Mergers and Acquisitions and CEO Debt-like Compensation

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Dedication

This dissertation work is dedicated to my parents Peng Qiuxi and Zou Xiaoqin, my husband Zekun, and my sons, Juntian and Yicheng.

Abstract

Prior research examining the effect of CEO compensation schemes on M&A decisions overlooks the fact that a significant portion of CEO compensation is debt-like (e.g., deferred compensation and defined benefit pensions). Theory suggests that debt-like compensation aligns CEOs' incentives with those of debtholders. I examine whether CEOs with higher debt-like compensation relative to equity compensation are more aligned with debtholders than equityholders when making M&A decisions. Supporting the incentive alignment argument, I find that acquirers with higher CEO relative debt-like compensation tend to pick less risky targets and are more likely to use debt financing, which is consistent with their CEOs being less risk-seeking and therefore having lower cost of debt. I also find that post-merger stock return volatility is lower for these acquirers. In addition, I document a lower correlation between bond returns and stock returns to M&A announcements for acquirers with high level of CEO relative debt-like compensation than for those with medium level. However, I do not find same results for acquirers with low level of CEO relative debt-like compensation. Overall, my study suggests that, when examining effects of CEO incentives on their decision-making, it is important to consider the relative incentive alignment between CEOs and both groups of stakeholders.

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1. Introduction

Mergers and acquisitions (M&As) are among the most important investment decisions a CEO makes for her firm. They often offer a quicker way for a firm to expand than internally generated growth. In 2011 alone, there were 38,000 M&A deals announced globally, with deal value amounting to a total of $2.47 trillion (Thomson Financials, 2011). Similar to other investment decisions made by a CEO, M&A is subject to agency problems between the CEO and other stakeholders of the firm. The agency problems can arise if all parties try to maximize their own utility (Jensen and Meckling, 1976). A CEO, for example, may engage in negative Net Present Value (NPV) M&A such that the size-dependent compensation would increase (Bliss and Rosen, 2001; Morck, Shleifer, and Vishny, 1990). One way to mitigate these agency problems is via the design of CEO compensation package. In this paper, I examine the effect of CEO compensation on acquisition decisions.[1] Specifically, I examine how the relative incentive alignment between the CEO and debtholders versus equityholders affects M&A decisions.

According to Jensen and Meckling (1976), investment decisions made by a manager in a levered firm are subject to both the agency cost of equity and the agency cost of debt. Although most prior research on M&A focuses on the agency cost of equity, the coexistence of the two types of agency problems particularly matters in the M&A setting. This is not only because of the large scale and long-term impact of M&A but also because M&A is a setting where the agency conflict between equityholders and debtholders can really manifest itself. Lewellen (1971) argues that when two firms with

[1] I use M&A, mergers and acquisitions interchangeably in this paper from this point onward.

non-perfectly correlated cash flows merge, the value of each firm's debts increases due to a "co-insurance" effect. This could represent a transfer of wealth from equityholders to debtholders when there is no synergy created in the merger (Kim and McConnell, 1977). On the other hand, acquirers can enter into risky deals that increase the expected payoff to equityholders while decreasing the expected payoff to debtholders. This might lead to a wealth transfer from debtholders to equityholders. Therefore, both types of agency problems need to be considered. Ignoring the incentive alignment with debtholders while only examining the incentive alignment with equityholders could result in an incomplete and unsound understanding of CEO behavior in M&A transactions.

Prior research on CEO compensation and M&A has focused on the agency problem between the CEO and equityholders (Datta, Iskandar-Datta, & Raman, 2001; Lekse & Zhao, 2009; Lewellen, Loderer, & Rosenfeld, 1985; Tehranian, Travlos, & Waegelein, 1987). Most studies examine the impact of equity compensation and other compensation arrangements that align the interest of the CEO with that of equityholders. Datta *et al.* (2001), for example, find that CEOs with more equity grants in the year before their M&A announcements pick riskier targets and experience higher returns in the stock market. The interpretation is that equity compensation offers incentives for CEOs to take risks, which aligns their interests with those of equityholders. Few studies have paid attention to the effect of CEOs' incentive alignment with debtholders in the M&A setting.

My paper attempts to fill the gap by examining the effect of CEO debt-like compensation on M&A characteristics and outcomes after controlling for the effect of equity compensation. CEO debt-like compensation includes defined benefit pensions and deferred compensation, and theories show that debt-like compensation provides incentive

alignment between the CEO and debtholders (Edmans and Liu, 2011). Debt-like compensation has a similar payoff structure as external debt, which is exposed fully to downside risk but has limited upside potential. The fact that debt compensation has a concave payoff structure makes the CEO concerned about the default probability and the liquidation value of the firm. Thus it limits the risk-taking incentive of the CEO (Edmans and Liu, 2011; Sundaram and Yermack, 2007). U.S. Generally Accepted Accounting Principles (GAAP) did not require public companies to disclose top executives' debt-like compensation until Dec. 15, 2006. Sundram and Yermack (2007) find that debt-like compensation represents a significant part of CEO compensation and that CEOs with more debt-like compensation manage their firms more conservatively. Wei and Yermack (2011) find that stock market reactions are lower and bond market reactions are higher for firms that disclose higher debt-like CEO compensation at the initial disclosure of debt-like compensation. Several subsequent studies have examined the effect of debt-like compensation on firm's investing decisions and the cost of debt. The overall findings are that higher CEO debt-like compensation is associated with lower cost of debt (Anantharaman, Fang, and Gong, 2010; Chen, Dou, and Wang, 2011; Wang, Xie, and Xin, 2010), lower investment in risky projects (Cassell, Huang, Manuel Sanchez, and Stuart, 2012; Tung and Wang, 2011), and lower financial leverage (Cassell *et al.*, 2012).

Based on the theory that debt-like compensation creates incentive alignment between the CEO and debtholders (Edmans and Liu, 2011; Jensen and Meckling, 1976), I study its effect on target choices, financing and payment methods, and M&A outcomes at announcements and after mergers. Since debt-like compensation reduces risk-taking

incentives, I first hypothesize that CEOs with higher debt-like compensation are likely to pick less risky M&A targets.

An acquisition can be financed by debt, equity, a combination of both, or internal corporate funds. Prior studies have shown that higher CEO debt-like compensation is associated with lower cost of debt because CEOs with higher relative debt-like compensation are perceived to be more aligned with debtholders (Anantharaman et al., 2013; Chen et al., 2011; Wang et al., 2010). In other words, CEOs with higher debt-like compensation can borrow at lower costs, which suggests a positive relation between CEO debt-like compensation and the probability of using debt to finance M&A. On the other hand, CEOs with higher debt-like compensation are more concerned about solvency of the firm, and therefore are less willing to increase the debt level. This suggests a negative relation between CEO debt-like compensation and the probability of using debt to finance. Overall, there are two mechanisms through which CEO debt-like compensation can affect the financing decision. I cannot predict which mechanism dominates, *ex ante*. I therefore hypothesize that CEO debt-like compensation affects financing decisions. Moreover, payment methods are related to financing methods. For example, M&A deals financed with only debt must be paid with cash, and equity payment requires equity financing. Since payment methods are correlated with financing methods, which are related to CEO incentives, I also test whether CEO debt-like compensation affects payment methods.

The relative incentive alignment between the CEO and the two types of stakeholders should affect equityholders' and debtholders' returns from the M&A. When CEOs become more aligned with debtholders, it is likely that features of M&A will favor debtholders more. Conversely, as CEOs become less aligned with debtholders, it is likely

that features of M&A will favor equityholders more. It has been shown in prior research that the association between bond reactions and stock reactions is lower for events that favor one group of stakeholders over the other (Maxwell & Rao, 2003). My third hypothesis is that the association between bond returns and stock returns during M&A announcement windows is lower for acquirers with very high or very low level of CEO relative debt-like compensation. Finally, given that CEO debt-like compensation affects incentive alignments between the CEO and stakeholders, which, in turn, affects risk-taking incentives, it should directly relate to firms' riskiness after mergers. I predict that post-merger riskiness is lower for acquirers with higher CEO debt-like compensation.

To measure the relative incentive alignment between the CEO and stakeholders, I follow prior literature (Anantharaman et al., 2013; Chen et al., 2011; Wang et al., 2010) by using the relative debt/equity ratio (rel_D/E), defined as the CEO's debt/equity ratio (CEO_D/E) divided by the firm's debt/equity ratio (firm_D/E). CEO_D/E is the ratio of CEO debt-like compensation and equity compensation, where debt-like compensation includes the cumulative balance of deferred compensation and the present value of defined benefit pension. Equity compensation includes holdings in common stock, restricted stock, and stock options. Firm_D/E is the ratio of a firm's long-term debt and market value of common shares outstanding. According to Edmans and Liu (2011), rel_D/E is a superior measure for the CEO's relative incentive alignment since a firm's optimal risk level depends on its capital structure. Because rel_D/E is a highly positively skewed variable, to mitigate this skewness, I use the rank of rel_D/E instead in my empirical tests.[2]

[2] Non-tabulated results using rel_D/E are qualitatively the same as reported results.

Empirical analyses yield results supporting my predictions. I find that CEOs with higher rel_D/E tend to pick targets with lower financial leverage, higher working capital, lower cash flow correlation and lower earning correlation with acquirers. They are more likely to use debt financing, suggesting that lower cost of debt dominates increased concern for solvency associated with higher CEO relative debt-like compensation. The association between abnormal bond returns and abnormal stock returns at M&A announcements is lower for acquirers with very high CEO rel_D/E. Finally, I find that post-merger stock return volatilities are lower for CEOs with higher rel_D/E. As CEO compensation is endogenously determined by firm and CEO characteristics, I adopt the propensity score matching approach to mitigate this problem. Results are similar based on the propensity score matching approach.

My paper contributes to the literatures on both M&A and debt-like compensation. Prior empirical research on CEO compensation and M&A focuses on compensation designs that align the interests between the CEO and equityholders. This literature ignores the effect of CEO compensation on the conflict of interest between equityholders and debtholders. This paper fills this void by showing the effect of debt-like compensation on M&A while controlling for the effect of equity compensation. I also examine various aspects of the M&A process, including target choices, financing and payment methods, market reaction at announcements, and post-merger returns volatilities. Results in all aspects are consistent with the theory that incentives provided by debt-like compensation align interests of CEOs with debtholders. My study therefore contributes to a more complete understanding of the effect of CEO compensation on M&A. It also provides novel evidence on CEO debt-like compensation's effects on M&A. Given the

more exogenous nature of M&A compared with ongoing operations, and different aspects of CEO decisions examined during and after M&A, my setting is less subject to the concern of endogeneity for CEO compensation compared with prior studies. Hence, this paper contributes to understanding the effect of CEO debt-like compensation on CEOs' decision making.

The remainder of the paper is organized as follows. Section 2 summarizes related literature and develops my hypotheses. Section 3 describes sample selection and provides descriptive statistics. Section 4 reports empirical results, and section 5 concludes.

