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Nam H. Nguyen

The University of Texas Rio Grande Valley

Hieu V. Phan

Hung V. Phan

Dung T. T. Tran

Hong Vo

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Tournament-Based Incentives and Mergers and Acquisitions

Nam H. Nguyen, Hieu V. Phan*, Hung V. Phan, Judy (Dung) Tran, and Hong Vo

* Corresponding author

Nam H. Nguyen, nam.nguyen1@utrgv.edu, Robert C. Vackar College of Business & Entrepreneurship, University of Texas Rio Grande Valley, 1201 W University Dr, Edinburg, TX 78539, phone: (956) 278-9881; Hieu V. Phan, hieu_phan@uml.edu, Manning School of Business, University of Massachusetts Lowell, 72 University Avenue, MA 01854, phone: (978) 934-2633; Hung V. Phan, hung.pv@due.edu.vn, Faculty of Accounting, University of Economics, University of Danang, 71 Ngu Hanh Son, Ngu Hanh Son District, Danang, Vietnam, phone: (+8423) 63836987; Judy (Dung) T.T. Tran, dung_tran@student.uml.edu, Manning School of Business, University of Massachusetts Lowell, 72 University Avenue, MA 01854. Hong Vo, vxhong@hcmiu.edu.vn, International University, Vietnam National University Ho Chi Minh City, Quarter 6, Linh Trung Ward, Thu Duc District, Ho Chi Minh City, Vietnam, phone: (+8428) 37244270. We appreciate helpful comments from Brian Lucey (the editor), an associate editor, two anonymous reviewers, Charlie Hadlock, Jian Huang, and participants at the 2018 FMA Annual Meeting. This paper also benefits from the discussion with Emre Unlu. All errors remain the sole responsibility of the authors.

Tournament-Based Incentives and Mergers and Acquisitions

Abstract

This research examines the relation between tournament-based incentives, which are proxied by the difference between a firm's CEO pay and the median pay of the senior managers, and mergers and acquisitions (M&As). We find that tournament-based incentives are positively related to firm acquisitiveness and acquiring firms' stock and operating performance. Further analysis indicates that positive acquisition performance increases the likelihood of the CEO being promoted from inside the acquiring firm. Our evidence is consistent with the view that tournament-based incentives motivate acquiring firms' managers to make greater efforts and take more risk that result in superior acquisition performance.

JEL classifications: G30, G34

Keywords: Merger and acquisition; Executive Compensation; CEO pay gap; Tournament incentives

1. Introduction

Managerial compensation plays a crucial role in aligning the interests of managers and shareholders and has important implications for firm policies and value (Jensen and Meckling, 1976). CEO pay gap, which is the difference in pay between the CEO and his senior executives (hereinafter referred to as Vice Presidents or VPs), has attracted increasing attention from academic research. Previous studies suggest that CEO pay gap represents the prize of an intra-firm CEO tournament that a VP would receive when being promoted to the CEO position of the firm (e.g., Gibbs, 1994). Tournament-based incentives can motivate managers to take risk (Kini and Williams, 2012) that improves firm performance (Kale, Reis, and Venkateswaran, 2009). In this research, we ask how tournament-based incentives affect firm acquisition activities and acquisition performance.

The tournament incentives theory suggests that executive compensation can provide promotion-based (i.e., tournament) incentives. In a company, the CEO is at the top of the promotion hierarchy so only performance-based incentives could motivate him to make greater efforts. However, both performance-based and promotion-based incentives could be appealing to the next group of senior executives (e.g., Green and Stokey, 1983; Baker, Jensen, and Murphy, 1988). When a firm runs an intra-firm rank-order tournament, senior executives are typically evaluated and ranked by their relative performance because their true abilities are mostly unobservable. A senior executive with the highest relative output will be the winner of the CEO tournament with the prize being the CEO position. If the likelihood of promotion to the CEO position is equal for the VPs, the promotion prize, which is proxied by CEO pay gap, can elicit greater efforts (Lazear and Rosen, 1981; Prendergast, 1999, Bognanno, 2001) and risk-taking (Kini and Williams, 2012) from the VPs that enhance corporate performance and value (Kale et al., 2009; Burns, Minnick, and Starks, 2017; Phan, Simpson, and Nguyen, 2017).

M&As are an important form of corporate investment. An advantage of using M&As over other corporate policies as the testing ground is that the former are observable at their announcements, which allows us to capture the direct effects of CEO pay gap on corporate behavior and gauge its implication for shareholder value. Numerous studies argue that executive compensation affects corporate acquisition decisions and their outcomes (e.g., Jensen, 1986; Datta, Iskandar-Datta, and Raman, 2001; Harford, Mansi, and Maxwell, 2008); however, to the best of our knowledge, no previous research has examined the relation between CEO pay gap and M&As. Furfine and Rosen (2011) and Phan (2014) report that M&As increase the default risk of acquiring firms. Managers are more likely to lose their jobs for making value-destroying acquisitions (Lehn and Zhao, 2006).¹ For these reasons, M&As arguably represent the discretionary risk taking of the acquiring firms' managers, which provides a useful setting to examine the relations between tournament incentives and corporate policies and performance.

We begin our analysis by examining the relation between CEO pay gap and M&A activities. Using a sample of 19,835 firm-year observations of 2,397 U.S public firms that have executive compensation data from 1993–2012, we find that CEO pay gap is positively related to a firm's acquisition likelihood, frequency, and value. Our finding is robust to the correction for

¹ We note that Lehn and Zhao (2006) focus on acquirer CEO turnover following the acquisitions. When a CEO is fired due to poor acquisition performance, it is reasonable to expect that VPs also bear some consequences, particularly if the latter are delegated to make M&A decisions. Therefore, we examine the possibility that VP turnover also increases following poor acquisition performance. We calculate the ratio of VPs who are no longer with the acquiring firms within the next three or five years following an acquisition. We exclude VPs aged 62 or above from the calculation since they would retire from the firm within the testing windows. The results of the regressions of VP turnover ratios on acquisition performance and other firm characteristics indicate that poor acquisition performance also leads to higher VP turnover rate.

potential endogenous relation between CEO pay gap and M&A decisions. Our evidence indicates that CEO pay gap is positively associated with managerial risk-taking.

Next, we investigate the relation between CEO pay gap and shareholder value proxied by the acquiring firms' acquisition announcement abnormal stock returns (CARs). Our cross-sectional analysis indicates that CEO pay gap is positively related to acquirer CARs. Further analysis indicates that CEO pay gap is positively related to the post-acquisition long-term stock and operating performance of the acquirers. In a complementary analysis, we find that CEO pay gap has more pronounced effects on the stock performance of acquirers with a higher likelihood of running CEO tournament. These acquirers are also more likely to engage in focused acquisitions. Taken together, our findings suggest positive relations between CEO pay gap and corporate risk taking and acquisition performance.

Our research informs the on-going debate on executive compensation. Large CEO pay packages have been a topical issue to the public and academics on the fairness ground. A CEO's large pay could represent the power of a CEO in capturing the pay-setting process (Bertrand and Mullainathan, 2001) or extracting economic rents and thereby implying a deviation from the optimal contracting (Bebchuk, Fried, and Walker, 2002). Alternatively, the high within-firm pay disparities can reflect executive compensation incentives. Our evidence suggests that a large pay gap between a CEO and the next group of senior executives can induce managers to work harder and pursue risk-increasing policies, and its positive relations with corporate performance and value are consistent with the efficient contracting argument. Our research also adds to a growing stream of literature that investigates the relations between tournament-based incentives and corporate policies and firm value. Finally, our findings can help policy makers to make informed decisions on policies related to executive compensation and its disclosure.

The rest of the paper proceeds as follows: Section 2 provides literature review and hypotheses development. Section 3 details the sample description, variable construction, and descriptive statistics. We discuss empirical methods, present results, and provide discussions in Section 4. Section 5 presents robustness checks and Section 6 concludes the paper.

2. Literature review and hypotheses development

2.1. CEO pay gap and M&A activities

M&As are one of the most important forms of corporate investment. Jensen and Meckling (1976) suggest that M&As can intensify the conflict of interest between shareholders and managers. Moeller, Schlingemann, and Stulz (2004) find that acquirer shareholder announcement returns over the period 1980-2001 are positive (1.1%) on average; however, in monetary value, acquirers appear to lose about \$25 million around the announcement of each acquisition deal, which is attributed to the losses incurred by large acquisition deals. Furfine and Rosen (2011) and Phan (2014) report that, on average, M&As increase the default risk of acquiring firms. Managers may pay a price in the form of their jobs for engaging in value-destroying acquisitions (e.g., Lehn and Zhao, 2006). These arguments indicate that M&As represent managers' discretionary risk-taking.

Jensen and Meckling (1976) argue theoretically that executive compensation is a part of the internal governance mechanism that can alleviate agency problems between managers and shareholders. Previous empirical research documents that managerial equity-based compensation (EBC) helps align the interests of managers and shareholders. Boulton, Braga-Alves, and Schlingemann (2014) find CEO's EBC to be positively related to corporate risk taking in M&As measured by acquisition likelihood and intensity, whereas Datta et al. (2001) report that managerial EBC is positively related to acquirer shareholder value. Gormley, Matsa, and Milbourn (2013)

document a positive relation between CEO vega, a risk-taking incentive measured by CEO wealth sensitivity to stock return volatility, and acquisition risk. Although numerous studies have examined the relations between different aspects of executive compensation and M&As, no previous research has investigated the relation between tournament-based incentives and M&As.

