEO mobility

On one hand, the M&A literature documents that diversification can help lower bidders' overall risk and uncertainty via the coinsurance effect with the target whose cash flows are imperfectly correlated (e.g., Levy and Sarnat 1970; Lewellen 1971). According to Amihud and Lev (1981), diversifying M&A activities even help elevate managers' undiversifiable employment risk (i.e., their career concern). Prior theoretical work also suggests that entrenched managers concerned about losing their jobs, without outside alternatives (i.e., with lower job mobility), have an incentive to engage in diversification because such a strategy makes it costly for the firm to fire them (Shleifer and Vishny 1989; Aggarwal and Samwick 2003). Consistent with this view, Phan (2014) reports a significant and positive relation between CEO risk aversion (measured by inside debt compensation) and acquirers' propensity to engage in industry diversification. In line with this tranche of research, less mobile or immobile CEOs, given their limited outside career options, are also expected to engage more in industry and/or international diversifications.

On the other hand, due to the nature of job hopping, more mobile CEOs are likely to gain diverse skills and accumulate experience from different industries after each transition, which could be beneficial to the current firm (Hambrick and Mason 1984; Hambrick 2007; Ryan and Wang 2012; Custódio and Metzger 2013). Accordingly, more mobile CEOs could also engage more in diversified M&A deals, especially across industries, since these M&As are thought to add value to the acquiring companies (Song 1982; Barbopoulos and Doukas 2018). Given these opposing effects, the potential relation between CEO mobility and the propensity to engage in diversifying acquisitions needs to be justified empirically.

[Insert Table 3.7 about here]

In this part of the analysis, we investigate how CEO mobility affects acquirers' likelihood to acquire a target in a different two-digit SIC industry (i.e., industry diversification), as well as a target in a different country (i.e., international diversification). Therefore, we run two logistic regressions using *industry diversification* and *international diversification* as dependent variables, respectively. The empirical evidence is reported in Table 3.7. Regarding industry diversification, although the first two regression models show that the coefficients of CEO mobility measures are positive, suggesting more mobile CEOs are more likely to engage in diversifying M&A deals across different industries, the estimates are not statistically significant. Similarly, as shown in the last two columns of Table 3.6, the empirical results for international diversification are not statistically significant either. Therefore, we refrain from drawing any definitive conclusions for the effect of CEO mobility on acquirers' propensity to engage in industry and international diversification. The results seem to suggest that both industrially and internationally diversifying acquisitions are not strongly related to CEO mobility.

ROBUSTNESS TESTS

Potential effects of managerial ability and CEO risk seeking inducing compensation

The reported correlations in the research methodology section suggest that the two CEO mobility measures capture a considerable quantity of managers' unobservable diverse skills and accumulated experience as well as their risk preferences. Therefore, one could argue that the overall results of CEO mobility in our study could be confounded by the managers' unobservable skills and risk preferences. To address this concern, in this section, we reexamine the aforementioned analyses by including the industry-year adjusted *managerial ability* index (Demerjian et al. 2012; Demerjian, Lev, Lewis, and McVay 2012) and CEO vega-to-delta (Core and Guay 1999, 2002).

[Insert Table 3.8 about here]

If CEO predicted mobility and CEO PCA mobility are simply mirages of the CEO's innate skills and risk preferences, the effects of the two mobility measures on M&A outcomes should dissipate when we include the proxies of skills and risk preferences (i.e., the managerial ability index and CEO vega-to-delta). Nonetheless, if our mobility measures convey more meaningful information than just the underlying skills and risk preferences (e.g., limited outside career options), the coefficients of CEO mobility will remain statistically significant. The empirical results are reported in Table 3.8. Across all model specifications, the effects of the CEO mobility measures remain positive and statistically significant at conventional levels, whereas the effects of the CEO vega-to-delta ratio and managerial ability are either marginally significant or insignificant. Hence, our overall results are robust to the inclusion of managerial ability and CEO risk seeking inducing compensation.

Self-selection bias

Following recent M&A studies (e.g., Phan 2014; Masulis and Simsir 2018), we utilize Heckman's (1979) selection model to control for self-selection bias in our empirical analyses, because the decision to engage in M&As is not random and we can only observe shareholder reactions, acquirers' post-M&A long-term performance, and payment considerations only for firms that decided to do so. First, we run a probit regression of a firm's propensity to engage in an M&A in a given year, similar with the model specification reported in Table 3.5, and calculate the inverse Mills ratio (IMR), *inverse Mills ratio*. Second, we rerun the multivariate regressions of CAR[-3,+3], BHAR[+1,+500], and *cash proportion* used to finance M&A transactions on CEO mobility measures together with the augmented IMRs.

