11-17-2015

CEO Compensation, Information Asymmetry, and Other Characteristics

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Abstract

This dissertation consists of three essays on various aspects of corporate finance. In the first essay, we examine the mean effect and volatility effect of CEO pay gap from creditors' perspective. Prior literature suggests that CEO pay gap relates positively to both the mean and the volatility of the stock return distribution. The mean effect and volatility effect of CEO pay gap yield opposite predictions regarding the creditors' reactions to CEO pay gap. In this study, we systematically study the impacts of CEO pay gap on debt contracting. We first confirm the mean effect and volatility effect of CEO pay gap. However, we find that mean effect better explains the relation between CEO pay gap and a firm's tail risk, crisis-period performance, and default risk in that CEO pay gap is associated with lower tail risk and default risk and better performance during the crisis period. We then document comprehensive evidence consistent with the mean effect of CEO pay gap in debt contracting. In particular, we find that there exist negative relations between CEO pay gap and cost of debt and the number of restrictive debt covenants, but a positive relation between CEO pay gap and debt maturity. Overall, our results provide overwhelming evidence in support of the mean effect of CEO pay gap from the creditors' perspective.

In the second essay, using an information asymmetry factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables, we first confirm the existence of an information asymmetry discount in firm value. We then empirically examine whether M&A announcements, which are usually accompanied by the release of large amounts of information about the targets due to careful scrutiny on the targets by the market, can serve as a mechanism to capture the target information asymmetry discount. We find that there exist significantly positive M&A announcement-period wealth gains, as measured by target-acquirer portfolio abnormal returns, that are related to target information asymmetry. The wealth gains related to target information asymmetry are shared by both

acquirers and targets. We preclude acquirer information asymmetry, corporate governance, and post-merger operating performance improvement as the alternative explanations of the wealth gains related to target information asymmetry. Furthermore, we find that firms with high information asymmetry are more likely to become targets. In terms of relative wealth gains between the acquirer and target, we find the party with high information asymmetry benefits less. At last, we document that target information asymmetry significantly influences certain deal characteristics such as method of payment, the likelihood of diversifying deals, the relative deal size, and days to complete the deals.

In the third essay, we attempt to answer the following two questions: does the management-shareholder power balance message delivered the 24 IRRC corporate governance provisions matter to the investors or do those provisions only matter for their antitakeover implications? Does the antitakeover effect of the BCF index and the staggered board provision indeed the cause of their strongly negative association with firm value documented by previous researchers? We design the study by re-examining the relations between various corporate governance indices (GIM, BCF, staggered board and cumulative voting) and acquirer announcement-period abnormal stock returns in the banking industry where the hostile takeover bids are rare. We find that in the absence of market for corporate control, the GIM index and the cumulative voting provision are still strongly related to acquirer abnormal returns while the BCF index and the staggered board provision lose their significance. Our findings confirm the linkage between market for corporate control, the BCF index and the staggered board provision and firm value. In addition, by showing that banks which distribute more rights to their shareholders are better acquirers, we provide evidence that the management-shareholder power balance effect of the corporate governance provisions should not be ignored.

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A Dissertation

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Philosophy

at the

University of Connecticut

2015

APPROVAL PAGE

Doctor of Philosophy Dissertation

CEO Compensation, Information Asymmetry, and Other Characteristics

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2015

Acknowledgements

First and Foremost, I would like to express my most sincere gratitude to my dissertation committee chair, Professor Chinmoy Ghosh, for his guidance, encouragement, understanding, and support. Without his generous help, this dissertation would not have been possible. I owe my profound appreciation to Professor Paul Borochin and Professor Hieu V. Phan, who provide valuable insights and comments to this dissertation. I am particularly grateful to Professor Joseph Golec, the most kind and supportive PhD program coordinator and advisor. Many thanks to my colleagues in UCONN Finance PhD program, especially Tingyu Zhou, Fan He, Le Sun, Reilly White, Alain Krapl, Scott Roark, Chongyu Wang, Stephen Rush, and Charles Clarke, for all the fun time we had together in the PhD program. Last but not least, I am blessed to have the best parents in this world who continuously support and encourage me. I owe everything to them. I can't think of a more appropriate conclusion of the acknowledgements than "Thank you, Mom and Dad".

TABLE OF CONTENTS

Essay 1

CEO Pay Gap and Corporate Debt Structure

1. Introduction

On August 05, 2015, SEC passes final ruling requiring public companies to disclose the ratio of the median of the annual total compensation of their all employees to the annual total compensation of their CEOs[1]. This ruling signals the increasing scrutiny placed on the pay disparity by the regulators. Meanwhile, the pay disparity among executives has also become the focus of a growing stream of academic research. However, there is no consensus over the measures of executive pay disparity, its implications, and its economic consequences (see, for example: Kale, Reis, Venkateswaran (2009); Bebchuk, Cremers, and Peyer (2011); Kini and Williams (2012); Chen, Huang, and Wei (2013); Masulis and Zhang (2014)). In this study, we mainly focus on the dollar measure of pay disparity, CEO pay gap, measured as the difference in CEO's pay and median pay of second-tier executive, and examine the pay disparity from creditors' perspectives. Our study from creditors' perspectives on CEO pay gap can shed further light on the impact of pay disparity on corporate decisions[2]. Prior research suggests two possible explanations for CEO pay gap. The tournament explanation maintains that CEO pay gap, together with the power and prestige associated with the CEO position, constitutes the incentive for a tournament among the second-tier executives for the top position (Kale, Reis, Venkateswaran (2009)). Because the true ability of managers is unobservable, a firm that runs the intra-firm tournament will rank managers based on their performance to select the next CEO. Kini and Williams (2012) suggest that the tournament incentive is analogous to a call option and

[1] see https://www.sec.gov/rules/final/2015/33-9877.pdf for details of the ruling.

[2] There is a long line of extant research that shows that managerial incentives and preferences have a significant influence on the design of debt contracts. For example, Hirshleifer and Thakor (1992) argue that managers' reputational concerns motivate them to pursue conservative investment options, which serves the interests of bondholders rather than shareholders, allowing the firm to raise more debt than equity. Chava, Kumar, and Warga (2009) document that bondholders use various types of covenants to deal with managerial entrenchment and the associated risk of managers' excess consumption of private benefits. Brockman, Martin, and Unlu (2010) report that bondholders use short-term debt to mitigate managerial risk-taking incentives and reduce agency costs induced by equity-based compensation of the borrowing firm's CEO.

managers have the incentive to undertake risk-increasing activities to maximize the outcome which is used to rank them. In line with this argument, Kini and Williams report evidence of a positive relation between CEO pay gap and risky investment and financing choices as manifested in larger research and development (R&D) investment, higher financial leverage, and larger cash flow and stock return volatility. Alternatively, Masulis and Zhang (2014) offer the traditional performance-based argument to explain CEO pay gap. They assert that CEO pay gap reflects the productivity difference between CEO and other senior executives. In their model, the more productive the CEO relative to the other senior executives, the higher is the CEO pay gap. Their data and analyses reveal results consistent with this prediction. Although the prior studies disagree on the underlying rationale for CEO pay gap, they concur on the economic outcomes of CEO pay gap: there is a positive relation between CEO pay gap and firm value and performance, which we categorize as the mean effect of CEO pay gap, and a positive relation between CEO pay gap and return volatility, which we categorize as the volatility effect of CEO pay gap.

Interestingly, the mean effect and volatility effect of CEO pay gap will elicit opposite reactions from the creditors. Specifically, higher operating performance and firm value provide thicker safety cushion for the creditors' investment, and should be perceived positively by the creditors (Collen, Livnat, and Segal (2009)). Whereas higher volatility implies greater downside potential of firm value which imposes greater risk for the creditors' investment, and should be perceived negatively by the creditors (Campbell and Taksler (2003)). In this study, we empirically investigate which effect of CEO pay gap, the mean effect or the volatility effect, prevails in explaining data from the creditors' perspectives.

We start our analysis by confirming the mean effect and volatility effect of CEO pay gap. Following prior literature, we use Tobin's Q and ROA as measures of the mean effect and use

cash flow volatility and stock return volatility as measures of the volatility effect. Indeed, we find that Tobin's Q, ROA, cash flow volatility, and stock return volatility all increase in CEO pay gap, confirming the positive mean effect and volatility effect in CEO pay gap.

Subsequently, we extend the analysis of CEO pay gap by examining the relation between CEO pay gap and a firm's tail risk. In the aftermath of the financial crisis in 2008, the importance of tail risk in asset pricing and risk management has been widely recognized by the academic researchers, policy makers, and practitioners (Bollerslev and Todorov (2011); Ellul and Yerramilli (2013); Kelly and Jiang (2014)). In particular, researchers show that bondholders also react to the tail risk, the risk of extreme large losses (Cremers, Driessen, and Maenhout (2008); Gemmill and Keswani (2011); Chava, Garduri, and Yerramilli (2014)). The intuition is as follows: because of their fixed claims on the firm's assets, creditors do not benefit from the upside potential but suffer from the downside risk, especially in the extreme tail events when equity capital is not enough to absorb the large losses. Thus, tail risk is a genuine threat to the creditors. Studying the relation between CEO pay gap and tail risk can further our understanding of the underlying cause of the relation between CEO pay gap and debt contract designs. The mean effect of CEO pay gap implies that because larger CEO pay gap promises greater firm value, we should observe a negative relation between CEO pay gap and tail risk. Alternatively, the volatility effect of CEO pay gap suggests that the larger spread of the return distribution resulting from CEO pay gap will lead to a positive relation between CEO pay gap and tail risk. Following Ellul and Yerramilli (2013), we measure the tail risk as the negative of the average return on the firm's stock over the 5% worst return days in a year. Using 21,143 firm-year observations from 1993 to 2011, we find evidence consistent with the mean effect of CEO pay

gap, but inconsistent with volatility effect in that we find that CEO pay gap has a significantly negative association with the tail risk.

We then investigate the mean effect versus volatility effect of CEO pay gap during the crisis period in 2007 and 2008. The crisis can be treated as a natural experiment to test the two effects of CEO pay gap. If the mean effect prevails, that is, either CEO pay gap serves as a motivation of the second-tier executives or a reward for a productive CEO or both, firms with higher pre-crisis CEO pay gap should perform better in the financial crisis. Conversely, if the volatility effect prevails, the sheer pursuit of highly risky projects should lead to worse crisis-period performance for firms with higher pre-crisis CEO pay gap. To analyze how pre-crisis CEO pay gap impacts crisis-period performance, we limit the sample to firms headed by the same CEOs from 2005 to 2008 and measure the effects of pre-crisis CEO pay gap (the average CEO pay gap in 2005 and 2006) on the firms' ROA and annual stock return in 2007 and 2008. Again, we find evidence in support of the mean effect of CEO pay gap. In particular, we find that both ROA and annual stock return in the crisis period are better when pre-crisis CEO pay gap is higher.

Next, we examine the effect of CEO pay gap on a firm's default risk proxied by its distance-to-default in a multivariate setting. Distance-to-default is measured as the z-score estimated using the Merton (1974) model, where the equity of the firm is considered a call option on the underlying value of the firm with the strike price equal to the value of the firm's debt. The higher the z-score, the lower is the default risk. Based on 20,199 firm-year observations from 1993 to 2011, we find that CEO pay gap is positively associated with distance-to-default, implying a negative relation between CEO pay gap and default risk. This result provides further support for the mean effect of CEO pay gap.

At last, we turn our attention directly to debt contact designs. Prior literature has documented several arrangements by the bondholders to address the increasing volatility arising from CEO compensation arrangements, such as shortening debt maturity, increasing cost of debt, and increasing the number of debt covenants (Chava et al. (2009); Brockman et al. (2010)). First, we analyze the relationship between CEO pay gap and debt maturity. We employ two alternative proxies for debt maturity in this analysis: i) the proportion of short-term debt out of total debt reported on a firm's balance sheet obtained from the Compustat database; and ii) number of years to maturity of newly issued debt retrieved from the SDC Platinum database. Using the debt data reported on the balance sheet allows us to account for both the cross-sectional and time serial variations in corporate debt maturity. However, given that firms do not frequently access external debt market, corporate debt maturity as reported on the balance sheet may be stale whereas CEO pay gap tends to be more dynamic. Therefore, we complement the debt maturity analysis based on balance sheet data with a study using the debt maturity of new debt issues, which allows us to better capture the bondholders' reaction to the dynamic CEO pay gap at the point when firms access external debt market. Our analysis results of both samples (15,215 firm-year observations from Compustat and 23,216 issues from SDC Platinum) from 1993 to 2011 consistently show a significantly positive relation between CEO pay gap and debt maturity, which is suggestive of the bondholders' willingness to lengthen the debt maturity in response to a larger CEO pay gap. This finding lends further support to the mean effect of CEO pay gap. To gain a deeper insight into the relation between CEO pay gaps and debt contract terms, we subsequently use the new debt issues sample to examine the link between CEO pay gap and the cost of debt. We measure the cost of debt as the yield spread between the yield to maturity of newly issued bonds and the yield to maturity of the corresponding Treasury benchmark with

similar debt maturity. Our evidence shows that CEO pay gap is negatively related to the cost of debt, which further corroborates the mean effect of CEO pay gap. Finally, we examine the effect of CEO pay gap on debt covenants using 1,843 loan contract data retrieved from the Thomson One Banker database in the 1993-2011 period . We find that CEO pay gap is negatively related to the number of restrictive debt, indicating that bondholders are less restrictive when they lend to a firm with a larger CEO pay gap. Again, the positive response of bondholders towards CEO pay gap is consistent with the mean effect of CEO pay gap. Overall, we find significant evidence that creditors associate high CEO pay gap with low lending risk, consistent with our previous findings regarding the tail risk and default risk.

Extant literature shows that CEO's risk-taking incentives is influenced by the sensitivity of CEO's compensation package to changes in stock price (delta) and the sensitivity of CEO compensation package to volatility of stock return (vega) (Brockman et al. (2010)). To ensure the robustness of our results, we control for the delta and vega of CEO compensation throughout our analysis. Furthermore, since the relations between CEO compensation and our dependent variables could be endogenous due to reasons such as reverse causality[3], we address these endogeneity concerns by using several identification strategies including: (i) ordinary least square (OLS) regressions using lagged independent variables; (ii) instrumental variable regressions in which CEO pay gap, CEO delta, and CEO vega are instrumented. Our results are robust to the control for CEOs' equity-based compensation and corrections for potential endogeneity bias.

[3] For example, firm performance can be attributed to a productive CEO who receives relatively higher pay, leading to a larger CEO pay gap. Also, Ortiz-Molina (2007) offer a detailed analysis on the channels through which debt structure impacts CEO compensation.

There are two other measures of executive pay disparity discussed in the literature: CEO pay slice and Gini coefficient. We fail to find significant relations between the two alternative measures of pay disparity and various dependent variables in our analysis. We attribute this to the different implications suggested by the three measures of executives pay disparity. CEO pay gap measures the dollar gap between CEO's pay and median pay of second-tier executives. CEO pay slice measures the percentage of total compensation of all top executives captured by CEO. At last, Gini coefficient measures the pay inequity not only between CEO and other top executives but also among the other top executives (Bebchuk, Cremers, and Peyer (2011)). According to our data, the correlation between CEO pay gap and CEO pay slice is 0.34, the correlation between CEO pay gap and Gini coefficient is 0.30, and the correlation between CEO pay slice and Gini coefficient is 0.60. Our findings indicate that only the absolute dollar pay disparity matters for debt contracting. This is likely attributable to the mean effect of the CEO pay gap: prior literature documents firm value increases in CEO pay gap but decreases in CEO pay slice (Kale, Reis, Venkateswaran (2009) and (Bebchuk, Cremers, and Peyer (2011)). In terms of Gini coefficient, Kale, Reis, Venkateswaran (2009) show a positive relation between firm value and Gini coefficient in their robustness check, albeit the relation is much weaker, most likely because the pay disparity among the other top executives contained in Gini coefficient adds noise to the analysis on CEO pay disparity. This may also lead to the insignificant relations documented in our study.

Our study is at the confluence of two growing strands of literature. The first strand focuses on executive pay disparity and its implications for corporate policies, cost of capital, and firm performance (Kale et al. (2009); Bebchuk et al. (2011); Kini and Williams (2012); Chen et al. (2013); Masulis and Zhang (2014)). These studies yield mixed evidence on the determinants

and consequences of executive pay disparity. We provide new insight to the debate by analyzing executive pay disparity from the creditors' perspective. The second stream of literature studies creditors' perception of managerial compensation and incentives (e.g., Hirshleifer and Thakor (1992); Chava et al. (2009); and Brockman et al. (2010)). These studies show that creditors are cognizant of the managerial incentives created by the design of executive compensation contracts. Our research extends this line of literature by examining the effect of another measure of executive compensation, notably CEO pay gap, on corporate tail risk, default risk and debt contracting.

Our research makes two noteworthy contributions to the literature. First, we add to the on-going debate on the consequences of executive pay disparity. Our findings that firms with higher CEO pay gap have lower tail risk, better performance during the financial crisis, lower default risk, and receive favorable treatment from creditors complement the findings by Kale et al. (2009)and Masulis and Zhang (2014) on the positive association between CEO pay gap and firm value. Moreover, our findings further confirm that different measures of executive pay disparity may convey different information and thus entail different economic consequences. Second, we contribute to the literature on the interactions among creditors, shareholders, and managers (Hirshleifer and Thakor (1992), Chava et al. (2009), and Brockman et al. (2010)). Previous studies mainly focus on the creditors' reactions to the volatility effect of CEO compensation arrangement and emphasize on the conflict of interest between shareholders and creditors. However, shareholders, executives, and creditors unquestionably share common interests and higher firm value and better firm performance can benefit all parties. Our analysis highlights the importance of this aspect of CEO pay gap.

The remainder of this paper is organized as follows: Section II describes the sample selection and data. We present empirical predictions, estimation results, and discussions in Section III. Section IV provides discussion of the three alternative measures of executive pay disparity, and Section V concludes the paper.

2. Sample and Data Description

A. Sample Selection and Variable Construction

We obtain compensation data of CEO and other senior executives from Execucomp database for the period from 1992 to 2010. For this period, we extract the full sample of observations from Execucomp, which includes 31,241 firm-year observations. The total compensation package is measured by the variable TDC1 reported in Execucomp, which consists of salary, bonus, total value of restricted stock grants, total value of stock option grants, long-term incentive payouts, and other forms of compensation We calculate CEO pay gap as the difference between CEO's total compensation package and the median total compensation package of the next layer of senior managers, (i.e., VPs) (Kale et al. (2009); Kini and Williams (2012)). We identify and exclude former CEOs who remain with the firm in an executive position from the pay gap estimation.

Execucomp reports option values calculated using the Black-Scholes option pricing model for the pre-2006 period but, following the passage of FAS 123R on December 12, 2004, it provides firms' self-reported fair values of options for the post-2005 period. To maintain consistency in option valuation, we follow Kini and Williams (2012) and estimate the inputs for the dividend-adjusted Black-Scholes option pricing model, and use this model to estimate option values (and option delta and option vega) for the post-2005 period. We then substitute the

estimated option values for the firms' self-reported ones in ExecuComp and re-estimate the TDC1 variable for the post-2005 period. We provide a description of the estimation method of delta and vega of CEO compensation in Appendix A. We adjust the calculated values of CEO pay gap, CEO compensation delta and vega for inflation using the Consumer Price Index (CPI).

We estimate the distance-to-default following Bharath and Shumway (2008). Distance-to-default is measured as the z-score estimated using the Merton (1974) model, where the equity of the firm is considered a call option on the underlying value of the firm with the strike price equal to the value of the firm's debt. The distance-to-default (DD) is measured using the following formula:

$$DD = \frac{\ln\left(\frac{V}{P}\right) + (\mu - 0.5\sigma^2)T}{\sigma\sqrt{T}}$$

In this formula, we assume the firm's asset value V follows a geometric Brownian motion with drift μ and volatility σ. T denotes the maturity of the outstanding debt. P is the face value of the debt. Because firm's asset value V and its associated volatility σ are not directly observable, we use equity data and an iterative procedure to estimate[4].

The debt-related data is obtained from a number of sources. The proportion of short-term debt (ST3), constructed as the proportion of debt maturing within three years out of total debt reported in a firm's balance sheet, is gathered from the Compustat database.[5] The maturity of new debt issue, defined as the number of years to maturity of newly-issued debt, and cost of debt, defined as the difference in yield to maturity of newly-issued debt and that of the corresponding Treasury bond with similar maturity, are obtained from SDC Platinum, and debt covenants are

[4] See Bharath and Shumway (2008) for details and SAS code for the estimation procedure.
[5] Our results are robust to other measures of short-term debt, such as ST2, ST4, and ST5.

obtained from Thomson One Banker. We construct other variables based on the information provided by Compustat and CRSP.

B. Summary Statistics

Table 1 reports the time series medians of the following compensation variables: CEO pay gap, CEO compensation delta, and vega. CEO pay gap exhibits an upward trend from 1993 to 2005, a significant jump from 2005 to 2006, a notable drop from 2007 to 2008, and a gradual recovery from 2009 to 2010**.** The ascending trend from 1993 to 2005 possibly reflects recognition by the board of directors of the importance of CEO pay gap. The jump in CEO pay gap from 2005 to 2006 coincides with the adoption of FAS 123R, which changes the accounting treatment of stock options. Hayes, Lemmon, and Qiu (2012) document a decline in the use of options following the implementation of FAS 123R in 2005 and an increase in reliance on bonuses, restricted stock options and long-term incentive awards. The jump in CEO pay gap possibly indicates that board of directors substitute options with other forms of compensation that increase the pay gap between CEO and other top executives. On the other hand, we find noticeable drop in CEO delta and vega from 2005 to 2006, corroborating the findings of Hayes, Lemmon and Qiu (2012). From 2007 to 2008, the financial crisis affected all three variables, CEO pay gap, CEO delta and vega all experiencing declines. After the financial crisis, the three variables recover gradually and by 2010, reach almost the levels of 2007. Graph 1 documents similar pattern of yearly distribution of CEO pay gap.

Table 2 presents the summary statistics of other variables. Panel A reports the distribution of compensation variables, Panel B reports firm characteristics, and Panel C reports issue. CEO pay gap has a mean value of $2.46 million and a median value of $0.94 million. The values are qualitatively similar to those reported by Kale et al. (2009) and Kini and Williams (2012). The

CEO delta indicates that, on average, CEO wealth increases by approximately $518 thousands for one dollar increase in stock price. In addition, an increase of 0.01 in annual stock return volatility results in an increase of $73 thousands in CEO wealth. All three variables are right-skewed so we use their natural logarithm transformation in our regression analysis.

As reported in Panel B, the mean (median) of cash flow volatility is 1.49% (1.03%) and the mean (median) of stock return volatility is 2.84% (2.46%), similar to the number reported by Kini and Williams (2012). Tail risk, the negative of the average stock returns over the 5% worst return days in a year, has a mean(median) value of 5.81% (4.98%). These values are higher than the numbers reported in Ellul and Yerramilli (2013) for bank holding companies, indicating that our sample of general firms has longer left tails than the bank holding companies. The distance-to-default, i.e., the z-score, has a mean value of 7.36 and a median value of 6.57. ST3, which measures the proportion of short-term debt out of total debt reported on the balance sheet, has a mean (median) value of 0.40 (0.32), which is comparable to the number reported by Brockman et al. (2010). The size of sample firms is big, with an average market value of $11.4 billion. Following prior literature, we use its log transformation throughout our analysis. The mean (median) values of market to book ratio is 1.84 (1.48). The leverage ratio has mean (median) value of 0.16 (0.13).

Panel C reports the summary statistics of the new debt issues sample. With total proceeds of $401.68 million, the new debt issues have average maturity of 12.37 years, 1.72 debt covenants, and yield spread of 1.88%. Because years to maturity skew to the right, we use their natural logarithm transformation in our analysis.

3. Empirical Predictions, Results, and Discussions

A. Mean Effect and Volatility Effect of CEO Pay Gap

Kale, Reis, Venkateswaran (2009) argue that CEO pay gap is a proxy for tournament incentives that induce senior managers to exert more effort and take more risks in order to improve their chance of winning the intra-firm rank order tournament. Consistent with their prediction, these authors find a positive relation between CEO pay gap and corporate performance. In further corroboration of the tournament argument, Kini and Williams (2012) provide empirical evidence that CEO pay gap is positively related to riskier investment and financing policy decisions. Alternatively, from the perspective of the traditional performance-based view of CEO compensation, CEO pay gap could simply reflect the superior productivity of the CEO relative to the second-tier executives (Masulis and Zhang (2014)). Nevertheless, the literature agrees that both firm performance and return volatility increase in CEO pay gap. We call the positive association between firm performance and CEO pay gap as the mean effect of CEO pay gap and the positive association between volatility and CEO pay gap as the volatility effect of CEO pay gap.

To confirm the two effects, we examine the relations between CEO pay gap and a firm's performance variables including Tobin's Q and ROA and a firm's volatility variables including cash flow volatility, and stock return volatility in Table 3. Similar to Kale, Reis, Venkateswaran (2009), we use the following empirical specification to examine the effect of CEO pay gap on firm performance:

$$\text{Tobin's } Q_{i,t}/ROA_{i,t} = \alpha_0 + \alpha_1 \text{Log(CEO Pay Gap)}_{i,t-1} + \alpha_2 \text{Log(CEO Delta)}_{i,t-1} + \alpha_3 \text{Log(CEO Vega)}_{i,t-1} + \alpha_4 \text{Tenure}_{i,t-1} + \alpha_5 \text{Log(Size)}_{i,t-1} + \alpha_6 \text{Log(Size)}^2_{i,t-1} + \alpha_7 \text{Leverage}_{i,t-1} + \alpha_8 \text{Capital}$$

to Sales_{t-1} + α_9R&D to Capital_{t-1} + α_{10}Advertising to Capital_{t-1}+ α_{11}Dividend Yield_{t-1} +

Firm Dummies + Year Dummies + $\varepsilon_{i,t}$ (1)

Panel A reports our findings of the effect of CEO pay gap on Tobin's Q and ROA. The first three models (column1, 2, and 3) use Tobin's Q as the dependent variable while the remaining three models (column 4, 5, and 6) use ROA as the dependent variable. Tobin' Q is defined as the ratio of the sum of market value of equity and book value of debt to book value of total assets. ROA is ratio of operating income before depreciation over book value of total assets. The model 1 and 4 include CEO pay gap as the main explanatory variables controlling for firm characteristics while model 2 and 5 further include CEO compensation delta, vega, and CEO tenure into the analysis. In model 3 and 6, we consider the possibility that the relation between CEO compensation and firm performance is endogenous and therefore employ instrumental variable (IV) regression to examine the relations between CEO pay gap and Tobin's Q and ROA, in which CEO pay gap, CEO delta and CEO vega are instrumented. Following prior research (e.g., Kale et al. (2006); Kini and Williams (2011)), we use natural logarithm of industry's median CEO pay gap, number of VPs, a dummy variable for inside promotion, a dummy variable for CFO as VP, and a dummy variable for succession plan as potential instruments for CEO pay gap, natural logarithm of median industry CEO delta as instrument for CEO delta, and natural logarithm of median industry CEO vega as instrument for CEO vega. We require the instruments to satisfy all the relevance and validity tests. Consistent Kale, Reis, Venkateswaran (2009), the coefficient estimates on CEO pay gap are positive and significant at at least 5% level across all six models, confirming a positive association between CEO pay gap and firm performance.

Panel B reports our findings of the effect of CEO pay gap on cash flow volatility and stock return volatility using the following specification based on Kini and Williams (2012):

$$\text{Cash Flow Volatility}_{i,t}/\text{Stock Return Volatility}_{i,t} = \alpha_0 + \alpha_1 \text{Log(CEO Pay Gap)}_{i,t-1} + \alpha_2 \text{Log(CEO Delta)}_{i,t-1} + \alpha_3 \text{Log(CEO Vega)}_{i,t-1} + \alpha_4 \text{Tenure}_{i,t-1} + \alpha_5 \text{Log(Size)}_{i,t-1} + \alpha_6 \text{Log(Size)}^2_{i,t-1} + \alpha_7 \text{Tobin's Q}_{i,t-1} + \alpha_8 \text{Sales Growth}_{t-1} + \alpha_9 \text{Leverage}_{t-1} + \alpha_{10} \text{ROA}_{t-1} + \text{Two-digit SIC Industry Dummies} + \text{Year Dummies} + \varepsilon_{i,t} \quad (2)$$

The first three models of Panel B use cash flow volatility as the dependent variable while the remaining three models use stock return volatility as the dependent variable Cash flow volatility is measured by the standard deviation of seasonally-adjusted quarterly cash flows over the period from year t to year t+4. Stock return volatility is measured by the standard deviation of the daily stock returns in calendar year t. Similar to Panel A, in model 1 and 4, we only include CEO pay gap as the main explanatory variables controlling for firm characteristics. In model 2 and 5 further include CEO compensation delta, vega, and CEO tenure. In model 3 and 6, we consider the possibility that the relation between CEO compensation and firm risk-taking is endogenous and again employ instrumental variable regression to examine the relation between CEO pay gap and the volatility variables. Consistent Kini and Williams (2012), the coefficient estimates on CEO pay gap are all positive and significant at 1% level, suggesting that larger CEO pay gap is indeed associated with greater risk-taking. Taken together, our findings confirm the mean and volatility effect of CEO pay gap.

According to prior literature, the mean effect and volatility effect of CEO pay gap should elicit opposite reactions from the creditors (Campbell and Taksler (2003) and Collen, Livnat, and Segal (2009)) The higher firm value and better firm performance assures the creditors about the

safety of their investment and will lead to favorable treatment from the creditors while higher volatility implies greater risk of potential loss for the creditors and will receive more austere terms in debt contracts. How will creditors react to CEO pay gap? Are they more concerned with the its mean effect or volatility effect? Those are interesting questions empirically examined in our study.

B. CEO Pay Gap and Tail Risk

Before directly examining the relation between CEO pay gap and debt structure, we look at another measure of risk, the tail risk. Following Ellul and Yerramilli (2013), we measure tail risk as the negative of the average stock returns over the 5% worst return days in a year. Because long left tail raises the possibility that equity capital is not enough to absorb the large losses. Long left tail imposes a genuine threat to the creditors. Researchers have shown tail risk is a factor to consider in bond pricing (Cremers, Driessen, and Maenhout (2008); Gemmill and Keswani (2011); Chava, Garduri, and Yerramilli (2014)). Studying how CEO pay gap relates to tail risk can facilitate our understanding of the effect of CEO pay gap on debt contract designs. The mean versus the volatility effect of CEO pay gap implies different relations between CEO pay gap and tail risk: the mean effect of CEO pay gap predicts a negative relation between CEO pay gap and tail risk while the volatility effect of CEO pay gap suggests a positive relation between CEO pay gap and tail risk.