2. Related literature and hypothesis development

2.1 CEO Compensation and M&A

My study is related to prior research on the relation between CEO compensation and M&A. Given that M&A is a major and widely observable investment, and it is subject to agency problems among the manager and stakeholders, many prior studies try to examine the effect of CEO incentives on the M&A process. Among the studies examining the effect of the acquirer's CEO compensation on M&A characteristics, most studies are dedicated to compensation designs aligning the interest of CEOs with that of equityholders (Datta *et al.*, 2001; Lekse & Zhao, 2009; Lewellen *et al.*, 1985; Tehranian *et al.*, 1987). Tehranian, Travlos and Waegelein (1987) show that firms with long-term incentive plans (LTIPs), experience higher stock returns during M&A announcements and higher earnings per share (EPS) post mergers. They argue that long-term incentive plans better align the horizon of the CEO with that of equityholders compared with short-term incentive plans, such as bonus plans. Lewellen *et al.* (1985) show a positive association between top management stock ownership and M&A stock announcement

returns. They attribute the result to stock compensation aligning the interests of the CEO to that of shareholders. Datta *et al.* (2001) and Lekse *et al.* (2008) examine the equity components in CEO compensation package and their effects on M&A characteristics. Datta *et al.* (2001) studies the effect of stock option and restricted stock grants on choices of M&A targets along with the market reaction to M&A announcements. They find that CEOs with higher equity-based compensation granted in the year immediately before M&A announcements are more likely to choose targets with higher growth. Although the average stock market reaction to M&A announcements is negligible for acquiring firms, a positive stock market reaction is observed when acquirer firms' CEOs have high levels of equity-based compensation grants. The evidence suggests that equity-based compensation aligns the interest of the CEO with that of equityholders. Lekse *et al.* (2008) also find that CEOs with higher equity-based compensation and higher pay-for-performance sensitivity before M&As are more likely to choose targets that are riskier and have greater growth opportunities.

One important fact omitted in prior studies is that there is not only an agency conflict between the CEO and equityholders but also one between equityholders and debtholders (Jensen and Meckling, 1976). The latter problem is particularly acute in the M&A setting because of the potential for wealth transfer between these two groups of stakeholders and because of the large scale of M&A (Kim and McConnell, 1977; Lewellen, 1971). To mitigate the agency problem between debtholders and equityholders, one option is to provide incentives to CEOs that align their interests partially with debtholders (Edmans and Liu, 2011; Jensen and Meckling, 1976; John and John, 1993). Ignoring these incentives makes our understanding about CEO compensation's effect on M&A

incomplete.

2.2 CEO Debt-like Compensation

Debt-like compensation includes defined benefit pensions and deferred compensation, which represent future payments of fixed amounts contingent on a firm's solvency. The debt-like compensation for top executives are usually unfunded and unsecured. Thus it resembles external debt, and that is why it is referred to as "debt-like compensation," or "inside debt." Debt-like compensation aligns the interest of the CEO with that of debtholders. Due to the concave payoff structure of debt-like compensation, CEOs with this type of compensation do not benefit fully from upside gains but do bear downside risks. Compared with equity compensation, the value of debt-like compensation depends not only on the firm's default probability but also on its liquidation value. Jensen and Meckling (1976) first suggested that, in a firm with both equity and debt financing, managers could be awarded some firm debt as compensation so that they would not take too much risk and, potentially, hurt debtholders. Edmans and Liu (2011) study the optimal compensation contract specifically in a levered firm and formally prove the prediction of Jensen and Meckling (1976) of using debt as compensation in the optimal contract.

Empirical studies on debt-like compensation have been scarce until recently, due to the lack of publicly available data on managers' debt-like compensation. The U.S. Securities and Exchange Commission (SEC) requires public U.S. firms to disclose top executive debt-like compensation for fiscal years ending on and after Dec. 15, 2006. Sundram and Yermack (2007) document that debt-like compensation is a significant part of CEO compensation using manually collected data on 237 large capitalization firms.

Wei and Yermack (2011) show that debt-like compensation is negatively associated with announcement stock returns and positively associated with announcement bond returns at the initial disclosure of debt-like compensation. Anantharaman *et al.* (2012), Chen *et al.* (2010), and Wang *et al.* (2010) show that higher CEO debt-like compensation is associated with a lower cost of debt in terms of interest rate and strictness of debt covenants. Cassell *et al.* (2011) find that the CEO's debt-like compensation is negatively associated with firms' risk taking in operating and financing decisions. Tung and Wang (2011) find that banks with higher CEO debt-like compensation before the crisis take less risk and perform better during the recent financial crisis.

To illustrate the fact that debt-like compensation aligns the interest of CEOs with that of debtholders, the ideal setting should have some conflict of interest between debtholders and equityholders. M&A transactions have the potential for such conflict (De Franco, Vasvari, Vyas, & Wittenberg-moerman, 2010; Jensen & Meckling, 1976; Kim & McConnell, 1977; Lewellen, 1971) and thus provide an ideal setting to study debt-like compensation.

2.3 Hypothesis Development

Prior research has shown that firms with CEOs who have higher debt-like compensation have lower operational risk (Cassell *et al.*, 2012; Tung and Wang, 2011). This is consistent with the theory that higher CEO debt-like compensation aligns the interests of CEOs and debtholders and thus discourages CEO risk taking. In the context of M&A, target choices play a big role in the tradeoff between debtholder and equityholder benefits, and thus the risk evaluation by CEOs. Riskier targets are more likely to increase the riskiness of the merged firm. Due to the concave payoff structure

for debtholders and the convex payoff structure for equityholders, riskier targets are less likely to benefit debtholders and are more likely to benefit equityholders. Often, the acquirer's CEO remains the CEO of the merged firm. As acquirers' CEOs hold higher relative debt-like compensation, they are more aligned with debtholders and thus should prefer less risky targets. Therefore I hypothesize:

H1: Acquirer CEOs with higher debt-like compensation choose less risky targets.

M&A usually triggers the need for external financing. In my sample, for example, there is only a small proportion of the deals (5%) that are financed internally. External financing can come via debt or equity. Prior research has examined various determinants of external M&A financing, and these determinants are mostly firm characteristics and market conditions (Martynova and Renneboog, 2009). As for CEO debt-like compensation, there are at least two mechanisms through which it can affect financing choices. On one hand, prior studies have shown that firms with higher CEO debt-like compensation can borrow at a lower cost in terms of debt covenant strictness, interest rate, or both (Anantharaman et al., 2013; Chen et al., 2011; Wang et al., 2010). This suggests that CEOs with more debt-like compensation are more likely to choose debt financing because of the lower borrowing costs, all else equal. On the other hand, given the theory that a CEO with more debt-like compensation is more concerned with solvency of her firm (Edmans and Liu, 2011), the CEO is less likely to choose debt financing to pay for M&A, as extra debt reduces the firm's solvency. Ex ante, I cannot predict which of these two mechanisms dominates. Therefore I hypothesize:

H2: Acquirers' CEO debt-like compensation affects M&A financing choices.

Lewellen (1971) shows that, when two firms with non-perfectly correlated cash flows merge, the value of the merging firm' debt increases, i.e., the "co-insurance" effect. This effect arises because the non-perfectly correlated cash flows of both firms provide insurance for the other firm's debt. This increase in debt value can exist even when there is no synergy created in the M&A. In such a case, the co-insurance effect represents a transfer of wealth from equityholders to debtholders. There is also empirical evidence from debt analysts' discussions about M&As' effect on bondholders' wealth, suggesting that merger deals, on average, benefit bondholders (De Franco, Vasvari, Vyas, and Wittenberg-Moerman, 2010). On the other hand, Jensen and Meckling (1976) suggest that, in a levered firm, equityholders have the incentive to take risky investment projects, which increase the value of equity at the expense of debtholders. From this perspective, as with other investments, M&A provides an opportunity to expropriate wealth from debtholders to equityholders. Theory suggests that the weight of CEO debt-like versus equity compensation indicates the relative incentive alignment between the CEO and the two groups of stakeholders (Edmans and Liu, 2011). As a result, when CEOs have very high relative debt-like compensation, they are more aligned with debtholders, and therefore are more likely to undertake M&As favoring debtholders. Alternatively, when they have very low relative debt-like compensation, they are less aligned with debtholders, and therefore are more likely to do deals favoring equityholders. Here high and low are relative to the medium level, where CEOs' incentives are less likely to be biased towards either stakeholder group.

Prior research suggests that investors (bondholders and equityholders) seem to understand the incentive implication of executive debt-like compensation (Wei and

Yermack, 2011). Using the announcement dates available for M&A, I can employ announcement returns in the bond market and the stock market to capture the perceived returns from M&A by each group of stakeholders. Furthermore, the association between bond returns and stock returns is lower when the deal favors one group of stakeholders more than the other, as suggested in Maxwell and Rao (2003). This leads to my third hypothesis:

H3: The association between announcement returns in the bond market and the stock market is lower for acquirers with very high or very low CEO relative debt-like compensation.

Finally, since CEOs with higher debt-like compensation have fewer risk-taking incentives and presumably pick less risky targets, it should be that post-merger riskiness is lower when acquirers' CEOs hold higher debt-like compensation. In addition, debt-like compensations are less liquid compared to equity compensation. Deferred compensation and defined benefit pensions are not tradable claims on the firm value. Therefore CEOs have more difficulty diversifying the risk associated with their debt-like compensation compared with equity compensation. When CEOs with higher debt-like compensation are making M&A decisions, they are more likely to conduct deals that reduce firm risk in order to reduce their compensation risk. If this is what happens, post-merger firm risk should be negatively related to CEO debt-like compensation. This is similar to the argument that CEOs concerned with "largely undiversifiable employment risk" engage in conglomerate mergers (Amihud and Lev, 1981). Based on these arguments, my last hypothesis is:

H4: Post-merger risk is lower for acquirers with higher CEO debt-like compensation.

3. Sample selection and descriptive statistics

3.1 Sample selection

I retrieve data on M&As from Thomson and Reuters's SDC Platinum and CEO compensation data from Standard and Poor's (S&P's) ExecuComp. The M&A dataset of SDC Platinum covers worldwide M&A since 1985. Information provided by SDC Platinum includes deal characteristics, target and acquirer financials, and financial advisors information. ExecuComp contains detailed top executives' compensation data of S&P 1500 companies collected from the companies' SEC filings. I compile firm's financials from COMPUSTAT's fundamental annual file and stock return data from the Center for Research in Security Prices (CRSP) database. Bond returns are calculated from the trading information of secondary U.S. public bond market accumulated by Trade Reporting and Compliance Engine (TRACE). Information regarding bond issues and bond ratings is compiled from the Mergent Fixed Investment Securities Database (FISD).

I start with all domestic M&As covered in SDC and announced between 2007 and 2011 by public non-financial U.S. acquirers. I focus only on acquisitions for U.S. targets to mitigate the potential effect of targets' domicile countries on my empirical tests. Cross-border acquisitions could be motivated by different reasons and involve different considerations compared with domestic transactions, which, in turn, are likely to affect how CEO incentives play a role in the M&A process. I require the M&As to be classified by SDC as a merger or an acquisition of majority interest similar to prior research (Datta

et al., 2001; Lekse and Zhao, 2009). The reason for starting the sample period in 2007 is that debt-like compensation is available from the fiscal year ending on or after Dec. 15, 2006 (Securities and Exchange Commision, 2006). Based on the above criteria, I identify 3,603 M&As in SDC. I establish an intersection between the SDC and the COMPUSTAT data through CUSIPs, TICKER symbols, and company-name matching and identify 1,036 deals with effective links to the COMPUSTAT database. When firms made more than one M&A announcement in a year, I keep the earliest one to maintain the independence of the observations. I further eliminate incomplete deals, which leaves my sample with 722 deals.[3] Finally, I require non-missing values for all explanatory variables for testing my hypotheses. My final sample contains 479 deals. The subsample used to test my first hypothesis is significantly smaller than the full sample since it requires targets to be public firms. Summary of sample selection is reported in Appendix C.