The tournament incentives theory argues that CEO pay gap can provide promotion-based incentives to the VPs. In a company, since the CEO is at the top of the promotion hierarchy, only performance-based incentives could elicit greater efforts from the CEO.² However, both performance-based and promotion-based incentives could be appealing to the VPs (Green and Stokey, 1983; Baker et al., 1988). If a firm runs an intra-firm rank-order tournament to select the next CEO, VPs are typically evaluated and ranked by their relative performance since their true abilities are mostly unobservable. The VP with the highest relative output wins the CEO tournament with the prize being the CEO position. If the likelihood of promotion to the CEO position is equal for the tournament participants, VPs can improve their chance of success by working harder (Lazear and Rosen, 1981; Prendergast, 1999, Bognanno, 2001) and taking more risk (Kini and Williams, 2012) to maximize the outcomes that are used to rank them (Kale et al., 2009; Burns, Minnick, and Starks, 2017; Phan, Simpson, and Nguyen, 2017).

Promotion incentives for VPs can relate positively to M&A activities. Graham, Harvey, and Puri (2015) conduct a survey of U.S. CEOs about who make important corporate decisions in a firm and find that 46.5% of the CEOs in their sample retain the M&A decision making for themselves, which implies that the remaining 53.5% of the CEOs may share or delegate acquisition

² Coles, Li, and Wang (2018) argue that CEO may be motivated by industry tournament incentives. We consider these incentives in the robustness check section.

decision making authority to the VPs in one way or another. In a recent empirical study, Greene and Smith (2018) analyze proxy data and report that CEOs delegate M&A decisions to VPs in nearly 30% of the acquisitions in their sample. To the extent that VPs are delegated power to make acquisition decisions and tournament-based incentives motivate them to take risk, we expect a positive relation between tournament-based incentives and M&A activities proxied by M&A likelihood, M&A frequency, and the values of M&A deals. The foregoing discussions lead to our first testable hypothesis as follows:

Hypothesis 1: CEO pay gap is positively related to M&A activities.

2.2. CEO pay gap and acquisition performance

Kale et al. (2009) find a positive relation between CEO pay gap and corporate performance proxied by returns on assets (ROA) and Tobin's Q. Phan et al. (2017) report that CEO pay gap relates positively to the value of cash to shareholders. Burns et al. (2017) document that CEO pay gap is associated with higher firm value in a cross-country sample. Collectively, the findings of these studies indicate positive relations between CEO pay gap and acquisition performance of the acquiring firms. Following this discussion, we state our second testable hypothesis as follows:

Hypothesis 2a: CEO pay gap is positively related to the acquisition performance of the acquiring firms.

Notwithstanding the above arguments, tournament incentives may induce VPs to engage in overinvestment and excessive risk taking (Hvide, 2002; Gilpatrick, 2009). Haß, Müller, and Vergauwe (2015) find that excessive risk taking induced by tournament incentives increases the likelihood of corporate fraud. As a result, acquisitions motivated by tournament incentives may harm shareholder value. These observations lead to our alternative hypothesis as follows:

Hypothesis 2b: CEO pay gap is negatively related to the acquisition performance of the acquiring firms.

Given the possible opposing effects of tournament incentives on the acquisition performance of the acquiring firms, their net effect needs to be determined empirically.

3. Sample, variable construction, and descriptive statistics

Our sample includes firms in the Compustat Executive Compensation (ExecuComp) database. The ExecuComp database reports over 80 different compensation items of more than 12,500 executives (usually top five executive officers of each company) in companies that are listed in the Standards and Poor's (S&P) 500, S&P SmallCap 600, and S&P 400 MidCap indexes. The executive compensation data are annual and available from 1992 onwards so our sample starts from 1993. The sample ends in 2012 because it allows us to track the long-term performance of the acquirers following the deal completion. We obtain accounting data from Compustat, stock price and return data from The Center for Research in Security Prices (CRSP), and M&A data from SDC Platinum. To focus the analysis on M&A deals that potentially have visible impacts on the respective acquirers, we follow the M&A literature in filtering out those deals with values below \$5 million and deal ratios, measured as the M&A deal values divided by the acquirer market value of equity at the end of the year preceding the M&A deal announcements, below 5% in our cross-sectional analyses.³ Furthermore, due to the high level of regulation in the finance and utility industries, we exclude acquisitions pursued by firms in these industries from our samples.

Following previous research (e.g., Kale et al., 2009; Kini and Williams, 2012; Phan et al., 2017), we measure CEO pay gap as the difference between the CEO's total compensation package

³ We relax this value filter in the robustness check section.

(ExecuComp variable TDC1, which includes salary, bonus, total value of stock and stock options granted, and long-term incentive payouts) and the median total compensation package of the VPs.⁴ It is noted that following the adoption of the Accounting Standards Codification (ASC) Topic 718 (formerly FAS 123R) on December 12, 2004, option values reported in ExecuComp change from those calculated by the Black-Scholes option pricing model (Black and Scholes, 1973) for 2005 and earlier period to the fair values self-reported by firms for the post-2005 period. To avoid discrepancy in option value calculation over these two periods, we use the dividend-adjusted Black-Scholes option pricing model to calculate option values for the post-2005 period. We then recalculate the TDC1 variable by substituting the estimated option values for the self-reported ones for the post-2005 period and use this measure of TDC1 in our analysis.⁵ We further identify and exclude former CEOs who remain with the firm in an executive position from the median VP compensation and pay gap estimation.

Table 1 reports the summary statistics of the full sample of firms used in the firm acquisitiveness analysis and the subsample of firms that pursued M&As in Panels A and B, respectively. The full sample is an intersection between Compustat and ExecuComp data that includes 19,835 firm-year observations of 2,397 unique firms that have non-missing executive compensation data to estimate CEO pay gap from 1993–2012. The M&A subsample, which is the intersection between the full sample and M&A data, has 929 unique firms that engaged in 1,816 M&A deals over the same period. We adjust all variables in dollars for inflation to the beginning

⁴ Bebchuk, Cremers, and Peyer (2011) use a different measure, CEO pay slice (CPS), to capture pay disparity. However, this measure tends to capture a different perspective of executive compensation. We discuss this measure in the robustness check section.

⁵ Our findings are qualitatively unchanged if we use the TDC1 variable reported in Compustat.

of 1993 dollars using the Consumer Price Index (CPI). The descriptive statistics in Panel A indicate that CEO pay gap is large (the mean value is \$4.32 million). Since CEO pay gap is heavily skewed to the right, we use its natural logarithm transformation in our analysis. Firms on average have five VPs. The statistics also suggest that CEO's equity holdings are highly sensitive to the changes in stock price and return volatility (the average CEO delta and CEO vega are approximately \$440,290 and \$86,980, respectively). In a majority (54%) of firm-year observations, CEOs are also the chairpersons of the boards of directors of their companies. Finally, the average firm in our sample is large (with book assets of \$5.54 billion) and has high growth potential (the sale growth and market-to-book equity are 13% and 1.97, respectively).

[Insert Table 1 about here]

The summary statistics in Panel B of Table 1 indicate that firms in the M&A subsample are essentially similar to those in the full sample except that the former appear to be smaller, have smaller CEO pay gap but larger CEO delta and CEO vega, and experience higher sales growth.⁶ When firms engage in M&As, they tend to use cash for payment more frequently (the average ratios of cash-only versus stock-only payment are 0.47 vs. 0.10, respectively).

[Insert Table 2 about here]

Table 2 reports the inter-temporal and 2-digit Standard Industrial Classification (SIC) distributions of the M&A deals and acquirers, respectively. During the sample period, the number of M&A deals increased in the late 1990s and early 2000s and then declined with the onset of the Great Recession. Industries with large numbers of acquiring firms include business services, measuring and controlling instruments, photographic medical and optical goods, electronic and

⁶ There are missing observations for CEO delta and CEO vega, which reduce their number of non-missing observations to 1,806.

electric equipment and components, chemicals and allied products, industrial and commercial machinery and computer equipment, and oil and gas extraction.

4. Research methods, empirical results, and discussions

4.1. CEO pay gap and M&A activities

We employ the following model to examine the relations between CEO pay gap and M&A activities:

$$\text{M\&A activities}_{i,t} = \alpha + \beta \text{Ln(Pay gap)}_{i,t-1} + \mathbf{X}_{i,t-1}\boldsymbol{\theta} + \text{Year fixed effects} + \text{Industry fixed effects} + \varepsilon_{i,t} \quad (1)$$

In Equation (1), the dependent variable, *M&A activities*, is either M&A dummy, M&A frequency, or acquisition value. M&A dummy takes a value of 1 if a firm announces an M&A bid in year t and 0 otherwise. M&A frequency is the number of acquisition deals a firm announces in year t . Acquisition value is the total acquisition value of a firm in year t scaled by the firm's book value of assets at the beginning of the year. We use i) the linear probability model to estimate a firm's likelihood to pursue an M&A deal,⁷ ii) the Poisson model to estimate the number of acquisition deals, and iii) the OLS model to estimate the acquisition value of a firm in a given year.