Table 4 reports our findings of the effect of CEO pay gap on the tail risk using the specification below:

$$\text{Tail Risk}_{i,t} = \alpha_0 + \alpha_1 \text{Log(CEO Pay Gap)}_{i,t-1} + \alpha_2 \text{Log(CEO Delta)}_{i,t-1} + \alpha_3 \text{Log(CEO Vega)}_{i,t-1} + \alpha_4 \text{Tenure}_{i,t-1} + \alpha_5 \text{Log(Size)}_{i,t-1} + \alpha_6 \text{Log(Size)}^2_{i,t-1} + \alpha_7 \text{Tobin's Q}_{i,t-1} + \alpha_8 \text{Sales}$$

$Growth_{t-1} + \alpha_9 Leverage_{t-1} + \alpha_{10} ROA_{t-1} + \alpha_{11} Annual\ Return_{t-1} + \alpha_{12}$ Altman Z-Score(dummy) $_{i,t-1} + \alpha_{13}$ Number of $Segments_{i,t-1}$ +Firm Dummies + Year Dummies + $\varepsilon_{i,t}$ (3)

The first model of Table 4 includes CEO pay gap as the only main explanatory variable while the second model further includes CEO delta, CEO vega, and CEO tenure. In both models, the coefficient of CEO pay gap is negative (-0.1172 and -0.0728) and significant at 1% level, indicating that higher CEO pay gap is associated with lower tail risk. This finding is compatible with the mean effect of CEO pay gap: either because of highly motivated VPs or because of a exceedingly productive CEO or both, a firm with higher CEO pay gap tends to have shorter left tail. In term of the other variables, we find that tail risk increases in square-term of firm size, Tobin's Q, growth rate of sales, CEO delta and decreases in firm size, ROA, and annual stock return. Model 3 of Table 4 presents the results of IV regressions. The coefficient on the predicted CEO pay gap remains negative and statistically significant. This evidence suggests that our results are robust to the correction for potential endogeneity bias.

C. Pre-crisis CEO Pay Gap and Crisis-period Performance

We then investigate the mean effect versus volatility effect of CEO pay gap during the crisis period. How the firms with high CEO pay gap fare during the crisis period can provide important clue of the economic consequences of CEO pay gap. If the mean effect prevails, managed by highly motivated VPs or/and marginally productive CEO, firms should have better performance in the financial crisis. Alternatively, if the volatility effect prevails, the investments in highly risky projects should result in worse crisis-period performance for firms with higher pre-crisis CEO pay gap. We limit the sample to firms headed by the same CEOs from 2005 to 2008 to study the effects of pre-crisis CEO pay gap on crisis-period performance. We use the

average CEO pay gap in 2005 and 2006 to measure the pre-crisis CEO pay gap and use ROA and annual stock return in 2007 and 2008 to measure crisis-period performance. We estimate the regressions in the following form:

$$ROA_{i,2007\text{-}2008}/\text{ Annual Return}_{i,2007\text{-}2008} = \alpha_0 + \alpha_1 \text{Log(Pre-crisis CEO Pay Gap)}_i + \alpha_2 \text{Log(Pre-crisis CEO Delta)}_i + \alpha_3 \text{Log(Pre-crisis CEO Vega)}_i + \alpha_4 \text{Tenure}_{i,2006} + \alpha_5 \text{Log(Size)}_{i,2006} + \alpha_6 \text{Log(Size)}^2_{i,2006} + \alpha_7 \text{Leverage}_{i,2006} + \alpha_8 ROA_{2006} + \text{Two-digit SIC Industry Dummies} + \text{Year Dummies} + \varepsilon_{i,t} \quad (4)$$

Table 5 reports the regression results. Model 1 and model 2 test effect of CEO pay gap on ROA in 2007 and 2008. Model 1 includes only CEO pay gap as the main explanatory variable and other control variables. The coefficient on pre-crisis CEO pay gap is positive (0.0182) and statistically significant at 1% level, indicating that firms have better operating performance during the crisis period when pre-crisis CEO pay gap is larger. Model 2 presents ROA regression results that additionally control for CEO delta, CEO vega and CEO tenure. The magnitude of the coefficient estimate on CEO pay gap decreases slightly to 0.0166 and remains significant but at the 5% level, indicating that our results are robust to the control of other CEO-related variables. Model 3 and model 4 test effect of CEO pay gap on annual buy-and-hold stock return in 2007 and 2008. The coefficients of pre-crisis CEO pay gap are 0.0136, significant at 5% level in model 3 and 0.0143, significant at 10% level in model 4. The difference is because of the further inclusion of CEO delta, CEO vega, and tenure in model 4. Our findings suggest that higher pre-crisis CEO pay gap relates to better buy-and-hold stock returns during the crisis period. Again, the crisis-period performance of firms is consistent with the mean effect of CEO pay gap and inconsistent with its volatility effect. Additionally, we find that the crisis-period performance is negatively related to pre-crisis CEO vega and the level of leverage in 2006.

D. CEO Pay Gap and Distance-to-Default

To gain further insights into the mean effect versus volatility effect of CEO pay gap on debt contracting, in this section, we study how CEO pay gap relates to bankruptcy risk. We measure bankruptcy risk by distance-to-default. Distance-to-default is constructed based on the model by Merton(1974), in which the equity of the firm represents a call option on the underlying value of the firm and the strike price of the call option equals to the face value of the firm's debt. Distance-to-default is the z-score of the normal distribution that determines the value of the call option. Higher z-score indicates lower bankruptcy likelihood. We calculate distance-to-default based on steps detailed in Bharath and Shumway (2008). Table 6 reports regression results with distance-to-default as dependent variable on CEO pay gap based on the following specification:

$$\text{Distance-to-default}_{i,t} = \alpha_0 + \alpha_1 \text{Log(CEO Pay Gap)}_{i,t-1} + \alpha_2 \text{Log(CEO Delta)}_{i,t-1} + \alpha_3 \text{Log(CEO Vega)}_{i,t-1} + \alpha_4 \text{Tenure}_{i,t-1} + \alpha_5 \text{Log(Size)}_{i,t-1} + \alpha_6 \text{Log(Size)}^2_{i,t-1} + \alpha_7 \text{Tobin's Q}_{i,t-1} + \alpha_8 \text{Sales Growth}_{t-1} + \alpha_9 \text{Leverage}_{t-1} + \alpha_{10} \text{ROA}_{t-1} + \alpha_{11} \text{Altman Z-Score(dummy)}_{i,t-1} + \alpha_{13} \text{Number of Segments}_{i,t-1} + \text{Firm Dummies} + \text{Year Dummies} + \varepsilon_{i,t} \quad (5)$$

Model 1 reports the regression results that includes only CEO pay gap as the main explanatory variable while model 2 further control for CEO delta, CEO vega, and CEO tenure. In both regressions, CEO pay gap is positively related to distance-to-default. Specifically, the coefficient of CEO pay gap in model 1 is 0.1116 and significant at 1% level and after including other CEO-related variables in model 2, the magnitude of coefficient of CEO pay gap reduces to 0.0959 but remains significant at 1% level. These findings indicate that a firm's default risk decreases in CEO pay gap. Consistent with our prior findings, the analysis of distance-to-default and CEO pay gap supports the mean effect of CEO pay gap. In terms of the control variables, we

find that a firm's distance-to-default is positively associated with the firm's Tobin's Q, operating performance as measured by ROA, and Altman Z-Score and negatively associated with growth rate of sales and leverage. We also run IV regression and report the results in model 3. The instruments pass the relevance and validity tests. The coefficient of predicted CEO pay gap is positive and significant at 1% level, indicating our findings on the relation between distance-to-default and CEO pay gap are robust after controlling for the possible endogeneity concern between bankruptcy risk and CEO compensation variables.

E. CEO Pay Gap and Debt Maturity

So far, our empirical evidence suggests that the mean effect, instead of volatility effect of CEO pay gap, prevails in explaining the relations between tail risk, crisis-period performance, and default risk. In this section, we directly examine the impact of CEO pay gap on debt structure. The first aspect of debt structure we examine is debt maturity. Extant literature suggests that bondholders use debt maturity to protect their interests (Leland and Toft (1996), Rajan and Winton (1995); Brockman et al. (2010)). If the creditors are more concerned with the volatility effect of CEO pay gap, we should expect a positive association between short-term debt and CEO pay gap. The advantage of short-term debt stems from its flexibility of contract, and ability to monitor. Creditors usually use short-term debt to mitigate a firm's risk-taking behavior by subjecting the borrowing firm to the risk of failure to rollover short-term debt. Alternatively, if creditors focus more on the mean effect of CEO pay gap, we should expect a negative association between short-term debt and CEO pay gap. That is, the better operating performance and higher firm value associated with larger CEO pay gap lead to fewer use of short-term debt by the creditors.

We use two alternative measures for debt maturity in this analysis: the proportion of short-term debt out of total debt (ST3) reported on a firm's balance sheet obtained from the Compustat database and number of years to maturity of newly issued debt retrieved from the SDC Platinum database.

To examine the effect of CEO pay gap on proportion of short-term debt, we estimate the following multivariate regression model:

$$ST3_{i,t} = \alpha_0 + \alpha_1 \text{Log(CEO Pay Gap)}_{i,t-1} + \alpha_2 \text{Log(CEO Delta)}_{i,t-1} + \alpha_3 \text{Log(CEO Vega)}_{i,t-1} + \alpha_4 \text{Log(Size)}_{i,t-1} + \alpha_5 \text{Log(Size)}^2_{i,t-1} + \alpha_6 \text{Leverage}_{i,t-1} + \alpha_7 \text{Asset Maturity}_{i,t-1} + \alpha_8 \text{Ownership}_{i,t-1} + \alpha_9 \text{Market/Book}_{i,t-1} + \alpha_{10} \text{Term Structure}_{i,t} + \alpha_{11} \text{Abnormal Earnings}_{i,t-1} + \alpha_{12} \text{Return Volatility}_{i,t-1} + \alpha_{13} \text{Rate(dummy)}_{i,t-1} + \alpha_{14} \text{Altman Z-Score(dummy)}_{i,t-1} + \text{Firm Dummies} + \text{Year Dummies} + \varepsilon_{i,t} \quad (6)$$

Table 7 reports the regression results. The first model contains only CEO pay gap as the main explanatory variable. The coefficient of CEO pay gap is -0.0079 and significant at 1% level. The second model further controls for CEO delta and CEO vega. The coefficient of CEO pay gap remains negatively significant. However, both magnitude (-0.050) and significance (10%) level of coefficient estimate of CEO pay gap drop in the second model. Our findings indicate that larger CEO pay gap is associated with lower proportion of short-term debt, confirming the mean effect of CEO pay gap. The signs and significance of the coefficients on control variables are consistent with those documented in the literature. For instance, the coefficients of size squared, volatility, and ownership are positive whereas the coefficients of CEO compensation delta, size, and leverage are negative. Model 3 of Table 7 presents the results of IV regression in which CEO pay gap, CEO delta and CEO vega are instrumented. We require the instruments to satisfy all the relevance and validity tests. The coefficients on the predicted CEO pay gap are negative and

statistically significant. This evidence suggests that our results are robust to the correction for potential endogeneity bias.

The use of maturity structure of outstanding debt reported in the firm's balance sheet in the above tests provides an important advantage since we can track the impact of CEO pay gap on debt structure both in the cross-section and time series bases. However, because firms do not issue debt regularly, debt maturity is likely to follow a decreasing trend whereas CEO pay gap could change dynamically and any documented effect between CEO pay gap and debt maturity could be spurious. To address this issue, we analyze the effect of CEO pay gap on the maturity of new debt issues obtained from SDC Platinum. This analysis should better captures bondholders' perception of CEO pay gap at the point when firms access external debt market. To that end, we use the following empirical model to examine the relation between CEO pay gap and maturity of newly issued debt:

$$\text{Log(Maturity)}_{i,t} = \alpha_0 + \alpha_1 \text{Log(CEO Pay Gap)}_{i,t-1} + \alpha_2 \text{Log(CEO Delta)}_{i,t-1} + \alpha_3 \text{Log(CEO Vega)}_{i,t-1} + \alpha_4 \text{Log(Size)}_{i,t-1} + \alpha_5 \text{Log(Size)}^2_{i,t-1} + \alpha_6 \text{Leverage}_{i,t-1} + \alpha_7 \text{Asset Maturity}_{i,t-1} + \alpha_8 \text{Ownership}_{i,t-1} + \alpha_9 \text{Market/Book}_{i,t-1} + \alpha_{10} \text{Abnormal Earnings}_{i,t-1} + \alpha_{11} \text{Volatility}_{i,t-1} + \alpha_{12} \text{Average Return}_{i,t-1} + \alpha_{13} \text{Interest Coverage}_{i,t-1} + \alpha_{14} \text{Term Structure}_{i,t} + \alpha_{15} \text{Altman Z-Score(dummy)}_{i,t-1} + \text{Firm Dummies} + \text{Year Dummies} + \varepsilon_{i,t} \quad (7)$$

Table 8 presents the results of our analysis of the relation between the maturity of new debt issues and CEO pay gap. Model 1 reports the results for the regression specification which includes CEO pay gap as the only main explanatory variable while model 2 controls for CEO delta and CEO vega. In both models, CEO pay gap is positively related to debt maturity, indicating creditors' willingness to provide longer-term debt to borrowing firms that have larger

CEO pay gap. The positive reaction from the bondholders towards borrowers' CEO pay gap is consistent with our earlier finding based on debt maturity obtained from balance sheet data, supporting the mean effect of CEO pay gap from bondholders' perspective. Turning to the control variables, our results indicate that the leverage, growth opportunity proxied by market-to-book ratio, asset volatility, and term structure are negatively related to debt maturity while average return prior to debt issues and Altman Z-Score dummy are positively related to debt maturity, which is consistent with the evidence reported in the literature (Brockman et al. (2010)). We also estimated the IV regression and model 3. The instrumented CEO pay gap is positive and statistically significant, confirming that our earlier findings regarding the relation between CEO pay gap and debt maturity after correcting for potential endogeneity bias.

In sum, using both the balance sheet and new issue data, we find consistent evidence that debt maturity increases in CEO pay gap. This finding is qualitatively unchanged when we control for other managerial risk-taking incentives proxied by CEO delta and CEO vega. The positive relationship between CEO pay gap and debt maturity indicates that bondholders react positively to CEO pay gap, suggesting that creditors place more emphasis on the mean effect of CEO pay gap rather than on its volatility effect.

F. CEO Pay Gap and Cost of Debt

In this section, we examine the relation between CEO pay gap and cost of debt for new debt issues. Previous literature shows that bondholders use cost of debt as a mechanism to restrain managerial propensity to risk-taking and as compensation for incremental risk (Brockman et al. (2010)). Specifically, bondholders increase cost of debt in response to managerial risk-seeking incentives, and reduce cost of debt when the incentives created by managerial compensation contracts are conducive to bondholders' interests. As such, the relation

between CEO pay gap and cost of debt should further reflect bondholders' perspective on the mean versus volatility effect of CEO pay gap. we estimate the following multivariate regression model with cost of debt as the dependent variable:

$$\text{Yield Spread}_{i,t} = \alpha_0 + \alpha_1 \text{Log(CEO Pay Gap)}_{i,t-1} + \alpha_2 \text{Log(CEO Delta)}_{i,t-1} + \alpha_3 \text{Log(CEO Vega)}_{i,t-1} + \alpha_4 \text{ Volatility}_{i,t-1} + \alpha_5 \text{Average Return}_{i,t-1} + \alpha_6 \text{ Log(Total Proceeds)}_{i,t} + \alpha_7 \text{Leverage}_{i,t-1} + \alpha_8 \text{Interest Coverage}_{i,t-1} + \alpha_9 \text{ Return on Sales}_{i,t-1} + \alpha_{10} \text{Treasury Benchmark Yield}_{i,t} + \alpha_{11} \text{Yield Curve Slope}_{i,t} + \text{Firm Dummies} + \text{Year Dummies} + \varepsilon_{i,t} \quad (8)$$

Yield spread is the difference between yield to maturity of new debt issues and the corresponding Treasury benchmark yield. Table 9 presents the results of the cost of debt regressions. We gather the sample for this analysis with data from the Global New Issues of SDC Platinum. Model 1 includes CEO pay gap as the main variable of focus and control variables. The coefficient on CEO pay gap is negative (-0.0006) and statistically significant at 1% level, indicating that bondholders impose lower cost of debt when CEO pay gap is large. Model 2 presents the regression estimates with additional control for CEO compensation delta and vega. The coefficient estimate of CEO pay gap remains negative (-0.0010) and significant at 1% level, indicating that our results are robust to the control for CEO equity-based compensation. Our findings further substantiate mean effect of CEO pay gap from bondholders' perspective. Turning to control variables, we find that CEO compensation vega, issue size, and leverage are positively related to the cost of debt, whereas average stock returns prior to debt issues, interest coverage, slope of yield curve, and profit margin measured by return on sales are negatively correlated with the cost of debt. These results are consistent with extant research. To address the concern about potential endogeneity between executive compensation and cost of debt, we run IV regressions with CEO pay gap, CEO delta, and CEO vega being instrumented and report the regression

estimates in model 3. The coefficient on predicted CEO pay gap remains negative and significant, suggesting that our results are robust to the endogeneity correction.

G. CEO Pay Gap and Number of Debt Covenants

Previous studies show that besides debt maturity and cost of debt, the other mechanism with which bondholders protect their interest is debt covenants. For instance, Begley and Feltham (1999) report that bondholders are more likely to use covenants restricting dividends and additional borrowings when they face a large threat of CEO opportunism, motivated by CEO stock ownership, to enhance shareholders' interest at the cost of bondholders. In a similar vein, Billett, King and Mauer (2007) argue that short-term debt and debt covenants are substitutes in mitigating shareholder-bondholder conflicts. Chava et al. (2009) document that bondholders use debt covenants in response to managerial entrenchment and to mitigate the risk of managerial self-dealing. Next, we examine the impact of CEO pay gap on the use of debt covenants with the following model:

$$\text{Log(Number of Debt Covenants)}_{i,t} = \alpha_0 + \alpha_1 \text{Log(CEO Pay Gap)}_{i,t-1} + \alpha_2 \text{Log(CEO Delta)}_{i,t-1} + \alpha_3 \text{Log(CEO Vega)}_{i,t-1} + \alpha_4 \text{Log(Maturity)}_{i,t} + \alpha_5 \text{Leverage}_{i,t-1} + \alpha_6 \text{Asset Maturity}_{i,t-1} + \alpha_7 \text{Market/Book}_{i,t-1} + \alpha_8 \text{Return Volatility}_{i,t-1} + \alpha_9 \text{Ownership}_{i,t-1} + \alpha_{10} \text{Abnormal Earnings}_{i,t-1} + \alpha_{11} \text{Altman Z-Score(dummy)}_{i,t-1} + \text{Firm Dummies} + \text{Year Dummies} + \varepsilon_{i,t} \quad (9)$$

We report the estimation results in Table 10. In columns model 1, we examine the relations between CEO pay gap and number of debt covenants. The coefficient estimate of CEO pay gap is -0.0515 and statistically significant, indicating that bondholders impose fewer debt covenants when lending to firms with larger CEO pay gap. This result is in line with our findings

in the previous sections and further corroborates bondholders' favorable response to CEO pay gap. Our finding regarding the relation between CEO pay gap and number of debt covenants is essentially similar when we additionally control for CEO delta and CEO vega in model 2. The negative association between number of debt covenants and CEO pay gap reinforces the mean effect of CEO pay gap. Among control variables, consistent with the results reported by Billet et al. (2007), we find that the number of debt covenants increases in leverage. Furthermore, we find the number of debt covenants increases in asset volatility and decreases in market-to-book ratio and asset maturity. Finally, we use the IV regression approach to account for the endogenous relation among CEO pay gap, CEO delta and CEO vega, and the number of debt covenants. Model 3 reports the results. The coefficient of the instrumented CEO pay gap remains negative and statistically significant, indicating that our finding is robust to the correction for potential endogeneity.

4. Discussion about Measures of Executive Pay Disparity

According to current literature, There are three measures of executive pay disparity: CEO pay gap, CEO pay slice, and Gini coefficient (Kale, Reis, Venkateswaran (2009); Bebchuk, Cremers, and Peyer (2011); Kini and Williams (2012); Chen, Huang, and Wei (2013);). CEO pay gap measures the dollar gap between CEO's pay and median pay of second-tier executives. CEO pay slice measures the percentage of total compensation of all top executives captured by CEO. At last, Gini coefficient measures the pay inequity among the top executives. Although these three measures all captures the extent of executive pay inequality, they also differ in their economic implications. According to Bebchuk, Cremers, and Peyer (2011), CEO pay slice captures the CEO entrenchment, or the relative negotiation power of CEO. The relations between CEO pay gap and CEO pay slice can be expressed by the following equations :

$$CEO\ Pay\ Slice = \frac{CEO\ Pay\ Gap + Median\ VP\ Pay}{CEO\ Pay\ Gap + 2Median\ VP\ Pay + Total\ Nonmedian\ VP\ Pay} \quad (10)$$

$$\frac{\partial CEO\ Pay\ Slice}{\partial CEO\ Pay\ Gap} = \frac{\partial\left(\frac{CEO\ Pay\ Gap + Median\ VP\ Pay}{CEO\ Pay\ Gap + 2Median\ VP\ Pay + Total\ Nonmedian\ VP\ Pay}\right)}{\partial CEO\ Pay\ Gap}$$

$$= \frac{Median\ VP\ Pay + Total\ Nonmedian\ VP\ Pay}{(CEO\ Pay\ Gap + 2Median\ VP\ Pay + Total\ Nonmedian\ VP\ Pay)^2}$$

$$= \frac{Total\ VP\ Pay}{(CEO\ Pay\ Gap + 2Median\ VP\ Pay + Total\ Nonmedian\ VP\ Pay)^2}$$

$$= \frac{Total\ VP\ Pay}{(CEO\ Pay + Total\ VP\ Pay)^2} \quad (11)$$

From the equations, we can conclude that CEO pay gap and CEO pay slice are not perfectly correlated and their relation relies on total VP pay and CEO pay. Of course, if total VP pay is greater than zero, the two variables are positively correlated but the correlation decreases in CEO pay. In particular, the equation (11) shows that when total VP pay is zero, there is no relation between CEO pay gap and CEO pay slice. Under this scenario, the CEO pay gap is CEO pay. The dollar value has no indication of CEO entrenchment. But CEO pay slice is one, indicating perfect entrenchment of CEO. This example shows that CEO pay slice captures the entrenchment effect better. Empirically, according to Table 11, the correlation between CEO pay gap and CEO pay slice is 0.34. The difference in CEO pay gap and CEO pay gap explains the different empirical findings documented by prior researchers: Bebchuk, Cremers, and Peyer

(2011) show that firm value and performance decrease in CEO pay slice while Kale, Reis, Venkateswaran (2009) document that firm value and performance increase in CEO pay gap. Substituting CEO pay gap with CEO pay slice in our previous analysis, we fail to find any significant relations, which might be because of the entrenchment effect contained in CEO pay slice.

In term of Gini coefficient, Table 11 reports that the correlation between CEO pay gap and Gini coefficient is 0.30 and the correlation between CEO pay slice and Gini coefficient is 0.60. Bebchuk, Cremers, and Peyer (2011) suggest that Gini coefficient not only contains the information on the pay disparity between CEO and other top executives, it also captures information on the pay disparity among the other top executives. Kale, Reis, Venkateswaran (2009) show a positive relation between firm value and Gini coefficient in their robustness check, but the relation is much weaker. Most likely it is because the information about the pay disparity among the other top executives adds noise to the analysis. This may also contribute to our failure to find any significant relations between Gini coefficient and debt-related variables.

5. Conclusion

Prior literature suggests two effects of CEO pay gap: the mean effect and the volatility effect. The mean effect suggests that CEO pay gap leads to higher firm value and better firm performance. The volatility effects indicates that CEO pay gap also motivates the greater risk-taking. the mean effect and volatility effect of CEO pay gap predicts opposite reactions from the creditors. The mean effect benefits the creditors' interest while the volatility effect impairs their interest. We empirically examine which effect is more important for the bondholders. In particular, we examine the effects of CEO pay gap on tail risk, crisis-period performance, default

risk, and various features of debt structure including maturity structure of debt, cost of debt and debt covenants. Consistent with the mean effect of CEO pay gap, we find that CEO pay gap is positively related to debt maturity and crisis-period performance, but negatively related to the tail risk, default risk, cost of debt and the number of debt covenants. Our finding is robust to the control of CEO equity-based compensation and corrections for potential endogeneity concerns. The finding of our research has important implications for executive compensation design and debt contracting.

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Appendix A: Estimating CEO Compensation Portfolio Delta and Vega

Sensitivity of CEO compensation portfolio to changes in stock price(delta) and stock return volatility(vega) are estimated using the following modified Black-Scholes (1973) model, modified by Merton(1973) to account for dividend payout:

$$Option\ Value = [Se^{-dT}N(Z) - Xe^{-rT}N(Z - \sigma\sqrt{T})]$$

where

$$Z = \frac{ln\left(\frac{S}{X}\right) + T\left(r - d + \frac{\sigma^2}{2}\right)}{\sigma\sqrt{T}}$$

N=cumulative probability function for the normal distribution

S=price of the underlying stock

X=option exercise price

σ=expected stock return volatility over the life of the option

r=log transformation of risk=free interest rate

T=time to maturity of the option in years

d=log transformation of expected divided yield over the life of the option

The value of unexercised options (options granted in previous years whose value is not reported) held by executives is estimated using the following procedure suggested by Core and Guay (2002) and Frank and Goyal (2007):

- Exercise price for unexercised options: First, we compute the ratio of realizable value of in-the-money exercisable options to the number of unexercised exercisable options. Second, we subtract this ratio from the fiscal year-end stock price. The resulting number is an estimate of the average exercise price for unexercised exercisable options held by executives. Similarly, an estimate of average exercise price of unexercised unexercisable options can be obtained by subtracting the ratio of in-the-money unexercisable option to the number of unexercised unexercisable options from the fiscal year-end stock price.
- Option maturity for unexercised exercisable options: The maturity of unexercised exercisable options is assumed to be four years less than average maturity of the new grants. In case that no grants are made this year, it is set at 6 years. The maturity of unexercisable options is set at one less than the average maturity of the new grants. In case that no grants are made this year, it is set at 9 years.

Stock price, risk-free rate, dividend yield and volatility: these inputs are obtained from Compustat, CRSP and ExecuComp databases.

Appendix B: Variable Definitions

Variable	Description
Abnormal Earnings	(earnings in year t+1-earnings in year t)/(share price)*outstanding shares in year t
Altman Z-Score dummy	Equals one if a firm has Altman Z-Score greater than 1.81 and zero otherwise
Annual Return	Buy-and-hold stock return over the year
Asset Maturity	Book value-weighted average of maturities of property, plant and equipment and current assets
Average Return	Average daily stock returns 180 days prior to the debt issue
Cash Flow Volatility	Standard deviation of seasonally-adjusted quarterly cash flows over the period from year t to year t+4.
CEO Delta	Change in CEO wealth given a $1 increase in stock price
CEO Vega	Change in CEO wealth given a 1% increase in stock return volatility
CEO Pay Gap	Difference in CEO pay and the median pay of other senior executives
CEO Tenure	Number of year in the CEO position of the current firm
CFO as VP	Equals one if CFO is VP, zero otherwise
Inside Promotion	Equals one if the current CEO is promoted from within the firm and zero otherwise
Interest Coverage	The natural log transformation of the pre-tax interest coverage ratio
Financial Leverage	Long-term debt divided by the market value of the firm
Market-to-book ratio	Market value of total assets divided by book value of total assets
Maturity	Years to debt maturity
Number of VPs	Number of VPs of a firm in a given year
Ownership	CEO ownership, calculated as number of shares owned by CEO scaled by total shares outstanding
Rating dummy	Equals one if a firm has S&P rating on long-term debt and zero otherwise
Return on Assets	Ratio of operating income before depreciation over book value of total assets

Return on Sales	Operating income before depreciation divided by sales
Volatility	Standard deviation of the monthly stock return in a year multiplied by the ratio of market value of equity to market value of assets
Sales Growth	Growth rate of annual sales
Size	Firm size, calculated as market value of equity plus book value of total assets minus book value of equity
Stock Return Volatility	Standard deviation of the daily stock returns in a given year
Yield Spread	Difference between a bond' yield to maturity and the yield to maturity of the corresponding Treasury benchmark with similar maturity
ST3	The sum of current liabilities, debt maturing in the second year, and debt maturing in third year, all divided by total debts
Succession Plan	Equals one if a VP is either president or COO but not chairman, zero otherwise.
Number of debt covenants	Total number of covenants of a debt issue
Tail Risk	Negative of the average stock returns over the 5% worst return days in a year
Term Structure	Difference between 10-year and 6-month Treasury rate at the fiscal-year end
Total Proceeds	Total proceeds of a new debt issue
Treasury Benchmark Yield	Treasury rate with terms that corresponds most closely to the maturity-term of a new debt issue
Yield Curve Slope	Difference between 10-year and 2-year Treasury rate at the fiscal-year end

Table 1: Distribution of Compensation Variables by Year

This table presents distribution of medians of CEO pay gap, CEO delta, and CEO vega by year. CEO Pay gap, CEO delta and CEO vega are adjusted for inflation using 1990 as the base year. CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The sample consists of 31,241 Execucomp firm-year observations of 3,278 firms from 1992 to 2010. All variables are defined in Appendix B.

Year	N	CEO Pay Gap (in 000s)	CEO Delta (in 000s)	CEO Vega (in 000s)
1992	363	818.927	106.984	20.798
1993	1,152	586.233	98.374	15.433
1994	1,541	571.237	87.742	12.332
1995	1,591	577.918	102.611	16.265
1996	1,636	686.351	124.814	17.657
1997	1,661	777.920	168.803	22.108
1998	1,721	797.162	146.689	30.546
1999	1,793	822.674	164.984	28.751
2000	1,779	824.957	160.018	32.863
2001	1,651	892.695	170.275	40.758
2002	1,656	858.893	144.947	44.512
2003	1,725	807.676	185.955	48.515
2004	1,732	951.459	204.488	46.518
2005	1,734	922.136	186.430	41.018
2006	1,814	2,064.480	161.371	18.773
2007	2,036	2,004.891	139.001	21.257
2008	1,948	1,297.416	79.840	17.944
2009	1,883	1,594.157	105.592	18.754
2010	1,825	1,841.640	123.371	19.063

Total	31,241	942.037	137.143	25.125

Graph 1: Distribution CEO Pay Gap by Year

This graph depicts the distribution of mean, median, upper-quarter, and lower-quarter CEO pay gap by year. CEO pay gap is adjusted for inflation using 1990 as the base year. CEO pay gap is difference in total compensations between CEO and other top executives. The sample consists of 31,241 Execucomp firm-year observations from 1992 to 2010.