[Insert Table 3.9 about here]

If the IMR's coefficient is statistically significant, inclusion of the IMR is necessary to control for self-selection bias. On the other hand, this would imply that our results are not sensitive to self-selection bias. More importantly, we expect the effects of CEO potential mobility to remain significant given the inclusion of the IMR. The results of the Heckman's test, as reported in Table 3.9, suggest our overall results are robust to self-selection bias, since the coefficients of CEO mobility measures remain statistically significant at conventional levels across all regression specifications. Specifically, we continue to observe that M&A decisions consummated by more mobile CEOs elicit higher CARs, lead to higher post-M&A long-term performance, and are financed with a higher percentage of cash than those made by less mobile CEOs. In sum, investment decisions pursued by more (less) mobile CEOs seem to be more (less) aligned with shareholder interests.

CONCLUSION

This paper explores the impact of acquirer CEOs' mobility on the incidence and outcomes of takeover decisions. Our results provide strong support for the CEO mobility effect in acquisitions. Specifically, we find M&As consummated by more (less) mobile CEOs to be associated with higher (lower) short-term shareholder gains. In addition, we find acquiring companies led by CEOs with greater (lower) mobility to realize better (worse) post-M&A long-term performance, exhibit a higher (lower) propensity to engage in value-increasing M&A activities, and tend to use cash (stock) to finance M&A transactions. Our findings are robust to omitted variable bias (e.g., managerial ability and risk seeking inducing compensation), and self-selection bias. In summary, among different managerial characteristics, the findings of this study demonstrate that CEO mobility plays an important role in explaining the nature of M&A decisions and the variation of acquisition returns. More importantly, consistent with recent anecdotal evidence, this study also suggests that increased managerial mobility can lead to the undertaking of risky M&A decisions that ultimately improve firm performance.

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Table 3.1 M&A distribution by year and sample descriptive statistics

Panel A of this table reports successful M&A announcements made by U.S. publicly listed firms annually during the 1994 – 2016 period. The final sample comprises of 2,906 announcements. The four columns show the annual number of M&A announcement for the full sample as well as the three subsamples based on the method of payment. Panel B shows the descriptive statistics of the independent variables used in the main analysis. Column (5) to (7) report the number of observations, mean and standard deviation while the last three columns show the 25th, 50th and 75th percentiles. Appendix 3.1 provides the variables' definitions.

		Panel A: M&A distribution by year Full sample 100% Stock 100% Cash Mixed					
Year	(1)	(2)	(3)	(4)			
1994	28	5	14	9			
1995	87	19	42	26			
1996	137	34	48	55			
1997	120	21	45	54			
1998	136	29	45	62			
1999	139	25	47	67			
2000	120	16	50	54			
2001	93	11	33	49			
2002	103	7	36	60			
2003	118	5	55	58			
2004	138	8	59	71			
2005	149	4	75	70			
2006	131	2	72	57			
2007	149	2	83	64			
2008	120	0	65	55			
2009	98	4	38	56			
2010	156	1	81	74			
2011	178	3	96	79			
2012	165	0	89	76			
2013	130	4	77	49			
2014	146	2	79	65			
2015	154	1	69	84			
2016	111	2	44	65			
Total	2,906	205	1,342	1,359			

Panel B: Descriptive statistics						
Variable	N	Mean	STD	25%	50%	75%
variable	(5)	(6)	(7)	(8)	(9)	(10)
Public target	2,906	0.4542	0.4980	0.0000	0.0000	1.0000
Industry diversification	2,906	0.3235	0.4679	0.0000	0.0000	1.0000
International diversification	2,906	0.2017	0.4013	0.0000	0.0000	0.0000
100% cash	2,906	0.4618	0.4986	0.0000	0.0000	1.0000
100% stock	2,906	0.0705	0.2561	0.0000	0.0000	0.0000
Relative deal value	2,906	0.0974	0.1555	0.0226	0.0451	0.1012
Firm size	2,906	7.9375	1.5192	6.8446	7.7786	8.8754
Firm leverage	2,906	0.1511	0.1451	0.0051	0.1300	0.2459
Firm market-to-book	2,906	3.5811	5.8819	1.7325	2.6073	3.9354
Firm return on assets	2,906	0.0627	0.0766	0.0332	0.0622	0.0963
CEO predicted mobility	2,906	0.0333	0.9078	-0.4866	-0.2274	0.2005
CEO PCA mobility	2,906	-0.0089	0.9701	-0.7212	0.0466	0.6760
CEO duality	2,906	0.5502	0.4976	0.0000	1.0000	1.0000
CEO age	2,906	54.6493	7.7882	50.0000	55.0000	60.0000
CEO tenure	2,906	7.3111	7.6535	2.0000	5.0000	10.0000
CEO cash compensation	2,906	1.1241	1.2881	0.3076	0.7050	1.4686

