ESSAYS ON CORPORATE FINANCE

A Dissertation

by

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ABSTRACT

The dissertation consists of three essays. The first essay examines the role of earnings per share (EPS)–tied performance metrics on firm value and share repurchase activity using compensation data from proxy statements. We find that firms are more likely to repurchase stock when CEO contracts are tied to EPS metrics. Because stock buybacks can potentially be beneficial for firms with low investment opportunities and high free cash flow, firms are grouped on these dimensions. Investors react positively when firms with low investment opportunities and high free cash flow add EPS-tied performance goals; in contrast, investors react negatively when firms with high investment opportunities and low free cash flows add such goals. The results are consistent with agency costs of free cash flow. Overall, this essay highlights the importance of EPS-tied performance metrics to firm value.

In the second essay, the effects of managers' pay duration on mergers and acquisitions (M&As) activities are studied. We find that when short-horizon managers make announcement of an M&A deal, both the short-term and long-term abnormal returns are greater than the group of firms with long-horizon managers. Consistent with the positive reactions, M&As conducted by short-horizon managers have stronger post-M&A accounting performance in the short term and do not exhibit poor performance in the long term. The results are surprising when viewed against the conventional wisdom that giving managers short-term incentives is suboptimal and imply that long-term incentives are not necessarily optimal for all firms in all situations.

In the third essay, we revisit the controversial question of whether long-run abnormal returns are associated with major corporate events. Our analyses investigate M&As, initial public offerings (IPOs), seasoned equity offerings (SEOs), and dividend initiations. In an attempt to resolve ambiguous empirical evidence with respect to these events, we conduct a variety of tests for abnormal long-run performance, including buy-and-hold returns (BHARs), different calendar time approaches, and a recent standardized test. Empirical tests for these different methods consistently detect significant long-run abnormal returns for all four corporate events.

To my beloved wife Sara

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NOMENCLATURE

ASR	Abnormal standardized return
BE	Book equity
BHAR	Buy-and-hold abnormal return
CAR	Cumulative abnormal return
CEO	Chief executive officer
CTAR	Calendar time abnormal return
EPS	Earnings per share
FCF	Free cash flow
IPO	Initial public offerings
MB	Market-to-book
ME, MVE	Market value of equity
M&A	Mergers and acquisitions
NR	Net repurchases
ROA	Return on assets
R&D	Research and development
OLS	Ordinary least squares
SEO	Seasoned equity offerings
WLS	Weighted least squares

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CHAPTER I

INTRODUCTION

In this dissertation, recent topics related to corporate governance and major corporate events are examined using short-run and long-run performance tests. Firms are required to disclose compensation details in their proxy statements. Using available information from proxy statements, earnings per share (EPS) metrics in compensations plans are extensively studied in the first part of the dissertation. Next, following Gopalan et al. (2014), pay duration measure is constructed using vesting schedules of pay components. Mergers and acquisitions (M&A) activities are examined for studying effects of incentive horizon using pay duration measure. Finally, we study long-run abnormal returns associated with major corporate events, including M&As, initial public offerings (IPOs), seasoned equity offerings (SEOs) and dividend initiations.

In the first essay, "Do EPS metrics in CEO pay contract affect repurchases and firm value?", the role of earnings per share (EPS)–tied performance metrics on firm value and share repurchase activity are investigated. There is a significant increase in the use of share repurchases (Skinner, 2008) and there has been widespread criticism of stock buybacks alleging that they are used only as attempts to inflate stock prices in the near term and that firms conducting them sacrifice longer-term investments that benefits both firms and their employees. Performance-vesting conditions written EPS could create incentives to repurchase stock because repurchases decrease shares outstanding, the denominator of EPS, and thus ceteris paribus, increase EPS. The increased EPS can then trigger vesting of certain performance-vesting stock or options, which an executive likely finds valuable even if it does not maximize shareholder wealth. Consistent with this prediction, we find that firms are more likely to repurchase stock when CEO contracts are tied to EPS metrics.