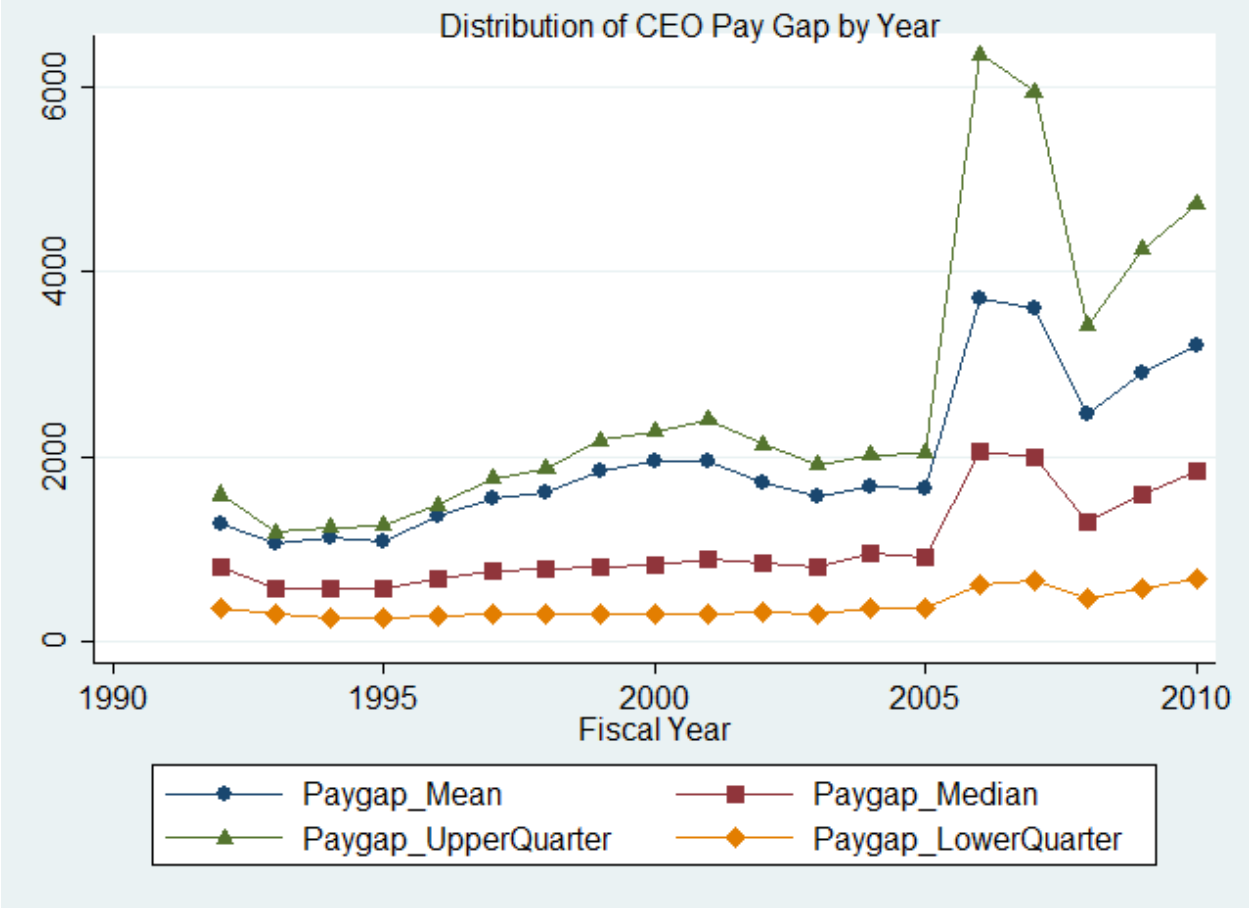

Table 2: Summary Statistics

This table reports the summary statistics of the key variables. Panel A reports the summary statistics of CEO compensation variables. CEO Pay gap, CEO delta and CEO vega are adjusted for inflation using 1990 as the base year. Panel B reports the summary statistics of firm characteristics variables. Panel C reports the summary statistics of new bond issues variables. All variables are defined in Appendix B.

Panel A: CEO Compensation Variables

Variables	Mean	S.D.	25% percentile	50% percentile	75% percentile	N
CEO Pay Gap (in 000s)	2,460.75	4,374.56	358.84	942.04	2,469.33	31,241
CEO Delta (in 000s)	518.13	1,332.39	47.35	137.14	392.33	31,241
CEO Vega (in 000s)	73.40	133.35	5.36	25.12	75.72	31,241

Panel B: Firm Characteristics Variables

Variables	Mean	S.D.	25% percentile	50% percentile	75% percentile	N
Abnormal Earnings	0.05	1.24	-0.01	0.01	0.02	23,216
Altman Z-Score (dummy)	0.85	0.36	1	1	1	23,216
Annual Return	0.17	0.68	-0.14	0.10	0.35	21,143
Asset Maturity	11.07	10.19	4.15	7.75	14.54	23,216
Average Return	0.00	0.02	-0.01	0	0.01	23,216
Cash Flow Volatility (%)	1.49	1.46	0.62	1.03	1.78	21,681
Distance-to-Default	7.36	4.78	4.02	6.56	9.79	20,199

Interest Coverage	2.07	0.75	1.56	1.95	2.50	23,216
Leverage	0.16	0.13	0.06	0.13	0.23	23,216
Market/Book	1.84	1.31	1.19	1.48	2.05	23,216
Number of Segments	1.84	1.12	1	1	2	20,199
Ownership	0.02	0.05	0.00	0.01	0.02	23,216
Rate (dummy)	0.59	0.49	0	1	1	23,216
Return on Assets	0.13	0.13	0.09	0.13	0.19	21,681
Return on Sales	0.20	0.10	0.12	0.19	0.27	23,216
Sales Growth	0.14	0.75	-0.00	0.08	0.19	21,681
Size(MM$)	11,414.07	30,518.68	951.88	2,626.82	8,527.19	23,216
ST3	0.40	0.32	0.14	0.32	0.60	15,214
Stock Return Volatility (%)	2.84	1.52	1.80	2.46	3.45	22,576
Tail Risk (%)	5.81	3.45	3.58	4.98	7.02	21,143
Tenure	6.66	6.87	2	5	9	21,681
Tobin's Q	2.01	1.72	1.20	1.55	2.23	21,681
Volatility	0.07	0.05	0.04	0.05	0.08	23,216

Panel C: New Debt Issues Variables

Variables	Mean	S.D.	25% percentile	50% percentile	75% percentile	N
Maturity	12.37	10.86	5.19	10.14	10.40	23,216
Sum of Debt Covenants	1.72	0.89	1	2	2	1,843
Spread (%)	1.88	1.71	0.77	1.33	2.36	23,216
Term (%)	1.93	1.13	0.96	2.22	2.85	23,216

Yield Curve Slope	1.38	0.94	0.45	1.71	2.16	23,216
Treasury Benchmark Yield (%)	4.40	1.63	3.30	4.43	5.71	23,216
Total Proceed (MM$)	401.68	422.01	148.96	296.99	499.29	23,216

Table 3: CEO Pay Gap and Firm Performance and Volatility

Panel A: CEO Pay Gap and Firm Performance

This table reports regression results with Tobin's Q and ROA as dependent variables on CEO pay gap. The sample covers period from 1993 to 2011. Tobin's Q is the ratio of the sum of market value of equity and book value of debt to book value of total assets. ROA is ratio of operating income before depreciation over book value of total assets. CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The OLS regressions control for firm and year fixed effects. The OLS regressions standard errors are adjusted for heteroskedasticity. All variables are defined in Appendix B. ***, **, and * denote the significance at 1%, 5% and 10% levels.

	OLS		IV(2SLS)	OLS		IV(2SLS)
		Tobin's Q_t			ROA_t	
Log(CEO Pay Gap)$_{t-1}$	**0.0597*** **	**0.0663*** **		**0.0093** **	**0.0119** **	
	(6.0882)	**(6.2417)**		**(2.4505)**	**(2.4369)**	
Log(CEO Delta)$_{t-1}$		0.7469***			-0.0056	
		(10.6654)			(-0.4999)	
Log(CEO Vega)$_{t-1}$		-0.2700***			-0.0195	
		(-8.0333)			(-1.1410)	
Predicted Log(CEO Pay Gap)$_{t-1}$			**0.0649** **			**0.1698** **
			(2.2213)			**(2.1170)**
Predicted Log(CEO Delta)$_{t-1}$			0.5438			-0.5417***
			(1.4412)			(-2.8876)
Predicted Log(CEO Vega)$_{t-1}$			0.5787***			0.1976***
			(5.9856)			(2.9079)
Tenure$_{t-1}$		-0.0015	-0.0043		0.0005	0.0043**
		(-1.0665)	(-1.0551)		(0.9749)	(2.1316)
Log(Size)$_{t-1}$	-1.2598***	-1.2900***	-1.1748***	-0.1112	-0.1206	-0.3630**
	(-10.1757)	(-9.9110)	(-8.5779)	(-0.6672)	(-0.6906)	(-2.1864)
Log(Size)2$_{t-1}$	0.0439***	0.0452***	0.0279***	0.0048	0.0055	0.0120
	(6.1756)	(5.9762)	(3.8349)	(0.4978)	(0.5453)	(1.0316)
Leverage$_{t-1}$	-0.9741***	-0.7509***	-0.5539***	-0.2620***	-0.2662***	-0.1824

	(-9.3223)	(-6.7973)	(-2.9926)	(-5.4466)	(-5.0157)	(-1.2227)
Capital to Sales$_{t-1}$	-0.0033	-0.0033	-0.0030	-0.0018	-0.0018	-0.0015
	(-1.0467)	(-1.0433)	(-0.9296)	(-1.0825)	(-1.0835)	(-1.0602)
R&D to Capital$_{t-1}$	0.0039***	0.0034***	0.0037***	0.0024	0.0025	0.0024
	(2.6911)	(2.9804)	(3.3189)	(0.4733)	(0.4806)	(0.5021)
Advertising to Capital$_{t-1}$	0.0030	0.0030	0.0036	0.0037**	0.0037*	0.0030
	(1.0299)	(1.0318)	(1.2654)	(1.9744)	(1.9392)	(1.4215)
Dividend Yield$_{t-1}$	0.1099***	0.1101***	0.1259***	-0.0389	-0.0390	-0.0071
	(4.9187)	(6.1217)	(6.4308)	(-0.8402)	(-0.8426)	(-0.7533)
Intercept	8.1596***	3.8950***	1.7907	0.5382	0.6778	
	(15.7785)	(5.1538)	(0.6700)	(0.7802)	(0.9393)	
Number of Obs	27,118	27,118	27,118	27,169	27,169	
R^2	0.5604	0.5658		0.1547	0.1546	
Anderson-Rubin Wald F-stat for Joint Significance			54.27***			3.88***
Hansen J Statistic			0.003			0.119
Endogeneity Test (Difference in Sargan-Hansen Statistics)			176.902***			15.090***
Instruments Used in IV (2SLS)			Industry-median CEO Delta$_{t-1}$			Industry-median CEO Delta$_{t-1}$
			Industry-median CEO Vega$_{t-1}$			Industry-median CEO Vega$_{t-1}$
			Number of VPs$_{t-1}$			Number of VPs$_{t-1}$
			CFO as VP$_{t-1}$			Succession Plan$_{t-1}$

Panel B: CEO Pay Gap and Volatility

This table reports regression results with stock return volatility and cash flow volatility in percentage points as dependent variables on CEO pay gap. The sample covers period from 1993 to 2011. Cash flow volatility is the standard deviation of seasonally-adjusted quarterly cash flows over the period from year t to year t+4. Stock return volatility is the standard deviation of the daily stock returns in year t. CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The OLS regressions control for industry and year fixed effects where industry is defined by the two-digit SIC code. The OLS regressions standard errors are adjusted for heteroskedasticity. All variables are defined in Appendix B. ***, **, and * denote the significance at 1%, 5% and 10% levels.

	OLS		IV(2SLS)	OLS		IV(2SLS)
	Cash Flow Volatility$_t$			Stock Return Volatility$_t$		
Log(CEO Pay Gap)$_{t-1}$	**0.0617*** **	**0.0742*** **		**0.0285*** **	**0.1039*** **	
	(6.6760)	**(7.2385)**		**(3.6050)**	**(11.3881)**	
Log(CEO Delta)$_{t-1}$		-0.0260**			-0.0193**	
		(-2.3654)			(-1.9877)	
Log(CEO Vega)$_{t-1}$		-0.0063			-0.1288***	
		(-0.7123)			(-16.7855)	
Predicted Log(CEO Pay Gap)$_{t-1}$			**0.3483*** **			**0.5776*** **
			(4.4029)			**(22.7550)**
Predicted Log(CEO Delta)$_{t-1}$			-1.4529***			0.2410***
			(-5.4513)			(5.8768)
Predicted Log(CEO Vega)$_{t-1}$			2.0699***			-0.2361***
			(5.3233)			(-6.7682)
Tenure$_{t-1}$		0.0016	0.0668***		-0.0012	-0.0214***
		(1.1159)	(5.2284)		(-0.9911)	(-7.6204)
Log(Size)$_{t-1}$	-1.2130***	-1.1955***	-2.0487***	-0.9114***	-0.8446***	-1.3856***
	(-22.0294)	(-21.4770)	(-10.0705)	(-21.4459)	(-19.4759)	(-23.3897)

Log(Size)2$_{t-1}$	0.0615***	0.0611***	0.0755***	0.0393***	0.0384***	0.0516***
	(18.5166)	(18.3545)	(11.6965)	(14.8921)	(14.5386)	(16.1658)
Tobin's Q$_{t-1}$	0.0886***	0.0933***	0.1049***	0.0959***	0.1039***	0.0303*
	(6.7836)	(6.5886)	(4.5699)	(6.0196)	(6.1381)	(1.8398)
Sales Growth$_{t-1}$	0.0786***	0.0805***	0.1954***	0.0576**	0.0590**	0.0220
	(2.9126)	(2.9313)	(2.8733)	(2.3799)	(2.4325)	(1.2621)
Leverage$_{t-1}$	-0.3018***	-0.3577***	0.4655*	1.9906***	1.8301***	2.6648***
	(-3.5047)	(-4.1542)	(1.7495)	(21.7784)	(20.9885)	(21.0317)
ROA$_{t-1}$	-1.4714***	-1.4448***	-0.1084	-2.7185***	-2.6826***	-3.0970***
	(-10.4631)	(-10.1968)	(-0.3838)	(-12.7248)	(-12.7021)	(-13.7723)
Intercept	6.5708***	6.2780***	13.4026***	6.2865***	5.8111***	5.6995***
	(29.1581)	(24.4455)	(9.0240)	(37.4887)	(33.4729)	(28.7748)
Number of Obs	21,681	21,681	21,681	22,576	22,576	22,576
R^2	0.2735	0.2738		0.5234	0.5319	
Anderson-Rubin Wald F-stat for Joint Significance			30.27***			242.18***
Hansen J Statistic			0.061			2.140
Endogeneity Test (Difference in Sargan-Hansen Statistics)			114.468***			367.612***
Instruments Used in IV (2SLS)			Industry-median CEO Delta$_{t-1}$			Industry-median CEO Paygap$_{t-1}$
			Industry-median CEO Vega$_{t-1}$			Industry-median CEO Delta$_{t-1}$
			Number of VPs$_{t-1}$			Industry-median CEO Vega$_{t-1}$
			Inside Promotion$_{t-1}$			CFO as VP$_{t-1}$

Table 4: CEO Pay Gap and Tail Risk

This table reports regressions results with tail risk in percentage points as dependent variable on CEO pay gap. The sample covers period from 1993 to 2011. Tail risk is measured as the negative of the average stock returns over the 5% worst return days in a year (Ellul and Yerramilli (2013)). CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The OLS regressions control for firm and year fixed effects. The OLS regressions standard errors are adjusted for heteroskedasticity. All variables are defined in Appendix B. ***, **, and * denote the significance at 1%, 5% and 10% levels.

	OLS		IV(2SLS)
	Tail Risk$_t$	Tail Risk$_t$	Tail Risk$_t$
Log(CEO Pay Gap)$_{t-1}$	**-0.1172*** **	**-0.0728*** **	
	(-4.9175)	**(-2.8400)**	
Log(CEO Delta)$_{t-1}$		0.8503***	
		(8.1811)	
Log(CEO Vega)$_{t-1}$		-0.5766***	
		(-8.8165)	
Predicted Log(CEO Pay Gap)$_{t-1}$			**-4.2221*** **
			(-3.6313)
Predicted Log(CEO Delta)$_{t-1}$			-18.6098**
			(-2.0545)
Predicted Log(CEO Vega)$_{t-1}$			16.5756***
			(3.0234)
Tenure$_{t-1}$		-0.0068**	0.1075*
		(-2.0099)	(1.6663)
Log(Size)$_{t-1}$	-0.9248***	-1.0396***	3.6732***
	(-4.6556)	(-5.2481)	(2.5978)
Log(Size)2$_{t-1}$	0.0388***	0.0471***	-0.1471*

	(3.1080)	(3.7658)	(-1.7254)
Tobin's Q_{t-1}	0.1180***	0.0984***	0.7313***
	(3.9724)	(3.5369)	(2.5932)
Sales $Growth_{t-1}$	0.0698*	0.0675*	0.1302
	(1.9448)	(1.9459)	(1.5068)
$Leverage_{t-1}$	0.0703	0.1187	-1.3425
	(0.2628)	(0.4431)	(-1.3203)
ROA_{t-1}	-4.4434***	-4.5335***	2.2472
	(-9.0927)	(-9.3703)	(0.9246)
Annual $Return_{t-1}$	-0.0644*	-0.0937***	0.4918
	(-1.7646)	(-2.6652)	(1.5666)
Altman Z-Score $(dummy)_{t-1}$	-0.0000	-0.0000	0.0000
	(-0.4561)	(-0.5968)	(0.0137)
Number of $Segments_{t-1}$	-0.0126	-0.0107	-0.3653***
	(-0.5012)	(-0.4290)	(-2.8880)
Intercept	10.3046***	6.7953***	71.7661*
	(12.4727)	(6.4825)	(1.7900)
Number of Obs	21,143	21,143	21,143
R^2	0.6440	0.6462	
Anderson-Rubin Wald F-stat for Joint Significance			22.98***
Hansen J Statistic			1.384
Endogeneity Test (Difference in Sargan-Hansen Statistics)			99.918***
Instruments Used in IV (2SLS)			Industry-median CEO $Delta_{t-1}$
			Industry-median CEO $Vega_{t-1}$
			Number of VPs_{t-1}

Table 5: Pre-crisis CEO Pay Gap and Crisis-period Performance

This table reports results of OLS regressions with crisis-period performance variables as dependent variables on per-crisis CEO pay gap. We limit the sample to firms headed by the same CEOs from 2005 to 2008. We measure pre-crisis CEO pay gap as average CEO pay gap in 2005 and 2006. The dependent variables are ROA and annual return in 2007 and 2008. ROA is defined as the ratio of operating income before depreciation over book value of total assets. Annual return is defined as buy-and-hold stock return over the year. CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The regressions control for industry and year fixed effects where industry is defined by two-digit SIC code. The regressions standard errors are adjusted for heteroskedasticity. All variables are defined in Appendix B. ***, **, and * denote the significance at 1%, 5% and 10% levels.

	OLS			
	$ROA_{2007,2008}$	$ROA_{2007,2008}$	Annual $Return_{2007,2008}$	Annual $Return_{2007,2008}$
Log (Pre-crisis CEO Pay Gap)	**0.0182*** **	**0.0166** **	**0.0136** **	**0.0143***
	(2.5989)	**(2.2298)**	**(1.9758)**	**(1.7548)**
Log (Pre-crisis CEO Delta)		0.0110		0.0447
		(0.3705)		(1.5455)
Log (Pre-crisis CEO Vega)		-0.0081		-0.0312*
		(-0.7192)		(-1.6966)
$Tenure_{2006}$		0.0019		0.0002
		(0.7297)		(0.1083)
$Log(Size)_{2006}$	0.3972	0.4092	-0.0129	-0.0156
	(1.2569)	(1.2727)	(-0.3291)	(-0.3929)
$Log(Size)2_{2006}$	-0.0231	-0.0237	0.0000	0.0004
	(-1.2695)	(-1.2972)	(0.0104)	(0.1628)
$Leverage_{2006}$	-0.1695*	-0.1695*	-0.1084*	-0.1047
	(-1.8415)	(-1.7698)	(-1.6820)	(-1.5972)

ROA_{2006}			0.1089	0.1022
			(0.5180)	(0.4854)
Intercept	-1.6345	-1.7331	0.4232	0.2351
	(-1.1912)	(-1.4433)	(1.5171)	(0.7510)
Number of Obs	2,255	2,222	2,362	2,324
R^2	0.0395	0.0405	0.2840	0.2901

Table 6: CEO Pay Gap and Distance-to-Default

This table reports regression results with distance-to-default as dependent variable on CEO pay gap. The sample covers period from 1993 to 2011. Distance-to-default is the z-score estimated based on Merton (1974) model, in which the equity of the firm is considered as a call option on the underlying value of the firm and the strike price equals the value of firm's debt. CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The OLS regressions control for firm and year fixed effects. The OLS regressions standard errors are adjusted for heteroskedasticity. All variables are defined in Appendix B. ***, **, and * denote the significance at 1%, 5% and 10% levels.

	OLS		IV(2SLS)
	Distance-to-Default$_t$	Distance-to-Default$_t$	Distance-to-Default$_t$
Log(CEO Pay Gap)$_{t-1}$	**0.1116*** **	**0.0959*** **	
	(3.8458)	**(3.1733)**	
Log(CEO Delta)$_{t-1}$		-0.0014	
		(-0.0367)	
Log(CEO Vega)$_{t-1}$		0.0956	
		(1.5671)	
Predicted Log(CEO Pay Gap)$_{t-1}$			**7.4382*** **
			(2.8873)
Predicted Log(CEO Delta)$_{t-1}$			-23.8455***
			(-3.2571)
Predicted Log(CEO Vega)$_{t-1}$			11.3667***
			(3.3316)
Tenure$_{t-1}$		0.0147***	0.5200***
		(3.1589)	(3.2711)
Log(Size)$_{t-1}$	-0.0522	-0.0932	-7.9993***
	(-0.1873)	(-0.3352)	(-2.8910)

Log(Size)2_{t-1}	-0.0212	-0.0200	0.3778***
	(-1.2345)	(-1.1622)	(3.0682)
Tobin's Q_{t-1}	0.2128***	0.2114***	1.9167***
	(3.5418)	(3.4825)	(4.0091)
Sales $Growth_{t-1}$	-0.1362***	-0.1363***	0.6289
	(-2.8097)	(-2.8075)	(1.4462)
$Leverage_{t-1}$	-8.4470***	-8.4437***	-16.8636***
	(-17.1749)	(-17.1231)	(-8.1604)
ROA_{t-1}	5.0777***	5.0844***	18.3781***
	(7.3698)	(7.3742)	(6.0488)
Altman Z-Score $(dummy)_{t-1}$	0.0000***	0.0000***	0.0001*
	(3.7872)	(3.7862)	(1.6902)
Number of $Segments_{t-1}$	0.0372	0.0332	-0.7266**
	(1.1004)	(0.9805)	(-2.5540)
Intercept	10.8122***	10.6960***	93.0731***
	(9.8297)	(9.6224)	(3.4828)
Number of Obs	20,199	20,199	20,199
R^2	0.7110	0.7112	
Anderson-Rubin Wald F-stat for Joint Significance			98.51***
Hansen J Statistic			0.046
Endogeneity Test (Difference in Sargan-Hansen Statistics)			317.780***
Instruments Used in IV (2SLS)			Industry-median CEO $Delta_{t-1}$
			Industry-median CEO $Vega_{t-1}$
			Inside $Promotion_{t-1}$

Number of VPs_{t-1}

Table 7: CEO Pay Gap and Proportion of Short-term Debt

This table reports regression results with ST3 (proportion of short-term debt over total debt) as dependent variable on CEO pay gap. The sample covers period from 1993 to 2011. ST3 is the proportion of short-term debt maturing in 3 years over total debt. CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The OLS regressions control for firm and year fixed effects. The OLS regressions standard errors are adjusted for heteroskedasticity. All variables are defined in Appendix B. ***, **, and * denote the significance at 1%, 5% and 10% levels.

	OLS		IV(2SLS)
	$ST3_t$	$ST3_t$	$ST3_t$
$Log(CEO\ Pay\ Gap)_{t-1}$	**-0.0079*** **	**-0.0050***	
	(-2.9957)	**(-1.7640)**	
$Log(CEO\ Delta)_{t-1}$		-0.0149***	
		(-4.7983)	
$Log(CEO\ Vega)_{t-1}$		0.0024	
		(1.2198)	
Predicted $Log(CEO\ Pay\ Gap)_{t-1}$			**-0.0393*** **
			(-6.9621)
Predicted $Log(CEO\ Delta)_{t-1}$			-0.0633***
			(-4.1992)
Predicted $Log(CEO\ Vega)_{t-1}$			0.0384***
			(4.8305)
$Log(Size)_{t-1}$	-0.1026***	-0.0940***	0.0274
	(-4.4678)	(-4.0814)	(0.9349)
$Log(Size)2_{t-1}$	0.0039***	0.0039***	0.0002
	(2.7643)	(2.7526)	(0.1602)
$Leverage_{t-1}$	-1.1056***	-1.1255***	-0.2935***
	(-33.7501)	(-34.1043)	(-7.8328)

Asset Maturity$_{t-1}$	-0.0001	-0.0002	-0.0019***
	(-0.1506)	(-0.3649)	(-4.4076)
Ownership$_{t-1}$	0.6309***	0.7125***	1.1304***
	(4.4897)	(5.0376)	(3.2642)
Market/Book$_{t-1}$	0.0055**	0.0038	0.0339***
	(2.1090)	(1.4267)	(5.0720)
Term Structure$_{t}$	0.0051	0.0055	-0.0097***
	(0.9558)	(1.0384)	(-3.4283)
Abnormal Earnings$_{t-1}$	0.0000	-0.0000	-0.0000
	(0.0025)	(-0.0748)	(-0.9133)
Volatility$_{t-1}$	0.2158***	0.1907***	-0.0850
	(3.2884)	(2.8987)	(-0.5140)
Rate (dummy)$_{t-1}$	-0.0613***	-0.0615***	-0.0232**
	(-6.3259)	(-6.3506)	(-2.0094)
Altman Z-Score (dummy)$_{t-1}$	-0.1182***	-0.1148***	0.0101
	(-11.8201)	(-11.4552)	(1.1061)
Intercept	-0.1026***	-0.0940***	0.5084***
	(-4.4678)	(-4.0814)	(3.9923)
Number of Obs	15,214	15,214	15,214
R^2	0.5506	0.5514	
Anderson-Rubin Wald F-stat for Joint Significance			24.23***
Hansen J Statistic			3.665
Endogeneity Test (Difference in Sargan-Hansen Statistics)			60.025***
Instruments Used in IV (2SLS)			Industry-median CEO PayGap$_{t-1}$
			Industry-median CEO

	$Delta_{t-1}$
	Industry-median CEO $Vega_{t-1}$
	Number of VPs_{t-1}
	Inside $Promotion_{t-1}$

Table 8: CEO Pay Gap and Debt Maturity of New Debt Issues

This table reports regression results with years to maturity of debt issues as dependent variable on CEO pay gap. The sample covers period from 1993 to 2011. Maturity is the years to maturity of new debt issues. CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The OLS regressions control for firm and year fixed effects. The OLS regression standard errors are adjusted for heteroskedasticity. All variables are defined in Appendix B. ***, ** and * denote the significance at 1%, 5% and 10% levels.

	OLS		IV (2SLS)
	$Log(Maturity)_t$	$Log(Maturity)_t$	$Log(Maturity)_t$
$Log(CEO\ Pay\ Gap)_{t-1}$	**0.0337****	**0.0316***	
	(2.3706)	**(1.9592)**	
$Log(CEO\ Delta)_{t-1}$		0.0146	
		(0.6584)	
$Log(CEO\ Vega)_{t-1}$		-0.0224	
		(-1.6237)	
Predicted $Log(CEO\ Pay\ Gap)_{t-1}$			**0.2494*****
			(4.7250)
Predicted $Log(CEO\ Delta)_{t-1}$			0.3193***
			(3.8576)
Predicted $Log(CEO\ Vega)_{t-1}$			-0.2105***
			(-3.6916)
$Log(Size)_{t-1}$	0.4232*	0.4292	0.0243***
	(1.7898)	(1.6313)	(4.2696)
$Log(Size)2_{t-1}$	-0.0221*	-0.0219	-0.5855***
	(-1.8178)	(-1.5512)	(-4.3566)
$Leverage_{t-1}$	-0.4826**	-0.3628	-1.0543***
	(-2.0280)	(-1.6096)	(-4.4886)

Asset Maturity$_{t-1}$	0.0041	0.0047*	0.0076***
	(1.5167)	(1.7624)	(3.9359)
Ownership$_{t-1}$	-0.0618	-0.0071	-5.4365***
	(-0.0756)	(-0.0116)	(-3.2001)
Market/Book$_{t-1}$	-0.0745***	-0.0843***	-0.1685***
	(-3.2824)	(-3.3836)	(-6.4478)
Abnormal Earnings$_{t-1}$	-0.0000	-0.0000	-0.0000
	(-0.2177)	(-0.9252)	(-0.5777)
Volatility$_{t-1}$	-1.8820***	-1.6325***	-2.9576***
	(-3.3092)	(-2.8496)	(-4.2287)
Average Return $_{t-1}$	26.6093***	29.2519***	17.2729**
	(3.9882)	(4.1637)	(2.1863)
Interest Coverage$_{t-1}$	0.0246	0.0472	-0.0682***
	(0.7940)	(1.4999)	(-2.6594)
Term Structure$_{t}$	-0.0311***	-0.0268**	-0.1779***
	(-3.0781)	(-2.3251)	(-3.1039)
Altman Z-Score (dummy)$_{t-1}$	0.1116**	0.0818	0.0173
	(2.2316)	(1.4388)	(0.8685)
Intercept	0.1507	0.0450	3.4872***
	(0.1296)	(0.0364)	(7.3716)
Number of Obs	23,216	23,216	23,216
R^2	0.1259	0.1529	
Anderson-Rubin Wald F-stat for Joint Significance			15.67***
Hansen J Statistic			0.012
Endogeneity Test (Difference in Sargan-			41.068***

Hansen Statistics)	
Instruments Used in IV (2SLS)	Industry-median CEO $PayGap_{t-1}$ Industry-median CEO $Delta_{t-1}$ Industry-median CEO $Vega_{t-1}$ Succession $Plan_{t-1}$

Table 9: CEO Pay Gap and Cost of Debt of New Debt Issues

This table reports regression results with spread of debt issues as dependent variable on CEO pay gap. The sample covers period from 1993 to 2011. Spread is the difference between yield to maturity of new debt issues and the corresponding Treasury benchmark yield. CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The OLS regressions control for firm and year fixed effects. The OLS regression standard errors are adjusted for heteroskedasticity. All variables are defined in Appendix B. ***, ** and * denote the significance at 1%, 5% and 10% levels.