Table 3.2 Univariate results of acquirer abnormal stock returns

This table reports the univariate analysis of acquirer cumulative abnormal returns (CAR[-3,+3]) for different M&A samples from 1994 to 2016. The cumulative abnormal returns (CAR[-3,+3]) are estimated using the one-factor model. The estimation period is from t = -211 to t = -11. Panel A reports the average CAR, its standard deviation, and the number of observations for the full sample, 100% cash, mixed, and 100% stock subsamples respectively. The first three columns in panel B shows similar statistics for the three different terciles of CEOs based on CEO predicted mobility, which is defined as the predicted value estimated from the logistic regression of switching position on 6 related mobility determinants. The last column of panel B reports the difference-in-means test between the high and low mobility groups. Panel C shows similar statistics for the three different terciles of CEOs based on CEO PCA mobility, which is defined as the weighted average of the five factors based on their eigenvalues estimated from the PCA of all 14 related mobility determinants. ****, ***, and * are used to indicate significant levels at 1%, 5% and 10% respectively. Appendix 3.1 provides the other variables' definitions.

Panel A: Acquir	er CARs for the full sa	mple and the three sul	osamples based on me	thod of payments		
Variable	Full sample	100% Cash	Mixed	100% Stock		
Mean	0.0041***	0.0087***	0.0026	-0.0163**		
Standard error	0.0015	0.0020	0.0023	0.0064		
Observations	2,906	1,342	1,359	205		
Pane	l B: Acquirer CARs for	the three terciles base	ed on <i>CEO predicted m</i>	obility		
	Bottom tercile	Middle tercile	Top tercile	Top - Bottom		
Variable	(Less mobile		(More mobile			
	CEOs)		CEOs)			
Mean	0.0007	0.0002	0.0113***	0.0107***		
Standard error	0.0025	0.0025	0.0026	0.0036		
Observations	968	969	969	N/A		
Panel C: Acquirer CARs for the three terciles based on CEO PCA mobility						
	Bottom tercile	Middle tercile	Top tercile	Top - Bottom		
Variable	(Less mobile		(More mobile			
	CEOs)		CEOs)			
Mean	-0.0015	0.0068***	0.0068***	0.0083**		
Standard error	0.0029	0.0025	0.0022	0.0036		
Observations	968	969	969	N/A		

Table 3.3 Acquirer cumulative abnormal returns and CEO mobility

This table reports the OLS results of regressing seven-day acquirer cumulative abnormal returns, CAR[-3,+3], on different measures of CEO mobility. CAR[-3,+3] is estimated using the one-factor model with the estimation period from t=-211 to t=-11 days to the announcement date. CEO predicted mobility is the predicted value estimated from the logistic regression of switching position on 6 related determinants of CEO mobility. CEO PCA mobility is the weighted average of the 5 factors based on their eigenvalues estimated from the PCA of all 14 related determinants of CEO mobility. Heteroskedasticity-robust standard errors are shown in parentheses. ***, **, and * are used to indicate significant levels at 1%, 5% and 10% respectively. Appendix 3.1 provides the other variables' definitions.