3.2 Descriptive statistics

Table 1 reports the descriptive statistics for my full sample. Panel A contains the over-time distribution of M&A deals. The number of M&A deals decreases from 122 in 2007 to 76 in 2009, which coincides with the recent financial crisis. This number increases in 2010 to reach 101. This trend in my sample is consistent with the trend in the total number of M&As announced in the U.S. during this period (Figure 1).[4] The number of M&As announced in the U.S. peaked in 2007, decreased significantly in 2009, and increased in 2010. The smaller number of deals in 2011 is due to incomplete deals. The average deal value, $1,358.64 million, is larger than that reported in prior studies, e.g.,

[3] Incomplete deals could be due to the riskiness of the targets. Since many data items are not available for incomplete deals and contract terms are subject to changes, I eliminate these observations from my sample.

[4] Source: Thomson Financial, Institute of Mergers, Acquisitions and Alliances (IMAA) analysis 2011.

Datta et al. (2001), whose sample covered deals announced in 1993-1998. This is consistent with the general increasing trend of M&A deal sizes since the 1990s (Figure 2).[5]

Panel B presents mean deal values within different subsamples. The top panel B.1 partitions the sample by merger mode and financing method, and the bottom panel B.2 partitions the sample by merger mode and payment method. Panel B.1 shows that the majority of the sample M&As—249 out of 470 deals (with available financing information) or 61.7% in terms of deal value—are financed through debt and equity at the same time. The next most frequently used financing method is non-debt financing. However, the average deal value is smaller for non-debt-financed deals compared with debt-financed deals. In terms of deal value, the percentages of my sample financed by all debt and non-debt are 18.9% and 19.4%, respectively, which are almost the same. When the two merger modes are compared, the average deal value is $1,414.81 million for non-tender offers and $1,006.10 million for tender offers.

Panel B.2 shows the average deal values by merger mode and payment method. The most frequently used payment method is cash: 315 out of 479 deals (65.8%) are paid with cash. The next most frequently used payment method is a hybrid of cash and stock, which represents 129 out of the total 479 deals (26.9%). To pay the deal fully with stock is rare. Cash payment is used even more often for tender offers and represents 82.8% (86.8%) of the tender offers in terms of frequency (deal value). Tender offers are usually paid with cash, since cash tender offers trigger only the Williams Act, while M&As paid with stock, whether constructed as tender offer or not, need to comply with the Securities Act of

[5] My sample consists of S&P 1500 firms, which are larger than average U.S. public firms and make larger M&As on average.

1933, which results in a longer waiting period for SEC approval (Martin, 1996). In terms of deal value, the percentages of the sample paid with cash, hybrid payment, and shares are 40.4%, 52.7%, and 7.0% respectively. Hybrid payment is used for the biggest portion of deal values. Average deal sizes are $856.46 million, $2,728.17 million, and $1,332.87 million for deals paid with cash, hybrid payment, and stock, respectively. Deals paid with cash are, on average, smaller than those paid with hybrid or stock payment.

Panel C reports statistics of the acquirers' CEO compensation. All variable definitions are included in Appendix A. The mean pension and deferred compensation levels for acquirer CEOs are $4.137 million and $3.576 million, respectively. The mean stock option, restricted stock, and direct stock holdings are $13.884 million, $4.441 million and $61.681 million, respectively. This indicates that CEOs hold more equity compensation than debt-like compensation on average. The mean (median) ceo_D/E is 0.28 (0.10), and more than a quarter of the sample firms' CEOs do not have any debt-like compensation. The mean (median) firm_D/E is 0.37 (0.20). This suggests that, on average, CEOs hold relatively lower "debt" to equity, compared with their firms' capital structures. According to Edmans and Liu (2011), the relative ratio of the CEO's D/E to the firm's D/E is the theoretically correct one in explaining the alignment of interests of CEOs with debtholders and equityholders. The median rel_D/E is 0.32. This means more than half of the sample firm's CEOs have D/E ratios lower than their firms. The mean rel_D/E is 2.50, which suggests this variable is highly right skewed. To mitigate this skewness, I use the rank of rel_D/E as my explanatory variable, instead of the raw rel_D/E, in my empirical tests. I assign the lowest rank (one) to all observations with rel_D/E being zero due to the large existence of such observations. The rest of my sample is ranked into nine groups

with equal frequencies based on rel_D/E. My results are qualitatively the same if I exclude the lowest rank group. The rank of rel_D/E (rel_D/E_r) has a mean of 4.66 and a median of 4. My sample statistics regarding CEO compensation are consistent with those reported in prior studies (e.g., Anantharaman *et al.*, 2010; Cassell *et al.*, 2012).

Panel D reports firm characteristics for both acquirers and targets, and deal characteristics. On average acquirers are much larger than targets, as indicated by an average acquirer size of $18.972 billion and an average target size of $1.537 billion. Acquirers hold 15% of their total assets in cash and short-term investments accounts on average. The mean financial leverage of the acquirer and the target are 0.22 and 0.19. This supports the idea that acquirers tend to choose targets that are financially less risky than themselves. The mean (median) cash flow correlation between acquirers and targets is 0.31 (0.37). The mean (median) operating income correlation between acquirers and targets is 0.42 (0.54). Abnormal stock return on announcement day for the acquirer is negligible, which is consistent with previous empirical evidence that acquirers usually experience very small or zero announcement returns for M&As (Eckbo, 2009). Furthermore, the stock premium paid to targets, using stock price four weeks before the announcement as benchmark, is 49.08%. Overall, M&As in my sample show similar deal characteristics to those documented in prior research (Eckbo, 2009).

4. Results

4.1 Target Choices

My first hypothesis is about the effect of the acquirer CEOs' relative debt-like compensation levels on choices of targets. Since higher debt-like compensation aligns the interest of CEOs with debtholders, acquirer CEOs with higher relative debt-like

compensation are more likely to choose less risky targets. I test four different target characteristics separately using the following OLS model (1):

$$Target\ characteristics_{i,t} = \alpha_0 + \beta_1 rel\_D/E\_r_{i,t-1} + control\ variables_{i,t-1} + industry\ FE + year\ FE + \varepsilon_{i,t} \quad (1)$$

My main variable of interest measuring CEOs' relative incentive alignment provided by debt-like compensation and equity compensation is rel_D/E. It is measured as ceo_D/E divided by the firm's D/E ratio. Edmans and Liu (2011) show that this measure is the theoretically correct way to measure the relative incentive alignment provided by the two types of compensation. The intuition is that the optimal tradeoff between debtholders' and equityholders' risk preferences depends on the capital structure of the firm. Therefore relative incentive alignment in the compensation design should be benchmarked against the firm's debt-to-equity ratio. Several prior studies use this variable to capture the relative incentives provided by debt-like compensation and equity compensation to CEOs (Anantharaman *et al.*, 2010; Cassell *et al.*, 2012; Tung and Wang, 2011; Wang *et al.*, 2010). Since rel_D/E is highly skewed, I use ranks of rel_D/E (rel_D/E_r), instead of raw rel_D/E, as the explanatory variable in my empirical tests.

I estimate the model using four target risk characteristics: financial leverage, working capital level, operating cash flow correlation with the acquirer, and operating income correlation with the acquirer. First, targets with more debt are more risky to the acquirers because they are more likely to increase the financial leverage of the merging firm. Second, working capital level relative to the total asset is a measure of a firm's liquid assets, which can be used to pay debt obligations and increase solvency. As a result, targets with more working capital are less risky to the acquirer. And third, Lewellen

(1971) argues that a merger between two firms with non-perfectly correlated cash flows increases the values of both firms' debts. Ex ante, a target with lower operating cash flow correlation with the acquirer is less risky to the acquirer. I also test the operating income correlation between the acquirer and the target since earnings are associated with future cash flows within the accrual based accounting system as in the U.S (Dechow, Kothari, & Watts, 1998).[6] Since all of the four risk characteristics measures are continuous variables, OLS regressions are used to estimate model (1) to test my first hypothesis[7].

As for control variables, prior research shows that certain acquirer characteristics and deal characteristics are associated with target characteristics (Datta *et al.*, 2001; Hansen, 1987; Lekse and Zhao, 2009). Some of those variables, such as the acquirer's financial leverage and market-to-book (MTB), are likely to be correlated with my main variable of interest, i.e., rel_D/E. To assure that my results are not affected by those correlated variables, I add the following controls into my regression model.

First, acquirers with high financial leverage ratios are riskier themselves and are thus less likely to pick risky targets in M&As. Therefore I control for the acquirer's financial leverage ratio before the M&A. Similarly, I control for the acquirer's cash level, cash from operations (cfo), and MTB. These variables can be proxies for the riskiness of the acquirer and, in turn, can affect the risk appetite of the acquirer. Furthermore, prior literature has shown that the size of the deal relative to the acquirer and the acquirer's

[6] In addition, I examine the relation between rel_D/E_r and stock return correlation between the acquirer and the target before deal announcements since stock market reacts to financial information. The result is statistically insignificant. This is not surprising though, as stock returns reflect the return to equityholders, and thus the correlation between stock return may not be a good indicator for coinsurance potential.

[7] I also test hypothesis one using a logistic regression of dummy variable indicating the target leverage being lower than that of the acquirer. Non-tabulated results show that CEOs with higher relative debt-like compensation tend to pick the target with lower leverage than the acquirer.

size are important determinants of target choice and payment choice in M&A (Hansen, 1987). Therefore I add the relative size of deal value to the acquirer's market value (rvalue) and the acquirer's size as control variables. I also control for year fixed effects and industry fixed effects to alleviate the concern that there are omitted variables that affect target choice and payment choice, and those effects do not change within the same period or within the same industry.

Table 2 presents the cross-sectional OLS regression results of testing H1. Results show that the target book leverage level is negatively (-0.009) associated with relative debt-like compensation for the acquirer CEO. This negative coefficient means that acquirers with higher CEO relative debt-like compensation are more likely to acquire targets with less debt, which is consistent with debtholders' interest. Working capital level measures the asset liquidity of the firm; a higher level of working capital helps to maintain solvency. In line with this feature, I find that acquirer CEOs with a higher relative debt-like compensation choose target firms with higher working capital holdings. The coefficient on rel_D/E_r is 0.012. Finally, lower correlation between cash flows (operating incomes) of the acquirer and the target predicts higher value increase of both firms' debts. The intuition is that, when the two firms' cash flows are less correlated, one firm's cash flow can serve as an insurance for the other firm's debt (Lewellen, 1971). Thus debtholders of the acquirer would prefer targets with less correlated cash flows. Operating income is associated with future cash flow under accrual accounting system, thus the correlation between operating incomes of the acquirer and the target should also reflect the coinsurance potential. Empirically, I show that there exists a negative

association, -2.302 (-2.878), between acquirers' CEO relative debt-like compensation, and cash flow (operating income) correlation between acquirers and targets.

4.2 Financing and Payment Method

My next prediction is that choices of financing for M&A are affected by the CEO relative debt-like compensation. To test the relation between debt-like compensation and financing method, I run ordered logit regressions with Financing as dependent variables using the following model (2a), since the dependent variables are ordered discrete variables:

$$Financing_{i,t} = \alpha_0 + \beta_1 rel\_D/E\_r_{i,t-1} + control\ variables_{i,t-1} + industry\ FE + year\ FE + \varepsilon_{i,t} \quad (2a)$$

where Financing equals 3 for debt financing, 2 for debt and equity financing, and 1 for equity financing and internal cash financing.