Stock buybacks can potentially be beneficial (harmful) for firms with low (high) investment opportunities and high (low) free cash flow. Thus, firms are sorted on these dimensions and the cumulative abnormal returns (CARs) around the proxy filing date are used to determine the effect of "adding EPS metrics" or "removing EPS metrics" on shareholder value. Investors react positively when firms with low investment opportunities and high free cash flow add EPS-tied performance goals. On the other hand, investors react negatively when firms with high investment opportunities and low free cash flows add such goals. Findings are consistent with agency costs of free cash flow. (Jensen, 1986)

In the second essay, "The Bright Side of Giving Managers Short-Horizon Incentives", coauthored with Mehmet Cihan and Shane Johnson, the effects of managers' pay duration on mergers and acquisitions (M&As) activities are examined. Research on the question whether incentives to managers improve firm performance provides mixed evidence. M&As are often one of the largest investments a firm makes and provides a conducive setting to explore the relation between executive compensation design and the creation of shareholder wealth (Datta, Iskandar-Datta, and Raman, 2001). In this essay, we present evidence that short-termism is not necessarily bad, at least when making an M&A deal, by showing that firms offering short-term incentives, defined by the length of compensation's vesting schedule, realize better announcement abnormal returns than firms offering relatively long-term incentives.

Consistent with the positive reactions, M&As conducted by short-horizon managers have stronger post-M&A accounting performance outcomes in the short term, and do not exhibit poor performance in the long term. The results are surprising when viewed against the conventional wisdom that giving managers short-term incentives is suboptimal, and imply that long-term incentives are not necessarily optimal for all firms in all situations.

In the third essay, "On long-run stock returns after corporate events", coauthored with James Kolari and Seppo Pynnonen, we contribute a broad set of evidence on the controversial question of whether long-run abnormal returns are associated with major corporate actions. Our analyses investigate major corporate events, namely mergers and acquisitions (M&As), initial public offerings (IPOs), seasoned equity offerings (SEOs), and dividend initiations. We contribute to the continuing controversy about the significance of long-run abnormal returns associated with these events by implementing a battery of different test approaches, including Bessimbinder and Zhang regression approach (Bessembinder and Zhang, 2013), well-known buy-and-hold returns (BHARs), three-factor calendar time regressions, and a recent standardized abnormal return (ASR) approach (Dutta et al., 2015).

Empirical tests for these different methods detect significant long-run abnormal returns for all four corporate events. BHAR and ASR findings suggests significant long-run abnormal underperformance over a 5-year horizon after M&As, IPOs, and SEOs. For IPOs and SEOs, a common reversal pattern is evident with 1-month over-performance followed by accumulating under-performance that becomes significant after about 3 years. We detect significant over-performance for dividend initiations using ASR approach.

CHAPTER II

DO EPS METRICS IN CEO PAY CONTRACT AFFECT REPURCHASES AND FIRM VALUE?

”There is only one combination of facts that makes it advisable for a company to repurchase its shares: First, the company has available funds –cash plus sensible borrowing capacity– beyond the near-term needs of the business and, second, finds its stock selling in the market below its intrinsic value, conservatively calculated.”

Warren Buffett, 1999 letter to Berkshire Hathaway shareholders

II.1 Introduction

Changes in payout policies over the last three decades exhibit a significant increase in the use of share repurchases (Skinner, 2008). There has been widespread recent criticism of stock buybacks alleging that they are used only as attempts to inflate stock prices in the near term and that firms conducting them sacrifice longer-term investments that benefits both firms and their employees.[1] It is important to understand why CEOs decide to engage in stock repurchases and how these decisions affect firm value. Fenn and Liang (2001) find that firms’ payout policies are related to the type of compensation—options versus stock—that firms use in compensating and incentivizing their executives. Other features of execu-