X7 • 11	CAR[-3,+3]
Variable	(1)	(2)
CEO predicted mobility	0.0057***	
•	(0.0017)	
CEO PCA mobility		0.0065***
		(0.0022)
CEO duality	0.0013	-0.0027
	(0.0032)	(0.0034)
CEO age	0.0004*	0.0001
	(0.0002)	(0.0002)
CEO tenure	0.0002	-0.0001
	(0.0002)	(0.0002)
CEO cash compensation	-0.0039*	-0.0047**
	(0.0023)	(0.0023)
Firm size	-0.0056***	-0.0070***
	(0.0015)	(0.0016)
Firm leverage	0.0193*	0.0106
	(0.0113)	(0.0114)
Firm market-to-book	-0.0004	-0.0003
	(0.0003)	(0.0003)
Firm return on assets	0.0415*	0.0353
	(0.0250)	(0.0248)
Public target	-0.0007	-0.0012
	(0.0037)	(0.0037)
Industry diversification	-0.0099***	-0.0109***
	(0.0031)	(0.0031)
International diversification	-0.0023	-0.0025
	(0.0034)	(0.0035)
100% cash	0.0044	0.0051
	(0.0031)	(0.0031)
100% stock	-0.0155**	-0.0136**
	(0.0068)	(0.0069)
Relative deal value	-0.0157	-0.0161
	(0.0172)	(0.0172)
Intercept	0.0306*	0.0654***
	(0.0177)	(0.0188)
\mathbb{R}^2	2.28%	2.28%
Observations	2,906	2,906

Table 3.4 Acquirer post M&A long-term performance and CEO mobility

This table reports the OLS results of regressing two-year acquirer buy-and-hold abnormal returns, BHAR[+1,+500], on different measures of CEO mobility. BHAR[+1,+500] is estimated using the one-factor model with the estimation period from t = -211 to t = -11 days to the announcement date. CEO predicted mobility is the predicted value estimated from the logistic regression of switching position on 6 related determinants of CEO mobility. CEO PCA mobility is the weighted average of the 5 factors based on their eigenvalues estimated from the PCA of all 14 related determinants of CEO mobility. Heteroskedasticity-robust standard errors are shown in parentheses. ***, ***, and * are used to indicate significant levels at 1%, 5% and 10% respectively. Appendix 3.1 provides the other variables' definitions.

	BHAR[-	+1,+500]
Variable	(1)	(2)
CEO predicted mobility	0.1174***	
	(0.0421)	
CEO PCA mobility		0.3160**
		(0.1363)
CEO duality	-0.0716	-0.2621
	(0.1707)	(0.2028)
CEO age	0.0117	0.0005
	(0.0147)	(0.0163)
CEO tenure	-0.0033	-0.0100
	(0.0083)	(0.0089)
CEO cash compensation	-0.2819***	-0.3141***
	(0.0915)	(0.0974)
Firm size	-0.1430	-0.2159
	(0.1354)	(0.1593)
Firm leverage	0.6174	0.1720
	(0.5772)	(0.5283)
Firm market-to-book	-0.1467	-0.1410
	(0.1060)	(0.1055)
Firm return on assets	6.5690**	6.2468**
	(2.5956)	(2.5639)
Public target	0.3037	0.2775
	(0.2806)	(0.2727)
Industry diversification	-0.1941	-0.2429
	(0.2244)	(0.2350)
International diversification	-0.0246	-0.0223
	(0.1514)	(0.1517)
100% cash	0.1762	0.1973
	(0.1556)	(0.1548)
100% stock	-1.4791	-1.3788
	(0.9770)	(0.9475)
Relative deal value	-0.3220	-0.3422
	(0.4345)	(0.4360)
Intercept	0.1283	1.5897
	(1.5798)	(1.9811)
\mathbb{R}^2	5.43%	5.61%
Observations	2,906	2,906

Table 3.5 Acquirer M&A decisions and CEO mobility

This table reports the logistic regressions of acquirer M&A decisions on the measures of CEO mobility. The dependent variable (i.e., the decision to engage in M&A activities) is a dummy that takes a value of one if a firm decides to engage in M&As in a certain year, and zero otherwise. CEO predicted mobility is the predicted value estimated from the logistic regression of switching position on 6 related determinants of CEO mobility. CEO PCA mobility is the weighted average of the 5 factors based on their eigenvalues estimated from the PCA of all 14 related determinants of CEO mobility. All models also include year and industry fixed effects; the latter is defined using two-digit SIC codes. All independent variables are lagged by one period. Heteroskedasticity-robust standard errors are shown in parentheses. ***, **, and * are used to indicate significant levels at 1%, 5% and 10% respectively. Appendix 3.1 provides the other variables' definitions.