	OLS		IV (2SLS)
	$Spread_t$	$Spread_t$	$Spread_t$
$Log(CEO\ Pay\ Gap)_{t-1}$	**-0.0006*** **	**-0.0010*** **	
	(-3.1369)	**(-5.2266)**	
$Log(CEO\ Delta)_{t-1}$		0.0001	
		(0.9644)	
$Log(CEO\ Vega)_{t-1}$		0.0016***	
		(8.7698)	
Predicted $Log(CEO\ Pay\ Gap)_{t-1}$			**-0.0176*** **
			(-4.0729)
Predicted $Log(CEO\ Delta)_{t-1}$			-0.0212***
			(-5.0318)
Predicted $Log(CEO\ Vega)_{t-1}$			0.0118***
			(4.6152)
$Volatility_{t-1}$	-0.0044	-0.0193	0.2334***
	(-0.3706)	(-1.5200)	(8.9695)
$Average\ Return_{t-1}$	-0.3200***	-0.2496***	-0.8915***
	(-7.3318)	(-5.8219)	(-4.0623)
$Log(Total\ Proceeds)_t$	0.0092***	0.0059***	0.0277***

	(17.4102)	(11.8412)	(3.6293)
$Leverage_{t-1}$	0.0141***	0.0136***	0.0007***
	(11.6536)	(11.0982)	(2.8543)
$Interest\ Coverage_{t-1}$	-0.0027***	-0.0033***	-0.0006
	(-5.5529)	(-6.2757)	(-0.4275)
$Return\ on\ Sales_{t-1}$	-0.0004***	-0.0005***	-0.0575***
	(-4.5217)	(-5.0371)	(-4.9949)
$Treasury\ Benchmark\ Yield_t$	-0.0000	-0.0000	-0.0032***
	(-0.0149)	(-0.0176)	(-5.7283)
$Yield\ Curve\ Slope_t$	-0.0010***	-0.0009***	-0.0008*
	(-2.7890)	(-2.6282)	(-1.7026)
Intercept	0.0069	0.0061	0.2290***
	(1.3689)	(1.1970)	(5.9097)
Number of Obs	23,216	23,216	23,216
R^2	0.5337	0.5440	
Anderson-Rubin Wald F-stat for Joint Significance			94.62***
Hansen J Statistic			1.727
Endogeneity Test (Difference in Sargan-Hansen Statistics)			243.753***
Instruments Used in IV (2SLS)			Industry-median CEO $Delta_{t-1}$
			Industry-median CEO $Vega_{t-1}$
			$Succession\ Plan_{t-1}$
			Number of VPs_{t-1}

Table 10: CEO Pay Gap and Debt Covenants

This table reports regression results with sum of debt covenants as dependent variable on CEO pay gap. The sample covers period from 1993 to 2011. Sum of debt covenants is the total number of debt covenants per debt issue. CEO pay gap is difference in total compensations between CEO and other top executives. CEO delta is the sensitivity of CEO total compensation to the change in stock price. CEO vega is the sensitivity of CEO total compensation to stock return volatility. The OLS regressions control for firm and year fixed effects. The OLS regression standard errors are adjusted for heteroskedasticity. All variables are defined in Appendix B. ***, ** and * denote the significance at 1%, 5% and 10% levels.

	OLS		IV(2SLS)
	Log(Sum of Debt Covenants)$_t$	Log(Sum of Debt Covenants)$_t$	Log(Sum of Debt Covenants)$_t$
Log(CEO Pay Gap)$_{t-1}$	**-0.0515*** **	**-0.0293*** **	
	(-5.7822)	**(-2.6423)**	
Log(CEO Delta)$_{t-1}$		-0.0558***	
		(-5.5457)	
Log(CEO Vega)$_{t-1}$		0.0039	
		(0.3380)	
Predicted Log(CEO Pay Gap)$_{t-1}$			**-0.0878*** **
			(-2.7879)
Predicted Log(CEO Delta)$_{t-1}$			-0.1162***
			(-3.1535)
Predicted Log(CEO Vega)$_{t-1}$			0.3380***
			(5.9231)
Log(Maturity)$_t$	0.0281*	0.0212	0.0271
	(1.8242)	(1.3649)	(1.3488)
Leverage$_{t-1}$	0.6483***	0.6203***	1.0368***
	(5.8312)	(5.4490)	(6.5559)
Asset Maturity$_{t-1}$	-0.0087***	-0.0088***	-0.0049***
	(-8.2269)	(-8.3074)	(-3.3076)

Market/Book$_{t-1}$	-0.0566***	-0.0540***	-0.1889***
	(-2.8956)	(-2.6564)	(-4.1508)
Volatility$_{t-1}$	4.6972***	4.9592***	5.0099***
	(10.0958)	(10.3333)	(8.1640)
Ownership$_{t-1}$	-0.2282	-0.4897	-5.1440***
	(-0.6103)	(-1.2509)	(-3.1417)
Abnormal Earnings$_{t-1}$	-0.0000	-0.0000*	0.0000
	(-1.4282)	(-1.7126)	(0.2644)
Altman Z-Score (dummy)$_{t-1}$	-0.0548**	-0.0447	-0.0254
	(-1.9936)	(-1.5795)	(-0.6504)
Intercept	0.7174***	0.7723***	-0.3638
	(7.5372)	(7.8985)	(-1.1471)
Number of Obs	1,843	1,843	1,843
R^2	0.1449	0.1743	
Anderson-Rubin Wald F-stat for Joint Significance			15.76***
Hansen J Statistic			1.761
Endogeneity Test (Difference in Sargan-Hansen Statistics)			54.474***
Instruments Used in IV (2SLS)			Industry-median CEO Delta$_{t-1}$
			Industry-median CEO Vega$_{t-1}$
			CFO as VP$_{t-1}$
			Inside Promotion $_{t-1}$

Table 11: Correlations among Measures of Executive Pay Disparity

This table reports correlation coefficients of CEO pay gap, CEO pay slice, and Gini cofficient. CEO pay gap measures the dollar gap between CEO's pay and median pay of second-tier executives. CEO pay slice measures the percentage of total compensation of all top executives captured by CEO. Gini coefficient measures the pay inequity among the top executives. ***, ** and * denote the significance at 1%, 5% and 10% levels.

	CEO Pay Gap	CEO Pay Slice	Gini Coefficient
CEO Pay Gap	1		
CEO Pay Slice	0.3381***	1	
Gini Coefficient	0.3037***	0.5994***	1

Essay 2

Target Information Asymmetry in M&A

1. Introduction

Information asymmetry, as a form of market friction, restricts information flow on a firm's activities, creates difficulties for the market to assess the true value of a firm, and makes it easier for the managers to conceal their entrenchment activities. As a result, prior literature documents evidence that information asymmetry is negatively related to firm value (Krishnaswami and Subramaniam (1999), Anderson, Duru and Reeb (2009), and Barth, Konchitchki and Landsman (2013)). In another word, there exists an information asymmetry discount in firm value. In this study, we explore mergers & acquisitions (M&A) as a possible channel to capture the information asymmetry discount in the targets. Acquisitions are among the largest and most significant investments made by a firm. Acquirers need to go through a thorough due diligence process to obtain and verify both public and private information about the targets (Lajoux and Elson (2000)). Meanwhile, M&A announcements can stir public interests in the targets and encourage investors to gather more information about the targets. The careful scrutiny by the market and the acquirer on the targets can release large amounts of relevant information about the targets, and as a result, M&A announcements can potentially alleviate the information asymmetry discount in the targets. Empirically, we examine this conjecture by testing whether there are wealth gains at M&A announcements that are related to target information asymmetry.

Measuring information asymmetry is a difficult task because the true level of information asymmetry cannot be directly observed and there is no consensus over which proxy best capture the true level of information asymmetry. Karpoff, Lee, and Masulis (2013) suggest a novel measure of information asymmetry by employing factor analysis to produce an aggregate information asymmetry factor from eight information asymmetry proxies and find that the

information asymmetry factor is positively related to lockup periods of seasonal equity offerings. We extend the analysis by Karpoff, Lee, and Masulis (2013) and apply factor analysis to construct one information asymmetry factor using ten well-documented information asymmetry proxy variables. These variables include number of analyst following the firm, firm size, firm age, tangible assets, average bid-ask spread, abnormal accruals, return volatility, analyst forecast error, analyst forecast dispersion and Amihud.

Adopting this novel measure of information asymmetry, we begin our analysis by exploring the relation between the information asymmetry factor and firm value. As expected, we find that controlling for different sets of firm characteristics, the information asymmetry factor remains significantly positively related to cost of equity, cost of debt, and negatively related to Tobin's Q, confirming the findings by prior literature that there exists an information asymmetry discount in firm value (Anderson, Duru and Reeb (2009) and Barth, Konchitchki and Landsman (2013)).

After establishing the existence of information asymmetry discount, we proceed to explore whether M&A announcements, which are usually accompanied with release of large amounts of information about the targets, can serve as a mechanism to mitigate information asymmetry discount in the targets. Empirically, we examine the relation between M&A announcement-period wealth effects and target information asymmetry factor. Using a sample of 543 completed M&A deals of public targets from 1990 to 2014, we find strong evidence supporting our conjecture in that there are significantly positive M&A announcement-period wealth gains related to target information asymmetry factor. Specifically, we find that target-acquirer value-weighted portfolio announcement-period abnormal returns, acquirer announcement-period abnormal returns, target announcement-period abnormal returns, and

target premium all increase significantly with target information asymmetry factor. According to our estimate, one standard deviation increase in the target information asymmetry factor increases the acquirer (target) shareholder value by 43 million (10.55 million) dollars based on the median market capitalization of the acquirer (target)[6]. Our findings suggest both targets and acquirers benefit from the positive wealth creation arising from the acquisitions of opaque targets.

We investigate alternative explanations of the positive wealth gains from the target information asymmetry. One possible explanation is that the acquirer information asymmetry, instead of the target information asymmetry, is the contributor to the wealth gains. For example, there exists a transparency synergy for acquisitions by transparent acquirers. Or simply, the transparent acquirers make better acquisitions. We thus include acquirer information asymmetry into the analysis and all of our initial findings regarding the wealth gains and target information asymmetry factor continue to hold, suggesting acquirer information asymmetry does not appear to be responsible for our findings. Corporate governance literature (Masulis, Wang, and Xie (2007)) suggest corporate governance variables such as board characteristics and corporate governance indices can significantly impact M&A performance. To ensure that the positive wealth gains related to target information asymmetry are not due to better governance by either acquirers or targets, we control for the governance variables, including board size, independent board percent, CEO/chairman duality, and BCF index, of both acquirers and targets in the analysis. We find that the inclusion of corporate governance variables doesn't alter the significantly positive relation between the wealth gains and target information asymmetry factor, excluding corporate governance as the possible explanation for wealth creation related to target

[6] The acquirer dollar gain is calculated by multiplying the product of coefficient estimate of target information asymmetry on acquirer CAR (0.0211) and the target information asymmetry standard deviation (0.75) by the median acquirer market capitalization (2,714 million dollars). The target dollar gain is estimated by the same manner.

information asymmetry. Post-merger operating performance improvement is considered as another possible reason for the announcement-period wealth creation in the M&A literature (Wang and Xie (2009)). We therefore investigate whether purchasing opaque targets leads to better post-merger operating performance. Following Wang and Xie (2009), we measure the change in the operating performance as the difference in performance-adjusted ROA of the acquirer and the target as a combined firm one-year prior to the acquisition to one-year, two-year, and three-year after the acquisition. We adjust the ROA of acquirer (target) by the ROA of industry-and-ROA matched firm of the acquirer (target). We find no significant relation between the performance improvement post-merger and target information asymmetry factor. This finding precludes operating efficiency as the alternative explanation for the wealth gains related to target information asymmetry.

We next investigate if the wealth gains arising from target information asymmetry incentivize firms to purchase targets with high information asymmetry. Following Bena and Li (2014), we form three different control samples that are randomly drawn, drawn by industry- and size-matching, or drawn by industry-, size-, and book-to-market ratio-matching. Using the three pools of control firms, we estimate the target selection likelihood by conditional logit model. We find that across all three control samples, firms with high level of information asymmetry are more likely to become targets. Given the massive wealth gains arising from purchasing targets with high information asymmetry, this finding is not surprising and further confirms the prior literature on the relation between acquisition synergies and M&A decisions (Betton, Eckbo, and Thorburn (2008)).

Another noteworthy aspect is how information asymmetry affects the bargaining power between the acquirer and the target. We measure relative gain of the target versus the acquirer as

the difference between target announcement-period abnormal dollar gains and acquirer announcement-period abnormal dollar gains scaled by the sum of market capitalization of the acquirer and the target. We find that target captures significantly smaller gains than the acquirer if there is high target information asymmetry. In addition, we find that target's relative gains increase in the acquirer information asymmetry. These two findings indicate that the information asymmetry indeed impact the relative bargaining power between the acquirer and the target and the party with high information asymmetry is in a weaker position when negotiating the deal.

At last, we investigate if certain deal characteristics can be influenced by the target information asymmetry. One notable characteristics variable closely associated with target information asymmetry is the method of payment. Hansen (1987) theorizes that stock offers dominate cash offers when there is high level of target information asymmetry so the target is forced to share the risk of acquirer overpaying. To empirically examine the influence of target information asymmetry level on the choice of method of payment, we estimate a probit model with all-cash dummy as the dependent variable. We find that there exists a significantly negative relation between target information asymmetry level and the likelihood of all-cash financed acquisitions, suggesting acquirers tend to finance the deals with stocks when facing high level of information asymmetry in the targets. This finding corroborates the risk-sharing hypothesis proposed by Hansen (1987). Another deal characteristics variable receives wide attention in the literature is diversifying versus focus acquisitions. Krishnaswami and Subramaniam (1999) document that there is wealth gained from a spin-off that improves focus when there is high level of information asymmetry about a firm. Their findings suggest greater focus can mitigate information asymmetry, leading to higher firm value. In this study, we empirically examine whether target information asymmetry will bias the firms towards value-increasing focused

acquisitions using a probit model. We define acquisitions as diversifying if targets and acquirers belong to different industries defined by two-digit SIC codes. We find that target information asymmetry is associated with higher likelihood of focused acquisitions, complementing the findings by Krishnaswami and Subramaniam (1999). Moreover, we investigate if target information asymmetry also affects relative deal size, measured by the ratio of deal value to acquirer market capitalization. We find significant negative relation between target information asymmetry and relative deal size, indicating that acquisitions of targets with high information asymmetry often involves targets that are relatively smaller in size. This finding is not surprising given the uncertainty involved in acquisitions of targets with high information asymmetry. The last aspect we examine if and how target information asymmetry impacts deal closure time, the number of days it takes to complete the deals, measured as the difference between announcement dates and effective dates. We find that higher target information asymmetry is associated with shorter deal closure time, possibly because of the thorough preliminary due diligence performed on the target with high information asymmetry prior to the deal announcements. Unfortunately, we don't have any data available to further test on this conjecture.

Our paper makes two contributions to the current literature. First, by adopting a composite measure initially proposed by Karpoff, Lee, and Masulis (2013), we further confirm the existence of information asymmetry discount. More importantly, we provide evidence that M&A can serve as a channel to release the information asymmetry discount in the targets. We examine the information-discovery aspect of M&A that is rarely discussed in the literature. Second, by identifying the significant relations between target information asymmetry and various aspects of M&A including announcement-period wealth effects, target selection choice, relative dollar gains of the target versus the acquirer, and certain deal characteristics, we

contribute to the extensive literature on the possible determinants of M&A performance. Interestingly, we provide our alternative explanation to the well-documented positive wealth effects when purchasing private targets. Our evidence indicates that apart from the liquidity effect suggested by Fuller, Netter, and Stegemoller (2002), information asymmetry in the targets can also lead to the positive wealth gains in the M&A.

The paper proceeds as follows. Section 2 discusses the related literature. Section 3 describes the data and variables used in our analysis. Section 4 reports our empirical findings and discussions. Section 5 concludes the paper.

2. Literature Review

Our study builds on the extensive literature on information asymmetry. The first aspect of information asymmetry is its relation with firm value. Current literature provides overwhelming evidence from various aspects that information asymmetry negatively impacts firm value. Barth, Konchitchiki, and Landsman (2013) document that earnings transparency is negatively associated with cost of equity. Anderson, Duru, and Reeb (2009) show that founders and heirs exploit firm opacity to extract private benefits, leading to lower firm value. Krishnaswami and Subramaniam (1999) find that there is value gained from corporate spin-off decisions that mitigate information asymmetry.

Another aspect of information asymmetry is how to capture the information asymmetry level of a firm. Current literature has proposed numerous measures. For example, Barth, Konchitchiki, and Landsman (2013) use the explanatory power (R^2) of the return-earnings regressions. Anderson, Duru, and Reeb (2009) instead construct an opacity index based on the ranks of four individual proxies of information asymmetry: trading volume, bid-ask spread,

analysts following and analysts forecast errors. In our study, we follow the procedure proposed by Karpoff, Lee, and Masulis (2013). They use factor analysis to construct an information asymmetry factor based on eight common measures of information asymmetry. The eight measures are firm size, firm age, number of analysts, tangible assets, number of prior stock offers, average bid-ask spread, return volatility, and abnormal accruals. They argue that the factor analysis incorporates the correlated information in these eight measures without inducing the multicollinarity or attenuation bias. They find that their information asymmetry factor is positively related to the likelihood and the duration of an seasoned equity offerings lockup.

The last aspect of information asymmetry literature that is closely related to our research is the studies of the target's information asymmetry in the M&A. Hansen (1987) suggests that if there is greater uncertainty of target valuation, the acquirer should use stock for acquisition. In addition, Fuller,Netter, and Stegemoller (2002)) show that acquirers experience significantly positive returns when acquiring private targets but significantly negative returns when purchasing public targets and their interpretation is that acquirers capture the liquidity discount in the private targets. They propose liquidity effect as the possible explanation for the positive wealth gains. In our study, we extend their work and examine the validity of an information asymmetry explanation. We control for the liquidity effect by focusing exclusively on the public targets, which allows us to directly test the wealth effects related to target information asymmetry.

3. Data and Sample Selection

3.1. Information Asymmetry Factor

Measuring information asymmetry is a difficult task because the true level of information asymmetry cannot be directly observed. Prior literature has proposed numerous proxies to measure information asymmetry. Yet, there is no consensus over which proxy best capture the true level of information asymmetry. Moreover, these proxies sometimes produce inconsistent even contradictory results. Karpoff, Lee, and Masulis (2013) circumvent this debate by using factor analysis that produces an aggregate measure of information asymmetry from several information asymmetry proxies. They also discuss two alternative approaches. One approach is to include all relevant proxies into the analysis. However, this approach can induce multicollinearity or attenuation bias. Another approach is to construct an equal-weighted index from various information asymmetry proxies. Two shortcomings are associated with this approach: The first shortcoming is that it arbitrarily assigned equal weight to each measure and another shortcoming is that units of measurement of each proxy can significantly affect the results. Therefore, a composite measure from factor analysis so far appears to be the most suitable approach.

We extend the analysis by Karpoff, Lee, and Masulis (2013) and apply factor analysis to construct one information asymmetry factor using 10 well-documented information asymmetry proxies. These proxies are described as follows:

Number of analyst following the firm (Barth et al. (2001), Frankel and Li (2004), and Karpoff, Lee, and Masulis (2013)): taken from I/B/E/S database, averaged over the year prior to the acquisition announcements;

Firm age (Lowry, Officer, and Schwert (2010) and Karpoff, Lee, and Masulis (2013)): measured as the number of years between the firm's IPO year and the year prior to the acquisition announcements;

Firm size (Hong et al.(2000), Leary and Roberts (2010), and Karpoff, Lee, and Masulis (2013)): measured as the natural log of the book value of total assets in the year prior to the acquisition announcements;

Tangible assets (Leary and Roberts (2010) and Karpoff, Lee, and Masulis (2013)): measured as property, plant and equipment scaled by total assets in the year prior to the acquisition announcements;

Average bid-ask spread (Clarke and Shastri (2000) and Karpoff, Lee, and Masulis (2013)): calculated as the average daily bid-ask spread over closing price over the year prior to the acquisition announcements;

Abnormal accruals (Hutton, Marcus, and Tehranian (2009) and Karpoff, Lee, and, Masulis (2013)): calculated based on Kothari, Leone, and Wasley (2005) model as the absolute value of the difference between firm-specific abnormal accruals and median abnormal accruals of its corresponding industry- and performance- matched portfolio in the year prior to the acquisition announcements;

Return volatility (Coles, Daniel, and Naveen (2006) and Karpoff, Lee, and Masulis (2013)): calculated as the standard deviation of daily stock returns over the year prior to the acquisition announcements;

Analyst forecast error (Krishnaswami and Subramaniam (1999) and Brown, Hillegeist, and Lo(2009)): calculated as the absolute value of the difference between mean earnings per share forecast and the actual earnings per share over the price, averaged over the year prior to the acquisition announcements;

Analyst forecast dispersion (Krishnaswami and Subramaniam (1999) and Leary and Roberts (2010)): calculated as the standard deviation of the earnings per share over the price, averaged over the year prior to the acquisition announcements;

Amihud (Amihud(2002)): a measure of price impact per dollar of trade, calculated as daily average of the ratio of absolute value of daily stock return to daily trading volume over year prior to the acquisition announcements;

According to prior literature, the first 4 variables are expected to be negatively related to a firm's information asymmetry level whereas the remaining 6 variables are expected to be positively related to information asymmetry. Panel A of Table 1 reports the factor loadings of the first three factors using factor analysis based on the 10 variables. The sample contains 41,570 observations from 1989 to 2013. The eigenvalues of the first three factors are 1.53, 0.56, and 0.13 respectively, suggesting the first factor captures substantial amount of variation in the 10 information asymmetry proxy variables. Similar to Karpoff, Lee, and Masulis (2013), the signs of the factor loadings of the 10 variables in the first factor are opposite to the predicted signs between these variables and information asymmetry, indicating that the factor represents "information symmetry" characteristics of the firm. Following Karpoff, Lee, and Masulis (2013), we multiply this factor by -1 to convert it to information asymmetry factor.

Panel B of Table 1 describes the time series distribution of the information asymmetry factor. The time series distribution of both the mean and the median of our information asymmetry factor exhibit clear descending trend from 1989 to 2013 and change from positive to negative in 2003, indicating that the firms become more transparent over the years.

3.2. Sample Selection

We obtain our original acquisition sample from Thomson One Banker. We impose the following criteria in sample selection:

1, Both acquirer and target are US firms.

2, The acquisitions are announced between 01/01/1990 and 12/31/2014.

3, The deal value is more than $1 million.

4, The acquisition is completed.

5, The acquirer controls less than 50% of the target's share prior to the acquisition announcements and more than 50% after the transaction.

6, Both acquirer and target have financial statement information from Compustat and stock returns data from CRSP.

7, Both acquirer and target have information asymmetry factor.

Consequently, we end up with 543 M&A transactions between 1990 and 2014. Table 2 presents distribution by announcement year of our sample of acquisitions. The number of announcements jumps notably from 1997 to 1998, peaks in 1999, and significantly declines in 2000, reflecting the general trend documented by Wang and Xie (2009). The impact of financial

crisis can be seen in the acquirer and target sizes. The market capitalizations of both acquirer and target decline significantly in 2008. In every year over the entire sample period, the median acquirer information asymmetry factor is lower than the median target information asymmetry factor, indicating that acquirer is persistently more transparent than the target.

Table 3 reports the summary statistics of the variables used in our analysis. The mean (median) of information asymmetry score for the full sample in Panel A is 0.00 (0.09). For the M&A subsample in Panel C, the mean (median) information asymmetry factor drops to -0.68 (-0.612 for the acquirers, indicating that the acquirers are more transparent than firms in the overall sample. Meanwhile, the mean (median) information asymmetry score for the target is 0.31 (0.45), suggesting that targets are tend to be more opaque than firms in the overall sample.

We compute the 5-day acquirer (target) cumulative abnormal returns (CAR) during the (-2,2) window surrounding the announcement date as the primary measure of wealth effects during the M&A announcement periods[7]. We obtain announcement dates from Thomson One Banker. To calculate the abnormal returns, we use CRSP equally weighted return as the market return with parameters estimated over 200 days ending at day -11 of the announcement date (day 0). The 5-day target-acquirer portfolio abnormal returns (portfolio CAR(-2,2)) are weighted-average 5-day abnormal returns of the target and the acquirer with the weights being the market capitalization of the target and the acquirer 11 trading days prior to the announcement dates. Consistent with existing literature on the wealth effects during acquisition announcement periods (Wang and Xie (2009)), we document positive abnormal returns for the targets with mean (median) 5-day target CAR to be 25.24% (22.23%), negative abnormal returns for the acquirers

[7] We use (-5,5) abnormal returns as the alternative measure of the announcement-period wealth effects in the robustness check.

with mean (median) 5-day acquirer CAR to be -1.59% (-1.52%), and positive 5-day target-acquirer portfolio abnormal returns with mean (median) 5-day portfolio CAR to be 1.74% (1.18%). To better capture the wealth effects experienced by the target shareholders, we further include premium into the analysis. Premium is premium of offer price to target trading price one week prior to the announcement date as reported in Thomson One Banker. The mean (median) premium in our sample is 36.93% (34.04%).

4. Empirical Findings and Discussions

4.1. Information Asymmetry Factor and Firm Value

It has been established in the literature that information asymmetry is negatively related to firm value (Krishnaswami and Subramaniam (1999), Anderson, Duru and Reeb (2009), and Barth, Konchitchki and Landsman (2013)). However, these studies don't have consensus over the measures of information asymmetry. In our study, we follow Karpoff, Lee, and Masulis (2013) and use factor analysis that aggregates the common information contained in 10 different measures of information asymmetry to construct an information asymmetry factor. We start our analysis by examining the relation between our information asymmetry factor and firm value. To systematically gauge the effect of information asymmetry factor on firm value, we investigate three different aspects of firm value: cost of equity, cost of debt, and Tobin's Q. According the extensive literature on information asymmetry in corporate finance, information asymmetry makes it difficult for outside investors to correctly assess the true economic activities of the firm and is often associated with higher agency costs. Thus, if our information asymmetry factor accurately captures the extent of information asymmetry in a firm, we should observe cost of

equity and cost of debt increase in the information asymmetry factor while Tobin's Q decreases in the information asymmetry factor.

Table 4 presents our findings on the association between firm value and information asymmetry factor. Panel A reports OLS regression results of expected cost of equity on information asymmetry factor controlling for year and two-digit SIC code industry fixed effects. We estimate expected cost of equity following Barth, Konchitchki, and Landsman (2013). For each firm, we first estimate the factor betas associated with the firm's return by estimating the following monthly time-series regression using the 60-month returns prior to year t:

$$RET_{i,m} - R_{f,m} = \alpha_i + \beta_{RMRF,i}\left(R_{M,m} - R_{f,m}\right) + \beta_{SMB,i}SMB_m + \beta_{HML,i}HML_m + \beta_{MOM,i}MOM_m + \varepsilon_{i,m} \quad (1)$$

where $RET_{i,m} - R_{f,m}$ is the firm's monthly return in excess of risk-free return. $RET_{i,m} - R_{f,m}$ is the monthly return of market portfolio in excess of the risk-free rate. SMB_m , HML_m , MOM_m are the size, book-to-market, and momentum factor portfolio returns extracted from French's data library[8]. We use $\hat{\beta}_{RMRF,i}$, $\hat{\beta}_{SMB,i}$, $\hat{\beta}_{HML,i}$,and $\hat{\beta}_{MOM,i}$ to denote the estimated betas from (1). We then place the estimated betas in the following equation to calculate the expected cost of equity for firm i:

$$ECC_{i,t} = \bar{R}_{f,t} + \hat{\beta}_{RMRF,i,t}, \overline{\left(R_M - R_f\right)}_t + \hat{\beta}_{SMB,i,t}\overline{SMB}_t + \hat{\beta}_{HML,i,t}\overline{HML}_t + \hat{\beta}_{MOM,i,t}\overline{MOM}_t \quad (2)$$

where $\overline{\left(R_M - R_f\right)}_t$, $\overline{SMB}_t$, $\overline{HML}_t$, and $\overline{MOM}_t$ are the expected annual factor returns for year t+1, which we estimate by first calculating the average of the 60 monthly factor returns prior to

[8] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

month m and then compounding the resulting monthly returns over 12 months prior to year t. Column (1) reports the impact of information asymmetry factor on the expected cost of equity excluding other fundamental risk characteristics. As predicted, the coefficient estimate of information asymmetry factor is positive and significant at 1% level. In column (2), we further include the fundamental risk characteristics variables including leverage, book-to-market ratio, market capitalization, market beta, and return momentum. The coefficient estimate of information asymmetry factor remains positively significant at 1% level. In terms of economic impact, a one standard deviation increase in information asymmetry factor results in 0.045 standard deviation increase in the cost of equity. Our findings indicate that information asymmetry factor contains incremental information to those already contained in these fundamental risk characteristics variables. Additionally, we find that expected cost of equity decreases in the book-to-market ratio and increases in leverage, market beta, and return momentum, consistent with the predictions made by Barth, Konchitchki, and Landsman (2013).

Panel B of Table 4 examines the relation between information asymmetry factor and cost of debt for new debt issues controlling for year and industry fixed effects. We obtain data on new debt issues from SDC Platinum database. Cost of debt is measured as the yield spread between yield to maturity of new debt issues and yield of maturity of benchmark Treasury Bonds with similar maturity. Cost of debt reflects bond investors' assessment of lending risk. Since information asymmetry clouds bond investors' ability to evaluate the lending risk, we expect that the risk premium demanded by bond investors should increase in the level of information asymmetry within a firm. Column (1) presents the regression results using information asymmetry factor as the only explanatory variable while column (2) further includes other control variables that can potentially impact cost of debt. In both columns, the coefficient

estimates of information asymmetry factor are positively significant. In column (1), the coefficient estimate of information asymmetry factor is 1.2062, significantly at 1% level while the coefficient estimate of information asymmetry factor decreases in magnitude to 0.2455 in column (2) but remains significant at 1% level. Using the coefficient estimate of information asymmetry factor in column (2), we estimate that one standard deviation increase in information asymmetry factor is associated with 0.19 standard deviation increase in the cost of debt. The findings indicate that bond investors demand higher risk premium in response to high level of information asymmetry within the issuing firm. In terms of control variables, consistent with existing literature, we find that cost of debt increases in book-to-market ratio, return risk, and leverage while decreases in the firm's size as proxied by sales[9], interest coverage, Altman Z-score, and issue size.

So far, we document that information asymmetry factor is associated with higher cost of equity and cost of debt. In Panel C of Table 4, we directly gauge the impact of information asymmetry factor on firm value. We measure firm value by industry-adjusted Tobin's Q where Tobin's Q is defined as the ratio of market value of total assets to the book value of total assets and industry-adjusted Tobin's Q is calculated by subtracting industry median Tobin's Q from the firm's Tobin's Q. In column (1), we control for some basic firm characteristics variables such as size proxied by sales, Delaware incorporation, S&P inclusion, and leverage, whereas in column (2), we further control for other variables documented by prior literature that can potentially influence Tobin's Q including capital to sales, R&D to capital, advertising to capital, and dividend yield. In both model specifications, we report significantly negative coefficient estimates of information asymmetry factor. The coefficient estimate of information asymmetry

[9] Because total assets are used in factor analysis to estimate the information asymmetry factor. To avoid multicollinearity issue, we use sales to proxy for size in the firm value regressions.

factor is -0.2404 in the first model specification and -0.2606 in the second model specification and both are significant at 1% level. Coefficient estimate of information asymmetry factor in column (2) suggests that one standard deviation increase in the information asymmetry factor results in 0.11 standard deviation decrease in industry-adjusted Tobin's Q. In terms of control variables, we find that industry-adjusted Tobin's Q is positively related to Delaware incorporation , SP 500 inclusion, capital-to-sales ratio, and R&D-to-capital ratio and negatively related to size and leverage. The overall findings regarding cost of equity, cost of debt, and Tobin's Q confirm the existence of an information asymmetry discount in firm value. In the subsequent sections, we examine the possibility of M&A serves as a channel to recover information asymmetry discount in the targets by testing whether there exists M&A wealth gains associated with target's information asymmetry factor. We argue that since targets of M&A announcements usually go through careful scrutiny by the acquirer and the market, M&A announcements can reveal large amounts of information about the targets. As a result, M&A announcements can lessen information asymmetry level in the targets, and unlock their information asymmetry discount.