[1] Recently, Democratic presidential candidate Hillary Clinton proposed “reforms to help CEOs and shareholders alike to focus on the next decade rather than just the next day”. Also some politicians, like Senators Elizabeth Warren and Tammy Baldwin, think that stock buybacks are bad and that SEC should forbid them as market manipulation. See: Wall Street Journal article http://on.wsj.com/1CBuLBD and Bloomberg View article http://bv.ms/1QyixQK

tive compensation could also affect the decision to repurchase stock. In particular, Bizjak, Hayes, and Kalpathy (2015) and Bettis et al. (2014) report that performance-contingent vesting conditions are common in executive compensation contracts. Performance-vesting conditions written on earnings per share (EPS) could create incentives to repurchase stock because repurchases decrease shares outstanding, the denominator of EPS, and thus ceteris paribus, increase EPS.[2] The increased EPS can then trigger vesting of certain performance-vesting stock or options, which an executive likely finds valuable even if it does not maximize shareholder wealth.

Considering the downsides of EPS metrics, some firms removed EPS-related triggers in their compensation plans. For example, in a recent case, Starbucks mentioned the removal of EPS-tied metrics in their proxy statement:[3]

“In recent years, shareholder feedback has influenced certain of our compensation design changes, including … the removal of EPS as a performance measure under our EMBP [Executive Management Bonus Plan] … ”

Yet, many other firms have added EPS-related compensation plans.

Given the increasing use of performance-vesting features in executive compensation, in particular those related to EPS, we examine two important questions using data on CEO compensation plans from the Incentive Lab database. The first question is: are firms significantly more likely to initiate stock buybacks when their CEOs have EPS-related triggers in their performance vesting conditions? We find they are.

[2]EPS is the most used accounting-type absolute performance metric. CEO pay contracts may include different types of accounting metrics, e.g. sales, operating income, earnings, cash flow, EBITDA, etc.

[3]Starbucks Corporation , Notice of 2014 Annual Meeting of Shareholders and Proxy Statement

Realizing that stock buybacks can potentially be beneficial (harmful) for firms with low (high) investment opportunities and high (low) free cash flow, the second question is: do investors react positively to additions of EPS-related triggers for firms with low investment opportunities and high free cash flow? In this case, the EPS-related triggers would be beneficial by reducing free cash flow problems to the type described by Jensen (1986). Conversely, do investors react negatively to additions of EPS-related triggers at firms with high investment opportunities and low free cash flow? In that case, investors would be harmed when EPS-related triggers lead CEOs to pay out cash that would be better used on high investment opportunities. Based on abnormal returns around proxy filing dates (in which the proxies disclose the additions or deletions of EPS-triggers), We find support for both hypotheses. We find that the additions of EPS-related goals increase the equity value around 1.1% for firms with low investment opportunities and high free cash flow.

This study contributes to the prior literature in several ways. First, we reveal the positive association between share repurchases and EPS-tied pay contracts. Second, we find that buyback activities triggered by EPS-tied compensations may also be explained by shareholders' interests in addition to those of managers. we argue that EPS-tied compensation grants can be designed so firm can both achieve certain goals to maximize shareholder value and incentivize managers at the same time. In order to protect shareholders from manipulative actions of managers, managerial incentives can be designed based on firms' investment opportunities and free cash flow. This paper also provides insights into the managerial incentives and implications of the accounting-tied performance grants. Overall, our results extend our understanding of EPS factors in executive contracts.

The paper is organized as follows. Section II.2 discusses the related literature. In section II.3, hypotheses are presented. Section II.4 describes the data sources and construction of variables. Section II.5.1 shows the effect of EPS-tied performance metrics on share repurchases. Section II.5.2 analyzes the effect of adding or removing EPS-related goals on firm value. Section II.6 discusses robustness checks and Section II.7 concludes. Definition of variables are in Appendix A.