\mathbf{X} is a vector of the control variables. Both CEO pay gap and control variables are measured at the end of the preceding fiscal year. Following the M&A literature, we include the following variables as controls: *Size*, *Market-to-book ratio*, *Momentum*, *Sales growth*, *Book leverage*, and *Firm age*. Previous research suggests that the sensitivities of CEO's equity holdings to the changes in stock price and stock return volatility (i.e., CEO delta and CEO vega, respectively) have impacts on corporate risk taking behavior (e.g., Datta et al., 2001; Coles, Daniel, and Naveen, 2006),

⁷ Since we control for several types of fixed effects, we use the linear probability model to avoid the incidental parameters problem. However, our results are qualitatively similar if we use the probit model for estimation.

therefore, we include CEO delta and CEO vega as controls in the regressions. We follow the procedures provided in Core and Guay (2002), Edmans, Gabaix, and Landier (2009), and Kini and Williams (2012) in estimating CEO delta and CEO vega. It is possible that CEO pay gap simply reflects the bargaining power of the CEOs relative to that of the board of directors, which indicates the need to control for CEO bargaining power in the regressions. Previous research suggests that an executive who simultaneously serves the dual role of CEO and board chairperson would have substantial influence over the board, particularly in setting his own pay (e.g., Cyert, Kang, and Kumar, 2002), therefore, we control for CEO bargaining power by including *CEO-Chairman dual dummy* in the regression. Harford (1999) observes a positive relation between corporate excess cash and M&A attempts, thus we further control for excess cash in our estimation. $\varepsilon_{i,t}$ is the error term that is assumed to be orthogonal to the variables on the right-hand side of Equation (1) (but we relax this assumption in our robustness tests). In addition, we include year dummies to control for potential time-varying macroeconomic conditions and 2-digit SIC code industry dummies to control for industry-fixed effects. In some specifications, we control for firm fixed effects instead of industry fixed effects to capture the effect of within-firm variation of CEO pay gap on firm acquisitiveness. Finally, we use the heteroscedasticity-robust standard errors clustered by firms to make statistical inference. We provide a description of the control variables in the Appendix.

We report the estimation results of the M&A linear probability model in Panel A of Table 3. All columns control for year fixed effects, and Columns 1 and 2 (Columns 3 and 4) control for industry (firm) fixed effects. We exclude *CEO delta* and *CEO vega* in Columns 1 and 3 but control for these two variables in Columns 2 and 4. The coefficients on $\ln(\text{Pay gap})$ are positive, ranging from 0.006 to 0.01, and statistically significant across specifications. This result is consistent with our expectation of a positive relation between CEO pay gap and M&A likelihood. Turning to the

control variables, *CEO delta* and *Market-to-book* are positively related to M&A likelihood, while *CEO vega*, *Book leverage*, and *Firm age* are negatively related to M&A likelihood.

[Insert Table 3 about here]

When writing executive compensation contracts, boards of directors may anticipate the effects of executive compensation on corporate behavior, such as M&As, and incorporate their expectation into the contract design. The possibility of a joint determination of executive compensation and M&As or reverse causality raises an endogeneity concern, which renders the linear probability model coefficient estimates biased and inconsistent. It is ideal if there were exogenous shocks to CEO pay gap that we could use to identify its effect on firm acquisitiveness. However, executive pay is a firm decision and the literature does not provide a clear guidance on any shocks to CEO pay gap that we can exploit for this purpose. Therefore, to alleviate endogeneity concern, we employ the instrumental variable (IV) estimation method using the two-stage least squares regressions to identify the relation between CEO pay gap and firm acquisitiveness. Motivated by prior research (e.g., Kale et al., 2009; Kini and Williams, 2012; Phan et al., 2017), we use the number of VPs as the first instrument for firm pay gap. Intuitively, a larger number of VPs implies a lower likelihood of winning the tournament for individual VPs, hence larger tournament prize to elicit efforts from these executives.

We use *CEO succession plan dummy* as the second instrument for CEO pay gap (Kale et al., 2009; Kini and Williams, 2012). *CEO succession plan dummy* is an indicator that takes a value of 1 if the firm lists its president and/or COO among the VPs and 0 otherwise. When a firm designates a VP as a CEO successor, the firm is not likely to run a CEO tournament so the CEO pay gap should be smaller. Our selected instruments should be valid because they are directly

related to CEO pay gap but arguably indirectly related to firm acquisitiveness through CEO pay gap.⁸

We report the results of the IV regressions in Panel B of Table 3. Columns 1 and 2 (Columns 3 and 4) report the first- and second-stage results of the IV regressions that controls for industry (firm) fixed effects. The first-stage results reported in Columns 1 and 3 indicate that the selected instruments have the expected signs and are statistically significant, suggesting that each instrument is relevant by itself. The weak instrument tests indicate that the instruments are strong and the overidentification tests suggest that the instruments satisfy the exclusionary requirements. The second-stage results reported in Columns 2 and 4 indicate that the coefficients on *Instrumented Ln(Pay gap)* are both positive and significant at the 5% level, which is consistent with the linear probability model results.⁹ Furthermore, the Wald test statistic reported in Column 4 rejects exogeneity, which substantiates the use of the IV model to address endogeneity concern.¹⁰

Using the coefficient estimates in Panels A and B of Table 3 for calculation, we find that, holding other variables unchanged at their sample means, a one standard deviation increase in CEO pay gap centered on its sample mean increases the M&A probability, on average, by 8.13

⁸ In an unreported analysis, we use the 2-digit SIC code industry's contemporaneous median *Ln(Pay gap)* as the third instrument for firm CEO pay gap (Kale et al., 2009). The intuition is that given an efficient external labor market for executives, firm pay gap should be positively correlated with the pay gap of other firms in the same industry. Our findings are qualitatively similar; however, we caution that industry CEO pay gap may not pass the instrument validity requirement since firms in the same industry may be motivated to set CEO pay gap by the same omitted variable (Gormley and Matsa, 2014).

⁹ The coefficient estimates of *Instrumented Ln(Pay gap)* appear to be larger than those in Panel A, which could be due to the fact that the IV models identify the local average treatment effect of the endogenous variable on the outcome variable (Imbens and Angrist, 1994).

¹⁰ Our findings persist if we also endogenize CEO delta and CEO vega.

percentage points. Given the unconditional probability of M&A of 29%, the economic effect of pay gap on M&A probability is economically important.

To the extent that tournament-based incentives lead to superior acquisition performance, which in turn improves the promotion opportunities of senior managers, we predict a positive relation between acquisition performance and the likelihood of the CEO being promoted from inside the acquiring firm.¹¹ To explore this possibility, we run a probit regression with the dependent variable being *CEO inside promotion* dummy, which takes a value of 1 if the CEO is promoted from inside the acquiring firm within the next three years following an acquisition deal and 0 otherwise. Acquisition performance is proxied by the 3-day acquirer CAR centered on the acquisition announcement day. We use the market model to estimate the M&A announcement CARs. Consistent with our expectation, the result reported in Column 1 of Table 4 indicates a positive relation between acquirer abnormal stock returns and the likelihood of CEO being promoted from inside the firm. The result reported in Column 2 of Table 4 suggests that the likelihood of CEO inside promotion within the next five years following the acquisition completion is even stronger.

[Insert Table 4 about here]

Faccio and Masulis (2005) argue that, all else being equal, cash payment is riskier than stock payment for an acquirer because the risk of the deal will be borne by the acquirer. To further examine the relation between CEO pay gap and acquisition risk, we estimate a cash payment Tobit model with the dependent variable being the percentage of cash used for payment to the target in

¹¹ It is worth noting that poor acquisition performance can lead to forced CEO turnover (Lehn and Zhao, 2006); however, good acquisition performance can facilitate CEOs' movement up the industry ladder to other bigger and more prestigious companies, which creates promotion incentives for VPs.

an acquisition deal. The results reported in Table A1 in the Internet Appendix indicate a positive relation between $\ln(\text{Pay gap})$ and the percentage of cash payment, which further corroborates our finding of a positive relation between CEO pay gap and corporate risk taking.

In summary, our results in this section support Hypothesis 1 that CEO pay gap is positively related to M&A activities. Moreover, superior acquisition performance increases the promotion opportunities for senior managers.

4.2. CEO pay gap and acquisition performance

4.2.1. CEO pay gap and acquisition announcement abnormal stock returns

In the preceding section, we show that tournament incentives, which are proxied by CEO pay gap, relate positively to firm acquisition likelihood, and acquisition performance is positively related to the promotion opportunities of the VPs. In this section, we examine the direct relation between tournament incentives and acquirer stock performance around the deal announcements.

We run cross-sectional regressions with the dependent variable being the 3-day acquirer CAR centered on the bid announcement day ($\text{CAR}(-1, 1)$). The test variable is $\ln(\text{Pay gap})$, which is measured at the end of the year preceding the acquisition announcement. Following the M&A literature, we control for acquiring firms' characteristics that include firm size, market-to-book ratio, momentum, book leverage, excess cash, and target and deal characteristics that include deal ratio, industry diversification, target public status, payment consideration (i.e., payment is in cash only, stock only, or a mixture of cash and stock), and whether the M&A bid is challenged, hostile, and made through tender. In addition, we control for the target industry's M&A intensity and year fixed effects.