4.2.Target Information Asymmetry Factor and Target-acquirer Portfolio Abnormal Returns

In the previous section, we establish the existence of information asymmetry discount using our information asymmetry factor. We conjecture that M&A announcements can serve as a mechanism to unlock the target information asymmetry discount because M&A announcements can lead to the release of large amounts of information about the targets due to careful scrutiny of the targets by the acquirer and the market. In this section, we examine the total M&A announcement-period wealth effects related to target information asymmetry. If M&A serves as

a mechanism to unlock target information asymmetry discount, we expect to find significant M&A announcement-period total wealth gains related to target information asymmetry. We measure the overall M&A announcement-period market reaction by value-weighted target-acquirer portfolio 5-day abnormal returns (portfolio CAR (-2,2)) in which the weights are determined by the market capitalization of the target (acquirer) 11 trading days prior to the announcement dates. Table 5 reports the results from the total wealth effects regressions. In column (1), the only explanatory variable is target information asymmetry factor and thus avoids any potential collinearity between target information asymmetry factor and other control variables. In column (2), we include the acquirer and deal characteristics variables into the analysis. In column (3), we further control for the target characteristics variables. We control for the year and industry fixed effects in all three columns. In column (1), the coefficient estimate of target information asymmetry factor is 0.0248 and significant at 1% level, while in column (2), the coefficient estimate of target information asymmetry factor is 0.0284 and significant at 1% level, and at last in column (3), the coefficient estimate of target information asymmetry factor is 0.0256 and significant at 5% level. Using the coefficient estimate in column (3), we find that portfolio total abnormal returns increase by 1.92% per one standard deviation increase in target information asymmetry factor. Or in dollar terms, one standard deviation increase in target information asymmetry factor results in 57 million abnormal dollar gains in total wealth shared by target and acquirer shareholders based on the median market capitalization of the targets and acquirers[10]. Our findings confirm that target information asymmetry indeed is associated with positive total wealth creation during the M&A announcement period. In addition, we find that

[10] we multiply the product of coefficient estimate of target information asymmetry factor in column (3) and standard deviation of target information asymmetry by the sum of the median market capitalization of the targets and the acquirers.

the portfolio abnormal returns increase in acquirer's Tobin's Q and decreases in target's Tobin's Q, consistent with the evidence documented by Lang, Stulz, and Walkling (1989).

4.3.Target Information Asymmetry Factor and Acquirer Abnormal Returns

In this section we examine whether acquirers benefit from the information discovery aspect of M&A by examining the relation between acquirer market reaction and target information asymmetry. We measure acquirer market reaction by acquirer 5-day cumulative abnormal returns (CAR) during the (-2,2) window surrounding the announcement date. Table 6 presents the results of OLS regressions of acquirer 5-day abnormal returns on target information asymmetry factor controlling for year and industry fixed effects. In column (1) we only include target information asymmetry factor as the explanatory variable, the coefficient estimate of which is 0.0327 and significant at 1% level. In column (2), we include acquirer and deal characteristics variables. The coefficient estimate of target information asymmetry factor decreases to 0.0215 but remains significant at 5% level. Finally, in column (3), we control for target, acquirer, and deal characteristics variables. The coefficient estimate of target information asymmetry factor is 0.0211 and still significant at 5% level. In terms of economic significance of target information asymmetry factor on acquirer returns, based on the coefficient estimate of target information asymmetry in column (3), we calculate that acquirer abnormal returns increase by 1.58% in response to one standard deviation increase in target information asymmetry. This multiplying the median acquirer market capitalization of 2,714 million dollars yields approximately 43 million abnormal dollar gains. Our findings indicate acquirer shareholders benefit greatly from acquisitions of firms with high information asymmetry. In addition, we find that acquirers experience higher abnormal returns in acquisitions made by smaller acquirers or in acquisitions financed all by cash, consistent with the findings by Masulis, Wang, and Xie (2007).

4.4.Target Information Asymmetry Factor, Target Abnormal Returns, and Premium

The findings so far confirm that the acquisitions of targets with high information asymmetry result in massive wealth gains in M&A, benefiting acquirer shareholders. In this section, we examine whether the target shareholders also benefit. To better capture the wealth effects experienced by the target shareholders, additional to target abnormal returns, we further include premium into the analysis. Premium is premium of offer price to target trading price one week prior to the announcement date. Column (1) and (2) of Table 7 report the effects of target information asymmetry factor on target abnormal returns while column (3) and (4) report the effects of target information asymmetry factor on premium. In column (1) and (3), we only include target information asymmetry factor as the explanatory variable. In column (2) and (4), we further control for target, acquirer, and deal characteristics. The results across all four columns show the positive effects of target information asymmetry on target shareholder wealth. The coefficient estimate of target information asymmetry factor in column (1) is 0.074 and significant at 1% level, in column (2) is 0.0569 and significant at 5% level, in column (3) is 0.0892 and significant at 1% level, and in column (4) is 0.1250 and significant at 1% level. In terms of economic significance, the estimates in column (2) and (4) indicate that one standard deviation increase in target information asymmetry factor leads to 4.27% increase in target abnormal returns and 9.38% increase in premium. Using median target capitalization of 247 million dollars, we calculate the abnormal dollar impact of one standard deviation of target information asymmetry factor is 10.55 million dollars. In terms of the control variables, we find that target abnormal returns increase in acquirer's Tobin's Q and decrease in target's Tobin's Q. Premium decreases in target size and increases in target leverage.

4.5.Controlling for Acquirer Information Asymmetry

So far our results suggest that acquisitions of targets with high information asymmetry lead to significantly positive M&A announcement-period wealth gains and the gains are shared by both acquirer and target. We conjecture that the release of target information asymmetry discount should be attributed to the wealth creation. However, there are alternative explanations to the positive wealth effects. One alternative explanation is that the acquirer, instead of the target, information asymmetry is the reason for the wealth creation. There are two ways that transparent acquirers can create value. One is that transparent acquirers are easier to monitor and less inflicted with agency costs. Thus, they are simply better or more efficient at target selection. Alternatively, there could exist a transparency synergy in the acquisitions in which transparent acquirers improve the transparency level in the targets, creating more value. In either cases, the acquirer information asymmetry should play a more dominant role than the target information asymmetry, and its inclusion should greatly weaken our previous findings regarding the wealth effects related to the target information asymmetry. In this section, we investigate the validity of the acquirer information asymmetry argument by including acquirer information asymmetry factor into the analysis. Table 8 reports the results controlling for acquirer information asymmetry factor. The coefficient estimates of target information asymmetry factor on target-acquirer portfolio abnormal returns, acquirer abnormal returns, target abnormal returns, and premium all remain significantly positive, showing that the inclusion of acquirer information asymmetry factor doesn't materially impact our previous findings. Specifically, according to column (1) of Table 8, the coefficient of target information asymmetry on target-acquirer portfolio abnormal returns is 0.0181, significant at 10% level. Compared to the original coefficient estimate of target information asymmetry at 0.0256, significant at 5% level reported in column (3) of Table 5. The inclusion of acquirer information asymmetry does weaken our

original finding on the positive aggregate value effect of target information asymmetry. But the impacts of target information asymmetry on the rest of dependent variables remain at the same magnitude and significance level as those reported in Table 6 and Table 7. These findings suggest that acquirer information asymmetry cannot fully explain the positive wealth gains related to target information asymmetry. Interestingly, the acquirer information asymmetry factor does significantly impact acquirer abnormal returns. The coefficient estimate of acquirer information asymmetry is on acquirer abnormal returns is -0.0417, significant at 1% level. The significantly negative relation between acquirer abnormal returns and acquirer information asymmetry factor indicates that transparent acquirers make better acquisitions. Note that the negative association between acquirer information asymmetry and acquirer abnormal returns suggests that the M&A information-release aspect for the target doesn't apply to the acquirer.

4.6.Controlling for Corporate Governance

Literature documents corporate governance can contribute significantly to the firm's overall performance and investment efficiency. Masulis, Wang, and Xie (2007) show that various corporate governance mechanisms, especially the corporate governance indices, can significantly impact the acquirer M&A announcement-period abnormal returns. Wang and Xie (2009) report that there exists a corporate governance synergy in that when the acquirer has better corporate governance than the target, the acquisition can improve the target's corporate governance, generating greater total shareholder value for both acquirer and target. In this section, we examine whether our previously documented relation between the M&A wealth effects and target information asymmetry can be explained by the corporate governance of the acquirer and the target. Table 9 presents the regression results controlling for corporate governance variables. We control for two different sets of corporate governance variables: board

characteristics and the corporate governance index (BCF index[11]). Because the board characteristics data are available from 1996 and BCF index is available from 1990, we regress them separately to maintain the maximum number of observations. The board characteristics variables include board size, independent board percentage, CEO/Chairman duality. Column (1), (3), (5), and (7) report the effects of target information asymmetry on portfolio abnormal returns, acquirer abnormal returns, target abnormal returns and, premium after controlling for board characteristics respectively. Compared to the original coefficient estimates of target information asymmetry reported in Table 5, 6, and 7, the effect of target information asymmetry on target premium weakens slightly but remains significantly positive at 5% level while the effects of target information asymmetry on the remaining variables stay qualitatively same in both magnitude and significance level. In terms of the corporate governance index, we control for BCF index and target-acquirer BCF difference to capture the effects of acquirer shareholder rights and shareholder rights transfer from the acquirer to the target. Column (2), (4), (6), and (8) report the effects of target information asymmetry on portfolio abnormal returns, acquirer abnormal returns, target abnormal returns and, premium after controlling for corporate governance index effect respectively. The impact of target information asymmetry on portfolio abnormal returns after controlling for corporate governance index effect remains positive and becomes more significant. Meanwhile, the impact of target information asymmetry on acquirer abnormal returns after controlling for corporate governance index effect stays the same in magnitude but becomes significant only at 10% level. At last, the impacts of target information asymmetry on target abnormal returns and premium after controlling for corporate governance index effect remain qualitatively the same in both magnitude and significance level. Our findings

[11] ISS (formerly RiskMetrics) changes their data gathering practice after 2006, which unfortunately fails to provide enough information to construct the GIM index, which is used by Wang and Xie (2008).

indicate that corporate governance can't explain the positive M&A wealth effect arising from target information asymmetry. Finally, the regression results show that only target board size has a significantly positive relation with target abnormal returns while the rest of the corporate governance variables are not significant. The discrepancy between our findings and the findings by Masulis, Wang, and Xie (2007) could be because of the different samples we use. Our sample includes only public targets while sample employed by Masulis, Wang, and Xie (2007) includes private, subsidiary, and public targets.

4.7. Long-term Operating Performance Change and Target Information Asymmetry

We conjecture that the positive wealth creation from target information asymmetry factor during the M&A announcement periods arises from the release of the information asymmetry discount in the targets. If so, the gains should be one-time gains. However, it is possible the announcement-period gains reflect the market expectation of long-term operating performance improvement in acquiring the opaque targets. We therefore investigate the if the acquisitions of targets with high information asymmetry results in the long-term operating performance improvement. Following Wang and Xie (2009), we measure the operating performance improvement by the change in return on assets (ROA) of the acquirer and the target as a combined firm from prior to the acquisition to three years after the acquisition. We adjust the ROA of the acquirer (target) by the ROA of acquirer's (target's) pre-merger performance- and industry- matching firm. We select the control firm of the acquirer (target) first by matching by two-digit SIC codes and then we choose from the industry-matching firms the firm that has closest pre-merger ROA with the acquirer (target). We combine the control firm of the target with the control firm of the acquirer to form an imaginary combined firm where the weights are determined by the total assets. We adjust the pre-merger ROA, one-year, two-year, three-year

post-merger ROA of the merged firm by the imaginary combined firm and calculate the change in the adjusted ROA from pre-merger to one-year, two-year, and three-year post-merger. Table 10 reports the regression results. We don't find any significant relation between target information asymmetry factor and changes in performance-adjusted ROA over the three years. We therefore can exclude the performance operating efficiency improvement as the alternative explanation for the wealth gains related to target information asymmetry during M&A announcements.

4.8. Information Asymmetry and Target Selection

We have identified that there exist significant wealth gains related to target information asymmetry during M&A announcement period, which we attribute to the release of the information asymmetry discount in the targets. We preclude the acquirer information asymmetry, corporate governance, and long-term operating performance efficiency improvement as the alternative explanations. In this section, we examine whether the wealth gains can motivate the target selection choice. Bena and Li (2014) argue that synergies can drive the M&A decisions. Given the massive wealth creation arising from purchasing targets with high information asymmetry, we expect information asymmetry can be an important determinants of target selection. To examine the relation between information asymmetry and target selection, we form three pools of control sample (Bena and Li (2014)). The first control sample is formed by 5 firms randomly drawn from the control sample of firms that are not targets or acquirers over the three years prior to the acquisition announcements and have information asymmetry factor available. The second control sample is formed by 5 industry- and size-matched firms that are drawn from the control sample of firms that are not targets or acquirers over the three years prior to the acquisition announcements and have information asymmetry factor available. The last

control sample is formed by 5 industry-, size-, and book-to-market ratio-matched firms that are drawn from the control sample of firms that are not targets or acquirers over the three years prior to the acquisition announcements and have information asymmetry factor available. Employing the three different pools of control samples, we estimate the effect of information asymmetry on target selection choice using a conditional logit model. Table 11 reports the results. Consistent with our expectation, across the three different sample pools, we find that consistent evidence that firms with high information asymmetry are more likely to be the targets. Additionally, we find that firms with higher R&D, higher ROA, cash, and lower stock returns are more likely to be chosen as the targets, consistent with evidence presented by Bena and Li (2014).

4.9. Relative Dollar Gains and Target Information Asymmetry

In this section, we examine how the division of M&A announcement-period gains between the acquirer and the target related to target information asymmetry. According to Ahern (2012), the division of gains can indicate the relative bargaining power between the acquirer and the target. In this section, we examine how target information asymmetry related to the relative gains of the target versus the acquirer. Following Ahern (2012), the relative dollars gains is measured as the difference in target 5-day announcement-period dollar gains minus acquirer 5-day announcement-period dollar gains scaled by the sum of the acquirer market cap and the target market cap 50 days prior to the announcement date. Table 12 reports the estimation results. We find that target captures significantly smaller gains than the acquirer if there is high target information asymmetry. In addition, we find that target's relative gains increase in the acquirer information asymmetry. These two findings indicate that the information asymmetry indeed impact the relative bargaining power between the acquirer and the target and the party with high information asymmetry is in a weaker position when negotiating the deal.

4.10. Deal Characteristics and Target Information Asymmetry

Prior literature documents that certain deal characteristics in M&A are influenced by information asymmetry level in the targets. One notable characteristics variable closely associated with target information asymmetry is the method of payment. Hansen (1987) theorizes that stock offers dominate cash offers when there is high level of target information asymmetry so the target is forced to share the risk of acquirer overpaying. To examine the influence of target information asymmetry level on the choice of method of payment, we estimate a probit model with all-cash dummy as the dependent variable controlling for year and industry fixed effects. All-cash dummy takes a value of one if the acquisition is financed entirely by cash and zero if the acquisition is financed partly or entirely by stock. Column (1) of Table 13 reports the estimation results. The coefficient estimate of target information asymmetry factor on all-cash dummy is negative (-0.5341) and significant at 1% level, indicating that target information asymmetry is associated with higher likelihood of stock-financed acquisitions. This finding is consistent with the risk-sharing of acquirer overpaying hypothesis proposed by Hansen (1987).

Another deal characteristics variable receives wide attention in the literature is diversifying versus focus acquisitions. Krishnaswami and Subramaniam (1999) document that there is wealth gained from a spin-off that improves focus when there is high level of information asymmetry about a firm. Their findings suggest greater focus can mitigate information asymmetry, leading to higher firm value. Meanwhile, diversifying acquisitions are often associated with risk-reduction motives. Amihud and Lev (1981) suggests that managers to engage in diversifying acquisitions to reduce the exposure to firm-specific risk. we therefore empirically examine whether target information asymmetry will bias the firms towards value-

increasing focused acquisitions or risk-reduction diversifying acquisition using a probit model. We define acquisitions as diversifying if targets and acquirers belong to different industries defined by two-digit SIC codes. Column (2) of Table 13 reports the estimation results. The coefficient estimate of target information asymmetry on diversifying dummy is negative (-0.5048) and significant at 5% level. This finding complements the findings by Krishnaswami and Subramaniam (1999) , confirming that firms resort to focus-increasing activities when facing high level of information asymmetry. This finding indicates that better understanding of acquirers of their own industry allows them competitive advantage when purchasing opaque target in the same industry .

The third feature we look at in association with target information asymmetry is relative deal size. We posit that deals with relative smaller deal size can be better integrated and thus target information asymmetry should be associated with smaller relative deal size. We measure the relative deal size as the ratio of deal value as reported by Thomson One Banker to acquirer market capitalization 11 trading days prior to the announcement dates. Column (3) of Table 13 reports that the coefficient estimate of target information asymmetry on relative deal size is negative (-0.2329) and significant at 1% level, suggesting that targets with high information asymmetry are often involved in deals small in size relative to the acquirer market capitalization.

The last aspect we examine is how target information asymmetry impacts the number of days it takes to close the deals, measured as the difference between announcement dates and effective dates. Because of the skewness of the distribution of deal closure time, we use the logarithm transformation of the variable plus one. We find that target information asymmetry negatively affects the deal closure time. We conjecture that the due diligence prior to the official announcements of the deals might contribute to this finding. In particular, our untabulated results

suggest that this relation concentrates in focused acquisitions, again confirming the information advantage of acquisitions of targets in the same industry.

4.11. Robustness check: 11-day abnormal returns and target information asymmetry

Our primary measure of M&A announcement-period wealth effects are 5-day cumulative abnormal returns during the (-2,2) window surrounding the announcement date. In this section, we use the 11-day cumulative abnormal returns during the (-5,5) window surrounding the announcement date as the alternative measure of shareholder wealth effects and re-examine how target information asymmetry factor impacts shareholder wealth during the M&A announcement periods. Table 14 reports the regression results using the 11-day cumulative abnormal returns. We find that our previous findings regarding the relation between target information asymmetry factor and target-acquirer portfolio abnormal returns, acquirer abnormal returns, and target abnormal returns stay robust.

5. Conclusion

In this paper, we study the target information asymmetry as a possible contributor to the wealth gains in M&A. We argue that because M&A usually is usually accompanied by large amounts of information-gathering on the targets, M&A can serve as a channel to release the information asymmetry discount in the targets. Using a novel measure of information asymmetry, we first confirm the existence of information asymmetry discount in firm value. We then test the relation between M&A wealth effects and target information asymmetry and find that significantly positive relations between target information asymmetry and all measures of the announcement-period wealth effects including target-acquirer portfolio abnormal returns, acquirer abnormal returns, target abnormal returns, and premium. We test and precludes acquirer

information asymmetry, corporate governance, and long-term operating performance improvement as the alternative explanations of the wealth gains. Our findings confirm the information-discovery aspect of M&A. In addition, we find that firms with high information asymmetry are more likely to become targets and the bargaining power between the acquirer and the target weakens in the party's information asymmetry level. Our probit regressions analysis shows that target information asymmetry is associated with higher likelihood of stock-financed acquisitions and focused acquisitions. Finally, both the relative deal size and deal closure time decrease in the target information asymmetry. In summary, we show that target information asymmetry is an important determinants of the M&A performance.

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Appendix : Variable Definitions

Variable	Description
Panel A: Information Asymmetry Factor and Variables	
Information asymmetry factor	The first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables, multiplying by (-1)
Number of analyst following the firm	taken from I/B/E/S database, averaged over the year prior to the acquisition announcements
Firm age	measured as the number of years between the firm's IPO year and the year prior to the acquisition announcements
Firm size	measured as the natural log of the book value of total assets in the year prior to the acquisition announcements
Tangible assets	measured as property, plant and equipment scaled by total assets in the year prior to the acquisition announcements
Average bid-ask spread	calculated as the average daily bid-ask spread over closing price over the year prior to the acquisition announcements
Abnormal accruals	calculated based on Kothari, Leone, and Wasley (2005) model as the absolute value of the difference between firm-specific abnormal accruals and median abnormal accruals of its corresponding industry- and performance- matched portfolio in the year prior to the acquisition announcements
Return volatility	calculated as the standard deviation of daily stock returns over the year prior to the acquisition announcements
Analyst forecast error	calculated as the absolute value of the difference between mean earnings per share forecast and the actual earnings per share over the price, averaged over the year prior to the acquisition announcements.
Analyst forecast dispersion	calculated as the standard deviation of the earnings per share over the price, averaged over the year prior to the acquisition announcements
Amihud	a measure of price impact per dollar of trade, calculated as daily average of the ratio of absolute value of daily stock return to daily trading volume over year prior to the acquisition announcements
Panel B: Dependent Variables	
Expected cost of equity	Estimated based on size, book-to-market, and momentum factors (Barth, Konchitchki, and Landsman (2013))
Cost of debt	The yield spread between yield to maturity of new debt issues and yield of maturity of benchmark Treasury Bonds with similar maturity
Deal Closure Time	Number of days to close the deal, measured as the difference between date announced and date effective
Industry-adjusted Tobin's Q	Tobin's Q is calculated as market value of assets divided by book value of assets, where market value of assets is computed as book value of assets less book value of common stock plus

	the market value of common stock ((item6-item60+item25*item199)/item6). Industry-adjusted Tobin's Q is the firm Tobin's Q less industry-median Tobin's Q where industry is defined by two-digit SIC code
Portfolio CAR (-2,2)	Value-weighted 5-day target-acquirer portfolio abnormal returns where the weight is determined by the market value of equity 11 trading days prior to the announcement date
Portfolio CAR (-5,5)	Value-weighted 11-day target-acquirer portfolio abnormal returns where the weight is determined by the market value of equity 11 trading days prior to the announcement date
Acquirer CAR (-2,2)	5-day acquirer announcement-period abnormal returns where day 0 is the announcement date
Acquirer CAR (-5,5)	11-day acquirer announcement-period abnormal returns where day 0 is the announcement date
Target CAR (-2,2)	5-day target announcement-period abnormal returns where day 0 is the announcement date
Target CAR (-5,5)	11-day target announcement-period abnormal returns where day 0 is the announcement date
Premium	Premium of offer price to target trading price one week prior to the announcement date as reported in Thomson One Banker
Change in ROA	The difference between post-acquisition performance-adjusted ROA and pre-acquisition performance-adjusted ROA. Performance-adjusted ROA is computed as the ROA of the acquirer or the target less ROA of its corresponding control firm. ROA is calculated as operating income before depreciation (item 13) over book value of total assets (item6)
Target Selection	Dummy variable, equals one for the target firms and zero for the control firms
Relative dollar gains	Measured as the difference in target 5-day announcement-period dollar gains minus acquirer 5-day announcement-period dollar gains scaled by the sum of the acquirer market capitalization and target market capitalization 50 trading days prior to the announcement date
Panel C: Characteristics Variables	
All-Cash deal	Dummy variable, equals one for purely cash-financed acquisitions, zero otherwise
BCF index	Constructed based on BCF (2009), the sum of 6 shareholder rights provisions
Board size	Number of directors on the firm's board
Cash	Measured as cash (item 1) over book value of total assets (item 6)
CEO/Chairman duality	Dummy variable, equals one if the CEO is also the chairman of the board
Competing offer	Dummy variable, equals one for deals that have competing bidders, zero otherwise.
Diversifying	Dummy variable, equals one if the acquirer and the target don't

	share the same two-digit SIC code, zero otherwise.
High tech combination	Dummy variable, equals one if the acquirer and the target are both from high tech industry with SIC codes 3571, 3572, 3575, 3577,3578, 3661, 3663,3669, 3674, 3812,3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899,7370, 7371, 7372, 7373, 7374, 7375, 7378 and 7379
Independent board	The percentage of board members that are independent
Leverage	Computed as book value of debts (item34+item9) over market value of total assets(item6-item60+item25*item199).
Market Cap	Market capitalization, calculated as number of shares outstanding multiplied by the stock price at the 6th trading day prior to the announcement date
R&D	Competed as the research & development expenditure (item13) scaled by total assets (item 6)
Relative deal size	Computed as deal value over acquirer's market capitalization
Return on Assets (ROA)	Computed as operating income before depreciation (item 13) over book value of total assets (item6)
Book to market	Measured as book value of equity (item 60) over market value of equity (item25*item199)
Sales	Taken as item 12
Sales growth	The growth rate of sales
Stock return	Buy-and-hold stock return over the year prior to the acquisition announcements
Tobin's Q	Calculated as market value of assets divided by book value of assets, where market value of assets is computed as book value of assets less book value of common stock plus the market value of common stock ((item6-item60+item25*item199)/item6)

Table 1: Information Asymmetry Factor

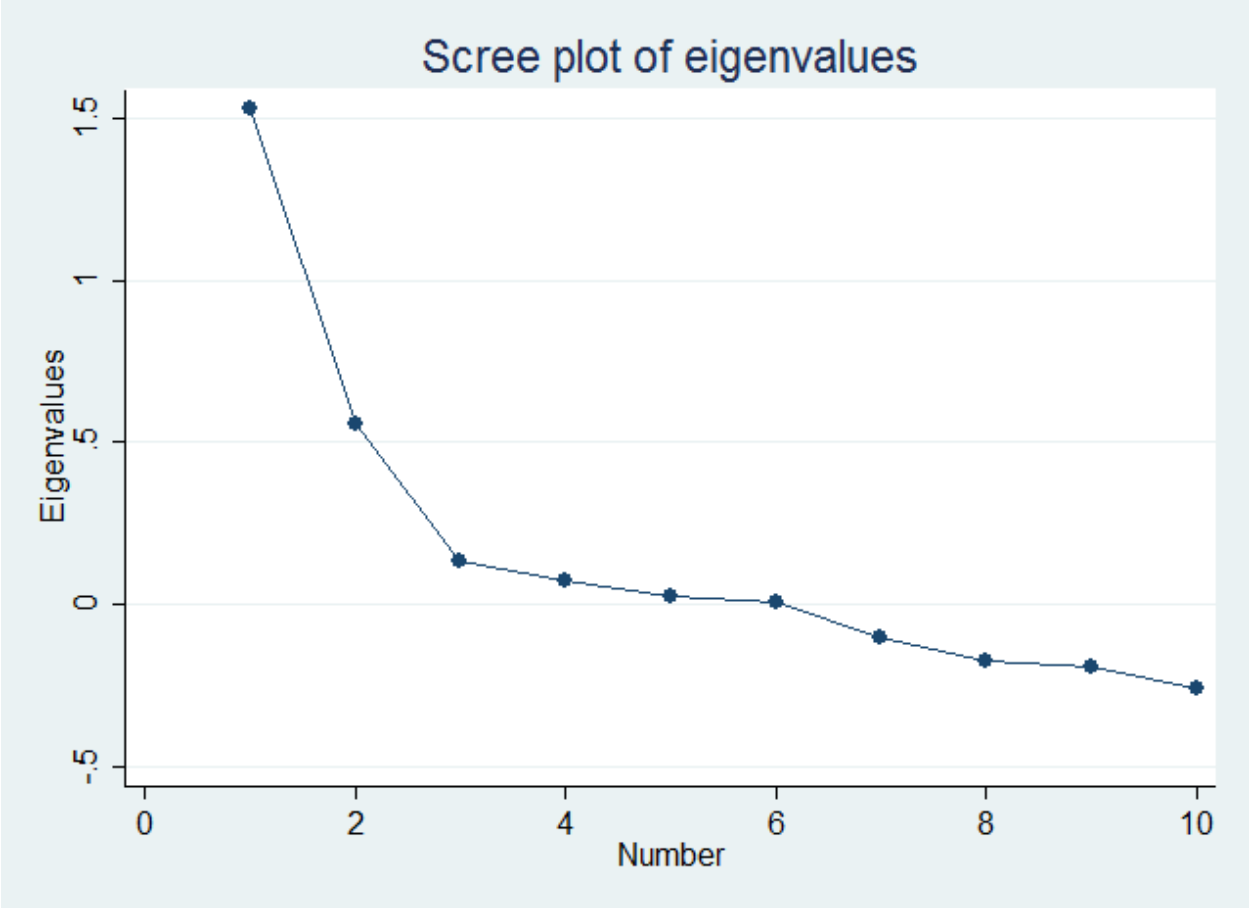
Panel A: Factor Loadings

This table reports the factor loadings for the first three factors from the factor analysis used to construct one information asymmetry factor. The sample contains 41,570 observations from 1989 to 2013. Following Karpoff, Lee, and Masulis (2013), we apply factor analysis using ten well-documented information asymmetry proxy variables to construct the information asymmetry factor. Similar to Karpoff, Lee, and Masulis (2013), the factor loadings of factor 1 has opposite signs with information asymmetry as predicted. We transform it by multiplying the factor by (-1). The Kaiser-Meyer-Olkin (KMO) measures the sampling adequacy. All variables are defined in the Appendix.

Variable	Predicted Correlation with Information Asymmetry	Factor 1	Factor 2	Factor 3	KMO
No. of Analysts	-	0.5846	-0.0571	-0.1524	0.6346
Firm age	-	0.4442	-0.0087	0.1598	0.7749
Firm size	-	0.7437	-0.0348	0.0484	0.6175
Tangible assets	-	0.1562	0.0774	0.2376	0.6098
Average bid-ask spread	+	-0.0584	0.0890	-0.0844	0.6687
Abnormal accruals	+	-0.1309	0.1119	-0.0120	0.6390
Return volatility	+	-0.4638	0.3996	-0.1714	0.6910
Analyst forecast error	+	-0.0449	0.4755	0.0297	0.6133
Analyst forecast dispersion	+	-0.0713	0.4966	0.0479	0.6066
Amihud	+	-0.1292	0.1633	-0.0591	0.7202
KMO overall					0.6524
Eigenvalue		**1.5258**	0.5566	0.1344	

Graph 1: Scree Plot

This graph depicts the eigenvalues of the factors based on the 10 original information asymmetry proxy variables. It provides a visual assessment on which factor explains most variations in the original variables.



Panel B: Time Series Distribution of Information Asymmetry Factor

This table presents times series distribution of information asymmetry factor. The sample contains 41,570 observations of from 1989 to 2013.All variables are defined in the Appendix.

Year	N	Percentage of Sample (%)	Information asymmetry Factor (Median)	Information asymmetry Factor (Mean)
1989	605	1.46	0.39	0.34
1990	689	1.66	0.48	0.44
1991	740	1.78	0.48	0.40
1992	941	2.26	0.51	0.40
1993	1,149	2.76	0.47	0.37
1994	1,366	3.29	0.46	0.36
1995	1,514	3.64	0.42	0.32
1996	1,936	4.66	0.48	0.38
1997	2,089	5.03	0.42	0.33
1998	2,124	5.11	0.40	0.34
1999	2,106	5.07	0.35	0.29
2000	2,054	4.94	0.39	0.32
2001	1,772	4.26	0.32	0.26
2002	1,668	4.01	0.10	0.04
2003	1,590	3.82	-0.09	-0.16
2004	1,735	4.17	-0.13	-0.22
2005	1,833	4.41	-0.17	-0.26
2006	1,918	4.61	-0.17	-0.25
2007	2,022	4.86	-0.19	-0.27
2008	1,966	4.73	-0.05	-0.11

2009	1,848	4.45	-0.17	-0.25
2010	1,889	4.54	-0.35	-0.43
2011	1,967	4.73	-0.34	-0.43
2012	1,987	4.78	-0.38	-0.48
2013	2,062	4.96	-0.45	-0.51
Total	41,570	100.00	0.08	0.00

Table 2: M&A Distribution by Announcement Year

The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. Both acquirers and targets have information asymmetry factor scores available. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix.