Financing method and payment choice are highly correlated in the M&A setting. For acquirers to pay the deal with stock, they have to secure external equity financing. On the other hand, debt financing only leads to cash payment. When debt financing is used, it is more likely for the acquirers to pay cash for the deal, all else equal. I also test the following OLS model (2b) to support H1:

$$Payment_{i,t} = \alpha_0 + \beta_1 rel\_D/E\_r_{i.t-1} + control\ variables_{i,t-1} + industry\ FE + year\ FE + \varepsilon_{i,t} \quad (2b)$$

where Payment equals 3 for an all cash payment, equals 2 for a hybrid payment, and 1 for an all stock payment.

In the above models (2a) and (2b), I control for leverage, cash, cash flow from operations, mediumowner, rvalue, MTB, leverage, indicators for tender offer, for public

targets and for friendly acquisitions, and size following prior literature (Amihud, Lev, and Travlos, 1990; Martin, 1996; Martynova and Renneboog, 2009). To start, acquirers with higher financial leverage are less inclined to use debt financing, since firms with higher leverage have lower capacity for additional debt. They are also less likely to pay out cash because they need cash to maintain their solvency. Firms with high cash reserves or high cash flow from operations are more likely to use debt financing and are more likely to pay cash because they have higher cash inflow and higher debt capacity. CEOs with medium levels of ownership in their firms are less likely to use equity financing or equity payment, since their control is likely to be diluted by additional equity offerings (Amihud *et al.*, 1990). In other words, they are more likely to use debt financing and pay cash. Firms with higher MTB are more likely to have overvalued equity and, as a result, are more likely to issue additional stock. Larger deal size relative to the acquirer's size is less likely to be financed through debt or to be paid with cash since it more likely to increase the debt burden significantly or drain the acquirer's cash balance. Tender offers are more likely to be paid with cash due to favorable regulatory treatment (Martin, 1996). Public targets are less likely to be paid with cash, compared to private targets, because owners of private targets often use M&A as an exit strategy and thus prefer cash payment. Hostility of the acquisitions could be related to the financing and payment methods (Martin, 1996; Martynova and Renneboog, 2009).

Table 3 reports the ordered logit regression results of model (2a). Column 2-4 presents the results estimated with the full sample. The coefficient on rel_D/E_r is 0.073, and it is statistically significant at 5% level. This means that CEOs with higher debt-like compensation are more likely to use debt financing, relative to combined debt and equity

financing, or non-debt financing. Here, non-debt financing includes all equity financing and all internal cash financing. This is consistent with prior evidence that CEOs with higher debt-like compensation can borrow at lower costs (Anantharaman et al., 2013; Chen et al., 2011; Wang et al., 2010) and thus are more likely to use debt financing. Alternatively, higher debt-like compensation aligns the CEOs more with debtholders. As a result, CEOs with higher debt-like compensation are more concerned with the solvency of their firms and are less willing to borrow additional debt. Cassell *et al.* (2012) shows that higher CEO debt-like compensation is associated with lower financial leverage for the firm. My empirical results suggest that in the M&A setting, lower cost of debt outweigh the increased concern for solvency, when CEOs hold higher relative debt-like compensation. For control variables, higher cash flow from operations is associated with higher probability of using debt financing. This is because firms with higher cash flow from operations are more likely to pay their debts, all else equal. I also find the MTB is negatively associated with the probability of using debt financing, which can be due to over-valuation of the acquirer's stock.

Table 3 Column 5-7 presents the ordered logit regression results of model (2a) estimated for deals without internal cash financing. Although both equity financing and internal cash financing are financing method without external debt, they are fundamentally different. Internal cash can be replaced with cash from external sources and thus implicitly bears a cost at the lower of cost of debt or cost of equity. Hence, from a cost of capital consideration point of view, it is not clear that debt financing is preferred to internal cash when borrowing is cheap. Furthermore, due to the concern for solvency, similar to debt financing, internal cash is less preferred than equity financing for CEOs

with higher debt-like compensation. This is because paying out internal cash reduces the ability of the firm to pay immediate debt, which increases the risk of the firm. Due to the above concerns, I exclude the internal cash financing from the sample for a cleaner test. The results are very similar to those in column 2-4. Higher CEO debt-like compensation is associated with higher probability of using debt financing, compared with debt and equity financing at the same time and with all-equity financing.

Table 4 reports the ordered logit regression results for testing the effect of rel_D/E_r on payment method. I find results consistent with financing choices. Acquirers with higher CEO debt-like compensation are more likely to choose cash payment compared with hybrid and shares payment. Combined with the result in Table 3, this result supports the hypothesis that CEOs with higher debt-like compensation are more likely to use debt financing and therefore more likely to pay cash instead of stock. As for control variables, relative deal size has a significant and negative coefficient of -5.369. When the deal value is large relative to the acquirer's size, it is more likely to drain the acquirer's cash balance and debt capacity if the acquirer pays cash for the deal because cash payment are usually financed internally or through debt. As a result, acquirers are less likely to use only cash when relative deal size is large. Furthermore, the risk associated with uncertainty regarding target's value is higher when the relative deal size is larger. One way to avoid overpaying for the target is to pay the seller with stock of the acquirer. The value of the stock would adjust accordingly, if the target's value is less than what is paid by the acquirer. In this sense, acquirers also are more likely to choose stock as payment when the relative size of the deal is large. Firms with higher MTB are less likely to pay cash. As MTB can be viewed as a proxy for the firm's growth opportunities, this result could

be caused by the firms reserving cash for growth opportunities. High MTB could indicate over-valuation of stock, which lead to more equity payment, too. Also, results show that mediumowner is significantly positively related to the odds of paying cash. One explanation could be that CEOs with medium levels of company ownership are most affected by ownership dilution (Martin, 1996). Thus they are less willing to use stock as payment and more likely to accept cash as payment. Tender offers are more likely to be paid with cash consistent with cash tender offers triggering favorable regulatory treatment and shortening the waiting time of approval from the SEC (Martin, 1996). Finally, the results suggest that acquirers are less likely to pay cash for public targets compared to private targets.

4.3 Market reactions

Previous results suggest that, when CEOs hold more debt-like compensation, their interests are more aligned with debtholders than equityholders. I find that acquirer CEOs with higher relative debt-like compensation tend to choose targets with lower leverage, higher working capital levels, lower operating cash flow correlation and lower operating income correlation with the acquirer. They are also more likely to finance the deal using debt and pay with cash, consistent with the idea that these CEOs can borrow at lower costs (Anantharaman et al., 2013; Chen et al., 2011; Wang et al., 2010). My next hypothesis is that the association between bond returns and stock returns during M&A announcements is lower for acquirers with very high or very low level of CEO relative debt-like compensation compared with medium level. The intuition is that M&As conducted by CEOs with very high relative debt-like compensation are more likely to favor debtholders, and those made by CEOs with very low relative debt-like

compensation are more likely to favor equityholders, which both lead to less co-movements in the bond and stock markets. I use market announcement returns in the bond and equity markets as proxies for stakeholders' returns (Kothari, 2001).

To test my hypothesis 3, I divide my sample into four quartiles based on the level of rel_D/E. Correlation coefficients between abnormal buy-and-hold bond return (BHR_BD) and abnormal buy-and-hold stock return (BHR_STK) are estimated for the high, low and medium group, which contains the top, bottom and middle two quartiles respectively. I then compare the correlation coefficients for the three groups. Results are reported in table 5. Variable BHR_STK measures the abnormal buy-and-hold return in the stock market, and BHR_BD measures the abnormal buy-and-hold return in the bond market. The event window is (-1,1), with day 0 being the announcement date, day -1 being the last trading day before the event announcement, and day 1 being the first trading day after the annoucement.[8] BHR_STK is measured as the difference between buy-and-hold raw stock return and the buy-and-hold value-weighted market portfolio return in the event window. I use the extreme quartile rankings to capture incentive bias towards one group of stakeholders as the optimal level of rel_D/E is hard to predict empirically. I use the lower correlation between abnormal bond returns and abnormal stock returns in the announcement window as the evidence of the deals benefiting one group of stakeholders more, and benefiting the other group less, similar to Maxwell and Rao (2003). My prediction is that correlation coefficients for high and low groups should be lower than for the medium group.

BHR_BD is measured following Bessembinder *et al.* (2008) methodology using the

[8] I also tested the hypothesis using event window (-3,3) and the non-tabulated results are similar to the ones reported in the table.

TRACE bond transaction data. TRACE only reports the transaction information including trade size and trade price, but not bond returns. Bond returns need to be calculated from self-constructed daily bond price. Bessembinder *et al.* (2008) suggest using last trade price or some sort of weighted-price as the daily bond price. It is well known that the secondary corporate bond market is relatively illiquid compared with the equity market. Many bonds are not traded daily. Due to this illiquidity, the last trade price may not represent the bond value traded in the market on a particular day. Instead, I use the trade-weighted-price as the daily bond price to calculate bond return, where trade-weighted-price is the volume weighted average price of all trades reported to TRACE for a certain bond on any particular day.[9]

Next, to calculate abnormal bond returns, I subtract credit rating and maturity-matched market portfolio return (Bessembinder, Kahle, Maxwell, & Xu, 2008; Gao, Liao, & Wang, 2012). I convert the bond ratings from the rating agency (Moody's, S&P, or Fitch) into five numerical categories as defined in Appendix B. I use mainly Moody's rating since it is the one that is mostly available. When Moody's rating is not available I use S&P's rating. Fitch's rating is used when both Moody's and S&P's rating are not available. Maturity is re-defined into two numerical categories based on whether the years-to-maturity is greater or less than five years (Gao *et al.*, 2012). The market portfolio includes all bonds with trading information in TRACE on the same event day. I then rank the bonds in the portfolio using bond credit rating and maturity. Each event bond is matched with the portfolio with the same credit rating and maturity. These daily benchmark portfolios are constructed for all event days. Finally, since most firms have

[9] I also use last trade price to calculate bond return and find results (non-tabulated) that resemble reported ones.

more than one bond outstanding, I compile all outstanding bonds' trading information to get the abnormal bond return for a firm. For firms with more than one bond outstanding, I use the value-weighted-average abnormal bond returns of all bonds as the abnormal bond return of the firms.[10]

Table 5 reports the correlation coefficients comparison results. The results show that the correlation between abnormal bond and stock returns is significantly lower for the high group compared to the medium group using both the Spearman rank correlation and the Pearson correlation. This is consistent with the hypothesis that when the CEO's incentive is more closely aligned with one group of stakeholders, in this case the bondholders, M&As are more likely to benefit this group of stakeholders. As a result, instead of gaining or losing together, returns for bondholders and shareholders start to diverge, which implies that the association between bond returns and stock returns decreases. However, I do not find significantly lower correlation between abnormal bond and stock return in the low group compared to the medium group.

4.4 Post-merger stock return volatility

The previous subsection studies how CEOs' debt-like compensation affects the market reactions to M&A announcements in the bond market and in the stock market. This sub-section examines Hypothesis 4 regarding the effect of CEOs' debt-like compensation on M&A outcomes in the post-merger period. This is a longer-term effect compared to the announcement market returns. I predict that acquirers with higher CEO relative debt-like compensation are less risky post merger. I employ the stock return

[10] I also use equal-weighted-average abnormal bond return of all bonds outstanding for firms with more than one bond and show results (non-tabulated) that resemble reported ones.

volatility in the post-merger period to measure firm risk.