II.2 Related literature

The connection between firm value and managerial incentives is one of the central topics in compensation research. In an ideal world, compensation plans should motivate CEOs to make business decisions that maximize shareholder value. A large body of the literature examines the relationship between executive compensations and firms' investment decisions (Larcker, 1983, Core and Larcker, 2002). Skinner (2008) (among others) shows that "share repurchases are now the dominant form of payout". Fenn and Liang (2001) examine how payout policies are affected by managerial stock incentives and find evidence that the effects are more pronounced at firms with potential agency problems.[4]

The compensation literature also shows that there is a link between firms' stock repurchases and the presence of EPS-tied performance metrics in CEO compensations (Young and Yang, 2011). Brav et al. (2005) surveyed senior financial executives and docu-

[4]Jensen (1986) discusses the agency problem between shareholders and managers over payout policies.

mented that majority of the executives expressed concerns about the effect of buybacks on EPS, indicating increasing EPS as an important element affecting their share repurchase decisions.

In a recent paper, Bizjak, Hayes, and Kalpathy (2015) find that firsm with earnings-based performance metrics are more likely to manage real earnings compared to non-earnings-based performance metrics. Also, Almeida, Fos, and Kronlund (2016) show the real effects of share repurchases by studying firms that are close to the threshold of zero earnings surprise.[5] They find that that EPS- motivated buybacks cause firms to reduce investment, R&D, and employment. As Almeida, Fos, and Kronlund (2016) echoed, EPS-driven buybacks are interesting in their own right, and additional motives and sources should be explored to answer why some companies are willing to sacrifice investments to finance EPS-motivated buybacks. In this study, we provide additional insights on this issue by studying EPS-metrics in CEO contracts.

As Frydman and Jenter (2010) noted, compensation schemes are endogenous with firm characteristics and correlated with several unobservable characteristics. Therefore, measuring their causal effects on firm value is particularly challenging. As Almeida, Fos, and Kronlund (2016) noted, the choice of how to finance share repurchases is also endogenous. In this study, to address endogeneity concerns, we use event study methodology to measure the effect of compensation plans on market value of equity. Moreover, Bennett et al. (2015) study asymmetry of performance goals around target values and find that firms

[5] Almeida, Fos, and Kronlund (2016) study stock market reactions to earnings announcements. In this paper, stock market reactions to changes in proxy statements are explored.

that just exceed their EPS targets have higher abnormal accruals (compared to firms that just miss their targets). In this paper, we use a similar approach to identify firms that are close to their target values.

In a related paper, Young and Yang (2011) study the link between firms' stock repurchase activity and the presence of EPS performance conditions in executive compensation contracts in UK. In this study, we revisit this issue using US data and we further explain firm value consequences. More recently, using CEO bonus compensation contracts, Cheng, Harford, and Zhang (2015) find that firms may buy back their shares to manipulate EPS to achieve bonus targets. They also find that the effect on share repurchases is greater when the EPS targets are closer to their threshold. As noted by Bens et al. (2003) and Hribar, Jenkins, and Johnson (2006), CEOs make sub-optimal decisions (buy back shares) to improve EPS. In this study, we argue that the board can prevent these sub-optimal decisions by choosing the correct contract type for CEOs.

II.3 Hypotheses

In the compensation literature, the key question related to EPS-tied goals is whether EPS-driven managerial actions such as share repurchases impose costs on shareholders. In this paper, we address this question looking the effects of EPS-tied compensations on repurchases and examining short term abnormal returns around the filing date of proxy statements to identify the market reaction.

First, we extend the hypothesis of Cheng, Harford, and Zhang (2015) to all types of executive payments (instead of using only bonus payments). First hypothesis is about the role of the EPS-tied absolute performance metrics on share repurchases activity. Share repurchases mechanically decrease the number of shares outstanding and increase EPS. Therefore, when a CEO's pay contract is tied to an EPS-metric, she would be motivated to buy back shares and the presence of EPS factors creates an agency problem between the CEO and shareholders. Accordingly, we expect that firms are significantly more likely to initiate stock buybacks when their CEOs have EPS-related triggers in their performance vesting conditions.