[Insert Table 5 about here]

The cross-sectional regression results reported in Column 1 of Table 5 indicate that CEO pay gap is positively related to acquirer abnormal stock returns (the coefficient is 0.002 and statistically significant at the 5% level). The signs and significance of other control variables are also consistent with those documented in the literature. For example, acquirer CARs are negatively related to acquirer size, acquirer pre-acquisition stock returns, public target, and target's high-tech status, but positively related to cash payment and financial leverage. We further control for CEO delta and CEO vega in Column 2 and note that our finding is virtually unchanged. On the other hand, CEO vega is negatively related to acquirer CARs. In Column 3, we control for other corporate governance measures proxied by blockholder ownership and the number of anti-takeover provisions that a firm adopts, but our findings continue to hold. In Columns 4-6, we re-estimate the models similar to those in Columns 1-3 but use the *Large CEO pay gap dummy* variable, which takes a value of 1 if CEO pay gap is above the sample median and 0 otherwise, instead of its continuous version to better capture the effect of CEO pay gap. We find that the results are stronger with the dummy version of CEO pay gap.

For illustration, we estimate the economic impact of CEO pay gap on acquirer short-term stock performance using the point estimates in Column 1 of Table 5. We find that, holding other variables unchanged at their sample means, an increase in CEO pay gap from 0.5 standard deviation below to 0.5 standard deviation above the sample mean (i.e., a one standard deviation change centered on the sample mean) is associated with an increase of 55 basis points (0.55%) in acquirer CAR(-1, 1). Given that the average market value of equity of the sample acquirers is \$5.335 billion, the increase in acquirer shareholder value is equivalent to \$29.17 million.

Since a firm is more likely to run a CEO tournament if the CEO is near retirement, we sort firms into a High (Low) tournament likelihood subsample if their CEOs age 63 or above (below

63). We perform the cross-sectional subsample analysis of acquisition announcement stock returns and report the results in Table 6. The results indicate that the effects of CEO pay gap on acquirer shareholder value are more pronounced for the subsample of firms that are more likely to run CEO tournament, which is consistent with the CEO tournament explanations.¹²

[Insert Table 6 about here]

4.2.2. CEO pay gap and acquirer long-term stock and operating performance

In this section, we examine the relations between CEO pay gap and the acquiring firms' long-term stock and operating performance. An acquirer's long-term stock performance is proxied by its buy-and-hold abnormal returns (BHARs), which are calculated as follows:

$$BHAR_i = \prod_{t=1}^T (1 + R_{i,t}) - \prod_{t=1}^T (1 + R_{matched\ firm,t}) \quad (2)$$

where $BHAR_i$ is the buy-and-hold abnormal return of firm i . We estimate the BHARs over the 1-, 2-, and 3-year periods starting 10 days after the M&A completion based on the matched firm-adjusted method suggested by Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999). In particular, we calculate the percentage differences in size (proxied by the market value of equity), book-to-market ratio, and stock performance (proxied by the buy-and-hold returns) between a sample firm and other firms in the same 2-digit SIC code industry in the year preceding the M&A announcement. We exclude firms that were involved in M&As in the three-year period before a sample firm's M&A bid announcement from the pool of potential matched firms. For each sample

¹² In an unreported analysis, we investigate and find a positive relation between CEO pay gap and the likelihood of focused acquisition, which indicates risk-increasing behavior, for firms that are more likely to run tournament. However, such relation is negative for firms that are less likely to run CEO tournament.

firm, we select a matched firm that has the lowest sum of the absolute value of the estimated percentage differences.¹³

Operating performance is measured as the ratio of earnings before interest, tax, and depreciation and amortization (EBITDA) to book value of assets. We follow the method suggested by Barber and Lyon (1996) in forming a matched portfolio for each sample firm in the year preceding the M&A bid announcement. The matched portfolio includes firms that are in the same 2-digit SIC code industry as the sample firm, have not been involved in any M&A over the last three years, and have operating performance within the range of 90%-110% of the respective performance of the sample firm in the year preceding the M&A announcement. We adjust a sample firm's operating performance by the matched portfolio's contemporaneous median operating performance and compare the matched portfolio-adjusted operating performance of the acquirers in each of the three years after the M&A completion to that in the year preceding the M&A bid announcement.

Table 7 reports the BHAR regression results. The dependent variables are the 1-, 2-, and 3-year acquirer BHARs. The estimation results indicate that pre-acquisition CEO pay gap is generally significantly positively related to BHARs. Turning to the control variables, the coefficient on *CEO-Chairman Dummy (Momentum)* is positive (negative) and statistically significant.

[Insert Table 7 about here]

¹³ Alternatively, we select a matched firm as the one that has size, proxied by the market value of equity in the year preceding the M&A bid, in the range of 70%-130% of that of the sample firm, and has the book-to-market ratio closest to the sample firm's one in the year preceding an M&A. Our results are robust to this alternative method of selecting the matched firm.

Table 8 reports the operating performance regression results. The dependent variables are the change in control firm-adjusted operating performance in the first, second, and third year after an M&A deal completion relative to that in the year preceding the deal announcement. Overall, the coefficients on the pre-acquisition CEO pay gap are positive and marginally significant. Among the control variables, *Book leverage (Deal ratio)* loads positive (negative) and significant.¹⁴

[Insert Table 8 about here]

In short, our evidence demonstrates that CEO pay gap is positively related to acquirer long-term stock and operating performance post mergers, which supports Hypothesis 2a but not Hypothesis 2b.

It is worth noting that although tournament incentives imply that only one senior executive can win the tournament prize, which is the increase in pay and prestige associated with the CEO position, senior executives may receive “invisible promotion” represented by larger pay packages as a result of the acquisition success and more prestige from a larger merged firm even without a change in their job titles.¹⁵ Furthermore, to the extent that an acquiring firm keeps the target firm as a separate entity, like a subsidiary, M&As can also provide additional promotion opportunities for acquirer VPs since the acquiring firm may appoint one of its VPs to the CEO position of the

¹⁴ CEO pay gap may change dynamically over the relatively long period from pre- to post-acquisition. In an unreported analysis, we use either an acquirer’s change in Ln(Pay gap) or its industry-adjusted change in Ln(Pay gap) as the test variable in the long-term abnormal operating performance and BHAR regressions. We find positive and highly significant relations between the change in Ln(Pay gap) and long-term operating and stock performance.

¹⁵ In a univariate analysis, we find that, on average, the acquirer’s industry-adjusted median VP pay increased by approximately \$273,000, \$374,000, and \$331,000 in the first, second, and third year after an M&A deal completion relative to its value in the year preceding the M&A deal.

target firm. These potential benefits may also elicit greater efforts from senior executives that contribute to superior acquirer performance. However, we acknowledge that we cannot completely rule out some possible effects of team efforts since acquisition success may require efforts of the whole management team.

5. Robustness Checks

We conduct a battery of robustness checks and summarize the findings in this section (some of the results are not reported for brevity but are available from the authors).

We estimate the acquisition frequency Poisson regression model and acquisition value OLS model and report the results in Panels A and B, respectively, of Table A2 in the Internet Appendix. We find that CEO pay gap is positively related to both acquisition frequency and value. This result is consistent with our finding that CEO pay gap is positively related to firm acquisitiveness.

It is noted that firms self-select to engage in M&A bids, so our M&A subsample is not random. To alleviate any concern about potential self-selection bias, we use the Heckman (1979) two-step self-selection correction model. Specifically, in the first step, we run a probit model (with specification similar to that of the linear probit model) to estimate the likelihood that a firm engages in an M&A bid in a given year. Then we use the probit model's coefficient estimates to calculate the inverse Mill's ratio (IMR) as follows:

$$\text{If M\&A dummy}_{i,t} = 1, \text{ then } IMR_{i,t} = \frac{\varphi(X\beta)}{\Phi(X\beta)} \quad (3)$$

$$\text{If M\&A dummy}_{i,t} = 0, \text{ then } IMR_{i,t} = \frac{-\varphi(X\beta)}{(1-\Phi(X\beta))} \quad (4)$$

where φ is the probability density function, Φ is the cumulative density function, and β is a vector of parameter estimates from the Probit model. We augment the cross-sectional regressions with IMR in the second step. If the coefficient on *IMR* is significant, we can claim that self-selection has a significant effect on the second-step estimates of the cross-sectional regression and

controlling for self-selection bias is then valid (see Wooldridge, 2002 (pp. 564)). The unreported estimation results indicate that our findings are qualitatively unchanged, while the coefficients on *IMR* are statistically insignificant. The latter result suggests that our concern about self-selection bias is unsubstantiated.

Following previous research (e.g., Kale et al., 2009; Kini and Williams, 2012), we use the number of VPs listed in ExecuComp in the main analysis. To alleviate any concern that the number of VPs could be arbitrarily cut off in ExecuComp due to the Securities Exchange Commission (SEC) reporting rules, we use the number of VPs listed in Boardex to rerun our analysis. We find that our results continue to hold.

Graham et al. (2015) report that shorter tenured CEOs are more likely to delegate authority to make decisions to VPs. Therefore, we examine the relation between CEO pay gap and firm acquisitiveness and acquisition performance conditional on CEO tenure. The results reported in Table A3 in the Internet Appendix indicate that tournament incentives have a stronger positive effect for firms with shorter tenured CEOs. Moreover, the CAR regressions indicate that tournament incentives also have a more pronounced effect on the acquisition performance of the acquiring firms whose CEOs have shorter tenure.