I use the following OLS regression model to test Hypothesis 4:

$$std\_ret\_post_{i,t} = \alpha_0 + \beta_0 * std\_ret\_pre_i + \beta_1 * rel\_D/E\_r_i + industry\ FE + year\ FE + \varepsilon_{i,t} \quad (4)$$

Post-merger period t is defined as the year t after the closing of the deal. For example, t equals 1 means the standard deviation of monthly stock return is measured in the first year after the closing of the deal.[11] I control for the standard deviation of monthly stock return in the pre-merger period to control for differences of idiosyncratic risks of the firms. The pre-merger period is the year before the deal announcement. I require at least 10 monthly stock returns for the standard deviation calculation. I also control for industry fixed effects and year fixed effects.

Table 6 reports the results of OLS regression using model (4) with standard deviations of stock returns measured in the first year and second year, post-merger, as dependent variables. Columns 2-4 represent the results with first year post-merger stock return volatility. The coefficient on std_ret_pre is 0.298, which is positive and statistically significant, as expected. Stock return volatilities of firms are likely to be correlated over time. The coefficient on rel_D/E_r is -0.003 and statistically significant. This is consistent with my hypothesis that M&As made by CEOs with higher debt-like compensation are less risky on average. This result complements the target choice and the market reactions at announcement results and supports the argument that CEOs with higher debt-like compensation (1) are more aligned with debtholders and (2) conduct less risky M&As that are more likely to benefit debtholders. Results in column 5-7 using

[11] Non-tabulated results using daily return volatilities are qualitatively the same as reported results.

stock return volatility measured within the second year, post-merger, are essentially the same as those in column 2-4.

4.5 Endogeneity

Since CEO compensation is not exogenously given but determined by the contracting environment, there is a concern for endogeneity, which might render my results spurious. The problem is that there can be omitted variables that affect both CEO compensation and the firm's M&A decisions. Even though my study is hypothetically facing this endogeneity issue, endogeneity is less of a concern here, compared with prior studies (Anantharaman et al., 2013; Cassell et al., 2012; Chen et al., 2011; Wang et al., 2010). First, unlike general investment choices and financial policies, the decision to engage in an M&A resembles an exogenous shock. It occurs at a much lower frequency and is less anticipated and controlled by the CEO, compared to other decisions that the CEO makes. It can only happen when there is a well-matched target and when agreements can be reached between the acquirer and the seller. Second, CEO compensation is measured before the M&A announcements in all of the tests, and thus it is pre-determined compared with the M&A characteristics I examined. Third, I do a comprehensive study of various aspects of the M&A process, e.g. target choices, financing choices and market reactions. It is less likely for some omitted variable to affect CEO compensation and the M&A process in such a systematic way that all of the results are spurious.

Still, some omitted firm characteristics and CEO characteristics may underlie CEO debt-like compensation and the firm's M&A decisions. Therefore I adopt a propensity score matching (Section 4.5.1) and an instrument variable (IV) approach (Section 4.5.2) to address the endogeneity in the following sections.

4.5.1 Propensity Score Matching Approach

The propensity score matching approach has been popular in recent Accounting literature to mitigate concerns with endogenous regressors (Armstrong, Jagolinzer, & Larcker, 2010; Murphy & Sandino, 2010; Shalev, Zhang, & Zhang, 2010). This approach has been argued to be superior compared with partial matching and control variables approach since it tries to match the "treatment" group with "control" group among all observable dimensions, therefore can better identify the treatment effects (Armstrong *et al.*, 2010). I follow the propensity score matching procedures used in recent Accounting literature examining CEO compensation (Armstrong *et al*., 2010; Murphy & Sandino, 2010; Shalev *et al.*, 2010) to mitigate the concern of endogeneity in my setting. Because I cannot use a matching sample that does not engage in M&As I have to perform a within sample matching similar to Shalev *et al.* (2010).

More specifically, I divide my sample based on level of rel_D/E and define a new dichotomous variable (High_rel_D/E), which equals 1 if rel_D/E is above median level and 0 otherwise. The group with High_rel_D/E=1 is the "treatment" group, and other group is the "control" group.[12] To develop the first stage model for estimating the propensity score, I use the determinants of CEO debt-like compensation identified in prior literature (Cen, 2010; Lee & Tang, 2011; Sundaram & Yermack, 2007) and also controls in my main models. I then calculate the propensity score based on the estimated first stage model as in equation (5) and use the score to perform the matching.

[12] This approach is standard in treatment effects studies. It is also used in Shalev et al. (2010), which constructs a dichotomous variable based on a continuous endogenous variable. I can also use the original rel_D/E_r to indicate different levels of treatment similar to Armstrong et al. (2010), which uses quintile rankings. However, since my sample is relatively smaller, using a more refined variable would make the matching difficult to perform.

$$Prob(High\_rel\_D/E_i) = \alpha_0 + \alpha_1 ROA_i + \alpha_2 tenure_i + \alpha_3 dual_i$$
$$+\alpha_4 liquidity_i + \alpha_5 age_i + \alpha_6 statewage_i + \alpha_7 statemortage_i$$
$$+\alpha_8 statelong_i + controls_i + \varepsilon_i \quad (5)$$

For each randomly selected "treatment" observation, I match it with a "control" observation with closest propensity score and the difference between propensity scores is less than 0.1. I retest my H1 to H4 using the matched sample and find that most of my results hold using the matched samples except for H4.[13] The result becomes insignificant while the sign is consistent. The first stage of propensity score estimations and second stage of hypotheses testing of H1 to H4 are reported in table 7. One thing needs to be noted is that propensity score matching can only address endogeneity arising from observable covariates but not from unobservable covariates.

4.5.2 Instrumental Variable Approach

IV approach is commonly used in the Accounting literature to address endogeneity problem, especially for those caused by correlated omitted variables. The main challenge of IV approaches is to find valid and strong IVs. Weak IVs can potentially lead to more biased estimates compared with OLS estimates (Larcker & Rusticus, 2010). I use the maximum state income tax rate for wage, for long-term capital gains, and the maximum rate of mortgage interest deduction as the instrumental variables for CEO debt-like compensation similar to prior studies (Anantharaman et al., 2013; Cassell et al., 2012).[14] CEOs benefit from deferred compensation and pensions through deferring income tax.

[13] Results from the matching approach are non-tabulated but available upon request.

[14] The maximum state income tax rates are calculated by Daniel Feenberg using TAXSIM model (Feenberg andCoutts, 1993) and can be downloaded from http://users.nber.org/~taxsim/state-rates/.

Income tax planning thus plays an important role when the CEO compensation is set (Cen, 2010). Therefore the state income tax rates could influence CEO debt-like compensation. On the other hand, it is less likely for a state's individual income tax rates to affect a firm's decisions during an M&A. Thus tax rate can potentially serve as a valid instrumental variable for CEO debt-like compensation. I use the maximum rate since CEOs are likely to be within the top tax bracket.

I use two-stage least square (2SLS) estimations for models with continuous dependent variables and use two-step maximum likelihood estimations for models with discrete dependent variables. I first run Hausman test to check the endogeneity of rel_D/E. Results show that the null hypothesis of exogenous rel_D/E cannot be rejected at 10% significance level in any of my regression models. Test of over-identification restrictions renders the Sargan and Basmann's chi-square statistic below 3.5, which is not statistically significant. Thus an over-identification restriction is not rejected in any regression model. Notice that I use three instrumental variables and that the over-identification tests require at least one to be valid. I also test the strength of the instrumental variables in the first-stage regression, and the F-statistics are in the range of 1.23-6.9. This indicates that instrumental variables are jointly significant in the first-stage regressions for some tests. However, this range is below the critical value of 9.08 for 10% maximum relative bias in 2SLS compared to OLS estimation, as suggested by Stock and Yogo (2005),[15] which indicates weak instrumental variables. Based on the above discussion of the severity of endogeneity in my study, and the validity and strength of instrumental variables, results

[15] The critical values of F-statistics are calculated for comparing maximum bias of two-stage least square to OLS at different level (for example, at 10%) when there is one endogenous explanatory variable in large samples (Stock andYogo, 2005). My sample is smaller compared to other studies on CEO debt-like compensation.

from 2SLS (or two-step probit regression) should be interpreted with caution. Overall, non-tabulated results using instrumental variable approach have same sign as my main results, although coefficients on rel_D/E_r are not statistically significant except for the test of cash flow correlation and post-merger stock return volatility.

4.6 Comparison with Prior Research

My study provides a more complete picture about the effect of the acquirer's CEO compensation on M&A by considering both incentives provided by debt-like compensation and equity compensation. In this section, I compare my study with Datta *et al.* (2001), which examines *only* the incentive effect of equity compensation on M&As. Datta *et al.* (2001) study the effect of annual executive equity-based compensation grants in the year before acquisitions, on M&A. They find that top executives with higher equity-based compensation in the year prior to acquisition acquire riskier targets and make acquisitions that benefit equityholders more. They measure benefits to equityholders by announcement stock returns and buy-and-hold stock returns following the acquisitions.

I test my Hypotheses 1, 2 and 4 by including equity compensation and debt compensation as independent variables, and I add compensation components one by one similar to a forward selection process. However, I do not test the best fitted model, and the purpose of this exercise is not to fit the model to the data. The purpose is to show that CEO debt-like compensation plays an important role in decision-making in the M&A process. Except for independent variables related to CEO compensation, models tested in this section are the same as in my main hypotheses tests. The results are reported in Table 8. All variables are defined in Appendix A. Overall, my previously reported results hold,

while the annual CEO equity-based compensation grant does not play a systematic role in the M&A process.

The compensation components I examined in this section includes the Black-Scholes value of option grants in the year before the acquisition; the dummy variable highebc, equaling one when equity-based compensation grants are above the median level and zero otherwise; total equity compensation holding (equity); total debt-like compensation holding (debt); CEO_D/E; and rel_D/E_r. The main explanatory variable used in Datta *et al.* (2001) is highebc. For each of the regression tests, I start with base model (1) where no control variables or fixed effects are included, as in Datta *et al.* (2001). In model (1), highebc is only statistically significant for working capital level of the target and payment method but does not affect other target characteristics, the financing decision, and post-merger risk. In model (2), I include all control variables and fixed effects, and the explanatory variable highebc is not significant in any tests of panel A or panel B. In model (3)-(7), I use the continuous variable of equity-based compensation grants (ebc) instead of highebc. The results show that equity-based compensation does not relate to target choices, financing choices and payment choices, market reaction and post-merger risk, but does relate to the financial leverage of the target. Higher grants are negatively associated with the financial leverage level of the target. I also test my H3 by partitioning my sample based on the level of equity-based compensation grant in the year prior to M&A and on CEO_D/E instead of rel_D/E. When comparing the high and the low ebc group with the medium ebc group, there is no statistical difference among the correlations of abnormal bond returns and abnormal stock returns during M&A announcements. Both Spearman and Pearson correlations are tested.

Notice that the sample period in Datta *et al.* (2001) is 1993-1998, which differs from my sample period 2007-2011. Their sample size is also larger since they hand-collect CEO compensation data and thus do not require sample firms be included in ExecuComp. Differences in sample selection notwithstanding, the results in Datta *et al.* (2001) seem to be not robust to controlling for other effects.