Year	N	Percentage of Sample (%)	Median acquirer information asymmetry Factor	Median target information asymmetry Factor	Median acquirer market cap ($mil)	Median target market cap ($mil)
1990	4	0.74	0.08	1.20	431.59	43.16
1991	4	0.74	-0.11	0.42	683.67	127.41
1992	5	0.92	-0.09	0.50	735.52	204.68
1993	5	0.92	0.35	0.79	239.39	87.25
1994	11	2.03	-0.30	0.55	1,970.39	87.98
1995	21	3.87	-0.35	0.76	2,281.43	148.25
1996	20	3.68	-0.61	0.80	3,186.70	149.52
1997	31	5.71	-0.20	0.76	1,124.00	172.69
1998	46	8.47	-0.27	0.64	1,399.88	126.42
1999	47	8.66	-0.16	0.66	2,368.67	210.76
2000	33	6.08	-0.05	0.65	1,587.21	225.79
2001	29	5.34	-0.00	0.85	2,174.97	107.87
2002	22	4.05	-0.25	0.79	2,304.31	134.01

2003	24	4.42	-0.90	0.54	4,609.85	270.18
2004	28	5.16	-0.78	0.16	3,583.82	702.07
2005	21	3.87	-1.37	0.11	3,736.06	509.36
2006	19	3.50	-1.09	0.20	9,950.35	389.78
2007	25	4.60	-1.33	-0.28	6,326.10	819.68
2008	28	5.16	-0.95	0.22	3,475.77	205.47
2009	23	4.24	-0.90	0.09	6,450.87	386.09
2010	22	4.05	-0.78	0.43	2,545.41	411.01
2011	10	1.84	-1.03	-0.35	3,102.89	802.64
2012	16	2.95	-1.21	-0.07	4,474.46	390.48
2013	22	4.05	-1.35	-0.23	5,027.49	966.12
2014	27	4.97	-1.42	-0.50	8,025.13	1,427.02
Total	543	100	-0.62	0.45	2,713.92	247.38

Table 3: Summary Statistics

This table reports the summary statistics of the key variables. Panel A reports the summary statistics of information asymmetry factor and variables constituting information asymmetry factor. Panel B reports the summary statistics of variables related to firm values. Panel C reports the summary statistics of abnormal returns and information asymmetry factor in M&A sample. Panel D reports the summary statistics of characteristics variables in M&A sample. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in Appendix.

Panel A: Information Asymmetry Factor and Variables

Variables	N	Mean	S.D.	25% percentile	50% percentile	75% percentile
Information asymmetry factor	41,570	0.00	0.81	-0.48	0.09	0.58
No. of Analysts	41,570	6.75	5.87	2.67	4.75	8.78
Firm age	41,570	8.23	7.35	3.00	6.00	12.00
Firm size	41,570	6.05	1.80	4.75	5.86	7.16
Tangible assets	41,570	0.43	0.40	0.14	0.31	0.64
Average bid-ask spread	41,570	0.04	0.26	0.03	0.04	0.06
Abnormal accruals	41,570	0.40	0.73	0.07	0.18	0.42
Return volatility (%)	41,570	3.60	1.86	2.32	3.20	4.41
Analyst forecast error (%)	41,570	3.66	22.15	0.33	0.90	2.45
Analyst forecast dispersion (%)	41,570	1.12	4.64	1.14	0.36	0.93
Amihud	41,570	0.40	4.51	0.00	0.01	0.11

Panel B: Firm Value Variables

Variables	N	Mean	S.D.	25% percentile	50% percentile	75% percentile
Expected cost of equity	26,277	0.11	0.14	0.03	0.10	0.19
Cost of debt (%)	11,746	1.06	1.07	0.54	0.86	1.28

Industry-adjusted Tobin's Q	32,229	0.54	1.94	-0.30	0.05	0.78

Panel C: Abnormal Returns and Information Asymmetry Factors

Variables	N	Mean	S.D.	25% percentile	50% percentile	75% percentile
Portfolio CAR (-2, 2) (%)	543	1.74	10.14	-3.67	1.18	6.42
Portfolio CAR (-5,5) (%)	543	2.04	11.94	-4.26	1.40	7.83
Acquirer CAR (-2, 2) (%)	543	-1.59	10.19	-7.04	-1.52	3.24
Acquirer CAR (-5, 5) (%)	543	-1.48	12.01	-7.28	-1.96	4.08
Target CAR (-2,2) (%)	543	25.24	24.19	9.88	22.23	36.60
Target CAR (-5,5) (%)	543	27.73	25.67	10.78	24.30	39.69
Premium (%)	509	36.93	34.82	17.37	34.04	50.54
Acquirer information asymmetry factor	543	-0.68	0.99	-1.29	-0.62	0.03
Target information asymmetry factor	543	0.31	0.75	-0.14	0.45	0.83

Panel D: Characteristics Variables

Variables	N	Mean	S.D.	25% percentile	50% percentile	75% percentile
Log (acquirer market cap)	543	7.90	1.91	6.62	7.85	9.11
Acquirer Tobin's q	543	3.18	3.45	1.54	2.24	3.63
Acquirer leverage	543	0.09	0.12	0.00	0.05	0.14
Acquirer ROA	543	0.13	0.17	0.09	0.14	0.21

Log (target market cap)	543	5.63	1.60	4.53	5.48	6.81
Target Tobin's q	543	2.44	2.14	1.34	1.78	2.74
Target leverage	543	0.10	0.14	0.01	0.03	0.16
Target ROA	543	0.03	0.23	-0.01	0.09	0.15
Relative deal size	543	0.38	0.54	0.07	0.20	0.50
High-tech combination (dummy)	543	0.26	0.46	0	0	1
Competing offer (dummy)	543	0.04	0.19	0	0	0
Diversifying (dummy)	543	0.28	0.45	0	0	1
Deal Closure Time	543	115.52	76.27	66.50	98.00	138.00
All cash (dummy)	543	0.33	0.47	0	0	1

Table 4: Firm Value and Information Asymmetry Factor

Panel A: Cost of Equity and Information Asymmetry Factor

This table reports results of OLS regressions with expected cost of equity as dependent variable on information asymmetry factor. The sample covers the period from 1990 to 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS	
	Expected Cost of Equity	
Information asymmetry factor	**0.0055*** **	**0.0078*** **
	(5.1326)	**(3.1928)**
Leverage		0.0128**
		(2.4709)
Book-to-market		-0.0022*
		(-1.7187)
Log(market cap)		0.0008
		(0.7540)
Beta		0.0499***
		(26.2549)
Momentum		0.0198***
		(10.5657)
Intercept	0.1398***	0.1011***
	(27.4090)	(12.1871)
Number of Obs	26,277	26,277
R^2	0.2790	0.3465

Panel B: Cost of Debt of New Debt Issues and Information Asymmetry Factor

This table reports results of OLS regressions with cost of debt of new debt issues as dependent variable on information asymmetry factor. The sample covers the period from 1990 to 2012. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS	
	Cost of Debt	
Information asymmetry factor	**1.2062*** **	**0.2455** **
	(21.3918)	**(2.2788)**
Return on assets		-0.6511
		(-1.0680)
Log (sales)		-0.3356***
		(-5.8642)
Book-to-market		0.0959***
		(8.5764)
Volatility		3.0746*
		(1.8557)
Stock return		-6.9621
		(-0.9176)
Leverage		1.8275***
		(5.9209)
Interest coverage		-0.3118***
		(-5.5397)
Altman Z-Score (dummy)		-0.3920***
		(-3.6235)
Log (issue size)		-0.0631***
		(-4.8220)
Benchmark yield		-0.0380
		(-0.4319)
Intercept	2.2580***	3.9441***
	(15.1520)	(5.0927)
Number of Obs	11,746	11,746
R^2	0.4925	0.5321

Panel C: Firm Value and Information Asymmetry Factor

This table reports results of OLS regressions with industry-adjusted Tobin's Q as dependent variable on information asymmetry factor. The sample covers the period from 1990 to 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS	
	Industry-adjusted Tobin's Q	
Information asymmetry factor	**-0.2404*** **	**-0.2606*** **
	(-6.3784)	**(-3.5702)**
Log (sales)	-0.2063***	-0.1216***
	(-11.5043)	(-4.0313)
Delaware incorporation	0.1355***	0.2214***
	(6.1309)	(5.6559)
S&P 500 inclusion	0.5727***	0.4664***
	(13.4176)	(5.3609)
Leverage	-2.3851***	-3.0410***
	(-40.9292)	(-24.7686)
Capital to sales		0.0014***
		(8.5737)
R&D to capital		0.0167**
		(2.1376)
Advertising to capital		-0.0191
		(-1.0984)
Dividend yield		0.3261
		(1.1330)
Intercept	2.1871***	1.2954***
	(11.3566)	(4.9376)
Number of Obs	32,229	8,328
R^2	0.0813	0.0858

Table 5: Acquirer-target Portfolio Abnormal Returns and Target Information Asymmetry

This table reports results of OLS regressions with 5-day acquirer-target value-weighted portfolio abnormal returns as dependent variable on target information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS		
	Portfolio CAR (-2, 2)		
Target information asymmetry factor	**0.0248*** **	**0.0284*** **	**0.0256** **
	(2.9722)	**(3.3514)**	**(2.5259)**
Log (acquirer market cap)		-0.0000	-0.0000
		(-0.3998)	(-0.4275)
Acquirer Tobin's q		0.0018	0.0036*
		(0.8949)	(1.6891)
Acquirer leverage		0.0604	0.0651
		(0.9689)	(0.9808)
Acquirer ROA		-0.0613	-0.0419
		(-1.2604)	(-0.9083)
Log(target market cap)			0.0011
			(0.9750)
Target Tobin's q			-0.0065**
			(-2.2239)
Target leverage			-0.0189
			(-0.3987)
Target ROA			-0.0575*
			(-1.9127)
High-tech combination		-0.0128	-0.0126
		(-0.7320)	(-0.7153)
Competing offer		-0.0068	-0.0144
		(-0.2236)	(-0.4432)
Relative deal size		0.0352***	0.0387***
		(2.6186)	(2.8541)
Diversifying		-0.0205	-0.0225
		(-1.5307)	(-1.5980)
All-cash deal		0.0289**	0.0286*
		(1.9824)	(1.8755)
Intercept	0.0911	0.0680	0.0770
	(1.3463)	(1.0418)	(1.1132)

Number of Obs	543	543	543
R^2	0.2130	0.2726	0.2961

Table 6: Acquirer Abnormal Returns and Target Information Asymmetry

This table reports results of OLS regressions with 5-day acquirer abnormal returns as dependent variable on target information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS		
	Acquirer CAR (-2, 2)		
Target information asymmetry factor	**0.0327*** **	**0.0215** **	**0.0211** **
	(3.8661)	**(2.5246)**	**(2.0026)**
Log (acquirer market cap)		-0.0089*	-0.0085*
		(-1.9077)	(-1.7348)
Acquirer Tobin's q		0.0035	0.0044**
		(1.6327)	(2.1487)
Acquirer leverage		0.0904*	0.0864
		(1.9023)	(1.6003)
Acquirer ROA		-0.0443	-0.0214
		(-1.0034)	(-0.4978)
Log(target market cap)			0.0030**
			(2.5067)
Target Tobin's q			-0.0042
			(-1.4944)
Target leverage			0.0228
			(0.5595)
Target ROA			-0.0855***
			(-2.8795)
High-tech combination		0.0073	0.0057
		(0.5495)	(0.4370)
Competing offer		-0.0171	-0.0248
		(-0.5106)	(-0.7145)
Relative deal size		-0.0122	-0.0080
		(-1.1655)	(-0.7480)
Diversifying		-0.0046	-0.0018
		(-0.4606)	(-0.1687)
All-cash deal		0.0394***	0.0409***
		(2.6311)	(2.6089)
Intercept	-0.0627	0.0017	0.0048

	(-1.3322)	(0.0287)	(0.0779)
Number of Obs	543	543	543
R^2	0.1829	0.2261	0.2603

Table 7: Target Abnormal Returns and Target Information Asymmetry

This table reports results of OLS regressions with 5-day target abnormal returns and target premium as dependent variables on target information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS			
	Target CAR (-2, 2)		Premium	
Target information asymmetry factor	**0.0740*** **	**0.0569** **	**0.0892*** **	**0.1250*** **
	(4.2653)	**(2.2838)**	**(3.1371)**	**(3.2694)**
Log (acquirer market cap)		-0.0015		-0.0042
		(-0.1455)		(-0.2568)
Acquirer Tobin's q		0.0109***		0.0150
		(2.5969)		(0.8815)
Acquirer leverage		0.2553*		0.1743
		(1.9101)		(0.7119)
Acquirer ROA		-0.0144		0.3029
		(-0.1348)		(1.4396)
Log(target market cap)		-0.0036*		-0.0072**
		(-1.7555)		(-2.0814)
Target Tobin's q		-0.0194***		-0.0116
		(-3.3701)		(-0.8328)
Target leverage		-0.0812		0.3622*
		(-0.7045)		(1.8130)
Target ROA		0.0337		-0.1891
		(0.5228)		(-1.0814)
High-tech combination		-0.0611*		0.0224
		(-1.6726)		(0.3581)
Competing offer		0.0234		0.1583
		(0.4054)		(1.4722)
Relative deal size		-0.0462*		0.0433
		(-1.8595)		(0.8039)
Diversifying		-0.0276		0.0132
		(-0.9950)		(0.3078)
All-cash deal		0.0492*		0.0525
		(1.6500)		(1.1828)
Intercept	0.4806***	0.5483***	0.9151***	0.7733***
	(3.1538)	(3.3494)	(3.3410)	(2.6266)

Number of Obs	543	543	509	509
R^2	0.1990	0.2496	0.1938	0.2364

Table 8: Controlling for Acquirer Information Asymmetry

This table reports results of OLS regressions controlling for acquirer information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS			
	Portfolio CAR (-2, 2)	Acquirer CAR (-2, 2)	Target CAR (-2, 2)	Premium
Target information asymmetry factor	**0.0181***	**0.0261****	**0.0598****	**0.1232*****
	(1.6692)	**(2.4566)**	**(2.3918)**	**(3.1693)**
Acquirer information asymmetry factor	0.0139	-0.0417***	-0.0241	0.0158
	(1.4091)	(-2.8759)	(-0.6787)	(0.3120)
Log (acquirer market cap)	0.0001	-0.0268***	-0.0121	0.0027
	(0.6002)	(-2.9675)	(-0.6163)	(0.0910)
Acquirer Tobin's q	0.0034	0.0064***	0.0120***	0.0143
	(1.5924)	(3.2488)	(2.6841)	(0.8009)
Acquirer leverage	0.0830	0.0639	0.2423*	0.1824
	(1.2347)	(1.2383)	(1.7911)	(0.7545)
Acquirer ROA	-0.0282	-0.0304	-0.0196	0.3059
	(-0.6475)	(-0.7043)	(-0.1828)	(1.4490)
Log(target market cap)	0.0011	0.0032**	-0.0035*	0.0071**
	(0.9679)	(2.3994)	(-1.6770)	(2.0650)
Target Tobin's q	-0.0058*	-0.0039	-0.0192***	-0.0118
	(-1.9468)	(-1.3776)	(-3.3336)	(-0.8505)
Target leverage	-0.0204	0.0161	-0.0851	0.3654*
	(-0.4340)	(0.3914)	(-0.7291)	(1.8191)
Target ROA	-0.0625**	-0.0734***	0.0406	-0.1934
	(-2.0334)	(-2.6287)	(0.6382)	(-1.1031)
High-tech combination	-0.0081	0.0003	-0.0642*	0.0246
	(-0.4592)	(0.0249)	(-1.7340)	(0.3922)
Competing offer	-0.0153	-0.0278	0.0216	0.1594
	(-0.4731)	(-0.8094)	(0.3722)	(1.4803)
Relative deal size	0.0336***	-0.0101	-0.0475*	0.0439
	(2.6997)	(-0.9218)	(-1.9002)	(0.8174)
Diversifying	-0.0206	-0.0033	-0.0285	0.0135
	(-1.5073)	(-0.3103)	(-1.0278)	(0.3141)
All-cash deal	0.0330**	0.0349**	0.0458	0.0546
	(2.0635)	(2.4307)	(1.5029)	(1.2048)
Intercept	0.0880	0.0891	0.5970***	0.7419**

	(1.2603)	(1.3072)	(3.3181)	(2.4622)
Number of Obs	543	543	543	509
R^2	0.3003	0.2791	0.2507	0.2366

Table 9: Controlling for Corporate Governance

This table reports results of OLS regressions controlling for corporate governance variables. The board characteristics sample consists of 448 completed U.S. M&A transactions between 1997 and 2014. The BCF index sample consists of 507 completed U.S. M&A transactions between 1991 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS							
	Portfolio CAR (-2, 2)		Acquirer CAR (-2, 2)		Target CAR (-2, 2)		Premium	
Target information asymmetry factor	**0.0300****	**0.0261*****	**0.0263****	**0.0200***	**0.0561****	**0.0585****	**0.0775****	**0.1146*****
	(2.5353)	**(2.5912)**	**(2.2294)**	**(1.9417)**	**(2.2082)**	**(2.3840)**	**(1.9958)**	**(2.9682)**
Board Size	-0.0029		-0.0002		-0.0005		-0.0119	
	(-0.8592)		(-0.0675)		(-0.0748)		(-1.1965)	
Independent board	0.0550		0.0352		0.1367		0.2314	
	(1.3465)		(0.8720)		(1.2580)		(1.3036)	
CEO/Chairman duality	0.0029		0.0022		0.0133		-0.0168	
	(0.2428)		(0.2010)		(0.5202)		(-0.4503)	
Target board Size	0.0437		0.0146		0.2928**		-0.0576	
	(0.6394)		(0.2370)		(2.2362)		(-0.2240)	
Target independent board	0.0025		0.0007		0.0077		0.0103	
	(0.4160)		(0.1572)		(0.6408)		(0.5559)	
Target CEO/Chairman duality	-0.0106		-0.0209		0.0446		0.0988	
	(-0.6989)		(-1.4905)		(1.3645)		(1.4923)	
BCF index		0.0035		-0.0043		0.0138		-0.0123
		(0.2862)		(-0.4272)		(0.4782)		(-0.3053)
Target-acquirer BCF difference		-0.0007		-0.0065		0.0147		-0.0001
		(-0.0676)		(-0.8068)		(0.6148)		(-0.0030)
Log (acquirer market cap)	-0.0000	-0.0000	-0.0096*	-0.0088*	0.0004*	0.0054	0.0001	0.0030
	(-0.1285)	(-0.3236)	(-1.7310)	(-1.7316)	(1.6831)	(0.5747)	(0.1780)	(0.2027)
Acquirer Tobin's q	0.0038*	0.0036*	0.0044**	0.0043**	0.0107***	0.0101**	0.0168	0.0120
	(1.7751)	(1.6842)	(2.3061)	(2.3681)	(2.6181)	(2.4786)	(0.9572)	(0.6917)
Acquirer leverage	0.0515	0.0633	0.0917	0.0843	0.2080	0.2004	0.3070	0.1311
	(0.6600)	(0.9535)	(1.4989)	(1.5212)	(1.5007)	(1.5967)	(1.2588)	(0.5673)
Acquirer ROA	-0.0382	-0.0374	-0.0178	-0.0166	-0.0440	-0.0451	0.2625	0.1893
	(-0.7317)	(-0.7815)	(-0.3719)	(-0.3754)	(-0.4019)	(-0.4366)	(1.1521)	(0.9009)
Log(target market cap)	0.0015	0.0011	0.0035***	0.0030**	-0.0064**	-0.0044*	0.0015	0.0056
	(1.1994)	(0.9842)	(2.6704)	(2.4569)	(-2.3492)	(-1.8728)	(0.3740)	(1.5678)
Target Tobin's q	-0.0069**	-0.0064**	-0.0044	-0.0040	-0.0205***	-0.0209***	-0.0175	-0.0104

	(-2.1273)	(-2.2089)	(-1.3728)	(-1.4395)	(-3.7580)	(-3.6872)	(-1.1958)	(-0.7199)
Target leverage	0.0252	-0.0067	0.0636	0.0270	0.0351	0.0112	0.2708	0.4375**
	(0.4524)	(-0.1400)	(1.4101)	(0.6700)	(0.2980)	(0.1053)	(1.3924)	(2.3539)
Target ROA	-0.0618**	-0.0601**	-0.0873***	-0.0860***	0.0675	0.0476	-0.2307	-0.1974
	(-1.9770)	(-1.9876)	(-2.8419)	(-2.8617)	(0.9960)	(0.7175)	(-1.2620)	(-1.1133)
High-tech combination	-0.0163	-0.0150	0.0050	0.0046	-0.0457	-0.0467	0.0132	0.0224
	(-0.8390)	(-0.8333)	(0.3403)	(0.3307)	(-1.1984)	(-1.3514)	(0.2123)	(0.3937)
Competing offer	-0.0165	-0.0109	-0.0229	-0.0205	0.0208	0.0270	0.1987*	0.1957*
	(-0.4891)	(-0.3304)	(-0.6406)	(-0.5708)	(0.3110)	(0.4244)	(1.6557)	(1.7198)
Relative deal size	0.0370***	0.0375***	-0.0071	-0.0082	-0.0498**	-0.0461**	0.0248	0.0360
	(2.6082)	(2.7819)	(-0.6399)	(-0.7702)	(-1.9764)	(-1.9684)	(0.4656)	(0.6887)
Diversifying	-0.0228	-0.0196	-0.0047	-0.0002	-0.0356	-0.0291	0.0098	0.0067
	(-1.4131)	(-1.3526)	(-0.4104)	(-0.0177)	(-1.1868)	(-1.0583)	(0.2228)	(0.1621)
All-cash deal	0.0325*	0.0285*	0.0440**	0.0416***	0.0540*	0.0616**	0.0758	0.0522
	(1.8758)	(1.8452)	(2.5604)	(2.6417)	(1.7839)	(2.0731)	(1.6442)	(1.1898)
Intercept	-0.1130	-0.0809	-0.0508	-0.0438	-0.2756*	-0.0518	0.0256	-0.0322
	(-1.5607)	(-1.3373)	(-0.7268)	(-0.6934)	(-1.8660)	(-0.3449)	(0.1203)	(-0.1176)
Number of Obs	448	507	448	507	448	507	426	479
R^2	0.3007	0.2860	0.2704	0.2602	0.2682	0.2421	0.2516	0.2312

Table 10: Post-merger Operating Performance Change and Target Information Asymmetry

This table reports results of OLS regressions with one-year, two-year, and three-year post-merger change in performance-adjusted ROA of the merged firms as dependent variables on target information asymmetry factor. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS		
	1-year Δ in Performance-adjusted ROA	2-year Δ in Performance-adjusted ROA	3-year Δ in Performance-adjusted ROA
Target information asymmetry factor	-0.0140	0.0030	-0.0317
	(-0.6109)	(0.1156)	(-1.2493)
Log (acquirer market cap)	0.0093	0.0105	0.0115
	(1.2219)	(0.7969)	(0.8654)
Acquirer Tobin's q	-0.0018	-0.0056	0.0141*
	(-0.3838)	(-0.6610)	(1.7320)
Acquirer leverage	0.0309	0.1144	0.2124
	(0.3225)	(0.9240)	(1.4788)
Acquirer ROA	-0.0504	-0.1218	-0.2583*
	(-0.4851)	(-0.8665)	(-1.9562)
Log(target market cap)	-0.0040	-0.0020	0.0023
	(-1.6207)	(-0.8002)	(0.7595)
Target Tobin's q	0.0002	0.0031	-0.0077
	(0.0199)	(0.2329)	(-0.5584)
Target leverage	-0.0441	-0.0489	-0.0331
	(-0.4723)	(-0.6393)	(-0.3122)
Target ROA	-0.0272	0.0312	-0.0928
	(-0.4104)	(0.3467)	(-1.1750)
High-tech combination	-0.0012	-0.0190	-0.0867**
	(-0.0368)	(-0.4713)	(-2.2527)
Competing offer	-0.0248	0.0276	-0.0184
	(-0.8658)	(0.3832)	(-0.1846)
Relative deal size	0.0506*	0.0507	0.0258
	(1.7924)	(1.6160)	(0.9334)
Diversifying	0.0350	0.0837**	-0.0147
	(1.4161)	(2.5857)	(-0.3809)
All-cash deal	0.0392	-0.0099	0.0397
	(1.1921)	(-0.3705)	(1.2978)

Intercept	-0.2867	-0.1284	0.0048
	(-1.1943)	(-0.9284)	(0.0342)
Number of Obs	277	206	161
R^2	0.3783	0.4273	0.5986

Table 11: Target Firm Selection and Target Information Asymmetry Factor

This table reports results of conditional logit models. The dependent variable target selection equals one for the target firms and zero for the control firms. The random control sample is formed by five randomly drawn control firms for each target. The industry and size control sample is formed by five control firms matched by industry and size with each target where industry is defined by the two-digit SIC codes. The industry, size, and book-to-market (B/M) control sample is formed by five control firms matched by industry, size, and book-to-market (B/M) with each target where industry is defined by the two-digit SIC codes. The information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	Conditional Logit					
	Random Sample		Industry and Size		Industry, Size, and	
	Target Selection		Target Selection		Target Selection	
Target information	**0.4706****	**0.4613*****	**0.2811*****	**0.4040*****	**0.2836*****	**0.3296****
	(6.6159)	**(3.6113)**	**(3.7427)**	**(2.8969)**	**(3.6830)**	**(2.3429)**
Log (sales)		0.0654		0.0801		0.0730
		(1.1838)		(1.3063)		(1.1473)
R&D		0.9755**		1.1985**		1.4717***
		(2.3121)		(2.4921)		(2.9697)
Sales growth		-0.0100		-0.0219		-0.0247
		(-0.3114)		(-0.7749)		(-0.7537)
ROA		0.5127*		0.4206*		0.0516
		(1.7908)		(1.8403)		(0.1793)
Leverage		-0.5710		0.3157		0.5296
		(-1.5332)		(0.7795)		(1.2818)
Cash		0.8354***		0.4927*		0.6569**
		(3.2730)		(1.8753)		(2.4198)
Book-to-market		-0.0526		-0.0669		
		(-1.2072)		(-0.9464)		
Stock return		-0.1830**		-0.1940***		-0.1499**
		(-2.5147)		(-2.7539)		(-2.1604)
Number of Obs	3,154	2,987	3,137	2,979	3,123	2,984
Pseudo R^2	0.02	0.05	0.01	0.02	0.01	0.02

Table 12: Relative M&A Announcements Dollar Gains and Target Information Asymmetry

This table reports results of OLS regressions with relative dollar gains as dependent variable on target information asymmetry factor. The relative dollars gains is the difference in target 5-day announcement-period dollar gains minus acquirer 5-day announcement-period dollar gains scaled by the sum of the acquirer market cap and the target market cap 50 days prior to the announcement date. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS		
	Relative Dollar Gains		
Target information asymmetry	**-0.0302*** **	**-0.0232*** **	**-0.0326*** **
	(-4.3304)	**(-2.8721)**	**(-3.6910)**
Acquirer information asymmetry			0.0178**
			(2.2328)
Log (acquirer market cap)		-0.0001*	-0.0000
		(-1.8904)	(-0.0251)
Acquirer Tobin's q		-0.0046**	-0.0048***
		(-2.5600)	(-2.6649)
Acquirer leverage		-0.0234	0.0003
		(-0.3760)	(0.0055)
Acquirer ROA		0.0110	0.0285
		(0.3225)	(0.8527)
Log(target market cap)		-0.0030***	-0.0030***
		(-3.5613)	(-3.5602)
Target Tobin's q		0.0022	0.0030
		(0.9667)	(1.2954)
Target leverage		-0.0717*	-0.0730*
		(-1.8374)	(-1.8945)
Target ROA		0.0737***	0.0683**
		(2.8355)	(2.5276)
High-tech combination		-0.0217	-0.0160
		(-1.4147)	(-1.0672)
Competing offer		0.0050	0.0037
		(0.2245)	(0.1672)
Relative deal size		0.0294***	0.0230**
		(2.9696)	(2.3481)
Diversifying		-0.0155	-0.0128
		(-1.2644)	(-1.0622)

All-cash deal		-0.0239**	-0.0184*
		(-2.5234)	(-1.8508)
Intercept	0.0765	0.0409	0.0564
	(1.1084)	(0.6561)	(0.9398)
Number of Obs	543	543	543
R^2	0.2200	0.3386	0.3482

Table 13: Certain Deal Characteristics and Target Information Asymmetry

This table reports results the effects of target information asymmetry factor on certain deal characteristics including relative deal size, all-cash deals, and diversifying deals. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	Probit	Probit	OLS	OLS
	All-cash	Diversifying	Relative Deal Size	Log(Deal Closure Time+1)
Target information asymmetry factor	**-0.5341*** **	**-0.5048** **	**-0.2329*** **	**-0.1589*** **
	(-3.5221)	**(-2.1511)**	**(-4.7259)**	**(-2.6112)**
Log (acquirer market cap)	0.0021	0.3946***	-0.0010*	-0.0001
	(1.4591)	(4.9477)	(-1.8837)	(-0.1498)
Acquirer Tobin's q	-0.0933	-0.1258**	-0.0110	0.0130*
	(-1.5782)	(-2.4852)	(-1.4806)	(1.9332)
Acquirer leverage	-0.8759	-2.7626**	0.2794	-0.2458
	(-0.9872)	(-2.5141)	(1.1908)	(-0.5487)
Acquirer ROA	0.5432	-1.6697**	-1.1203*	-0.3163*
	(0.8419)	(-2.5620)	(-1.9358)	(-1.8744)
Log(target market cap)	-0.1147**	-0.4368***	-0.0056	0.0035
	(-2.5187)	(-3.3786)	(-1.0134)	(0.4240)
Target Tobin's q	-0.1075**	0.1228**	0.0141*	-0.0201
	(-2.2196)	(2.4073)	(1.6675)	(-1.6252)
Target leverage	-1.9451***	-0.2783	0.3448	0.4510
	(-2.7241)	(-0.3215)	(1.3433)	(1.6308)
Target ROA	-0.1961	0.1013	0.1290	-0.1060
	(-0.5343)	(0.2083)	(0.9646)	(-0.7133)
High-tech combination	0.2476	-0.7895***	0.0371	-0.0181
	(1.2254)	(-3.4179)	(0.6574)	(-0.2481)
Competing offer	0.6359*	-0.4450	0.1751*	0.2236
	(1.8339)	(-1.0223)	(1.6755)	(1.2254)
Relative deal size	-0.9147***	0.2062		0.0470
	(-2.6254)	(0.8583)		(0.8179)
Diversifying	0.0800		-0.0849	-0.3947***
	(0.4296)		(-1.4561)	(-6.1496)
All-cash deal		-0.0158	-0.1351**	0.0135
		(-0.0826)	(-2.4157)	(0.1783)
Intercept	0.5417	3.9176***	1.2453***	4.1712***
	(0.9873)	(2.8566)	(3.6760)	(7.0561)

Number of Obs	543	543	543	543
R^2 (Pseudo R^2)	0.2025	0.3605	0.3870	0.2607

Table 14: Robustness Check: 11-day Abnormal Returns and Target Information Asymmetry

This table reports results of OLS regressions with 11-day target-acquirer portfolio, acquirer, and target 11-day abnormal returns as dependent variables on target information asymmetry factor. The sample consists of 543 completed U.S. M&A transactions between 1990 and 2014. The regressions control for year and industry fixed effects where industry is defined by the two-digit SIC codes. The regressions standard errors are adjusted for heteroskedasticity. Information asymmetry factor is the first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables. All variables are defined in the Appendix. ***, **, and * denote the significance at 1%, 5%, and 10% levels.