***	M&A d	lecisions
Variable	(1)	(2)
CEO predicted mobility	0.0683**	` ` `
·	(0.0343)	
CEO PCA mobility	` ,	0.1014***
•		(0.0370)
CEO duality	-0.0253	-0.0854*
•	(0.0468)	(0.0515)
CEO age	-0.0079***	-0.0119***
	(0.0029)	(0.0029)
CEO tenure	0.0000	-0.0029
	(0.0032)	(0.0030)
CEO cash compensation	-0.0545***	-0.0667***
1	(0.0199)	(0.0203)
Firm size	0.0684***	0.0469**
	(0.0190)	(0.0213)
Firm leverage	-1.0573***	-1.1314***
C	(0.1600)	(0.1616)
Firm market-to-book	-0.0017	-0.0017
	(0.0029)	(0.0030)
Firm return on assets	1.9461***	1.9594***
	(0.2682)	(0.2669)
Intercept	-2.2995***	-1.8298***
•	(0.2373)	(0.2552)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Pseudo R ²	6.78%	7.13%
Observations	22,038	22,038

Table 3.6 Acquirer payment decisions and CEO mobility

This table reports the Tobit regressions of acquirers' use of cash in financing M&As (bounded between 0% and 100%) on the measures of CEO mobility. The dependent variable is the percentage of cash acquirers use to finance the takeover deals. *CEO predicted mobility* is the predicted value estimated from the logistic regression of switching position on 6 related determinants of CEO mobility. *CEO PCA mobility* is the weighted average of the 5 factors based on their eigenvalues estimated from the PCA of all 14 related determinants of CEO mobility. All models also include year and industry fixed effects; the latter is defined using two-digit SIC codes. Heteroskedasticity-robust standard errors are shown in parentheses. ***, **, and * are used to indicate significant levels at 1%, 5% and 10% respectively. Appendix 3.1 provides the other variables' definitions.

	Cash pr	oportion
Variable	(1)	(2)
CEO predicted mobility	0.1345**	
,	(0.0641)	
CEO PCA mobility	` ,	0.1830***
·		(0.0588)
CEO duality	0.0873	-0.0203
•	(0.0758)	(0.0824)
CEO age	0.0118**	0.0043
Ç	(0.0049)	(0.0048)
CEO tenure	-0.0018	-0.0084*
	(0.0049)	(0.0045)
CEO cash compensation	-0.1332***	-0.1492***
1	(0.0361)	(0.0364)
Firm size	-0.1458***	-0.1831***
	(0.0326)	(0.0355)
Firm leverage	0.1132	-0.0294
	(0.2696)	(0.2719)
Firm market-to-book	-0.0163**	-0.0147**
	(0.0066)	(0.0065)
Firm return on assets	1.6261***	1.5160***
	(0.4745)	(0.4713)
Public target	0.0554	0.0423
	(0.0790)	(0.0788)
Industry diversification	-0.3892***	-0.3923***
·	(0.0761)	(0.0758)
International diversification	0.6662***	0.6628***
	(0.1034)	(0.1028)
Relative deal value	-2.2540***	-2.2743***
	(0.2327)	(0.2315)
Intercept	3.9246***	4.9314***
•	(0.7746)	(0.8125)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
AIC	3,217.52	3,212.01
Observations	2,906	2,906

Table 3.7 Acquirer diversification decisions and CEO mobility

This table reports the logistic regressions of acquirer diversification decisions (i.e., either across industries or country borders) on the measures of CEO mobility. In the first (last) two columns, the dependent variable is a dummy that take a value of one if the target firm belongs to a different two-digit SIC group (country) from that of the acquirer, and zero otherwise. *CEO predicted mobility* is the predicted value estimated from the logistic regression of switching position on 6 related determinants of CEO mobility. *CEO PCA mobility* is the weighted average of the 5 factors based on their eigenvalues estimated from the PCA of all 14 related determinants of CEO mobility. All models also include year and industry fixed effects; the latter is defined using two-digit SIC codes. Heteroskedasticity-robust standard errors are shown in parentheses. ***, **, and * are used to indicate significant levels at 1%, 5% and 10% respectively. Appendix 3.1 provides the other variables' definitions.