As for the testing of my hypotheses, first of all, I find that the CEO's relative debt-like compensation level is negatively associated with targets' riskiness, positively associated with the likelihood of using debt financing and payment, after controlling for the CEO's annual equity compensation. It also reduces the association between bond returns and stock returns at M&A announcements and leads to lower stock return volatilities post-merger. The ceo_D/E does not seem to affect these decisions in a systematic way. Higher ceo_D/E is associated with lower target leverage and lower cash flow correlation between the target and the acquirer. It also reduces the association between bond returns and stock returns at deal announcements. However, ceo_D/E is not related to target working capital level, financing and payment decisions, and post-merger stock return volatility. What matters is rel_D/E, i.e., the relative incentive alignment with the firm's stakeholders. This supports my argument that it is important to consider the relative incentive provided by equity compensation and debt compensation when accessing the incentive effective of CEO compensation in decision making.

5. Conclusion

I investigate the effect of CEO incentives on M&A decisions and examine both debt-like compensation and equity compensation. Debt-like compensation has concave payoff structure and provides an incentive for CEOs to reduce the risk of firms, which aligns

their interest with those of the debtholders. On the other hand, the value of equity compensation usually increases with the riskiness of the firm due to the convex payoff structure. Therefore equity compensation provides risk-taking incentives to the CEOs and aligns their interest with equityholders'. The relative weight of these two types of compensation measures the relative incentive alignment of CEOs with debtholders and equityholders.

I find that higher CEO relative debt-like compensation is associated with less risky target characteristics measured by lower financial leverage, higher working capital, lower cash flow correlation and lower earnings correlation with the acquirer. It is also associated with a higher possibility of using debt financing and cash payment, consistent with higher CEO relative debt-like compensation being perceived to reduce risk-taking and thus reduce cost of debt. Furthermore, the association between abnormal bond returns and abnormal stock returns is lower for firms with very high CEO relative debt-like compensation. This is consistent with M&As made by CEOs with very high relative debt-like compensation being more likely to benefit debtholders relative to equityholders, all else equal. Last but not least, post-merger stock return volatilities of the merging firms are lower, for acquirer CEOs with higher relative debt-like compensation. Overall, my results suggest that debt-like compensation aligns the interest of CEOs with debtholders and plays an important role in M&A decision-making. Therefore it is important to consider the CEO's relative incentive alignment with both groups of stakeholders when studying the effect of CEO incentives on decision-making.

Figure 1: Number and value of announced M&A transactions during 1985-2011 in the United States. Source: Thomson Financial, Institute of Mergers, Acquisitions and Alliances (IMAA) analysis.

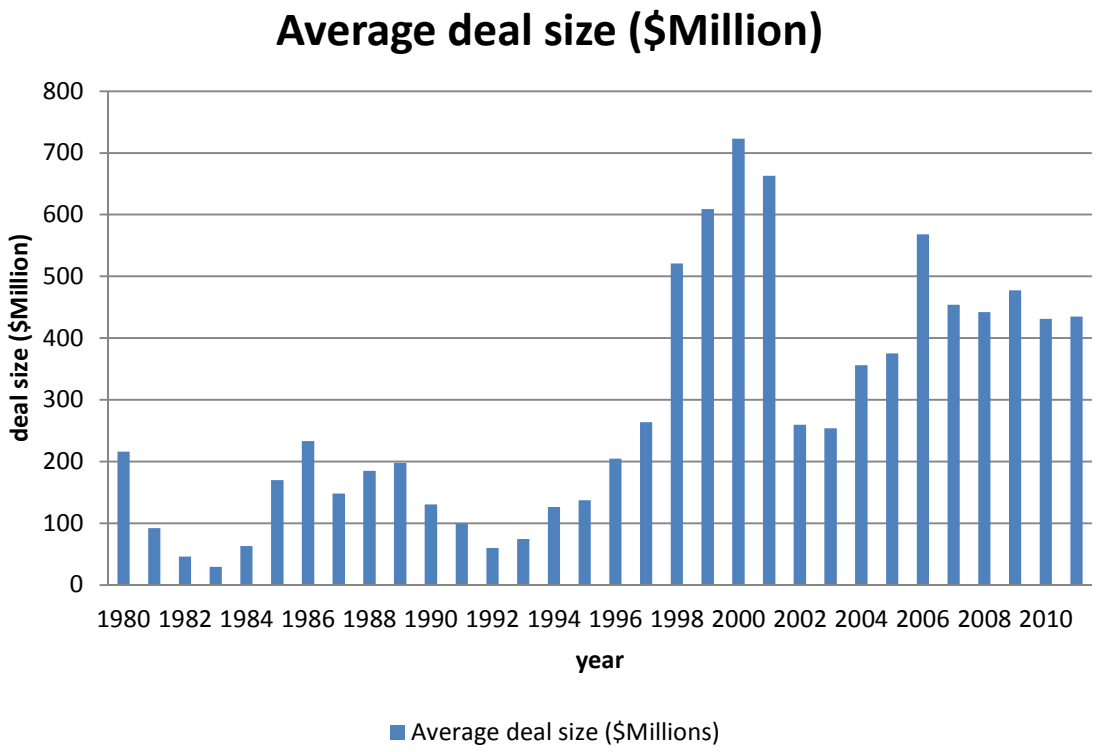

Figure 2: Average deal size for domestic M&As by public U.S. firms during 1980-2011 (in $millions). Source: Thomson and Reuters, SDC Platinum

Table 1: Descriptive statistics

Panel A: Composition of sample by year

year	number	value ($ m)	% of sample
2007	122	1,039.62	25.5%
2008	105	956.49	21.9%
2009	76	2,993.36	15.9%
2010	101	1,122.95	21.1%
2011	75	1,101.47	15.7%
all	479	1,358.64	100.0%

Panel B: Deal values by merger mode and financing (payment) method

B.1 Deal values by merger mode and financing method

	Non-tender offer			Tender offer			Total		
Financing	N	Mean	% of subsample	N	Mean	% of subsample	N	Mean	% of subsample
Non-Debt	125	848.05	18.40%	22	806.82	28.00%	147	841.88	19.40%
Debt & Equity	220	1,613.82	61.70%	29	1,365.11	62.50%	249	1,584.85	61.70%
All debt	62	1,851.32	19.90%	12	503.84	9.50%	74	1,632.81	18.90%
	407	1,414.81	100.00%	63	1,006.10	100.00%	470	1,360.03	100.00%

B.2 Deal values by merger mode and payment method

	Non-tender offer			Tender offer			Total		
Payment	N	Mean	% of subsample	N	Mean	% of subsample	N	Mean	% of subsample
CASH	262	760.09	33.9%	53	1,332.87	86.8%	315	856.46	40.4%
HYBRID	118	2,891.22	58.1%	11	979.09	13.2%	129	2,728.17	52.7%
SHARES	35	1,332.87	7.9%	0	1,085.34	0.0%	35	1,332.87	7.0%
	415	1,414.36	100.0%	64	1,272.06	100.0%	479	1,395.35	100.0%

Panel C: CEO Compensation of Acquirers

		mean	median	Q1	Q3	std
pension	479	4,136.75	35.49	0.00	3,979.78	8,762.06
deferred	479	3,576.40	394.44	0.00	2,894.43	9,951.56
debt	479	7,713.15	1,841.76	0.00	7,777.26	16,078.17
option	479	13,884.40	4,389.73	460.84	15,382.94	25,615.85
restricted	479	4,440.92	1,635.43	0.00	4,784.23	8,708.97
stock	479	61,680.79	10,085.53	3,801.18	26,917.51	265,294.80
equity	479	80,006.11	21,299.72	8,556.31	56,843.81	270,106.76
ceo_D/E	479	0.28	0.10	0.00	0.33	0.51
firm_D/E	479	0.37	0.20	0.09	0.45	0.48
rel_D/E	479	2.50	0.32	0.00	1.53	6.24
rel_D/E_r	479	4.66	4.00	1.00	7.00	3.16

Panel D: Acquirer and target firm characteristics

		mean	median	Q1	Q3	std.
cash	479	0.15	0.09	0.04	0.21	0.15
market	479	18,971.67	3,176.94	1,225.37	13,933.30	43,403.80
MTB	479	1.25	1.01	0.60	1.65	0.98
leverage	479	0.22	0.20	0.12	0.30	0.15
cfo	479	0.11	0.11	0.06	0.15	0.07
size	479	8.45	8.29	7.10	9.63	1.71
ret	479	0.00	0.00	-0.02	0.02	0.04
rvalue	479	0.14	0.08	0.02	0.18	0.16
leverage_t	230	0.19	0.13	0.02	0.29	0.20
work_t	190	0.28	0.24	0.09	0.47	0.24
corr_cfo	178	30.51	36.81	3.03	68.48	44.45
corr_oi	192	41.52	54.11	6.67	81.98	47.13
market_t	229	1,536.75	414.28	117.76	1,317.84	4,307.56
pre_4week	233	49.08	38.87	21.95	64.29	45.81

Table 2: CEO debt-like compensation and target choices

This table represents OLS regression results using various target characteristics (leverage_t, work_t, and corr_ocf, corr_oi) as dependent variables. Industry and year fixed effects are included in all regressions. Variable definitions are reported in appendix A. Robust standard errors are reported in parentheses under the estimated coefficients. *, **, and *** represent significance at 10%, 5%, and 1% level, respectively.

Dependent	leverage_t	work_t	corr_ocf	corr_oi
Intercept	0.067	0.253*	-49.506*	13.584
	(0.096)	(0.138)	(27.666)	(30.557)
rel_D/E_r	-0.009**	0.012**	-2.302*	-2.878**
	(0.004)	(0.006)	(1.253)	(1.276)
size	0.021***	-0.008	7.232***	5.304**
	(0.008)	(0.011)	(2.562)	(2.363)
cash	-0.033	0.338***	0.324	-15.188
	(0.127)	(0.123)	(31.833)	(29.404)
rvalue	0.220***	-0.210**	58.038***	36.998*
	(0.068)	(0.094)	(21.506)	(21.965)
MTB	0.004	0.030	7.265	4.324
	(0.024)	(0.024)	(5.181)	(6.215)
cfo	0.156	-0.470	143.952**	50.064
	(0.263)	(0.363)	(59.577)	(72.631)
leverage	0.154	0.003	5.659	-42.330
	(0.100)	(0.149)	(26.231)	(33.311)
industry FE	yes	yes	yes	yes
year FE	yes	yes	yes	yes
N	230	190	178	192
Adj. R^2	0.311	0.308	0.130	0.064

Table 3: CEO debt-like compensation and financing method

This table represents ordered logit regression result for financing method using the full sample (column 2-4) and using the sample with all-cash financing excluded (column 5-7). Dependent variable financing equals 3 for all debt financing, 2 for debt and equity financing at the same time, and 1 for non-debt financing. Variable definitions are reported in appendix A. Industry and year fixed effects are included both regressions. *, **, and *** represent significance at 10%, 5%, and 1% level, respectively.

	full sample			exclude all cash		
Parameter	Estimate	χ^2	Pr > χ^2	Estimate	χ^2	Pr > χ^2
Intercept3	-2.501**	5.222	0.022	-2.103*	2.973	0.085
Intercept2	0.306	0.079	0.779	0.888	0.532	0.466
rel_D/E_r	0.076**	4.936	0.026	0.068*	3.716	0.054
cfo	5.168***	8.346	0.004	4.730**	6.691	0.010
cash	-1.281*	2.780	0.095	-1.169	2.205	0.138
leverage	-0.625	0.716	0.397	-1.253	2.676	0.102
MTB	-0.258*	3.407	0.065	-0.365**	6.467	0.011
mediumowner	0.270	0.375	0.540	0.269	0.349	0.555
rvalue	1.142*	2.741	0.098	0.830	1.360	0.244
size	0.013	0.034	0.853	0.087	1.434	0.231
public	0.030	0.017	0.896	0.068	0.080	0.777
tender	0.119	0.146	0.702	0.161	0.243	0.622
friendly	0.911	1.421	0.233	0.302	0.115	0.734
industry fixed	yes			yes		
year fixed	yes			yes		
N	470			447		
Pseudo R^2	0.160			0.180		

Table 4: CEO debt-like compensation and Payment method

This table represents ordered logit regression results for payment method. Dependent variable Payment equals 3 for cash payment, 2 for hybrid, 1 for shares. Variable definitions are reported in appendix A. Industry and year fixed effects are included. *, **, and *** represents significance at 10%, 5%, and 1% level, respectively.