CEOs of firms with more divisions are also more likely to delegate power to VPs (Graham et al., 2015), which suggests that tournament incentives have stronger effects for firms with more divisions. To test this prediction, we obtain the number of business segments that a firm has from the Compustat Segment database and examine the effects of tournament incentives on M&A

likelihood and acquirer firm CAR conditional on its number of business segments. The results reported in Table A4 in the Internet Appendix are consistent with our expectation.¹⁶

Some acquirers in our sample were engaged in more than one M&A deal over the sample period. To address a possibility that our results are driven by serial M&As pursued by these acquirers, we retain the first M&A deal of each acquiring firm in each year during the sample period but is not preceded by any M&A deal in the previous three years and rerun our tests. Our findings are qualitatively similar even though the sample is smaller.

To focus on acquisition deals that potentially have significant impacts on the acquirers, we filter out those deals that have values below \$5 million and account for less than 5% of the acquirer market value of equity from our cross-sectional analysis. However, one might be concerned that large deals are more likely to be overseen by CEOs and less likely to be delegated to VPs, which potentially bias our sample against the tournament incentives. To address this concern, we relax the filter and exclude only acquisition deals that have values below 1% of the acquirer market value of equity, or even drop this value filter completely, but our findings are qualitatively unchanged.

Bertrand and Mullainathan (2001) argue that large CEO pay packages may indicate that CEOs capture the pay setting process, which signals agency problems. Bebchuk, Cremers, and Peyer (2011) report that CEO pay slice (CPS), which is measured as the fraction of the aggregate compensation of the top-five management team captured by the CEO, is negatively related to acquirer stock performance. These authors suggest that CPS reflects the importance of the CEO and his ability to extract rents, an indication of the agency problems. It is noteworthy that agency

¹⁶ We thank an anonymous reviewer for suggestion to consider the effects of tournament incentives on M&As conditional on CEO tenure and a firm's number of divisions.

problems are typically associated with lower acquirer performance (Masulis et al., 2007), which is inconsistent with our finding of a positive relation between CEO pay gap and acquirer performance. CEO pay gap, which measures the dollar difference between a CEO pay package and the median pay of the VPs, is different from CPS, which measures CEO pay as the fraction of the aggregate compensation of the management team. For our sample, the coefficient of the correlation between CEO pay gap and CPS is merely 0.27, suggesting that these two measures capture different perspectives of executive compensation. By construction, CPS could bias toward firms with smaller size whose management teams tend to have smaller pay packages, thus, a larger CPS is likely to indicate CEO relative power. On the other hand, CEO pay gap, as a dollar measure, can better capture the prize of the CEO tournament as suggested by the literature.

Although an intra-firm tournament provides promotion incentives to only VPs, Coles et al. (2018) argue that industry promotion incentives can motivate CEOs to take risk and improve corporate performance. Huang, Jain, and Kini (2019) report that industry promotion incentives motivate firms to deploy cash for investment and focused acquisitions, among others. In the next robustness check, we rerun the M&A linear probability and CAR cross-section regressions that control for industry promotion incentives proxied by industry pay gap. We follow Coles et al. in calculating two measures of the industry pay gap, *indgap1* and *indgap2*, and use them as proxies for industry promotion incentives. As the total compensation received by a CEO in a given year could be an outlier, *indgap1* is measured as the difference between a firm's CEO total

compensation and the second-highest CEO total compensation in the same 2-digit SIC code industry group.¹⁷

Since firms typically use CEO pay of industry peers with similar size as a benchmark for their own CEO pay (Bizjak, Lemmon, and Naveen, 2008; Faulkender and Yang, 2010; Bizjak, Lemmon, and Nguyen, 2011; Coles et al., 2018), we construct *indgap2* based on both 2-digit SIC code industry and size grouping. Specifically, in each industry-year, we sort firms into two subgroups based on their net sales relative to the industry median net sales and then measure industry pay gap as the difference between a firm's CEO total compensation and the highest CEO total compensation in the same industry-size group. Since the findings are qualitatively similar for both industry pay gap measures, we report the estimation results based on *indgap2* in Table 9 for discussion. The estimation results indicate that our findings about the effects of CEO pay gap on firm acquisitiveness and acquirer abnormal stock returns are essentially unchanged. Furthermore, we note that industry pay gap is negatively related to acquirer abnormal stock returns.

[Insert Table 9 about here]

Finally, our sample period includes the adoption of the Sarbanes-Oxley Act (SOX) in 2002, which has effects on executive compensation and corporate governance. To alleviate any concern that our results could be affected by SOX, we construct the SOX dummy variable that takes a value of 1 for the years 2002 and after and 0 otherwise. We re-estimate the M&A probability and CAR regression models augmented with the stand-alone SOX dummy variable and its interaction with CEO pay gap. The results indicate firms with larger CEO pay gap are more likely to pursue M&As

¹⁷ However, we also construct the variable *indgap1_raw*, which is measured as the difference between a firm's CEO total compensation and the highest CEO total compensation in the same two-digit SIC industry group and use this variable in our tests but our findings are qualitatively unchanged.

following SOX, which could be explained by stricter due diligence requirements for a greater involvement of the VPs in the acquisition process. The CAR regressions indicate that both tournament incentives and SOX have a positive effect on acquisition performance; however, the interaction between these two variables has little effect on acquirer shareholder value. In an alternative analysis, we split the sample into pre- and post-SOX periods and perform subsample analysis, but the results are qualitatively similar, albeit weaker due to smaller subsample size.

6. Conclusions

We use the M&A setting to investigate the links between tournament-based incentives proxied by CEO pay gap and firm acquisition activities and acquisition performance. A desirable feature of M&As for our research is that M&A decisions are observed at their announcements. This feature enables us to capture the relations between CEO pay gap and corporate behavior and value and make inference about the incentives of managers. We find positive relations between acquirer CEO pay gap and M&A activities and acquirer stock and operating performance. We further find that the relation between CEO pay gap and acquisition performance is stronger for firms that are more likely to run CEO tournaments. Acquisition performance also relates positively to the likelihood of a CEO being promoted from inside the acquiring firm and negatively relates to VP turnover. Our results indicate that tournament-based incentives, proxied by CEO pay gap, motivate managers to work harder and take more risk that improve acquirer acquisition performance. Our evidence suggests that a large pay gap between a CEO and the next group of senior executives can induce managers to work harder and pursue risk-increasing policies that create greater shareholder value.

The on-going debate on executive compensation suggests that large pay disparities among firm executives could represent economic rent extraction by powerful CEOs or reflect executive compensation incentives. Our results are consistent with the latter, which indicates efficient contracting. Our findings suggest that when firms design executive compensation contracts, they should consider CEO pay gap as promotion incentives to align the interests of senior managers and shareholders. Finally, our evidence suggests that regulators should be careful in formulating public policies that arbitrarily push for smaller pay disparities because they may adversely affect promotion incentives, an efficient form of contracting, for corporate managers.

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Appendix. Definitions of Variables

This appendix provides information on the terms used in this article, along with their definitions and the sources from which they were obtained.

Variable name	Construction	Data source
12-month cumulative returns	The annual geometric mean returns based on CRSP monthly stock returns for a fiscal year.	CRSP
Book leverage	The ratio of the sum of (short-term debt + long-term debt) to the book value of assets.	Compustat
Cash ratio	The ratio of cash and equivalents to the book value of assets at the beginning of the year.	Compustat
CEO age	Age of the CEO.	ExecuComp
CEO delta	A measure of the sensitivity of the value of the CEO's equity holdings to a one percent change in the stock price.	Compustat, CRSP, ExecuComp
CEO pay gap	The difference between the CEO's total compensation package and the median VP's total compensation package.	ExecuComp
CEO vega	A measure of the sensitivity of the value of the CEO's equity holdings to a one percent change in the volatility of stock prices.	Compustat, CRSP, ExecuComp
Challenge dummy	An indicator that takes a value of 1 if competing bid is present and 0 otherwise	SDC Platinum
Deal ratio	M&A deal value divided by the acquirer's market value of equity measured four weeks before a bid announcement.	SDC Platinum
Diversifying dummy	An indicator that takes a value of 1 if the acquirer and target do not belong to the same 2-digit SIC code industry and 0 otherwise.	Compustat
Excess cash	Deviation of firm cash holdings from its expected cash holdings where cash holdings are estimated as a function of firm size, leverage, market-to-book ratio, cash flow, standard deviation of cash flow for the last ten years, net working capital (net of cash), research and development, capital expenditures, acquisition spending, dividend, S&P long-term credit ratings, and industry and year fixed effects.	Compustat
Firm age	Number of years that a firm has been included in Compustat	Compustat

High tech dummy	An indicator that takes a value of 1 if an acquirer belongs to either of the following four-digit SIC industry: 3571, 3572, 3575, 3577, 3578, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3677, 3678, 3679, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371-7375, 7378, 7379 and 0 otherwise.	Compustat
Hostile dummy	An indicator that takes a value of 1 if an M&A is a hostile takeover and 0 otherwise.	SDC Platinum
M&A dummy	An indicator that indicates whether a sample firm announces an M&A bid in a given year.	SDC Platinum
Market-to-book ratio	The market value of assets divided by the book value of assets where the market value of assets is measured as (the market value of equity + preferred stock value + debt in current liabilities + long term debt – deferred taxes and investment tax credit).	Compustat
Momentum	Momentum is calculated as the buy-and-hold return over the 12-month period preceding the bid announcement.	CRSP
Target public status dummy	An indicator that takes a value of 1 if the target in an M&A is a publicly listed firm and 0 otherwise.	SDC Platinum
Relative size	The ratio of acquirer's to target's market value of equity measured four weeks before bid announcement.	SDC Platinum
Sales growth	The average annual sale growth rate of the last three years	Compustat
Size	The logarithm transformation of book value of assets.	Compustat
Target industry M&A intensity	The value of all corporate control transactions of at least \$1 million reported by SDC Platinum for each prior year and 2-digit SIC code industry divided by the total book value of assets of all Compustat firms in the same 2-digit SIC code industry and year.	Compustat and SDC Platinum
Tender dummy	An indicator that takes a value of 1 if an M&A is conducted through tender offer and 0 otherwise.	SDC Platinum