Hypothesis 1: When a CEO's executive compensation is tied to EPS, firms are likely to buy back their shares.

Hypothesis 1a: When EPS targets are close to (ex-post) actual value, the magnitude of the net repurchases increases.

Next, we examine stock price reactions to adoptions or deletions of EPS-related triggers in performance vesting conditions. Because stock buybacks can potentially be beneficial (harmful) for firms with low (high) investment opportunities and high (low) free cash flow, we sort firms on these dimensions.[6] When we place the firms into investment and free cash flow groups, we expect different reactions for different types of groups. First, we consider the firms with low investment opportunities and high free cash flows as these two accounting metrics are important indicators for the agency problem between managers and

[6]Rajan and Wulf (2006) study agency problems and executive perks by using cash flow and market-to-book ratio. Fenn and Liang (2001) consider few investment opportunities or high free cash flow as indicators for the agency problem. John, Knyazeva, and Knyazeva (2011) study the effect of geography on agency costs and firm payout policies and find that the effect is most noticeable for companies with limited investment opportunities and high free cash flow.

shareholders.

Hypothesis 2a: When shareholders (board) make a contract that is tied to EPS, if the firm has low investment opportunities and high free cash flows, then it is expected that the equity value of the firm will increase.

As an alternative, high investment opportunities and low free cash flows are two accounting indicators that indicate a growth path for a firm. Therefore, shareholders may expect a growth for this type of firm, and EPS-tied metrics may slow the growth of the firm if CEOs are incentivized by EPS-tied goals in their pay contract. Thus, removing EPS-tied metrics may help the firm in this circumstance, i.e. high growth possibilities with a shortage of free cash flow.

Hypothesis 2b: When the firm has high investment opportunities and low free cash flows, equity value of the firm positively changes if shareholders (board) remove EPS-tied contracts.

II.4 Data, variables and descriptive statistics

Executive compensation plans are from Incentive Lab, and the firms' accounting and financial data are from Compustat. Our sample covers for fiscal years between 1998 and 2013 since coverage of Inventive Lab database starts from 1998. Only CEO compensation plans are used in the sample. After excluding financials and utilities (SIC code 6000–6999 and 4900–4999), our sample consists of 1,343 firms with 13,411 firm-years. Incentive Lab collects grant data from definitive proxy statements (DEF 14A) filed by the firms. The sample of the firms in Incentive Lab is based on the largest 750 public firms measured by the market value. In this paper, we especially emphasize EPS-tied absolute performance metrics. Proxy filings are usually reported three months after the fiscal year end. Incentive Lab data is merged with the recent fiscal year accounting variables from Compustat. Figure B.1 shows the timeline of the events.

Cumulative abnormal returns (CARs) are calculated using Eventus. Market Model is used with the estimation period length of 255 trading days.[7] Filing dates from Incentive Lab are used to calculate CARs around proxy statement announcements. We calculate three-day and seven-day abnormal returns around the filing date. Following Fama and French (2001), Skinner (2008) and Cheng, Harford, and Zhang (2015), "net repurchase" is defined as the increase in common treasury stock. If treasury stock is zero in the current and the prior year, net repurchase is the difference between stock purchase and stock issuance. If either of these two amounts is negative, net repurchases are set to zero. Net repurchases are scaled by market value of equity (ME) or book equity (BE). According to Fama and French (1993), book equity is the book value of the stockholders' equity plus the balance sheet deferred taxes and investment tax credit (if available) minus the book value of preferred stock. Depending on availability, the redemption, liquidation, or par value (in that order) is used to estimate the value of preferred stock. Negative book equity values are excluded.

Cash is the amount of cash and cash equivalents scaled by the book value of assets. Market to Book is the market value of equity plus debt, divided by the book value of assets.