	Estimate	χ^2	Pr > χ^2
Intercept3	2.885**	4.590	0.032
Intercept2	5.893***	18.092	<.0001
rel_D/E_r	0.088**	3.981	0.046
cash	-0.647	0.459	0.498
rvalue	-5.369***	43.138	<.0001
mediumowner	1.160*	3.104	0.078
MTB	-0.489***	8.700	0.003
size	-0.043	0.249	0.618
cfo	3.555	2.533	0.112
leverage	0.479	0.275	0.600
tender	1.158***	7.569	0.006
public	-1.550***	28.911	<.0001
friendly	-0.479	0.276	0.599
industry fixed	yes		
year fixed	yes		
N	479		
Pseudo R^2	0.400		

Table 5: CEO debt-like compensation and market announcement returns

This table represents comparison results of correlation coefficients between abnormal bond return (BHR_BD) and abnormal stock returns (BHR_STK) during M&A announcement windows. BHR_BD and BHR_STK are measured in event window (-1,1) in terms of trading day, where day 0 is the M&A announcement day. Comparisons are performed between low, medium and high group, which contains lowest, highest and middle two quartiles of observations based on level of rel_D/E. Z-statistics is reported for each comparison of correlation coefficients, where two-tailed p-values are reported below the z-statistics. *, ** and *** indicate significance at 10%, 5% and 1% level respectively for two-tailed tests.

			z-statistics				z-statistics		
group	rel_D/E	Spearman	2 vs. 1	3 vs. 2	3 vs. 1	Pearson	2 vs. 1	3 vs. 2	3 vs. 1
1	low	0.304	-0.450			0.224	0.410		
			(-0.653)				(0.682)		
2	medium	0.226		-1.940*		0.296		-2.120**	
				(0.052)				(0.034)	
3	high	-0.130			-2.050**	-0.089			-1.470
					(0.040)				(0.142)

Table 6: CEO debt-like compensation and post-merger stock return volatility

This table represents OLS regression results using std_ret_post and std_ret_post2 as dependent variable. Std_ret_post is the standard deviation of monthly stock return within the first year after deal completion. Std_ret_post is measured for the second year after deal completion. Std_ret_pre is measured for the year before deal announcement. Variable definitions are included in appendix A. t-value is calculated with robust standard error. *, **, and *** represents significance at 10%, 5%, and 1% level, respectively.

	$std\_ret\_post_1$			$std\_ret\_post_2$		
	Estimate	t value	Pr > |t|	Estimate	t value	Pr > |t|
Intercept	0.090***	5.370	<.0001	0.085***	3.330	0.001
std_ret_pre	0.298***	4.740	<.0001	0.209**	2.420	0.016
rel_D/E_r	-0.002**	-2.070	0.039	-0.003**	-2.420	0.016
year FE	yes			yes		
ind. FE	yes			yes		
N	387			280		
Adj. R^2	0.319			0.198		

Table 7: Results using propensity score matching

This table presents propensity score matching results. Both the logistic regression estimation for propensity score calculation and the hypothesis testing using the matched sample are reported. *,** and *** indicate significance at 10%, 5% and 1% level for two-tailed test unless otherwise indicated.

Panel 7A.1 Estimation results using logit regression model (5) for H1

Parameter	Estimate	χ^2	Pr > χ^2
Intercept	-4.715***	14.273	0.000
ROA	2.260	1.180	0.277
tenure	-0.095***	23.057	<.0001
dual	0.922***	13.812	0.000
liquidity	-0.269	0.123	0.726
age	0.065***	11.604	0.001
Statewage	0.170	0.703	0.402
Statemortage	0.144***	8.757	0.003
Statelong	-0.062	0.102	0.750
size	0.274***	11.834	0.001
leverage	-2.931***	10.958	0.001
cfo	-0.717	0.077	0.782
cash	-4.524***	17.825	<.0001
MTB	0.232	1.887	0.170
rvalue	0.167	0.050	0.822
industry fixed	Yes		
year fixed	Yes		
N	466		
Pseudo R^2	0.363		

Panel A.2 T-test results using matched sample for H1. P-value is based on one-tailed t-test.

Dependent	N	Diff. (high-low)	Predicted sign	P-value	t
leverage_t	110	-0.050*	-	0.095	-1.320
work_t	70	0.105**	+	0.049	1.680
corr_ocf	78	-0.098	-	0.184	-0.910
corr_oi	94	-0.125*	-	0.085	-1.380

Panel B.1 Estimation results using logit regression model (5) for H2

Parameter	Estimate	χ^2	Pr > χ^2
Intercept	-4.517*	7.138	0.008
ROA	2.319	1.262	0.261
tenure	-0.079***	14.290	0.000
dual	1.020***	16.274	<.0001
liquidity	-0.292	0.136	0.713
age	0.059***	8.823	0.003
statewage	0.213	1.016	0.314
statemortgage	0.151***	9.075	0.003
statelong	-0.087	0.183	0.669
size	0.232***	7.094	0.008
leverage	-3.133***	12.134	0.001
cfo	-0.405	0.024	0.878
cash	-4.538***	17.422	<.0001
MTB	0.166	0.946	0.331
rvalue	0.350	0.186	0.666
mediumowner	-2.950***	7.087	0.008
public	-0.092	0.103	0.748
tend	0.256	0.435	0.510
friendly	0.373	0.145	0.703
industry fixed	Yes		
year fixed	Yes		
N	466		
Pseudo R^2	0.363		

Panel B.2 Order logit regression results using matched sample for H2

Parameter	Estimate	χ^2	Pr > χ^2	Estimate	χ^2	Pr > χ^2
Intercept3	-2.054***	77.785	<.0001	-2.054***	74.490	<.0001
Intercept2	0.586***	10.352	0.001	0.694***	13.688	0.000
highk2	0.456*	3.301	0.069	0.543**	4.359	0.037
N	242			232		
-2LogL	465.067			439.578		

Panel C.1 Estimation results using logit regression model (5) for H3. Dependent variable equals 3 for the top quartile, 2 for medium two quartiles and 1 for the bottom quartile based on rel_D/E ranking.

Parameter	Estimate	χ^2	Pr > χ^2
Intercept_3	-3.673**	4.674	0.031
Intercept_2	-0.668	0.159	0.690
ROA	3.840	1.662	0.197
tenure	-0.100***	10.972	0.001
dual	0.557	1.998	0.158
liquidity	-0.378	0.064	0.800
Age	0.059**	4.223	0.040
statewage	0.301	1.432	0.232
statemort	0.106	2.644	0.104
statelong	-0.235	0.963	0.327
leverage	-2.722**	3.892	0.049
invest	0.469	1.177	0.278
industry fixed	yes		
year fixed	yes		
N	179		
Pseudo R^2	0.351		

Panel C.2 Testing results using matched sample for H3

			z-statistics				z-statistics		
group	rel_D/E	Spearman	2 vs. 1	3 vs. 2	3 vs. 1	Pearson	2 vs. 1	3 vs. 2	3 vs. 1
1	low	0.255	-0.310			0.181	-0.390		
			(0.757)				(0.700)		
2	medium	0.191		-1.590		0.260		-1.790*	
				(0.112)				(0.074)	
3	high	-0.147			-1.640	-0.118			-1.210
					(0.101)				(0.226)

Panel D.1 Estimation results using logit regression model (5) for H4

Parameter	Estimate	χ^2	Pr > χ^2
Intercept	-3.117**	6.282	0.012
ROA	1.906	1.524	0.217
tenure	-0.097***	24.661	<.0001
dual	0.837	11.877	0.001
liquidity	0.205	0.066	0.798
age	0.060***	10.008	0.002
statewage	0.136	0.469	0.494
statemortgage	0.151***	9.797	0.002
statelong	-0.035	0.034	0.854
size	0.195**	6.443	0.011
std_ret_pre	-14.859***	20.366	<.0001
industry fixed	Yes		
year fixed	Yes		
N	465		
Pseudo R^2	0.348		

Panel D.2 T-test result using matched sample for H4. P-value is based on one-tailed t-test.

Dependent	N	Diff. (high-low)	Predicted sign	P-value	t
$std\_ret\_post_1$	194	-0.005	-	0.274	-0.600
$std\_ret\_post_2$	144	-0.002	-	0.425	-0.190

Table 8: Comparison with Datta *et al.* (2001)

This table represents comparison of my study with Datta *et al.* (2001). Panel A reports the results for testing target characteristics. Panel B reports the results for testing financing and payment method. t-values are calculated with robust standard errors and are included in parentheses below the coefficient estimates. *, **, *** represent significance at 10%, 5%, and 1% level respectively. Control variables are the same as in main tests.

Panel A: Target characteristics

A.1 Dependent=leverage_t

	(1) leverage_t	(2) leverage_t	(3) leverage_t	(4) leverage_t	(5) leverage_t	(6) leverage_t	(7) leverage_t
intercept	0.210***	0.076	0.079	0.086	0.067	0.062	0.078
	(0.019)	(0.096)	(0.096)	(0.095)	(0.096)	(0.095)	(0.096)
highebc	-0.040	-0.022					
	(0.026)	(0.025)					
ebc			-0.084	-0.087	-0.092*	-0.096*	-0.106*
			(0.053)	(0.053)	(0.054)	(0.053)	(0.056)
equity				-0.001*	-0.001*		
				(0.001)	(0.001)		
debt					-0.010		
					(0.008)		
ceo_D/E						-0.055**	
						(0.027)	
rel_D/E_r							-0.010**
							(0.004)
controls	no	yes	yes	yes	yes	yes	yes
industry FE	no	yes	yes	yes	yes	yes	yes

year FE	no	yes	yes	yes	yes	yes	yes
N	229	229	229	229	229	229	229
Adj. R^2	0.006	0.315	0.319	0.321	0.321	0.327	0.333

Panel A (continued)

A.2 Dependent=work_t

	(1) work_t	(2) work_t	(3) work_t	(4) work_t	(5) work_t	(6) work_t	(7) work_t
intercept	0.233***	0.209	0.211	0.210	0.226	0.225	0.233*
	(0.029)	(0.141)	(0.143)	(0.143)	(0.143)	(0.144)	(0.140)
highebc	0.082**	0.016					
	(0.036)	(0.035)					
ebc			0.023	0.023	0.026	0.027	0.049
			(0.080)	(0.080)	(0.081)	(0.080)	(0.082)
equity				0.000	0.000		
				(0.001)	(0.001)		
debt					0.006		
					(0.010)		
ceo_D/E						0.021	
						(0.033)	
rel_D/E_r							0.011**
							(0.006)
controls	no	yes	yes	yes	yes	yes	yes
industry FE	no	yes	yes	yes	yes	yes	yes
year FE	no	yes	yes	yes	yes	yes	yes
N	189	189	189	189	189	189	189
Adj. R^2	0.023	0.301	0.300	0.296	0.293	0.297	0.311