Table 1: Descriptive Statistics

Panel A reports the descriptive statistics of an unbalanced panel of 2,397 unique firms that have non-missing CEO pay gap from 1993–2012. Panel B reports the descriptive statistics of a subsample of 929 unique firms that announce M&A bids over the same period. *M&A dummy* is an indicator that takes a value of 1 if a firm announces an M&A bid in a given year and 0 otherwise. *CEO pay gap* is the difference between a CEO's total pay package and the median pay package of the VPs. *CEO delta* measures the dollar change in the value of CEO's stockholdings, option holdings, and restricted stock and option grants given a 1% change in the stock price. *CEO vega* measures the dollar change in CEO's option holdings and restricted stock option grants given a change of 0.01 in the annualized volatility of stock returns. *CEO-chairman dummy* takes a value of 1 if the CEO is also a Chairman in a given year and 0 otherwise. *Market-to-book ratio* is measured as the market value of assets divided by the book value of assets where the market value of assets is measured as (the market value of equity + preferred stock value + debt in current liabilities + long term debt – deferred taxes and investment tax credit). *Momentum* is 12-month cumulative return calculated as the annual geometric mean returns based on CRSP monthly stock return for each fiscal year. *Book leverage* is the ratio of the sum of (short term debt + long term debt) to the book value of assets. Variables in dollars are inflation-adjusted to the beginning of 1993 dollars using the CPI. Other variables are as described in the Appendix.

Panel A: Full Sample

Variable	N	Mean	p25	p50	p75	Std. deviation
M&A dummy	19,835	0.29	0.00	0.00	1.00	0.45
CEO pay gap (in thousands)	19,835	4,319.66	604.85	1,538.81	4,136.86	8,097.76
CEO delta (in thousands)	19,835	440.29	51.53	137.79	376.79	1,006.40
CEO vega (in thousands)	19,835	86.98	11.07	35.41	95.98	141.34
CEO-Chairman dual dummy	19,835	0.54	0.00	1.00	1.00	0.50
Number of VPs	19,835	4.92	4.00	5.00	6.00	1.31
Book value of assets (in millions)	19,835	5,543.75	463.76	1,198.09	3,663.96	20,248.92
Market-to-book ratio	19,835	1.97	1.21	1.56	2.19	1.49
Book leverage	19,835	0.23	0.06	0.21	0.33	0.21
Net working capital ratio	19,835	0.07	-0.02	0.07	0.17	0.18
Sales growth	19,835	0.13	-0.01	0.08	0.18	0.79
Firm age	19,835	25.45	12.00	21.00	38.00	15.89

Panel B: M&A Subsample

Variable	N	mean	p25	p50	p75	Std. deviation
CAR(-1, 1)	1,816	0.01	-0.03	0.00	0.04	0.05
CEO pay gap (in thousands)	1,816	3,583.47	630.67	1,469.01	3,596.54	6,292.63
CEO delta (in thousands)	1,806	645.67	67.26	148.51	371.21	6,174.44
CEO vega (in thousands)	1,806	96.67	17.57	39.25	92.56	223.09
CEO-Chairman dual dummy	1,816	0.57	0.00	1.00	1.00	0.50
Number of VPs	1,816	4.99	4.00	5.00	6.00	1.25
Book value of assets (in millions)	1,816	3,940.06	504.66	1,189.62	2,993.81	11,065.98

Market-to-book ratio	1,816	1.92	1.24	1.56	2.07	1.50
Book leverage	1,816	0.21	0.07	0.21	0.32	0.17
Sales growth	1,816	0.16	0.01	0.09	0.23	0.73
Momentum	1,816	0.23	-0.01	0.19	0.43	0.42
Firm age	1,816	25.73	12.00	22.00	38.00	15.22
Deal ratio	1,816	0.27	0.08	0.14	0.30	0.36
Diversifying dummy	1,816	0.37	0.00	0.00	1.00	0.48
Cash dummy	1,816	0.47	0.00	0.00	1.00	0.50
Stock dummy	1,816	0.10	0.00	0.00	0.00	0.30
Public target dummy	1,816	0.31	0.00	0.00	1.00	0.46

Table 2: Inter-temporal and Industry Distributions of M&As

Table 2 reports the intertemporal and 2-digit SIC code industries distribution of M&A activities of acquirers over the period 1994–2012.

Panel A: Inter-temporal Distribution of M&As

Year	Frequency	Percent
1994	10	0.55
1995	62	3.41
1996	113	6.22
1997	105	5.78
1998	110	6.06
1999	99	5.45
2000	104	5.73
2001	95	5.23
2002	96	5.29
2003	117	6.44
2004	131	7.21
2005	104	5.73
2006	112	6.17
2007	105	5.78
2008	73	4.02
2009	65	3.58
2010	93	5.12
2011	102	5.62
2012	<u>120</u>	<u>6.61</u>
	1,816	100.00

Panel B: 2-digit SIC Code Industries with Most M&A Deals

2-digit SIC Code	Industry	Frequency	Percent
73	Business Services	234	12.89
38	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks	193	10.63
36	Electronic and Other Electrical Equipment and Components, Except Computer Equipment	181	9.97
35	Industrial and Commercial Machinery and Computer Equipment	152	8.37
28	Chemicals and Allied Products	140	7.71
13	Oil and Gas Extraction	106	5.84
37	Transportation Equipment	58	3.19
80	Health Services	58	3.19
33	Primary Metal Industries	52	2.86
20	Food and Kindred Products	48	2.64
27	Printing, Publishing, and Allied Industries	44	2.42
50	Wholesale Trade-durable Goods	41	2.26

Table 3: CEO Pay Gap and Firm Acquisitiveness

Table 3 reports the results of the M&A linear probability (Panel A) and IV regression (Panel B) models using the full sample from 1993–2012. The dependent variable is *M&A dummy* that takes a value of 1 if a firm announces an M&A deal in a given year and 0 otherwise. Pay gap is the difference between a CEO's total pay package and the median pay package of the VPs. The remaining variables are controls and are defined in the Appendix. The models are estimated with year fixed effects and either 2-digit SIC code industry or firm fixed effects, but their estimates are suppressed for brevity. *t*-statistics based on heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Panel A: Linear Probability Models

Variable	(1)	(2)	(3)	(4)
Ln(Pay gap)	0.008*** (2.79)	0.006* (1.70)	0.010*** (3.10)	0.010** (2.55)
Ln(CEO delta)		0.012*** (3.83)		0.009** (2.11)
Ln(CEO vega)		-0.011*** (3.33)		-0.007* (1.72)
CEO-Chairman dual dummy	-0.006 (0.92)	-0.01 (1.41)	0.004 (0.48)	0.001 (0.12)
Book leverage	-0.112*** (8.17)	-0.120*** (8.21)	-0.241*** (9.47)	-0.266*** (9.78)
Excess cash	-0.007 (1.58)	-0.007 (1.46)	0.016** (2.56)	0.019*** (3.02)
Market-to-book	0.021*** (8.49)	0.019*** (7.02)	0.017*** (4.74)	0.014*** (3.62)
Net working capital ratio	0.080*** (4.24)	0.077*** (3.37)	0.026 (0.90)	0.058 (1.57)
Sale growth	0.005 (1.39)	0.006 (1.25)	0.003 (1.17)	0.004 (1.43)
Size	0.057*** (21.20)	0.059*** (18.20)	-0.006 (0.84)	-0.007 (0.78)
Ln(firm age)	-0.014*** (2.83)	-0.008 (1.47)	-0.037** (1.99)	-0.049** (2.38)
Intercept	-0.117*** (3.01)	-0.129*** (4.40)	0.082 (1.01)	0.116 (1.28)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	No	No
Firm fixed effects	No	No	Yes	Yes
Number of observations	19,835	19,416	19,835	19,416
Pseudo R ²	0.08	0.08	0.25	0.25