Variable	Industry di	versification	International	diversification
Variable	(1)	(2)	(3)	(4)
CEO predicted mobility	0.0559		-0.0739	
	(0.0869)		(0.1067)	
CEO PCA mobility		0.0808		0.0632
		(0.0853)		(0.0896)
CEO duality	0.0411	-0.0072	-0.0167	-0.0496
	(0.0990)	(0.1104)	(0.1098)	(0.1208)
CEO age	0.0005	-0.0031	-0.0019	-0.0016
-	(0.0069)	(0.0067)	(0.0083)	(0.0083)
CEO tenure	-0.0056	-0.0080	0.0032	0.0049
	(0.0069)	(0.0065)	(0.0078)	(0.0073)
CEO cash compensation	-0.0161	-0.0245	-0.0993*	-0.1043*
	(0.0496)	(0.0505)	(0.0576)	(0.0577)
Firm size	0.0592	0.0395	-0.0128	-0.0326
	(0.0457)	(0.0519)	(0.0465)	(0.0500)
Firm leverage	-0.0615	-0.1260	0.0178	-0.0069
	(0.3754)	(0.3801)	(0.4134)	(0.4142)
Firm market-to-book	-0.0069	-0.0058	-0.0105	-0.0097
	(0.0085)	(0.0084)	(0.0075)	(0.0073)
Firm return on assets	-0.4416	-0.4736	0.6351	0.6255
	(0.6055)	(0.6022)	(0.6608)	(0.6642)
Public target	-0.9758***	-0.9780***	-0.2123*	-0.2142*
	(0.1095)	(0.1092)	(0.1254)	(0.1253)
100% cash	-0.3583***	-0.3536***	-0.4070***	-0.4072***
	(0.1012)	(0.1011)	(0.1126)	(0.1125)
100% stock	0.4303**	0.4371**	-1.4537***	-1.4385***
	(0.1870)	(0.1869)	(0.3431)	(0.3433)
Relative deal value	0.1775	0.1662	-2.6416***	-2.6557***
	(0.3084)	(0.3085)	(0.7149)	(0.7177)
Intercept	-2.1933***	-1.7833***	-3.2576***	-3.1788***
	(0.5445)	(0.6084)	(0.6028)	(0.6442)
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Pseudo R ²	21.86%	21.88%	12.84%	12.84%
Observations	2,906	2,906	2,906	2,906

Table 3.8 Potential effects of managerial ability and CEO risk-seeking inducing compensation

This table reports the multivariate analysis of acquirer cumulative abnormal returns, post-M&A long-term performance, M&A decisions, and method of payments on the measures of CEO mobility controlling for managerial ability and CEO risk preferences. In column (1) and (2), the dependent variable is CAR[-3,+3] estimated using the one-factor model with the estimation period from t = -211 to t = -11 days to the announcement date. In column (3) and (4), the dependent variable is BHAR[+1,+500] estimated using the one-factor model with the estimation period from t = -211 to t = -11 days to the announcement date. In column (5) and (6), the dependent variable is a dummy that takes a value of one if a firm decides to engage in M&As in a certain year, and zero otherwise. In column (7) and (8), the dependent variable is the percentage of cash acquirers use to finance the takeover deals. CEO predicted mobility is the predicted value from the logistic regression of switching position on 6 related determinants of CEO mobility. CEO PCA mobility is the weighted average of the 5 factors based on their eigenvalues estimated from the PCA of all 14 related determinants of CEO mobility. CEO vega-to-delta is the ratio of CEO vega to CEO delta. Managerial ability is the decile rank (by industry and year) of managerial efficiency estimated from Demerjian et al. (2012). Other control variables are suppressed for brevity. Heteroskedasticity-robust standard errors are shown in parentheses. ***, ***, and * are used to indicate significant levels at 1%, 5% and 10% respectively. Appendix 3.1 provides the other variables' definitions.