A.3 Dependent=corr_ocf

	(1) corr_ocf	(2) corr_ocf	(3) corr_ocf	(4) corr_ocf	(5) corr_ocf	(6) corr_ocf	(7) corr_ocf
intercept	29.083***	-45.877	-45.200	-45.203	-56.884*	-53.525*	-49.357*
	(4.756)	(28.617)	(28.545)	(28.569)	(29.300)	(28.395)	(27.932)
highebc	3.363	3.028					
	(6.677)	(7.223)					
ebc			2.709	2.713	2.582	-0.603	-1.196
			(18.008)	(18.225)	(18.032)	(17.532)	(17.832)
equity				0.001	0.002		
				(0.251)	(0.240)		
debt					-5.289*		
					(2.764)		
ceo_D/E						-18.447**	
						(7.684)	
rel_D/E_r							-2.313*
							(1.265)
controls	no	yes	yes	yes	yes	yes	yes
industry FE	no	yes	yes	yes	yes	yes	yes
year FE	no	yes	yes	yes	yes	yes	yes
N	178	178	178	178	178	178	178
R-sq	0.001	0.222	0.222	0.222	0.241	0.244	0.238
adj. R-sq	-0.004	0.112	0.111	0.105	0.122	0.131	0.124

Panel B

B.1 Financing method

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	financing	financing	financing	financing	financing	financing	financing
intercept3	1.590***	2.077	2.073*	1.902	1.858	2.003	2.097*
	(0.156)	(1.263)	(1.260)	(1.281)	(1.284)	(1.270)	(1.271)
intercept2	-0.984***	-0.906	-0.912	-1.090	-1.146	-0.992	-0.907
	(0.140)	(1.259)	(1.256)	(1.278)	(1.282)	(1.267)	(1.267)
highebc	-0.044	0.004					
	(0.183)	(0.203)					
ebc			-0.316	-0.389	-0.363	-0.261	-0.248
			(0.513)	(0.516)	(0.516)	(0.513)	(0.513)
equity				-0.010	-0.009		
				(0.007)	(0.007)		
debt					0.114		
					(0.078)		
ceo_D/E						0.434	
						(0.282)	
rel_D/E_r							0.068*
							(0.035)
controls	no	yes	yes	yes	yes	yes	yes
industry FE	no	yes	yes	yes	yes	yes	yes
year FE	no	yes	yes	yes	yes	yes	yes
N	445	445	445	445	445	445	445
Pseudo R^2	0.000	0.099	0.100	0.102	0.105	0.103	0.104

Panel B (continued)

B.2 Payment method

	(1) payment	(2) payment	(3) payment	(4) payment	(5) payment	(6) payment	(7) payment
intercept2	-0.439***	-3.060**	-3.064**	-3.079**	-3.073**	-3.061**	-2.885**
	(0.133)	(1.339)	(1.345)	(1.345)	(1.346)	(1.346)	(1.342)
intercept1	-2.333***	-6.032***	-6.037***	-6.069***	-6.063***	-6.034***	-5.879***
	(0.194)	(1.380)	(1.386)	(1.386)	(1.387)	(1.388)	(1.383)
highebc	0.441**	-0.058					
	(0.192)	(0.246)					
ebc			-0.735	-0.845	-0.846	-0.715	-0.688
			(0.617)	(0.621)	(0.621)	(0.617)	(0.613)
equity				-0.013	-0.013		
				(0.008)	(0.008)		
debt					-0.010		
					(0.091)		
ceo_D/E						0.221	
						(0.330)	
rel_D/E_r							0.085*
							(0.044)
controls	no	yes	yes	yes	yes	yes	yes
industry FE	no	yes	yes	yes	yes	yes	yes
year FE	no	yes	yes	yes	yes	yes	yes
N	477	477	477	477	477	477	477
Pseudo R^2	0.007	0.304	0.306	0.309	0.309	0.306	0.311

Panel C: market reaction

			z-statistics				z-statistics		
group	ebc	Spearman	2 vs. 1	3 vs. 2	3 vs. 1	Pearson	2 vs. 1	3 vs. 2	3 vs. 1
1	low	0.301	-1.080			0.385	-1.510		
			(0.28)				(0.130)		
2	medium	0.119		-0.240		0.139		-0.830	
				(0.810)				(0.406)	
3	high	0.074			-1.160	-0.019			-2.080**
					(0.246)				(0.038)

			z-statistics				z-statistics		
group	ceo_D/E	Spearman	2 vs. 1	3 vs. 2	3 vs. 1	Pearson	2 vs. 1	3 vs. 2	3 vs. 1
1	low	0.384	-0.131			0.352	-0.470		
			(0.263)				(0.638)		
2	medium	0.192		-2.020**		0.273		-2.290**	
				(0.043)				(0.022)	
3	high	-0.178			-2.690***	-0.145			-2.370**
					(0.007)				(0.018)

Panel D: post-merger stock return volatility

	(1) std_ret_post$_1$	(2) std_ret_post$_1$	(3) std_ret_post$_1$	(4) std_ret_post$_1$	(5) std_ret_post$_1$	(6) std_ret_post$_1$	(7) std_ret_post$_1$
intercept	0.096***	0.078***	0.076***	0.076***	0.076***	0.076***	0.087***
	(0.007)	(0.016)	(0.015)	(0.016)	(0.016)	(0.016)	(0.017)
highebc	-0.006	0.002					
	(0.006)	(0.006)					
ebc			0.019	0.019	0.019	0.019	0.017
			(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
equity				-0.000	-0.000		
				(0.000)	(0.000)		
debt					0.000		
					(0.002)		
ceo_D/E						-0.001	
						(0.008)	
rel_D/E_r							-0.002*
							(0.001)
controls	no	yes	yes	yes	yes	yes	yes
industry FE	no	yes	yes	yes	yes	yes	yes
year FE	no	yes	yes	yes	yes	yes	yes
N	385	385	385	385	385	385	385
Adj. R^2	0.042	0.311	0.315	0.313	0.311	0.313	0.319

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Appendix A: Variable definitions

Variable	Definition
PAYMENT METHOD	
CASH	Equals 1 if payment is made using only cash or cash equivalents, 0 otherwise
SHARES	Equals 1 if payment is made only in some form of stock, 0 otherwise
HYBRID	Equals 1 if payment is made using a mix of cash and stock, 0 otherwise
Payment	Equals 3 if payment type is CASH, 2 if payment type is HYBRID, 1 if payment type is SHARES
FINANCING METHOD	
Financing	3 for all debt financing, 2 for debt and equity financing, 1 for all equity financing and all cash financing.
COMPENSATION	
pension	Present value of accumulated pension benefits from all pension plans at fiscal year end ($1000)
deferred	Total aggregate balance in deferred compensation plans at fiscal year-end ($1000)
debt	Sum of pension and deferred compensation
stock	Market value of direct stock holding at fiscal year-end ($1000)
option	Estimated aggregate value of in-the-money option holdings at fiscal year-end, including both exercisable and non-exercisable options ($1000)
restrict	Market value of restricted stock holding at fiscal year-end ($1000)
equity	Sum of stock, option, and restrict
ceo_D/E	CEO total debt-like compensation divided by total equity compensation. Total debt-like compensation is the sum of pension and deferred, and total equity holding is the sum of stock, option, and restrict
rel_D/E	ceo_D/E relative to firm D/E ratio where firm D/E ratio is the firm's long-term debt and current portion of long-term debt divided by market value of the firm's equity.
rel_D/E_r	Rank of rel_D/E, which equals 1 when rel_D/E is 0, and the rest is based on rankings of nine groups with equal frequencies based on rel_D/E.
ebc	Black-Scholes value of option grants in the year before the acquisition divided by total compensation in the same year, as in Datta *et al.* (2001)
highebc	ebc level is above medium level.
High	Equals 1when rel_D/E is in the highest quartile, 0 otherwise
Low	Equals 1 when rel_D/E is in the lowest quartile, 0 otherwise

FIRM and Deal CHARACTERISTICS

cash	Cash and short-term investments scaled by total asset
cfo	Cash flow from operations
leverage	Sum of long-term debt and current portion of long-term debt divided by total asset
market	Market value of firm at fiscal year-end
MTB	Market-to-book ratio
ret	Announcement date acquirer stock return subtracting value weighted market return
rvalue	The deal value relative to the market value of the acquirer
size	logarithm of total assets
corr_cfo	Spearman correlation between the operating cash flow of the acquirer and the target within 10 years before deal announcements multiplied by 100
corr_oi	Spearman correlation between the operating income of the acquirer and the target within 10 years before deal announcements multiplied by 100
leverage_t	Target leverage
market_t	Target market value at fiscal year-end
work_t	Target working capital defined as total current asset subtracting total current liabilities, then divided by total asset
pre_4week	Merger premium relative to target stock price four weeks before the announcement
Tender	Equals 1 for tender offer, 0 otherwise
Public	Equals 1 for public targets, 0 otherwise
Friendly	Equals 1 if M&A is not hostile, 0 otherwise
ROA	Return on asset defined as operating income divided by total asset
Tenure	Number of years the CEO has served as CEO
Age	CEO age
Dual	Equals 1 for CEOs hold CEO and chairman positions, 0 otherwise
Liquidity	Equals 1 if operating cash flow is negative, 0 otherwise
Statewage	Maximum state tax rate for wages calculated from TAXSIM model
Statemortage	Maximum state tax rate for mortgage interest deduction calculated from TAXSIM model
Statelong	Maximum state tax rate for long term capital gain calculated from TAXSIM model

MARKET REACTION

BHR_STK	Abnormal buy-and-hold stock return, where benchmark is value-weighted market portfolio return.
BHR_BD	Abnormal buy-and-hold bond return, where benchmark is credit rating and maturity matched portfolio return. Credit rating

	categories are defined in Appendix B. Maturity is redefined into two categories for years-to-maturity above or below five years. Daily bond price is the trade-volume-weighted-average of all trades. Value-weighted-average BHR of all bonds is used as a firm's BHR is the firm has more than one bond outstanding.
POST-MERGER	
$std\_ret\_post_1$	Standard deviation of monthly stock return within the year post-closing; at least 10 monthly stock returns required for calculations
$std\_ret\_post_2$	Standard deviation of monthly stock return within the second year post-closing; at least 10 monthly stock returns required for calculations
std_ret_pre	Standard deviation of monthly stock return within the year before the merger announcement; at least 10 monthly stock returns required for calculations

Appendix B: Conversions of Credit Ratings into Numeric Ratings

Moody's	Standard & Poor	Fitch	Numeric Rating
Aaa	AAA	AAA	
Aa1	AA+	AA+	
Aa2	AA	AA	
Aa3	AA-	AA-	1
A1	A+	A+	
A2	A	A	
A3	A-	A-	
Baa1	BBB+	BBB+	
Baa2	BBB	BBB	2
Baa3	BBB-	BBB-	
Ba1	BB+	BB+	
Ba2	BB	BB	3
Ba3	BB-	BB-	
B1	B+	B+	
B2	B	B	4
B3	B-	B-	
Caa1	CCC+	CCC+	
Caa2	CCC	CCC	
Caa3	CCC-	CCC-	
Ca	CC	CC	5
C	C	C	
	D	RD/D	

Appendix C: Sample Selection

Sample period: 010106-123111

	Number of deals
All M&A from SDC announced by public corporate bidders for US targets	3,603
With link to ExecuComp and COMPUSTAT	1,036
Complete deals	722
No missing values for explanatory variables	479