	OLS					
	Portfolio CAR (-5, 5)		Acquirer CAR (-5, 5)		Target CAR (-5, 5)	
Target information asymmetry factor	**0.0287*** **	**0.0266** **	**0.0355*** **	**0.0243***	**0.0902*** **	**0.0637** **
	(3.0820)	**(2.2381)**	**(4.0612)**	**(1.9642)**	**(4.8669)**	**(2.3135)**
Log (acquirer market cap)		-0.0001		-0.0072		-0.0036
		(-0.7024)		(-1.1455)		(-0.3197)
Acquirer Tobin's q		-0.0010		-0.0008		0.0092**
		(-0.4086)		(-0.2920)		(2.5206)
Acquirer leverage		0.0007		0.0414		0.1427
		(0.0094)		(0.6425)		(1.0348)
Acquirer ROA		-0.0735		-0.0534		-0.0444
		(-1.1622)		(-0.8636)		(-0.3616)
Log(target market cap)		0.0003		0.0020*		-0.0032
		(0.2678)		(1.7727)		(-1.4965)
Target Tobin's q		-0.0032		-0.0009		-0.0196***
		(-0.8228)		(-0.2338)		(-2.7852)
Target leverage		0.0172		0.0514		0.0064
		(0.2875)		(0.9528)		(0.0520)
Target ROA		-0.0308		-0.0536		0.0138
		(-0.7683)		(-1.2639)		(0.1871)
High-tech combination		-0.0118		0.0055		-0.0655*
		(-0.5918)		(0.3297)		(-1.6790)
Competing offer		-0.0005		-0.0049		0.0028
		(-0.0189)		(-0.2449)		(0.0456)
Relative deal size		0.0376**		-0.0037		-0.0527**
		(2.0485)		(-0.3253)		(-2.1704)
Diversifying		-0.0235		-0.0084		-0.0273
		(-1.2071)		(-0.6223)		(-0.9070)
All-cash deal		0.0307		0.0360*		0.0834***
		(1.6359)		(1.9004)		(2.6854)
Intercept	0.1176	0.1185	-0.0626	0.0122	0.4644***	0.5842***
	(1.5178)	(1.6086)	(-0.9439)	(0.1532)	(2.8105)	(3.2894)

Number of Obs	543	543	543	543	543	543
R^2	0.1740	0.2354	0.1329	0.1700	0.1846	0.2491

Essay 3

Corporate Governance and Acquirer Stock Returns in the Banking Industry

1. Introduction

The separation of ownership and control in corporations introduces the conflict of interest between shareholders and management. The power balance between the two parties reflects the level of internal monitoring by the shareholders: if there are more rights enjoyed by the shareholders, the more capable they are to discipline the management. Recent studies have proposed several indices to quantitatively measure monitoring structure by the shareholders (corporate governance structure) based on individual firms' corporate governance provisions. Examples include GIM index by Gompers, Ishii and Metrick(2003) and BCF index by Bebchuk, Cohen and Ferrell (2009). Those studies document negative relations between the corporate governance indices and firm value as well as long-run stock returns. Masulis, Wang and Xie (2007) further identify acquisitions as one of the possible channels through which values can be destroyed for the poorly governed firms.

Given the importance of market for corporate control in disciplining management, most of those studies focus exclusively on the antitakeover implications of the corporate governance indices. In fact, the BCF index is constructed using a subset of provisions within the GIM index that are most effective in fending off hostile takeover bids. Masulis et al.(2007) find that BCF index has stronger indicative power on acquirer returns than GIM index and therefore confirms this selection criterion. In particular, they single out the staggered board, shown by previous studies (Bebchuk, Coates and Subramanian, 2002; Bebchuk and Cohen, 2005) as the most powerful antitakeover provision, and find it has highly significant negative effect on acquirer returns all by itself. However, a close examination of the original 24 provisions in the GIM index suggests they are more than antitakeover protections. Taken in its entirety, it is an indicator

of the balance of power between shareholders and management (Gompers et al., 2003)[12]. Unfortunately, those two layers of information delivered by the governance indices are difficult to disentangle. For firms facing constant threats of hostile takeovers, the provisions' antitakeover implication is more dominant and their balance of power effect has been largely ignored. In this paper, we intent to examine whether or not the balance of power effect of governance provisions also matters to the investors. In order to do so, we chose an industry where firms are safe from hostile takeover threats---the banking industry.

It has been well documented that because most of the banking mergers require regulatory approvals[13], hostile takeovers are rare in the banking industry (Whidbee,1997; Brook et al., 2000; Adams and Mehran, 2003; Hagendorff et al., 2007). Our own sample further confirms this fact---none of the observations in our sample are hostile[14] . Despite the lack of hostile takeover threats, the summary statistics of our sample shows that banks on average have scores of the corporate governance indices comparable to the levels reported by Masulis et at.(2007)for overall industries. This fact allows us to re-examine the three indices in an environment free of market for corporate control. Such analysis can provide insights in answering the following two questions regarding corporate governance provisions: 1, does the balance of power effect of the corporate governance provisions matter to the investors? 2, do the strong negative relations between the BCF and staggered board[15] indices and stock returns reported by Masulis et at. (2007) and Bebchuk et al.(2009) are indeed due to their antitakeover effect as claimed by the authors?

[12] Gompers, Ishii and Metrick (2003) divided the 24 provisions into five groups: tactics for delaying hostile bidders; voting rights; director/officer protection; other takeover defenses and state laws.
[13] See Section 18(C) of the Federal Deposit Insurance Act (12 U.S.C. [section] 1828(c))(the "Bank Merger Act")
[14]Out of 677 observations in our sample, we are able to find the acquisition attitude records for 671 observations. Among them, 662 are friendly and the other 9 are not applicable.
[15] We refer staggered board and cumulative voting as separate indices for simplicity.

Among GIM, BCF and staggered board indices, GIM includes all 24 corporate governance provisions, and therefore is the most comprehensive measure of the power balance between shareholders and the management. If the power-balance effect of the governance provisions does matter to the investors, the relation between GIM index and stock returns should remain significant in the banking industry. In addition, if the BCF index and staggered board are causing the firms to perform poorly because of their powerful antitakeover effects, we should expect them to become much less important for banks. At last, in order to further study the power balance effect, we singled out cumulative voting provision. Although it does not receive the same level of attention as staggered board in governance index literature[16], it is widely considered as a measure of investor protection (La Porta et al., 2002). Cumulative voting allows minority shareholders proportional representation on the board of directors. Firms with cumulative voting are tend to be more democratic than those that without. In this study, we intend to test if cumulative voting provision is priced by investors.

Our research contributes to the current literatures of corporate governance indices in the following two main aspects: first, by focusing on an industry absent of market for corporate control, we are, according to our knowledge, the first study to examine the power balance effect of corporate governance provisions separate from their antitakeover effect. Second, we provide further evidence confirming the linkage between market for corporate control, antitakeover provisions and firm value.

[16] In Bebchuck et al., 2008, they pointed out cumulative voting as the only provision outside the BCF index that received significant precatory resolutions between 2003 and 2004.

The rest of this paper is organized as following: section 2 reviews the past literatures related to our study and discusses our hypothesis. Section 3 describes the data. Section 4 presents the results of the empirical analysis. Section 5 concludes.

2. Literature Review and Hypothesis

2.1. Corporate governance indices research

Gompers, Ishii and Metrick (2003) construct the GIM index based on 24 corporate governance provisions and show that the GIM index is negatively related to firm value. Since the GIM index is constructed by adding one point for each provision that is detrimental to shareholder rights, their findings suggest that the firms that distribute more rights to their shareholders perform better.

Bebchuk, Cohen, and Ferrell (2009) choose 6 out of the 24 provisions in GIM index based on the provisions' antitakeover effectiveness and propose an entrenchment index (BCF index). They find that BCF index is monotonically negatively associated with firm value as well as abnormal stock returns. Meanwhile, they do not find any such association for the rest 18 provisions in the GIM index. They conclude that the BCF index is fully responsible for the negative relation between corporate governance provisions and firm value documented by GIM.

In terms of staggered board studies, Bebchuk, Coates, and Subramanian(2002) point out the powerful antitakeover implications of staggered boards. Later on, Bebchuk and Cohen(2005) further establish the link between presence of staggered board and lower firm value. They list long waiting time and prohibitively high acquiring cost as two main impediments for hostile bidders to gain control of a company with staggered board.

Although the studies abovementioned establish negative relations between various corporate governance indices and firm value, they stop short at identifying possible channels

through which poorly governed management can destroy firm value. To fill in this gap, Masulis, Wang and Xie (2007) propose acquisitions as a possible channel. The authors study the relations between various corporate governance indices (GIM, BCF and staggered board) and acquisitions announcement-period abnormal stock returns (CARs). They find that firms with higher index scores in GIM, BCF or with a staggered board experience significantly lower acquisitions CARs. They suggest that those firms are poorer acquirers because their managers are entrenched by the antitakeover provisions and therefore are more likely to indulge in empire-building acquisitions.

There are very limited studies on cumulative voting. In what is now an old study, Bhagat and Brickley (1984)find that the management-sponsored proposals which reduce the impact of cumulative voting lead to significantly negative stock reactions. Gordon (1994) argues for cumulative voting as well. He states that for many firms, cumulative voting mechanism provides a cost-effective avenue for activist institutions to put directors on the board and thus, enhances the quality, independence and accountability of the board. However, he reasons the impact of cumulative voting will depend on the firm's ownership concentration, the easiness with which its institutional shareholders can exit, and its competitive environment.

2.2. Corporate governance in the banking industry literatures

Banks are special in corporate governance studies. Adam and Mehran (2003) list the characteristics of bank holding companies (BHC) that are different from those of manufacturing firms, most notably, the presence of regulation and high leverage. They argue that the uniqueness of banking industry can systematically affect its corporate governance mechanisms as well. To test this hypothesis, the authors compare summary statistics of several key corporate governance variables of BHC with those of the manufacturing firms. They find that on average BHC have

larger boards, higher percentage of outside directors, lower CEO and institutional ownership and rely less on incentive-based compensation such as stock options than manufacturing firms.

Hagendorff et al.(2007) summarize previous studies on the impacts of mergers and acquisitions on the performance of banks. They show that for the period from 1971 to 1997, 6 out of 8 studies on M&A of US banks document negative abnormal returns while the remaining 2 studies don't report any results. The authors then look at the studies on the relations between several important governance variables and M&A performance of the banks. For banks, CEO ownership is positively associated with merger performance but the relation is nonlinear and turns negative when the ownership reaches 25%, consistent with the findings on CEO ownership for overall firms. Banking literatures depart from general studies when it comes to the relation between independent board representation and merger performance. Contrary to their well-documented non-linear positive relations for overall firms (Byrd and Hickman,1992), independent board members don't seem to contribute to merger performance in the banking industry despite their larger than average representation in bank boards (Subrahmanyam et al., 1997).

Booth, Cornett,and Tehranian(2002) studies the substitution effect of regulation for internal monitoring mechanisms (CEO/Chair duality, managerial stock ownership and outside directors). They find that for highly regulated firms (utilities and banks), internal governance mechanisms are less important in controlling agency conflicts. John, Mehran and Qian(2010) take another look at the role of regulators in the banking industry. They find that regulators and debtholders play a role in monitoring the risk choice of the banks.

2.3. Our Hypothesis

In this study, we want to re-examine the relations between the various corporate governance indices and firm values in the banking industry. Since the prior researchers on corporate governance indices mainly focus on the their antitakeover implications , we are interested to test that in an industry where market for corporate control is absent, how the relations between corporate governance provisions and firm values will change. The results can shed light on two aspects of corporate governance provisions: 1, does the balance of power effect of the corporate governance provisions matter to the investors? 2, do the strong negative relations between the BCF and staggered board indices and stock returns reported by Masulis et at. (2007) and Bebchuk et al.(2009) are indeed due to their antitakeover effect. If as suggested by GIM(2003) that those 24 provisions on an aggregate level indicate the balance of power between management and shareholders and this information is priced by the investors, we should expect to see that the GIM index continues to be significantly associated with firm value in the banking industry. In particular, the presence of cumulative voting as an important indicator of shareholder rights should contribute positively to firm value. Meanwhile, if the negative relations between BCF staggered board indices and firm value are caused by the antitakeover effect of those indices, such relations should disappear in the banking industry. Since Masulis et al., 2007 is the only study we can find that compares the effects of BCF index, GIM index and staggered board side by side, we decide to follow their methodology and look at the effects of corporate governance indices on acquisition announcement-period abnormal returns for bank acquirers. We propose our main hypothesis as follows:

Balance of power effect hypothesis: corporate governance provisions collectively reflect the balance of power between shareholders and management. Banks distributing more rights to their shareholders (democracy) are better managed than those distributing fewer rights

(dictatorship). Democratic banks are less likely to engage in empire-building acquisitions and therefore are better acquirers.

Antitakeover effect hypothesis: the previously documented negative relations between BCF index and staggered board index are caused by their antitakeover effects. In an industry where firms face no hostile takeover threats, the antitakeover effect of those indices becomes inconsequential. Those two indices have limited predicative power on the acquisition performance of the banks.

3. Sample Selection

From a unique dataset of M&A transactions, we identify 677 acquisitions made by 120 commercial banks (SIC code 6000, 6021, 6022 and 6712) from January 1, 1991 to December 31, 2006 that meet the following criteria:

1, The acquisition is completed.

2, The acquirer control less than 50% prior to the acquisition announcement date and 100% after.

3, The deal value is more than 1 million and is at least 1% of the acquirer's market value of equity.

4, The acquirers have annual financial information available from CRSP and COMPUSTAT and governance information available from IRRC.

It is worth noting that we follow the data selection criteria by Masulis et al. (2007) exactly to ensure the possible differences in our findings are not due to the sample selection standards.

We obtain data on financial statement from COMPUSTAT and on stock price and trading volume from CRSP. We obtain data on the individual corporate governance provisions, the GIM index score, board of directors, from RiskMetrics. We obtain data on CEO compensations and ownership from ExeComp. We obtain the BCF score from professor Bebchuk's website. All the

datasets are matched by CUSIP number and announcement date. Except for the governance-provision related datasets, we use fiscal year prior to announcement date as the matching year. For governance-provision related datasets, we follow the convention and use the IRRC-publication year prior to the announcement date as the matching year. We calculate all the variable values based on the appendix on variable definitions of Masulis et al. (2007)

Table 1 lists the distribution of the sample by years of the initial announcements. The highest number of acquisitions occurred in year 1994. The year congress passed the Riegle-Neal Interstate Banking and Branching Efficiency act allowing interstate banking practice. However, the both the acquirer size and deal size didn't pick up until year 1997. The year Riegle-Neal went into effect. The lag was possibly caused by the fact many states allowed interstate banking shortly after the passage of Real-Neal act but many large nationwide bank acquisitions took place after the act's effective date. Another landmark year in banking industry was year 1999, when Gramm-Leach act was enacted. This act allows combination of commercial banks, investment banks and insurance companies. Acquirer size experienced a large jump that year and reached the largest in year 2000, reflecting big banks move quickly to take advantage of the deregulation[17]. The period from year 1999 to 2000 coincided with the M&A "bubble" period reported in Masulis et al.(2007). So it is difficult to disentangle Gramm-Leach Effect from overall M&A boom. But evidently affected by the general trend, bank acquisition activities in 2001 took a big dip before recovering in 2002.

4. Empirical Results

4.1.Variable Description

4.1.1. Acquirer Return

[17] Studies on Gramm-Leach act have found larger banks stand to gain more than smaller banks. (Lee and Tompkins (2000); Barth et al. (2000); Akhigbe and Whyte (2001))

For comparison purposes, we follow Masulis et al.(2007)methodology closely. We use short-term event-study methodology to measure shareholder reaction to initial acquisition announcements. The cumulative abnormal returns (CARs) are calculated over a 5-day period from (-2, 2) with day 0 as the announcement date and are adjusted by equal-weighted market returns. The market returns are estimated over 200- day period from day -210 to day -11.

The first column of Panel A of Table 2 reports mean CARs of -0.91% for the whole sample, significantly different from zero at 1% level, which is 1.125% lower than the 0.215% acquirer CARs reported by Masulis et al.(2007). This result is consistent with past literatures on acquirer returns in US banking industry summarized by Hagendorff et al.(2007). They tabulate eight studies on announcement returns to bidding banks in US covering period from year 1972 to 1997, none of which report positive returns. They attribute the massive acquisition-related shareholder wealth destruction in the banking industry to agency costs.

Column 2 to column 4 of Panel A breaks down the CARs by methods of payment. Cash-financed deals generate slightly positive mean CARs of 0.24%, which is significantly higher than the mean CARs of -1.14% by the stock-financed deals. The difference is 1.38% or $103 million if we multiply the 1.38% by the mean market value of acquirers in our sample. Such difference is in accordance with the documented general trend and can be attributed to the fact that stock-financed deals are more likely to be initiated by acquirers whose shares are over-valued.

Panel B of Table 2 summarizes CARs by target ownership status. The acquisitions of publicly-owned targets generate -1.42% mean CARs while the acquisitions of privately-owned targets generate -0.15% CARs. The difference is about -1.28%, significant at 1% level. Again, this is consistent with the results recorded by the general studies. The argument is that privately-owned targets come with a liquidity discount and therefore are cheaper for the acquirers.

At Last, we further divide the targets in our sample into five categories based on their SIC codes: commercial banks(SIC codes: 6021, 6022, 6029, 6081 and 6712), insurance firms or investment banks(SIC codes: 6211, 6282, 6289, 6311, 6331, 6371 ,6726, 6733, 6794 and 6799), savings institution(SIC codes:6035 and 6036),other financial firms(SIC codes within the 6000 range but not covered by the listed financial firm categories), and non-financial firms(SIC codes not within 6000 range). Panel C of Table 2 reports acquirer CARs by target industries. As shown by the number of observations, commercial banks most often target at commercial banks---470 of 677 observations target at commercial banks. Those acquisitions appear to perform the poorest among the five categories of targets, providing evidence that there might be some diversification gains for banks acquiring at non-bank targets. However, the gains are very limited and in a relative manner since none of 5 categories of targets generate significantly positive average CARs.

4.1.2. Corporate Governance Indices and Acquirer Returns

The variables of interest in this study are governance indices GIM , BCF, staggered board and cumulative voting. The first three variables are frequently discussed in studies of corporate governance provisions. The last one has been studied less often. However, since one of the main purposes of this paper is to test if banks distributing more rights to their shareholders are better acquirers and the presence of cumulative voting represents a bank's attitude towards minority shareholders, we decide to include it as a separate index.

Panel A of Table 3 reports mean and median scores of the indices and their correlations with acquirers CARs. Compared with Masulis et al.(2007), who report scores of three indices: GIM, BCF and staggered board, the values of the indices in our sample are slightly higher. A more important difference between our results and the findings by Masulis et al.(2007) is that

except for GIM index, the other two indices appear to have no significant associations with acquirers CARs. Given the lack of hostile takeover threats in the banking industry, we consider that the zero correlations between the BCF and staggered board indices and CARs in the banking industry provide evidence to the linkages between market for corporate control and those two indices as predicted by *Antitakeover effect hypothesis* . Moreover, consistent with *Balance of power effect hypothesis,* the correlation between GIM index and acquirer CARs remains significantly negative, indicating that more democratic bank acquirers can create more wealth or at least destroy less value for their shareholders by means of internal governance even without the presence of market for corporate control. To further test the *Balance of power effect hypothesis*, we take a look at another important provision related to shareholder-right protection: cumulative voting. As expected, although only a small percentage of banks have cumulative voting (0.17), this provision is strongly and positively[18] associated with acquirers CARs.

Panel B of Table 3 reports the results of univariate analysis using the portfolio approach. Our portfolio classification schemes are the same as those used by Masulis et al.(2007). For GIM index, we apply two classification schemes: one to compare the CARs of the portfolios at the extreme ends of GIM index while the other studies its median effect. For the first scheme, we assign banks with GIM score of 5 or less into the Democracy portfolio and with 14 or more into the Dictatorship portfolio. For the second scheme, we use score 9 as the cut-off point to assign the bank acquirers. For BCF index, Democracy portfolio consist of banks with BCF score of 2 or less and Dictatorship portfolio consist of banks with BCF score of 3 or more. The results are the same with the findings of correlation analysis: banks in GIM-democracy portfolio perform better than their peers in GIM-dictatorship portfolio under both schemes and the difference is more

[18] Unlike other provisions, cumulative voting and secret ballot are consider beneficial to shareholders and in the GIM and BCF calculation, the authors add one point to the index value when there is an absence of cumulative voting or secret ballot.

pronounced at the extreme ends while there is no significance difference in performance between BCF-democracy group and BCF-dictatorship group. Again, those finding are consistent with *Balance of power effect hypothesis* and *antitakeover effect hypothesis*.

4.1.3. Important Characteristics Variables

Panel B of Table 4 summarizes acquirer characteristics. Compare to the levels reported by Masulis et al.(2007), on average our bank acquirers are larger by asset size ($36,769 million versus $9,005 million) , more leveraged(82% versus 15%), and have lower Tobin's Q(1.1 versus 1.98). Those different characteristics between banks and other firms have been documented by many banking literatures such as Adam and Mehran (2003) and Hagendorff et al.(2007), who suggest they provide grounds for separate studies in corporate governance of banks. Panel C reports deal characteristics. Again the deal characteristics of our sample are notably different from those reported by Masulis et al.(2007): deals of our sample are smaller(7.32% versus 16%), more likely to be a public company (60% versus 33%) and less likely to be financed by cash (17% versus 46%). Given all of those features have been shown by prior researchers to significantly affect acquirer returns (Moeller, Schlingemann, and Stulz(2004); Chang (1998); Fuller, Netter, and Stegemoller (2002)), it is important for us to control for them in the following regression analysis to ensure that the findings in the relations between the corporate governance indices and acquirer CARs in the banking industry are not caused by those characteristics variables.

4.2.Regression Results

4.2.1. Baseline Regression

Table 6 reports baseline results of regressing bank acquirers CARs on the four indices controlling for the bidder and deal characteristics and target industries. All four regressions are adjusted for year fixed effects and acquirer clustering. Among the four indices, BCF, GIM and

staggered board have negative coefficients while coefficient of cumulative voting is positive. Those signs are in line with our expectations about the impacts of the indices on the firm value. More importantly, in terms of statistical significance, with values of coefficient estimates of -0.0008(t-statistic 0.77) and -0.0035(t-statistic 0.87), BCF and staggered board are no longer significantly related to acquirer CARs. The lack of significance in the BCF and staggered board indices contrasts with the findings by Masulis et al.(2007) who report both indices to be highly significant and confirms our *antitakeover effect hypothesis*. However, coefficients of the GIM and cumulative voting indices remain significant, providing evidence for our *Balance of power effect hypothesis.* In particular, the coefficient estimate for GIM index is -0.0012 with t-statistic of 2.12. To measure the economic significance of the different impact of GIM and BCF index, we calculate change in acquirer CARs as a result of one standard deviation increase in each index. We find that one standard deviation increase in GIM index (BCF index) lowers acquirer returns by about 0.294% (0.102%), suggesting the impact of GIM index on acquirer returns is about 3 times greater than that of the BCF index. Note that Masulis et al.(2007) find the effect of BCF is about 1.5 times stronger than that of GIM index. We consider the reverse in effects between the two indices is the consequence of the combination of *Balance of power effect hypothesis* and *antitakeover effect hypothesis*. At last, the coefficient of cumulative voting is estimated at 0.0091(t-statistic 2.23), indicating firms with cumulative voting generate 0.91% higher acquisition announcement returns than those without cumulative voting. This value represents the highest return difference brought about by a single provision among the four indices, providing further evidence that banks distributing more rights to shareholders perform better.

Next, we examine the impact of controlling variables. For acquirer characteristics, leverage is the only significant variable, suggesting debtholders play an important role in monitoring bank management, which is consistent with the argument proposed by John, Mehran and Qian(2010) . The positive sign of our coefficient estimate of Tobin's q is consistent with the positive relation between Tobin's q and acquirer returns documented by Lang, Stulz and Walking (1991) and Servaes(1991). The sign between relative deal size and acquirer returns is negative. According to Moeller, Schlingemann, and Stulz(2004), relative deal size only negatively affects acquirer returns for large acquirers. Since our summary statistic shows that the bank acquirers on average are much larger than acquirers in overall industries, this result is in line with the evidence presented by Moeller, Schlingemann, and Stulz(2004). In terms of deal characteristics, we classify the deals into four categories based on methods of payments and target ownership status: stock-financed public target acquisitions, cash-financed public target acquisitions, stock-financed private target acquisitions and cash-financed private target acquisitions. To avoid perfect multicollinearity, we omit stock-financed public target acquisitions from the regression. The coefficients of the rest three deal categories are all positive, suggesting stock-financed public target acquisitions are responsible for the overall negative stock returns for the bank acquirers. Ordering the coefficient estimates of the three deal categories from lowest to highest, we find cash-financed private deals generate highest returns for the acquirer shareholders, followed by stock-financed private deals, and lastly cash-financed public deals. This finding indicates that the relations documented by past literatures on the effects of method of payments and target ownership status on acquirer returns (Chang (1998); Fuller, Netter, and Stegemoller (2002)) apply to bank acquisitions as well. At last, we control for the target industries. We divide the target industries into four categories: investment banks or insurance

firms, savings and loan institutions, other financial firms, and non-financial firms. Only the acquisitions of investment banks or insurance firms are significantly and positively associated with bank acquirers CARs, indicating gain from economy of scale for commercial banks acquiring investment banks or insurance firms.

4.2.2. Controlling for Board Characteristics

The results of the baseline regression are consistent with our *antitakeover effect hypothesis* and *Balance of power effect hypothesis*. However, to ensure they are not caused by governance variables such as board characteristics and CEO characteristics, we decide to include those variables in our regression analysis.

Table 7 reports the regression results controlling for board characteristics. Since our director data from RiskMetrics only date back to 1996, our sample size decreases from 677 to 320. Despite that, our previous findings of the relations between the four corporate governance indices and bank acquirer CARs continue to hold, indicating that they are not caused by board characteristics variables. With regard to board characteristics variables, none of the variables included are significant. Adam and Mehran (2003) argue that in the banking industry, regulators as outside monitors strongly influence the board size and composition. As a result, the importance of board oversights in the banking industry may be reduced as well. In addition, it is worth noting that independent board percentage has a negative albeit insignificant sign, echoing the finding by Subrahmanyam et al.(1997), who document a negative relation between acquirer returns and percentage of outside directors in the banking industry. In terms of acquirer and deal characteristics variables, we find that in this subsample, the variable signs stay the same but their magnitudes become stronger, especially for Tobin's q and relative deal size. As shown by table 1, from 1997(the year Riegle-Neal act became effective) onward, both deal size and acquirer size

increase notably. Since by Moeller, Schlingemann, and Stulz(2004), relative deal size only negatively affects acquirer returns for large acquirers, we consider the greater impact of acquirer and deal characteristics variables in this later period can be due to the size effect. At last, with respect to target industries, the coefficient estimates of the target category of investment banks or insurance firms are no longer significant but remain positive. Another target category with positive coefficient estimates is the savings institution, which are significant in three out of the four regressions. According to Curry and Shibut (2000), the clean-up of the savings and loan institution crisis was nearly completed in the year-end of 1995. Since the sub-sample used in this regression starts in year 1996, the significantly positive coefficient estimates might reflect the improvements in quality of the savings and loan institution targets after the clean-up.

4.2.3. Controlling for CEO Characteristics

Table 8 presents regression estimates controlling for CEO characteristics. In this set of regressions, we choose CEO age as the proxy for CEO experience, CEO equity-based compensation (percentage of value of annual stock options and restricted stock grants over the total compensation), CEO ownership (number of shares owned over year-end shares outstanding) and CEO ownership-square (the square term of CEO ownership) as the proxy for CEO incentive and at last, the three-year operating income growth rate as the proxy for management quality. We obtain CEO compensation and ownership data from ExeComp, which starts from year 1992. Due to data restriction, our sample size decreases further to 161 observations.

As shown in Table 8, the coefficient estimates of the four corporate governance indices continue to have the same signs and statistical significances as in the previous regressions, indicating our *antitakeover effect hypothesis* and *Balance of power effect hypothesis* are still valid after considering CEO incentive and performance characteristics. Notice that none of the

CEO characteristics variables are significant. The insignificant coefficient estimates of CEO equity-based compensation and CEO ownership are in line with the findings by Masulis et al.(2007), who point out in footnote 22 that Qiu(2006) also finds the relation between acquirer CARs and equity-based compensation to be insignificant. Another point worth noting about the CEO ownership is that its relation with acquirer CARs appears to be quadratic: the coefficient estimates of the CEO ownership are positive and of the square term of the CEO ownership are negative, which is consistent with the findings by Hughes et al.(2003). Among all other controlling variables, only the coefficient estimates of cash-financed public-target deal type remains significant in all 4 regressions. However, the signs of the coefficient estimates stay unchanged from the previous 2 set of regressions and their magnitudes are approximately the same, suggesting the reductions in the significance level are mainly due to the decreased sample size.

4.2.4. Controlling for Frequent Acquirer Effect and Office of Bank Holding Companies

Since our full sample includes 677 observations by 120 bank acquirers, it is necessary to control for the acquirers that make multiple acquisitions within a year. We introduces three dummy variables for this purpose---freq_dummy1 for acquirers who has completed one acquisition within a year before the announcement, freq_dummy2 for two acquisitions and freq_dummy2 for three or more acquisitions. In addition, to distinguish the acquisitions made by office of bank holding companies (SIC code 6712), we include a dummy variable for office of bank holding companies. Table 9 reports the regression results. As shown by the top section, the magnitudes and significance levels of the four corporate governance indices remain the same, suggesting that our *balance of power effect hypothesis* and *antitakeover effect hypothesis* are still valid. Furthermore, none of the newly introduced dummy variables are significant and other

controlling variables maintain their magnitudes and significance levels as in the baseline regressions.

4.2.5. Controlling for Riegle-Neal Act and Gramm-Leach Act

There are two acts in the 1990s that changed the overall landscape of banking industry: Riegle-Neal interstate banking and efficiency act and Gramm-Leach act. Riegle-Neal act allows interstate bank mergers and acquisition. Under this act, banks are able to operate and compete at national level. In Panel A of Table 10, we report deal summaries before and after the effective date of Rigle-Neal act. We find that the number of deals is about the same before and after the act. However, post the act the average acquirer market value of equity and the average deal value increase by more than 4 times and 6 times respectively. The differences are significant at 1% level. Since both the acquirer and target grow considerably in size, the relative deal size does not change as significantly post the act as the first two variables---only the median values are different at 10% level. In Panel B, we report the results of the similar comparison analysis for Gramm-Leach Act. This act was enacted in 1999 and removes the barriers of mergers among commercial banks, investment banks and insurance firms. Although smaller number of deals is consummated after the passage of the Gramm-Leach act, the increases in both the market value of the acquirers and the deal value are more pronounced than post the Riegle-Neal Act and the differences are significant at 1% level. This evidence is consistent with the large jump in acquirer size from year 1999 to 2000 reported by Table 1, which we interpret to reflect that large banks move quickly to take advantage of the opportunities created by the passage of the Gramm-Leach act. Given the significant changes in acquirer and deal size, it is necessary to control for those two acts in our analysis. The results are presented in Panel C (for Riegle-Neal Act) and Panel D(for Gramm-Leach Act) of Table 10. In both Panels, the magnitude, sign and statistical

significance of the coefficient estimates of the four corporate governance indices remain the unchanged---the coefficient estimates of the GIM index are significantly negative, of the BCF index and the staggered board provision are negative but not significant, and of the cumulative voting provision are significantly positive, suggesting our *balance of power effect hypothesis* and *antitakeover effect hypothesis* are robust to those two acts. With respect to the effects of the two acts, the passage of the Riegle-Neal Act contributes positively albeit insignificantly to acquirer returns while that of the Gramm-Leach Act is significantly and negatively associated with acquirer returns.