Panel B: IV Regressions

	First-stage (1)	Second-stage (2)	First-stage 3	Second-stage 4
Number of VPs	0.023*** (4.13)		0.010** (2.01)	
CEO succession plan dummy	-0.118*** (8.49)		-0.040*** (2.60)	
Instrumented Ln(Pay gap)		0.054** (1.97)		0.108** (1.99)
Ln(CEO delta)	0.284*** (47.72)	-0.006 (0.42)	0.336*** (45.31)	-0.021 (0.83)
Ln(CEO vega)	0.009*** (8.58)	-0.001 (1.33)	0.004*** (4.19)	-0.001 (1.51)
CEO-Chairman dual dummy	0.114*** (7.74)	-0.014* (1.67)	-0.004 (0.22)	-0.008 (0.97)
Book leverage	-0.067* (1.84)	-0.115*** (6.56)	-0.114** (2.13)	-0.159*** (7.33)
Excess cash	0.033*** (2.76)	-0.010* (1.65)	0.007 (0.51)	0.003 (0.52)
Market-to-book	0.053*** (10.22)	0.016*** (4.56)	0.024*** (3.94)	0.014*** (3.10)
Net working capital ratio	-0.495*** (9.43)	0.108*** (3.01)	-0.307*** (3.90)	0.119*** (2.88)
Sale growth	-0.015 (1.58)	0.007 (1.62)	-0.020** (2.42)	0.005 (1.17)
Size	0.351*** (54.64)	0.038** (2.10)	0.387*** (24.02)	0.004 (0.16)
Ln(firm age)	-0.042*** (3.84)	-0.007 (1.18)	0.048 (1.22)	-0.011 (1.44)
Intercept	2.712*** (44.00)	-0.254* (1.81)	2.147*** (14.22)	-0.803** (2.21)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	No	No
Firm fixed effects	No	No	Yes	Yes
Number of observations	19,416	19,416	19,416	19,416
Adjusted R ²	0.58		0.71	
<i>Wald test of exogeneity:</i>				
F-statistic		1.08		3.47
p-value		0.30		0.06
<i>Sargan overidentification test:</i>				
χ^2	2.41		0.23	
p-value	0.12		0.63	

Weak instrument test:

Cragg-Donald Wald F-statistics	42.98***	12.75***
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Table 4: Acquirer Performance and CEO Inside Promotion

Table 4 reports the results of the CEO inside promotion probit model. The dependent variable is *CEO inside promotion* dummy that takes a value of 1 if an acquiring firm's CEO is promoted from inside the company within three years (or five years) following an acquisition deal and 0 otherwise. *CAR(-1, 1)* is the 3-day acquirer CAR centered on the acquisition announcement day. *Change in operating performance* is the change in acquirer operating performance from before to after the acquisition deal. *t*-statistics based on heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	Next 3 years CEO Inside Promotion (1)	Next 5 years CEO Inside Promotion (2)
CAR(-1, 1)	0.648** (1.95)	1.713** (2.04)
Size	0.069** (2.26)	0.054 (1.57)
Market-to-book ratio	0.039 (1.57)	0.034 (1.32)
Book leverage	-0.247 (0.99)	-0.037 (0.13)
Change in operating performance	0.547 (0.96)	-0.181 (0.28)
Intercept	-0.643 (1.35)	-0.204 (0.54)
Year fixed effects	Yes	Yes
Number of observations	1,142	866
Pseudo R^2	0.02	0.02

Table 5: Acquirer CAR Cross-Sectional Regressions

Table 5 reports the cross-sectional regression results of the acquirer CARs. The dependent variable is the 3-day acquirer CAR centered on the acquisition announcement days. Pay gap is the difference between a CEO's total pay package and the median pay package of the VPs. Large CEO pay gap dummy is an indicator variable that takes a value of 1 if a firm's CEO pay gap is above the sample median and 0 otherwise. The remaining variables are controls and are defined in the Appendix. Firm characteristics are measured at the end of the year preceding the acquisition announcement. *t*-statistics based on heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Pay gap)	0.002** (2.03)	0.002** (1.99)	0.003* (1.75)			
Large CEO pay gap dummy				0.009*** (3.50)	0.009*** (3.57)	0.012*** (3.27)
Ln(CEO delta)		0.002* (1.67)	0.002 (1.48)		0.002 (1.61)	0.002 (1.39)
Ln(CEO vega)		-0.001** (2.22)	-0.001 (0.76)		-0.001** (2.46)	-0.002 (1.17)
GIM index			-0.001 (0.34)			-0.001 (0.32)
Blockholder ownership			-0.01 (0.75)			-0.01 (0.82)
CEO-Chairman dual dummy	0.001 (0.34)	0.001 (0.23)	0.001 (0.30)	0.001 (0.37)	0.001 (0.29)	0.001 (0.21)
Size	-0.004*** (4.07)	-0.004*** (4.08)	-0.006*** (3.42)	-0.004*** (4.66)	-0.004*** (4.42)	-0.006*** (3.77)
Market-to-book ratio	-0.001 (1.23)	-0.001 (1.49)	-0.002 (0.98)	-0.001 (1.26)	-0.001 (1.48)	-0.001 (0.94)
Book leverage	0.017** (2.43)	0.017** (2.46)	0.019* (1.79)	0.017** (2.50)	0.017** (2.54)	0.020* (1.92)
Deal ratio	-0.001 (0.35)	-0.001 (0.16)	-0.006 (0.94)	-0.001 (0.37)	-0.001 (0.18)	-0.006 (0.91)
Diversifying dummy	-0.003 (1.30)	-0.003 (1.42)	-0.001 (0.48)	-0.003 (1.35)	-0.003 (1.48)	-0.002 (0.53)
Target public status dummy	-0.017*** (6.66)	-0.018*** (6.55)	-0.017*** (4.42)	-0.017*** (6.63)	-0.018*** (6.50)	-0.017*** (4.44)
Challenge dummy	-0.01 (1.33)	-0.01 (1.33)	-0.003 (0.35)	-0.01 (1.28)	-0.01 (1.27)	-0.003 (0.29)
Hostile dummy	0.022* (1.83)	0.022** (1.99)	0.027* (1.92)	0.022* (1.80)	0.022* (1.94)	0.027* (1.92)
Cash dummy	0.007***	0.007***	0.007**	0.007***	0.007***	0.007**

	(3.09)	(3.31)	(2.18)	(3.08)	(3.31)	(2.28)
Stock dummy	-0.005	-0.005	-0.004	-0.005	-0.005	-0.003
	(1.31)	(1.21)	(0.66)	(1.26)	(1.14)	(0.51)
Momentum	-0.005*	-0.005*	-0.009**	-0.005*	-0.005*	-0.009**
	(1.87)	(1.68)	(2.03)	(1.84)	(1.66)	(1.99)
Excess cash	-0.002	-0.002	-0.001	-0.002	-0.002	-0.001
	(1.21)	(1.22)	(0.16)	(1.29)	(1.29)	(0.24)
High tech dummy	-0.006**	-0.006**	-0.008*	-0.006**	-0.006**	-0.008**
	(2.28)	(2.25)	(1.94)	(2.31)	(2.26)	(2.06)
Target's industry M&A intensity	-0.017	-0.018	-0.005	-0.018	-0.018	-0.006
	(1.52)	(1.57)	(0.37)	(1.60)	(1.62)	(0.41)
Intercept	0.023***	0.020**	0.022	0.028***	0.024***	0.030**
	(3.01)	(2.43)	(1.54)	(4.08)	(3.42)	(2.35)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,816	1,816	839	1,816	1,816	839
Adjusted R^2	0.07	0.07	0.09	0.08	0.08	0.09

Table 6: CEO Pay Gap and Acquirer CARs – CEO Tournament Likelihood

Table 6 reports the results of the acquirer CAR cross-sectional regressions for subgroups of firms sorted on CEO age, which proxies for a firm's likelihood of running CEO tournament. The dependent variable is the 3-day acquirer CAR centered on the acquisition announcement day. Pay gap is the difference between a CEO's total pay package and the median pay package of the VPs and is measured at the end of the year preceding the M&A announcement. Large CEO pay gap dummy is an indicator variable that takes a value of 1 if a firm's CEO pay gap is above the sample median and 0 otherwise. The remaining variables are controls and are defined in the Appendix. *t*-statistics based on heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

	CEO Age 63 or Above (1)	CEO Age Below 63 (2)	CEO Age 63 or Above (3)	CEO Age Below 63 (4)
Ln(Pay gap)	0.002** (2.02)	0.001* (1.72)		
Large CEO pay gap dummy			0.009*** (3.40)	0.005* (1.76)
CEO-Chairman dual dummy	0.007 (1.03)	0.001 (0.13)	0.008 (1.03)	-0.002 (0.82)
Size	-0.006** (2.59)	-0.004*** (3.81)	-0.005** (2.27)	-0.004*** (4.34)
Market-to-book ratio	-0.002 (0.49)	-0.001 (0.78)	-0.002 (0.46)	-0.001 (1.10)
Book leverage	0.029 (1.37)	0.020*** (2.76)	0.027 (1.26)	0.018** (2.49)
Deal ratio	0.027*** (3.08)	-0.006* (1.76)	0.026*** (2.93)	-0.005 (1.33)
Diversifying dummy	-0.004 (0.66)	-0.002 (1.02)	-0.004 (0.79)	-0.002 (0.91)
Target public status dummy	-0.023*** (3.22)	-0.015*** (5.14)	-0.024*** (3.25)	-0.016*** (5.45)
Challenge dummy	-0.043 (1.55)	-0.006 (0.68)	-0.041 (1.46)	-0.005 (0.63)
Hostile dummy	0.052** (2.40)	0.014 (0.93)	0.049** (2.20)	0.015 (1.12)
Cash dummy	0.015** (2.58)	0.005* (1.95)	0.012** (2.07)	0.006** (2.41)
Stock dummy	0.020* (1.74)	-0.006 (1.28)	0.021* (1.78)	-0.006 (1.34)
Momentum	-0.008 (1.10)	-0.004 (1.36)	-0.006 (0.86)	-0.004 (1.29)