Variable	CAR	[-3,+3]	BHAR[-	+1,+500]
Variable	(1)	(2)	(3)	(4)
CEO predicted mobility	0.0057***		0.1189***	
,	(0.0017)		(0.0421)	
CEO PCA mobility	, ,	0.0063***	, ,	0.3127**
•		(0.0022)		(0.1310)
CEO vega-to-delta	-0.0013	-0.0014	0.0778	0.0734
_	(0.0013)	(0.0013)	(0.0615)	(0.0605)
Managerial ability	-0.0069	-0.0051	-0.1394	-0.0427
	(0.0051)	(0.0051)	(0.2264)	(0.2021)
Other controls	Yes	Yes	Yes	Yes
R ² /Pseudo R ² /AIC	2.38%	2.36%	5.47%	5.65%
Observations	2,906	2,906	2,906	2,906
Variable	M&A decisions		Cash pr	oportion
Variable	(5)	(6)	(7)	(8)
CEO predicted mobility	0.0663*		0.1287**	
	0.0003		0.128/	
	(0.0343)		(0.0640)	
CEO PCA mobility		0.0944**		0.1711***
CEO PCA mobility		0.0944** (0.0374)		0.1711*** (0.0599)
CEO PCA mobility CEO vega-to-delta				
·	(0.0343)	(0.0374)	(0.0640)	(0.0599)
·	(0.0343) 0.0452*	(0.0374) 0.0425*	(0.0640) 0.0690*	(0.0599) 0.0650
CEO vega-to-delta	(0.0343) 0.0452* (0.0232)	(0.0374) 0.0425* (0.0231)	(0.0640) 0.0690* (0.0407)	(0.0599) 0.0650 (0.0402)
CEO vega-to-delta Managerial ability Other controls	(0.0343) 0.0452* (0.0232) 0.0454	(0.0374) 0.0425* (0.0231) 0.0648	(0.0640) 0.0690* (0.0407) -0.1720	(0.0599) 0.0650 (0.0402) -0.1186
CEO vega-to-delta Managerial ability	(0.0343) 0.0452* (0.0232) 0.0454 (0.0792)	(0.0374) 0.0425* (0.0231) 0.0648 (0.0794)	(0.0640) 0.0690* (0.0407) -0.1720 (0.1260)	(0.0599) 0.0650 (0.0402) -0.1186 (0.1276)

Table 3.9 Heckman tests for self-selection bias

This table reports the multivariate analysis of acquirer cumulative abnormal returns, post-M&A long-term performance, and method of payments on the measures of CEO mobility controlling for Heckman self-selection bias. In column (1) and (2), the dependent variable is CAR[-3,+3] estimated using the one-factor model with the estimation period from t = -211 to t = -11 days to the announcement date. In column (3) and (4), the dependent variable is BHAR[+1,+500] estimated using the one-factor model with the estimation period from t = -211 to t = -11 days to the announcement date. In column (5) and (6), the dependent variable is the percentage of cash acquirers use to finance the takeover deals. CEO predicted mobility is the predicted value from the logistic regression of switching position on 6 related determinants of CEO mobility. CEO PCA mobility is the weighted average of the 5 factors based on their eigenvalues estimated from the PCA of all 14 related determinants of CEO mobility. Other control variables are suppressed for brevity. Heteroskedasticity-robust standard errors are shown in parentheses. ***, ***, and * are used to indicate significant levels at 1%, 5% and 10% respectively. Appendix 3.1 provides the other variables' definitions.

Variable	CAR	[-3,+3]	BHAR[+1.+500]		Cash proportion	
Variable	(1)	(2)	(3)	(4)	(5)	(6)
CEO predicted mobility	0.0062***		0.0926**		0.1817***	
	(0.0017)		(0.0438)		(0.0687)	
CEO PCA mobility	, , , ,	0.0063***	, , ,	0.3413**	, ,	0.2359***
·		(0.0022)		(0.1398)		(0.0649)
Inverse Mills ratio	0.0042**	0.0029	-0.2018***	-0.2792***	0.4077**	0.3781*
	(0.0018)	(0.0018)	(0.0746)	(0.0844)	(0.2034)	(0.1982)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
R ² /Pseudo R ² /AIC	2.45%	2.36%	5.53%	5.81%	3,215.14	3,210.24
Observations	2,906	2,906	2,906	2,906	2,906	2,906

APPENDICES

APPENDIX 1.1 ESSAY 1 VARIABLE DESCRIPTIONS

Variable	Description				
	Firm Characteristics				
Firm Size	Log of (1 + Total Assets)				
Firm Financial Leverage	(Current Debt + Long-term Debt)/(Total Equity)				
Firm Market to Book Ratio	(Total Assets - Book Equity + Market Capitalization)/ (Total Assets)				
	Deal Characteristics				
Relative Deal Value	Deal value scaled by the acquirer's total assets				
Friendly Deal	Equals 1 if the acquisition was a friendly attempt, and 0 otherwise				
Public Target	Equals 1 if a public target was acquired, and 0 otherwise				
Private Target	Equals 1 if a private target was acquired, and 0 otherwise				
Pre-crisis	Equals 1 if the announcement was made before 12/31/2007, and 0 otherwise				
During-crisis	Equals 1 if the announcement was made after 12/31/2007 and before 06/30/2009, and 0 otherwise				
Post-crisis	Equals 1 if the announcement was made after 06/30/2009, and 0 otherwise				
Stock Deal	Equals 1 if at least 30% of the transaction was paid with the acquirers' stock, and 0 otherwise				
International Diversification	Equals 1 if the target was a non-US company, and 0 otherwise				
Industrial Diversification	Equals 1 if the target was not in the same industry as the acquirer based on 2-digit SIC, and 0 otherwise				
	CEO Characteristics				
CEO Age	Log of (CEO Age)				
CEO Compensation	Log of (1 + Total Compensation)				
CEO Relative Leverage	(CEO Debt to Equity)/(Firm Debt to Equity)				
CEO Relative Leverage (SERP)	(CEO Pension to Equity)/(Firm Debt to Equity)				
CEO Relative Incentive	(CEO Inside Debt/Change in CEO Equity)/(Firm Debt/Change in Firm Equity)				
CEO Relative Incentive (SERP)	(CEO Pension/Change in CEO Equity)/(Firm Debt/Change in Firm Equity)				