4.2.6. Additional Explanatory Power of the GIM Index and Provisions of the BCF Index

So far, our analysis has shown that in the banking industry where market for corporate control is absent, the antitakeover implications of the corporate governance provisions do not matter anymore while the balance of power message reflected by those provisions remains. However, our analysis up to this point has treated the BCF index and the GIM index as separate indices and ignored the fact that the BCF index is consisted of six provisions that are also in the GIM index. In this section, we intend to examine the additional explanatory power of the GIM index on top of the six provisions within the BCF index. For this purpose, in this section, we include the O index in the regression analysis alongside the BCF index as well as the provisions within the BCF index. The O index was first introduced by Bebchuk, Cohen and Farrel(2008). It is the sum of all the other eighteen provisions not included in the BCF index. BCF(2008) finds that after controlling for the BCF index, the O index has no significant association with stock returns. However, a possible explanation of this finding is that due to the high correlation between the BCF index and the GIM index(0.74 by BCF(2008) and 0.67 by our sample) and the strong antitakeover implication of the BCF index in the overall industries, the power balance

effect of the GIM index has largely been overshadowed. In the banking industry where the antitakeover concerns subside, we should expect to see the additional explanatory power of the O index if both of our *balance of power effect hypothesis* and *antitakeover effect hypothesis* hold. In addition, BCF(2008) find that each of the 6 provisions within the BCF index is significantly and negatively associated with the firm value. However, under our *antitakeover effect hypothesis* for the banking industry, those provisions should lose their significance level to a great extent. Our analysis results with regard to the O index and provisions within the BCF index are presented in Table 11. In Panel A, we report the regression results of the O index on acquirer CARs controlling for the BCF index or each provision within the BCF index. In Panel B, we report the results of the CARs-Oindex regression controlling for each provision within the BCF index and the BCF index minus the provision chosen. In all the regressions, we further control for the acquirer and deal characteristics and the target industries but omit the results here for brevity. As expected, in all sets of regressions, the coefficient estimates of the O index are significantly negative, suggesting the GIM index does explain significantly more variations in bank acquirers CARs than the BCF index or any individual provision within the BCF index. Consistent with our previous findings, the coefficient estimates of the BCF index and the staggered board provision are negative but not significant. The coefficient estimate of another powerful antitakeover provision poison pill is not significant either, neither does the limit to amend charter provision or the supermajority to approve a merger provision. Another provision limit to amend bylaw is even significantly positive. The only provision that is significantly negative is the golden parachutes provision but only at 10% level. Those estimates are in stark contrast to the findings by BCF (2008), who find all the provisions within the BCF index to be

significantly negative at 5% level at least, and further confirms our *antitakeover effect hypothesis*.

5. Conclusion

By re-examining the relations between various corporate governance indices (GIM, BCF, staggered board and cumulative voting) and acquirer announcement-period abnormal stock returns in the banking industry market for corporate control is absent, we find that acquirer returns are significantly and negatively associated with the GIM index, significantly and positively associated with the cumulative voting provision, and have no association with the BCF index and the staggered board provision. Those results are notably different from findings by previous researchers on corporate governance indices in the overall industries such as Masulis, Wang and Xie(2007) and Bebchuk, Cohen, and Ferrell (2009) and confirms the linkage between market for corporate control, the BCF index and the staggered board provision and firm value. Furthermore, our findings suggest that the corporate governance provisions have implications beyond antitakeover defenses and their management-shareholder power balance message is priced by the investors.

Our findings are robust when we control for the CEO and board characteristics and stay robust when we take into consideration Riegle-Neal act and Gramm-Leach act.

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Table 1: Market Value of Bank Mergers

Deal Summary by Sample Years

Year	Number of Acquisitions	Percentage of Sample	Mean Acquirer Market Value of Equity ($mil) (Median)	Mean Deal Value($mil) (Median)	Mean Relative Size (Median)
1991	29	4.28	2013.66	299.67	0.1209
			(873.70)	(32.00)	(0.0268)
1992	41	6.06	1988.16	82.21	0.0597
			(1167.59)	(45.05)	(0.0225)
1993	74	10.93	2092.33	84.84	0.0505
			(1299.74)	(44.71)	(0.0335)
1994	91	13.44	2684.60	116.30	0.0668
			(1461.57)	(48.82)	(0.0250)
1995	41	6.06	2349.23	289.95	0.0921
			(1541.78)	(35.35)	(0.0341)
1996	34	5.02	2400.63	152.44	0.0772
			(1441.04)	(45.45)	(0.0352)
1997	53	7.83	5859.47	433.78	0.0866
			(2711.31)	(81.19)	(0.0240)
1998	61	9.01	6589.07	385.13	0.063
			(4936.56)	(118.86)	(0.023)
1999	44	6.50	11968.91	275.64	0.0532
			(5374.89)	(165.01)	(0.0306)

2000	34	5.02	22790.80	1580.66	0.0603
			(8615.94)	(163.29)	(0.0308)
2001	20	2.95	14627.35	196.97	0.0365
			(8015.76)	(120.06)	(0.0251)
2002	16	2.36	19713.35	443.40	0.0496
			(1570.65)	(66.97)	(0.0120)
2003	26	3.84	14150.23	2264.59	0.108
			(2404.38)	(221.06)	(0.067)
2004	42	6.20	14341.93	1999.72	0.076
			(2397.31)	(138.71)	(0.046)
2005	32	4.73	14272.07	1430.69	0.0762
			(2731.95)	(154.97)	(0.0514)
2006	39	5.76	8148.58	686.24	0.1166
			(2329.64)	(160.07)	(0.0570)
Total	677	100	7509.18	568.38	0.0732
			(2359.64)	(81.00)	(0.0310)

Table 2: Announcement Abnormal Returns

Panel A: CARs by Methods of Payments

		Whole Sample	All Cash	Stock	Cash-Stock Diff.
CAR	Mean	-0.0091***	0.0024	-0.0114***	0.0138***
(-2,2)	Median	-0.0074***	-0.0027	-0.0083***	0.0056**
Number of obs.		677	113	564	

Panel B: CARs by Target Ownership Status

		Public Target	Private Target	Pub.-Pri. Diff
CAR	Mean	-0.0142***	-0.0015	-0.0128***
(-2,2)	Median	-0.0076***	-0.0032	-0.0082***
Number of obs.		403	274	

Panel C: CARs by Target Industries

		Comm. Banks	Savings Inst.	Insurance/ Inv. Banks	Other Financials	Non-Financials
CARs	Mean	-0.0104***	-0.0080***	0.0071	-0.0143**	-0.0045
(-2,2)	Median	-0.0114***	-0.0074***	-0.0006	-0.0232*	-0.0047
Number of obs.		470	145	34	21	7

Table 3: Univariate analysis on Corporate Governance Indices and CARs

Panel A: Correlation Analysis

	Mean	Median	Correlation with CAR
GIM	9.83	10	-0.09**
BCF	2.65	3	-0.05
Staggered Board	0.78	1	-0.05
CumVote	0.17	0	0.11***

Panel B: Portfolio Difference in CARs

		Democracy	Dictatorship	Diff.	Test in Diff.
GIM Classification (I)	Mean	0.0064	-0.0157***	0.0221	2.68***
(Democracy: Index<=5	Median	0.0074	-0.0097**	0.0171	2.06**
Dictatorship: Index>=14)	Number of Obs.	17	33		
GIM Classification (II)	Mean	-0.0057**	-0.0120***	0.0064	2.21**
(Democracy: Index<=9	Median	-0.0049**	-0.0091***	0.0042	1.72*
Dictatorship: Index>=10)	Number of Obs.	318	359		
BCF Classification	Mean	-0.0069***	-0.0108***	0.0039	1.36
(Democracy: Index<=2	Median	-0.0058***	-0.0084***	0.0026	1.12
Dictatorship: Index>=3)	Number of Obs.	300	377		

Table 4: Summary Statistics

Panel A: Summary Statistics for CAR and Antitakeover Provisions(N=677)

Variable	Mean	S.D.	Q1	Median	Q3
CAR (%)	-0.91	3.71	-2.81	-0.73	1.07
GIM index	9.83	2.45	8	10	12
BCF index	2.65	1.27	2	3	4
Staggered Board	0.78	0.42	1	1	1
Cumulative Voting	0.17	0.38	0	0	0

Panel B: Acquirer Characteristics (N=677)

Variable	Mean	S.D.	Q1	Median	Q3
Total Assets($mil)	36,769.12	93,344	6,660.28	13,185.10	30,906.40
Market Value of Equity($mil)	7509.18	20,355.91	1,175.71	2359.59	5,639.59
Tobin's Q	1.10	0.10	1.04	1.07	1.15
Free Cash Flow(%)	2.31	0.47	2.01	2.30	2.55
Leverage (%)	82	7	78	83	88
Stock Price Runup(%)	8.08	22.46	-6.03	5.98	19.97

Panel C: Deal Characteristics(N=677)

Variable	Mean	S.D.	Q1	Median	Q3
Relative Deal Size (%)	7.32	12.21	1.23	3.10	8.18
Public (Dummy)	0.60	0.49	0	1	1
Private (Dummy)	0.40	0.49	0	0	1
All Cash (Dummy)	0.17	0.37	0	0	0
Some Stock (Dummy)	0.83	0.37	1	1	1

Table6: Initial Regression of Acquirer Announcement Abnormal Returns

OLS adjusted for Heteroskedasticity, and acquirer clustering and controlled for year fixed effect, whose coefficient estimates are suppressed.

	(1)	(2)	(3)	(4)
Dependent Variable	Car2	Car2	Car2	Car2
GIM Index	-0.0012**			
	(-2.12)			
BCF Index		-0.0008		
		(-0.77)		
Staggered Board			-0.0035	
			(-0.87)	
Cumulative Voting				0.0091**
				(2.23)
Acquirer Characteristics				
Firmsize	0.0005	0.0006	0.0006	0.0009
	(0.32)	(0.37)	(0.37)	(0.57)
Tobin's Q	0.0596	0.0659	0.0701	0.0426
	(1.34)	(1.47)	(1.48)	(0.93)
FCF	-0.3303	-0.3325	-0.3878	-0.2460
	(-1.01)	(-0.98)	(-1.16)	(-0.78)
Leverage	0.0841*	0.0892*	0.0905*	0.0774
	(1.66)	(1.72)	(1.71)	(1.58)
Runup	-0.0112	-0.0111	-0.0110	-0.0091
	(-1.44)	(-1.42)	(-1.41)	(-1.17)
Deal Characteristics				
RelDealSz	-0.0367	-0.0365	-0.0365	-0.0361
	(-1.50)	(-1.48)	(-1.49)	(-1.46)
Cash*Private	0.0152***	0.0155***	0.0153***	0.0151***
	(3.15)	(3.12)	(3.21)	(3.25)
Cash*Public	0.0075	0.0077	0.0077	0.0085
	(1.25)	(1.29)	(1.28)	(1.45)
Stock*Private	0.0074***	0.0077***	0.0080***	0.0073***
	(3.06)	(3.12)	(3.29)	(2.96)
Target Industries				
Ins_Inv	0.0150*	0.0146*	0.0143*	0.0148*
	(1.75)	(1.70)	(1.71)	(1.77)
Savings_Inst	0.0013	0.0016	0.0018	0.0010
	(0.36)	(0.41)	(0.47)	(0.28)
OtherFinancial	-0.0064	-0.0066	-0.0068	-0.0066
	(-0.93)	(-0.96)	(-0.98)	(-0.94)
NonFinancial	-0.0037	-0.0051	-0.0059	-0.0045
	(-0.18)	(-0.24)	(-0.27)	(-0.22)
Constant	-0.1182	-0.1387	-0.1431	-0.1141
	(-1.35)	(-1.56)	(-1.55)	(-1.30)
Observations	677	677	677	677
Adjusted R-squared	0.050	0.045	0.045	0.051

Table7: Regression of Acquirer Announcement Abnormal Returns Controlling Board Characteristics

OLS adjusted for Heteroskedasticity, and acquirer clustering and control for year fixed effect, whose coefficient estimates are suppressed.

	(1)	(2)	(3)	(4)
Dependent Variable	Car2	Car2	Car2	Car2
GIM Index	-0.0021**			
	(-2.17)			
BCF Index		-0.0026		
		(-1.48)		
Staggered Board			-0.0143	
			(-1.62)	
Cumulative Voting				0.0228**
				(2.64)
Board Characteristics				
Duality	0.0013	0.0019	0.0011	0.0007
	(0.33)	(0.46)	(0.27)	(0.15)
BdSz	-0.0009	-0.0008	-0.0007	-0.0005
	(-1.43)	(-1.43)	(-1.32)	(-0.92)
IndepPerc	-0.0163	-0.0156	-0.0176	-0.0233
	(-1.03)	(-0.9)	(-1.04)	(-1.40)
Acquirer Characteristics				
Firmsize	0.0035	0.0034	0.0034	0.0040*
	(1.51)	(1.40)	(1.41)	(1.71)
Tobin's Q	0.1320**	0.1380**	0.1732**	0.0663
	(2.39)	(2.39)	(2.46)	(1.17)
FCF	-0.7966	-0.6786	-1.0540*	-0.4991
	(-1.45)	(-1.17)	(-1.67)	(-0.96)
Leverage	0.1890**	0.1948**	0.2292**	0.1518*
	(1.66)	(2.30)	(2.51)	(2.00)
Runup	-0.0190	-0.0188	-0.0184	-0.0155
	(-1.38)	(-1.34)	(-1.33)	(-1.15)
Deal Characteristics				
RelDealSz	-0.0644***	-0.0645***	-0.0630***	-0.0654***
	(-3.24)	(-3.17)	(-3.04)	(-3.15)
Cash*Private	0.0254**	0.0250**	0.0255**	0.0233**
	(2.56)	(2.44)	(2.59)	(2.56)
Cash*Public	0.0197**	0.0199**	0.0213**	0.0208**
	(2.12)	(2.09)	(2.23)	(2.08)
Stock*Private	0.0056	0.0062	0.0069	0.0072
	(1.22)	(1.36)	(1.48)	(1.65)
Target industries				
Ins_Inv	0.0137	0.0129	0.0116	0.0127
	(1.07)	(1.02)	(0.95)	(1.02)
Savings_Inst	0.0108*	0.0109*	0.0123**	0.0085
	(1.84)	(1.82)	(2.05)	(1.46)
OtherFinancial	-0.0063	-0.0066	-0.0069	-0.0095
	(-0.45)	(-0.48)	(-0.51)	(-0.62)
NonFinancial	0.0027	0.0002	-0.0004	0.0002
	(0.12)	(0.01)	(-0.02)	(0.01)
Constant	-0.2796**	-0.3072**	-0.3623**	-0.2122*
	(-2.19)	(-2.31)	(-2.47)	(-1.70)
Observations	320	320	320	320
Adjusted R-squared	0.093	0.085	0.09	0.10

Table8: Regression of Acquirer Announcement Abnormal Returns Controlling CEO Characteristics

OLS adjusted for Heteroskedasticity, and acquirer clustering and control for year fixed effect, whose coefficient estimates are suppressed.

Dependent Variable	(1) Car2	(2) Car2	(3) Car2	(4) Car2
GIM Index	-0.0029**			
	(-2.03)			
BCF Index		-0.0041		
		(-1.55)		
Staggered Board			-0.0294	
			(-1.63)	
Cumulative Voting				0.0397**
				(2.27)
CEO Characteristics				
CEOAGE	0.0006	0.0002	0.0001	0.0001
	(0.85)	(0.33)	(0.17)	(0.21)
CEOEqtyComp	-0.0024	-0.0071	0.0023	-0.0072
	(-0.14)	(-0.4)	(0.13)	(-0.44)
CEO_Ownership	0.3330	0.4073	0.0637	0.4590
	(0.80)	(0.97)	(0.11)	(1.06)
CEO_Ownership2	-2.6688	-3.3382	-0.4848	-3.3271
	(-0.69)	(-0.85)	(-0.09)	(-0.78)
OprtGrth	-0.0065	-0.0051	-0.0042	-0.0022
	(-1.30)	(-0.93)	(-0.85)	(-0.47)
Acquirer Characteristics				
Firmsize	0.0049	0.0049	0.0046	0.0083**
	(1.24)	(1.17)	(1.13)	(2.17)
Tobin's Q	0.1521*	0.1477	0.2448*	0.0606
	(1.79)	(1.65)	(1.99)	(0.73)
FCF	-1.4850	-1.2023	-2.3445	-1.1356
	(-1.32)	(-1.09)	(-1.46)	(-1.11)
Leverage	0.1236	0.1157	0.2299	0.0991
	(0.99)	(0.86)	(1.56)	(0.78)
Runup	-0.0341	-0.0375	-0.0342	-0.0326
	(-1.4)	(-1.5)	(-1.45)	(-1.37)
Deal Characteristics				
RelDealSz	-0.0549	-0.0525	-0.0412	-0.0518
	(-1.18)	(-1.11)	(-0.84)	(-1.14)
Cash*Private	0.0243	0.0230	0.0282*	0.0251
	(1.54)	(1.46)	(1.70)	(1.64)
Cash*Public	0.0256**	0.0262**	0.0270**	0.0284**
	(2.3)	(2.27)	(2.30)	(2.35)
Stock*Private	-0.0026	-0.0003	0.0005	0.0022
	(-0.25)	(-0.03)	(0.04)	(0.22)
Target industries				
Ins_Inv	0.0328	0.0319	0.0295	0.0302
	(0.96)	(0.93)	(1.00)	(0.97)
Savings_Inst	0.0115	0.0112	0.0141*	0.0094
	(1.51)	(1.45)	(1.92)	(1.17)
OtherFinancial	-0.0074	-0.0096	-0.0146	-0.0118
	(-0.81)	(-1.05)	(-1.40)	(-1.11)
NonFinancial	-0.0154	-0.0168	-0.0202	-0.0183
	(-0.51)	(-0.55)	(-0.68)	(-0.69)
Constant	-0.2977	-0.2870	-0.4450*	-0.2259
	(-1.44)	(-1.28)	(-1.84)	(-1.01)
Observations	161	161	161	161
Adjusted R-squared	0.077	0.064	0.095	0.105508186

Table9: Regression of Acquirer Announcement Abnormal Returns Controlling the Effect of Frequent Acquirers and Office of Bank Holding Companies

OLS adjusted for Heteroskedasticity, and acquirer clustering and control for year fixed effect, whose coefficient estimates are suppressed.

	(1)	(2)	(3)	(4)
Dependent Variable	Car2	Car2	Car2	Car2
GIM Index	-0.0011**			
	(-2.07)			
BCF Index		-0.0006		
		(-0.51)		
Staggered Board			-0.0028	
			(-0.70)	
Cumulative Voting				0.0098**
				(2.49)
Effect of Frequent Acquirers and Office of Bank Holding Companies				
Freq_dummy1	0.0000	-0.0001	0.0000	-0.0002
	(-0.01)	(-0.02)	(0.00)	(-0.08)
Freq_dummy2	-0.0023	-0.0026	-0.0026	-0.0032
	(-0.50)	(-0.55)	(-0.55)	(-0.72)
Freq_dummy3	-0.0042	-0.0038	-0.0035	-0.0054*
	(-1.35)	(-1.21)	(-1.12)	(-1.68)
BHC	-0.0039	-0.0047	-0.0048	-0.0043
	(-0.80)	(-0.89)	(-0.90)	(-0.87)
Acquirer Characteristics				
Firmsize	0.0006	0.0006	0.0006	0.0010
	(0.33)	(0.38)	(0.37)	(0.61)
Tobin's Q	0.0637	0.0688	0.0725	0.0465
	(1.38)	(1.49)	(1.51)	(0.99)
FCF	-0.3376	-0.3604	-0.4020	-0.2411
	(-1.00)	(-1.04)	(-1.17)	(-0.75)
Leverage	0.0906*	0.0933*	0.0955*	0.0859*
	(1.74)	(1.78)	(1.78)	(1.69)
Runup	-0.0111	-0.0110	-0.0109	-0.0088
	(-1.41)	(-1.39)	(-1.38)	(-1.12)
Deal Characteristics				
RelDealSz	-0.0372	-0.0369	-0.0369	-0.0367
	(-1.53)	(-1.51)	(-1.51)	(-1.50)
Cash*Private	0.0149***	0.0151***	0.0149***	0.0146***
	(3.11)	(3.06)	(3.14)	(3.22)
Cash*Public	0.0069	0.0070	0.0070	0.0079
	(1.12)	(1.17)	(1.15)	(1.30)
Stock*Private	0.0077***	0.0080***	0.0082***	0.0077***
	(3.14)	(3.28)	(3.35)	(3.08)
Target industries				
Ins_Inv	0.0144*	0.0141	0.0139	0.0140*
	(1.69)	(1.64)	(1.66)	(1.70)
Savings_Inst	0.0014	0.0017	0.0018	0.0010
	(0.38)	(0.44)	(0.48)	(0.29)
OtherFinancial	-0.0061	-0.0063	-0.0065	-0.0062
	(-0.88)	(-0.90)	(-0.92)	(-0.87)
NonFinancial	-0.0031	-0.0046	-0.0051	-0.0037
	(-0.15)	(-0.22)	(-0.24)	(-0.18)
Constant	-0.1271	-0.1441	-0.1484	-0.1249
	(-1.41)	(-1.60)	(-1.59)	(-1.38)
Observations	677	677	677	677
Adjusted R-squared	0.046	0.041	0.042	0.049

Table 10 Panel A: Deal Summary Pre- and Post- Riegle-Neal Act

This table compares bank mergers and acquisitions deals before and after Riegle-Neal act. The cut-off date is June 1, 1997, the effective date of this act.

Riegle-Neal	Number of Acquisitions	Mean Acquirer Market Value of Equity($mil) (Median)	Mean Deal Value($mil) (Median)	Mean Relative Deal Size (Median)
Prior	304	2257.67	155.51	0.0744
		(1353.73)	(42.85)	(0.0295)
Post	311	10628.12	945.87	0.0801
		(3390.35)	(136.42)	(0.0408)
Diff	7	8370.5[a]	790.4[a]	0.0056
		(2037[a])	(93.55[a])	(0.0113[c])

Table 10 Panel B: Deal Summary Pre- and Post- Gramm-Leach Act

This table compares bank mergers and acquisitions deals before and after Gramm-Leach act. The cut-off date is November 12, 1999, the date the act is enacted.

Riegle-Neal	Number of Acquisitions	Mean Acquirer Market Value of Equity($mil) (Median)	Mean Deal Value($mil) (Median)	Mean Relative Deal Size (Median)
Prior	463	3846.1	223.0	0.0709
		(1999.8)	(62.0)	(0.0287)
Post	214	15434.5	1315.7	0.0780
		(3049.2)	(137.7)	(0.0420)
Diff	-249	11588.5[a]	1092.8[a]	0.0071
		(1049.4[a])	(75.7[a])	(0.0133[c])

Table10 Panel C: Regression of Acquirer Announcement Abnormal Returns Controlling the Effect of Riegle-Neal Act

OLS adjusted for Heteroskedasticity, and acquirer clustering and control for year fixed effect, whose coefficient estimates are suppressed.

	(1)	(2)	(3)	(4)
Dependent Variable	Car2	Car2	Car2	Car2
GIM Index	-0.0011**			
	(-2.04)			
BCF Index		-0.0008		
		(-0.72)		
Staggered Board			-0.0034	
			(-0.85)	
Cumulative Voting				0.0091**
				(2.25)
Effect of the Riegle-Neal Act				
Riegle-Neal	0.0174	0.0182	0.0182	0.0184
	(1.57)	(1.63)	(1.62)	(1.64)
Acquirer Characteristics				
Firmsize	0.0004	0.0005	0.0005	0.0008
	(0.27)	(0.31)	(0.31)	(0.52)
Tobin's Q	0.0557	0.0615	0.0657	0.0383
	(1.25)	(1.37)	(1.39)	(0.83)
FCF	-0.3220	-0.3246	-0.3772	-0.2357
	(-0.98)	(-0.95)	(-1.12)	(-0.74)
Leverage	0.0775	0.0820	0.0836	0.0706
	(1.55)	(1.61)	(1.61)	(1.45)
Runup	-0.0108	-0.0106	-0.0106	-0.0087
	(-1.39)	(-1.36)	(-1.35)	(-1.11)
Deal Characteristics				
RelDealSz	-0.0364	-0.0362	-0.0362	-0.0358
	(-1.49)	(-1.47)	(-1.47)	(-1.45)
Cash*Private	0.0150***	0.0152***	0.0151***	0.0148***
	(3.09)	(3.05)	(3.14)	(3.18)
Cash*Public	0.0076	0.0078	0.0077	0.0086
	(1.27)	(1.31)	(1.29)	(1.46)
Stock*Private	0.0074***	0.0077***	0.0080***	0.0073***
	(3.06)	(3.19)	(3.27)	(2.95)
Target industries				
Ins_Inv	0.0147*	0.0143*	0.0140*	0.0145*
	(1.71)	(1.66)	(1.66)	(1.73)
Savings_Inst	0.0016	0.0019	0.0021	0.0013
	(0.43)	(0.49)	(0.55)	(0.36)
OtherFinancial	-0.0060	-0.0062	-0.0064	-0.0061
	(-0.88)	(-0.91)	(-0.93)	(-0.89)
NonFinancial	0.0001	-0.0010	-0.0017	-0.0003
	(0.01)	(-0.04)	(-0.07)	(-0.01)
Constant	-0.1083	-0.1274	-0.1319	-0.1032
	(-1.24)	(-1.44)	(-1.44)	(-1.18)
Observations	677	677	677	677
Adjusted R-squared	.0517	.0470	.0477	.0539

Table10 Panel D: Regression of Acquirer Announcement Abnormal Returns Controlling the Effect of Gramm-Leach Act

OLS adjusted for Heteroskedasticity, and acquirer clustering and control for year fixed effect, whose coefficient estimates are suppressed.

	(1)	(2)	(3)	(4)
Dependent Variable	Car2	Car2	Car2	Car2
GIM Index	-0.0013**			
	(-2.33)			
BCF Index		-0.0009		
		(-0.82)		
Staggered Board			-0.0038	
			(-0.95)	
Cumulative Voting				0.0088**
				(2.17)
Effect of the Gramm-Leach Act				
Gramm-Leach	-0.0551**	-0.0530*	-0.0535**	-0.0520*
	(-2.07)	(-1.96)	(-2.02)	(-1.95)
Acquirer Characteristics				
Firmsize	0.0008	0.0009	0.0009	0.0012
	(0.50)	(0.54)	(0.54)	(0.74)
Tobin's Q	0.0500	0.0572	0.0619	0.0344
	(1.11)	(1.25)	(1.29)	(0.74)
FCF	-0.2797	-0.2853	-0.3442	-0.2060
	(-0.83)	(-0.81)	(-1.00)	(-0.63)
Leverage	0.0764	0.0820	0.0839	0.0701
	(1.51)	(1.58)	(1.58)	(1.43)
Runup	-0.0107	-0.0106	-0.0105	-0.0087
	(-1.41)	(-1.38)	(-1.37)	(-1.15)
Deal Characteristics				
RelDealSz	-0.0371	-0.0369	-0.0369	-0.0365
	(-1.52)	(-1.50)	(-1.50)	(-1.48)
Cash*Private	0.0163***	0.0165***	0.0164***	0.0161***
	(3.47)	(3.41)	(3.52)	(3.58)
Cash*Public	0.0075	0.0077	0.0077	0.0086
	(1.23)	(1.28)	(1.26)	(1.43)
Stock*Private	0.0081***	0.0084***	0.0087***	0.0081***
	(3.52)	(3.68)	(3.80)	(3.40)
Target industries				
Ins_Inv	0.0140	0.0137	0.0133	0.0138
	(1.63)	(1.58)	(1.58)	(1.65)
Savings_Inst	0.0010	0.0012	0.0015	0.0007
	(0.27)	(0.34)	(0.40)	(0.20)
OtherFinancial	-0.0071	-0.0073	-0.0075	-0.0072
	(-1.02)	(-1.04)	(-1.07)	(-1.03)
NonFinancial	-0.0041	-0.0056	-0.0064	-0.0051
	(-0.19)	(-0.27)	(-0.30)	(-0.25)
Constant	-0.1048	-0.1274	-0.1326	-0.1031
	(-1.20)	(-1.43)	(-1.43)	(-1.17)
Observations	677	677	677	677
Adjusted R-squared	.0628	.0567	.0576	.0630

Table11 Panel A: Regression of Acquirer Announcement Abnormal Returns on the BCF Index or Provisions in the BCF Index with the O index

OLS adjusted for Heteroskedasticity, and acquirer clustering and control for year fixed effect, whose coefficient estimates are suppressed. Only coefficient estimates of variables of interest are displayed. The coefficients of independent variables other than the variables of interest are the same as in Table 6.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable	Car2	Car2	Car2	Car2	Car2	Car2	Car2
O index	-0.0016**	-0.0016**	-0.0017**	-0.0016**	-0.0021***	-0.0017**	-0.0017**
	(-2.51)	(-2.25)	(-2.52)	(-2.52)	(-3.09)	(-2.51)	(-2.49)
BCF Index	-0.0002						
	(-0.23)						
Staggered Board		-0.0009					
		(-0.21)					
Poison Pill			0.0003				
			(0.12)				
Golden Parachutes				-0.0057*			
				(-1.72)			
Limit to Amend Bylaws					0.0054*		
					(1.72)		
Limit to Amend Charter						0.0009	
						(0.18)	
Supermajority							0.0000
							(-0.01)
Observations	677	677	677	677	677	677	677
Adjusted R-squared	0.0491	0.0492	0.0491	0.0533	0.0517	0.0491	0.0491

Table11 Panel B: Regression of Acquirer Announcement Abnormal Returns on each provision in the BCF index, the BCF index minus the provision and the O index

OLS adjusted for Heteroskedasticity, and acquirer clustering and control for year fixed effect, whose coefficient estimates are suppressed. Only coefficient estimates of variables of interest are displayed. The coefficients of independent variables other than the variables of interest are the same as in Table 6.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Car2	Car2	Car2	Car2	Car2	Car2
O index	-0.0016**	-0.0016**	-0.0018***	-0.0020***	-0.0016**	-0.0016**
	(-2.26)	(-2.41)	(-2.76)	(-3.12)	(-2.51)	(-2.33)
BCF Index-the provision	-0.0001	-0.0005	0.0011	-0.0010	-0.0003	-0.0003
	(-0.11)	(-0.37)	(1.01)	(-0.85)	(-0.31)	(-0.23)
Staggered Board	-0.0008					
	(-0.18)					
Poison Pill		0.0006				
		(0.19)				
Golden Parachutes			-0.0062*			
			(-1.83)			
Limit to Amend Bylaws				0.0056*		
				(1.80)		
Limit to Amend Charter					0.0011	
					(0.22)	
Supermajority						0.0002
						(0.05)
Observations	677	677	677	677	677	677
Adjusted R-squared	0.0477	0.0478	0.0527	0.051	0.0477	0.0477