Excess cash	-0.006 (1.64)	-0.001 (0.05)	-0.008** (2.05)	-0.001 (0.27)
High tech dummy	-0.006 (0.87)	-0.007** (2.50)	-0.007 (1.00)	-0.007** (2.53)
Target's industry M&A intensity	0.016 (0.56)	-0.022* (1.81)	0.016 (0.53)	-0.021* (1.71)
Intercept	0.031 (1.46)	0.040*** (4.07)	0.028 (1.36)	0.029*** (3.94)
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	245	1,509	245	1,509
Adjusted R^2	0.15	0.08	0.15	0.07

Table 7: CEO Pay Gap and Acquirer Long-term Stock Performance

Table 7 reports the cross-sectional regression results of the acquirer one-, two-, and three-year BHARs. The BHARs are calculated based on the matched firm-adjusted method as described in the text. Pay gap is the difference between a CEO's total pay package and the median pay package of the VPs and is measured at the end of the year preceding the M&A announcement. Large CEO pay gap dummy is an indicator variable that takes a value of 1 if a firm's CEO pay gap is above the sample median and 0 otherwise. The remaining variables are controls and are defined in the Appendix. The models are estimated with year fixed effects, but their estimates are suppressed for brevity. *t*-statistics based on heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Variable	One-year BHAR (1)	Two-year BHAR (2)	Three-year BHAR (3)	One-year BHAR (4)	Two-year BHAR (5)	Three-year BHAR (6)
Ln(Pay gap)	-0.004 (0.28)	0.003* (1.75)	0.014* (1.83)			
Large CEO pay gap dummy				0.02* (1.71)	0.072* (1.81)	0.089** (1.96)
Ln(CEO delta)	0.003 (0.23)	-0.009 (0.49)	-0.018 (0.78)	-0.004 (0.35)	-0.019 (1.01)	-0.025 (1.16)
Ln(CEO vega)	-0.009 (1.39)	-0.001 (0.02)	-0.016 (1.29)	-0.009 (1.22)	-0.001 (0.09)	-0.016 (1.32)
CEO-Chairman dual dummy	0.027 (1.02)	0.122*** (3.03)	0.116** (2.35)	0.02 (0.76)	0.095*** (2.34)	0.085* (1.70)
Size	0.009 (0.73)	-0.007 (0.37)	0.01 (0.42)	0.008 (0.66)	-0.006 (0.29)	0.013 (0.54)
Market-to-book ratio	0.009 (0.93)	0.023 (1.64)	0.034** (1.98)	0.007 (0.89)	0.021** (2.02)	0.033** (2.48)
Momentum	-0.139*** (4.43)	-0.202*** (4.29)	-0.235*** (4.03)	-0.139*** (3.82)	-0.209*** (3.82)	-0.239*** (3.70)
Book leverage	0.096 (1.12)	-0.052 (0.40)	-0.148 (0.93)	0.088 (1.01)	-0.09 (0.67)	-0.198 (1.20)
Deal ratio	-0.038 (1.08)	-0.015 (0.28)	0.009 (0.13)	-0.036 (1.01)	-0.014 (0.26)	0.008 (0.11)
Diversifying dummy	-0.002 (0.07)	0.007 (0.18)	0.061 (1.28)	-0.001 (0.05)	0.008 (0.20)	0.061 (1.24)
Target public status dummy	-0.008 (0.26)	-0.009 (0.20)	-0.044 (0.80)	-0.017 (0.61)	-0.031 (0.73)	-0.066 (1.21)
High tech dummy	-0.002 (0.06)	-0.015 (0.32)	0.033 (0.59)	-0.001 (0.01)	-0.014 (0.30)	0.033 (0.55)
Intercept	-0.094 (0.78)	-0.002 (0.01)	-0.064 (0.29)	-0.063 (0.75)	-0.002 (0.02)	-0.096 (0.62)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,665	1,665	1,665	1,665	1,665	1,665

Adjusted R^2	0.01	0.01	0.01	0.01	0.01	0.01
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Table 8: CEO Pay Gap and Acquirer Long-term Operating Performance

Table 8 reports the cross-sectional regression results of the acquirer operating performance. The dependent variable is the change in acquirer matched portfolio-adjusted operating performance, which is measured as the difference between an acquirer's matched portfolio-adjusted operating performance in the first, second, and third year following the M&A deal completion and its respective matched portfolio-adjusted operating performance in the year preceding the M&A announcement (labeled *OP1*, *OP2*, and *OP3*, respectively). Pay gap is the difference between a CEO's total pay package and the median pay package of the VPs and is measured at the end of the year preceding the M&A announcement. Large CEO pay gap dummy is an indicator variable that takes a value of 1 if a firm's CEO pay gap is above the sample median and 0 otherwise. The remaining variables are controls and are defined in the Appendix. The models are estimated with year fixed effects, but their estimates are suppressed for brevity. *t*-statistics based on heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Variable	OP1 (1)	OP2 (2)	OP3 (3)	OP1 (4)	OP2 (5)	OP3 (6)
Ln(Pay gap)	0.001 (0.72)	0.002* (1.72)	0.003* (1.74)			
Large CEO pay gap dummy				0.004* (1.67)	0.007* (1.84)	0.009** (2.34)
Ln(CEO delta)	0.001 (0.42)	0.002 (1.19)	0.002 (1.15)	0.001 (0.24)	0.001 (0.30)	0.001 (0.78)
Ln(CEO vega)	-0.001 (0.64)	-0.001 (0.64)	-0.001 (0.75)	-0.001 (0.92)	-0.001 (1.00)	-0.001 (1.06)
CEO-Chairman dual dummy	0.005 (1.54)	0.008** (2.11)	0.004 (1.17)	0.004 (1.25)	0.008** (2.09)	0.006 (1.61)
Size	-0.001 (0.83)	-0.001 (0.04)	-0.001 (0.26)	-0.001 (0.43)	0.001 (0.35)	0.001 (0.69)
Market-to-book ratio	-0.001 (0.64)	0.001 (0.61)	0.003* (1.92)	-0.001 (0.81)	0.001 (0.20)	0.003* (1.76)
Book leverage	0.021** (2.29)	0.035*** (3.06)	0.027** (2.53)	0.018* (1.95)	0.031*** (2.79)	0.027** (2.44)
Deal ratio	-0.018*** (3.45)	-0.011** (2.10)	-0.009 (1.59)	-0.017*** (3.32)	-0.011** (2.05)	-0.009* (1.65)
Diversifying dummy	0.005 (1.54)	0.001 (0.40)	0.006* (1.83)	0.005* (1.68)	0.002 (0.47)	0.007** (2.00)
Target public status dummy	0.003 (0.90)	0.001 (0.19)	-0.004 (1.05)	0.003 (0.92)	0 (0.05)	-0.003 (0.70)
High tech dummy	-0.004 (0.96)	-0.002 (0.36)	-0.004 (1.01)	-0.002 (0.57)	-0.001 (0.30)	-0.005 (1.05)
Intercept	0.02 (1.57)	0.01 (0.54)	0.005 (0.24)	0.006 (0.65)	-0.002 (0.16)	-0.01 (0.91)

Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,559	1,376	1,234	1,559	1,376	1,234
Adjusted R^2	0.02	0.01	0.02	0.01	0.01	0.02

Table 9: CEO Pay Gap, Industry Pay gap, and M&As

Table 9 reports the results of the M&A linear probit models using the full sample from 1993–2012. The dependent variable is *M&A dummy* that takes a value of 1 if a firm announces an M&A deal in a given year and 0 otherwise. Pay gap is the difference between a CEO’s total pay package and the median pay package of the VPs. Large CEO pay gap dummy is an indicator variable that takes a value of 1 if a firm’s CEO pay gap is above the sample median and 0 otherwise. Industry pay gap is measured as the difference between a firm’s CEO total compensation and the highest CEO total compensation in the same industry-size group. Panel B reports the acquirer CAR cross-sectional regression results. The dependent variable is the 3-day acquirer CAR centered on the acquisition announcement day. The models are estimated with other control variables, but their estimates are suppressed for brevity. *t*-statistics based on heteroscedasticity-robust standard errors clustered by firms are reported in parentheses. ***, **, * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

Panel A: CEO Pay Gap, Industry Pay Gap, and M&A Probability

Variable	(1)	(2)	(3)	(4)
Ln(Pay gap)	0.008*** (2.83)	0.007* (1.89)	0.010*** (2.99)	0.010** (2.37)
Ln(Industry pay gap)	0.013*** (3.09)	0.012*** (2.76)	0.008 (1.48)	0.009* (1.71)
Ln(CEO delta)		0.012*** (3.82)		0.010** (2.25)
Ln(CEO vega)		-0.011*** (3.39)		-0.008* (1.81)
Other controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	No	No
Firm fixed effects	No	No	Yes	Yes
Number of observations	19,588	18,074	19,588	18,074
Adjusted R^2	0.07	0.07	0.24	0.24

Panel B: CEO Pay Gap, Industry Pay Gap, and Acquirer CARs

Variable	(1)	(2)	(3)	(4)
Ln(Pay gap)	0.002* (1.68)	0.002* (1.73)		
Large CEO pay gap dummy			0.007*** (2.88)	0.008*** (3.13)
Ln(Industry CEO pay gap)	-0.001* (1.82)	-0.001* (1.79)	-0.001** (2.25)	-0.001** (2.30)
Ln(CEO delta)		0.002 (1.58)		0.001 (0.94)
Ln(CEO vega)		-0.001**		-0.001**

		(2.26)		(2.52)
Other controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	1,816	1,816	1,816	1,816