APPENDIX 2.1 ESSAY 2 VARIABLE DESCRIPTIONS

Variable	Description
CEO relative leverage	CEO inside debt to CEO inside equity scaled by firm market leverage after logarithm transformation
CEO relative leverage ≥ 1	Equals one if CEO relative leverage is greater than or equal to one, and zero otherwise
CEO relative incentive	CEO inside debt to change in CEO inside equity scaled by the ratio of firm debt to change in firm equity after logarithm transformation
CEO relative incentive ≥ 1	Equals one if CEO relative incentive is greater than or equal to one, and zero otherwise
CEO vega-to-delta ratio	CEO vega to CEO delta scaled by CEO debt-to-equity
CEO age	Natural logarithm of CEO age
CEO tenure	Natural logarithm of one plus the number of years the CEO has held the CEO position
CEO cash compensation	Natural logarithm of CEO salary plus bonus
CEO duality	Equals one if the CEO is also the chair of the company's board of directors, and zero otherwise
CEO relative ownership	Equals one if the CEO's stock ownership is above the industry median, and zero otherwise
CEO pay slice	Equals one if the ratio of the CEO's total compensation to the top five executives' is greater than the industry median, and zero otherwise
CEO relative tenure	Equals one if the CEO's tenure is above the industry median, and zero otherwise
Firm size	Natural logarithm of firm market capitalization
Firm leverage	Long-term debt to total equity
Firm market-to-book ratio	Market value of assets to book value of assets
Firm sales growth	Percentage change in sales from the previous period to the current period
Firm R&D	Firm R&D expense to firm total assets after logarithm transformation
Firm free cash flows	Ratio of earnings before depreciation and amortization minus the change in working capital and capital expenditures to firm total assets
Multiple announcements	Equals one if the firm announces more than one CSR event in a year, and zero otherwise
CSR financial commitment	Equals one if the firm explicitly discloses the invested amount of money is greater than \$200,000, and zero otherwise
CSR environmental concern	Equals one if the announcement is an environmental - related event, and zero otherwise
CSR corporate philanthropy	Equals one if the announcement is a corporate philanthropy event, and zero otherwise
CSR socially responsible investment	Equals one if the announcement is a socially responsible investment, and zero otherwise

APPENDIX 3.1 ESSAY 3 VARIABLE DESCRIPTIONS

Variable	Description
Deal & Firm Characteristics	
Public status	Equals 1 if a public target was acquired, and 0 otherwise
Industry diversification	Equals 1 if the target was not in the same industry as the acquirer based on two-digit SIC, and 0 otherwise
International diversification	Equals 1 if the target was a non-US company, and 0 otherwise
100% cash	Equals 1 if the whole transaction was paid with cash, and 0 otherwise
100% stock	Equals 1 if the whole transaction was paid with stock, and 0 otherwise
Relative deal value	Deal value scaled by the acquirer's market value of assets
Firm size	Natural logarithm of market value of assets
Firm leverage	Ratio of long-term debt to total assets
Firm market-to-book-ratio	Ratio of market value of equity to book value of equity
Firm return on assets	Ratio of net income before extraordinary items to total assets
CEO Characteristics	
CEO predicted mobility	The predicted value estimated from the logistic regression of switching position on 6 related mobility determinants
CEO PCA mobility	The weighted average of the five factors based on their eigenvalues estimated from the PCA of all 14 related mobility determinants
CEO duality	Equals 1 if the CEO is also the chair of the board, and 0 otherwise
CEO age	Age of the CEO in years
CEO tenure	Tenure of the CEO in years
CEO compensation	Sum of salary and bonus scaled by total assets

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