[7] The estimation period ends 64 trading periods before the event date (filing date).

Market to Book ratio is used to measure investment opportunities. Dividend payout ratio is the dividend paid scaled by net income. Bliss, Cheng, and Denis (2015) define free cash flow (FCF) as operating income before depreciation, minus total interest-related expenses, minus total income taxes. This study excludes *cash dividends* and is scaled by total assets because paying dividends is an alternative method of payout policy.[8] Profitability (ROA) is the ratio of net income to the total assets. Leverage is the sum of short-term and long-term debt scaled by total assets.

Pay contract is compared to the actual performance for EPS-tied grants. Following Bennett et al. (2015), *Actual EPS - Target EPS* is calculated as the difference between actual EPS (reported in Compustat) and the target EPS (from proxy statements in Incentive Lab).[9] Three variables based on *Actual EPS - Target EPS* variable are constructed. *ExceedEPS* is a dummy variable such that ExceedEPS=1 if a firm just exceeds an EPS goal in their CEO compensation plan.[10] *MissedEPS* is a dummy variable such that MissedEPS=1 if a firm just missed an EPS goal in their CEO compensation plan.[11] Finally, *CloseEPS* is a dummy variable for firms that just missed or exceeded an EPS goal in their CEO compensation plan.

EPS-metric is a dummy variable that equals one if a firm has an EPS-tied absolute performance metric in their CEO's pay contract and zero if they do not. *EPS-metrics Added*

[8] Results hold when we don't exclude cash dividends in calculating FCF.

[9] Compustat reports four different EPS measures based on the fact that EPS are fully diluted (or not) & earnings include extraordinary items (or not). Following Bennett et al. (2015), we pick the actual EPS that is closest to the target EPS specified in Incentive Lab.

[10] $0 \leq$ Actual EPS - Target EPS $<$ +0.02

[11] $0 >$ Actual EPS - Target EPS $>$ -0.02

sample includes firms that added EPS-tied absolute performance metrics in their CEO compensation contracts for the *first time*. (Firms that have already had EPS-tied metrics are excluded; this exclusion is especially necessary for first observation of a firm in the sample). Figure B.2 shows an example of adding EPS-metrics in pay contracts. Similarly, *EPS-metrics Removed* sample includes firms that removed EPS-tied absolute performance metrics (and never used them again). EPS-metrics Removed sample *only* includes first filing dates after the existence of last EPS-tied metrics. Figure B.3 illustrates an example of dropping EPS-metrics from pay contract.

Table C.1 presents summary statistics for the main firm characteristics. Panel A covers all observations from the sample and presents distributions of the main accounting variables. Note that, variables are winsorized at 1% and 99% in the models to reduce the effects of outliers. Panel B includes mean values for three subsets of the sample. The last two subsets explicitly look at the firms that add or drop EPS factors in CEO plans. The average net repurchases scaled by market equity is higher for the EPS sample (2.4%) compare to full sample (1.7%). The average values of FCF variable are higher for EPS and EPS-metrics Added samples compared to the overall mean. Also, profitability and dividend payout ratio are different for the EPS-metric Added sample and the EPS-metrics Removed sample. Market to Book ratio is relatively low for the EPS-metric Removed sample.

II.5 Empirical results

II.5.1 The effect of EPS-tied metrics on share repurchases

In this section, the effects of EPS-tied absolute performance metrics on share repurchases are examined. Executives whose contracts are tied to EPS metrics have an incentive to buy back. Therefore, there should be a positive and significant relation between EPS-tied metrics in pay contracts and share repurchases. To test the incentives, a left-censored Tobit Regression is used. The dependent variable is net repurchases scaled by market value of equity (NR/ME) or net repurchases scaled by book equity (NR/BE). Independent variables are left bounded by zero by definition.

Figure B.4 shows the mean value of net repurchases scaled by market value of equity (NR/ME) or net repurchases scaled by book equity (NR/BE) for the period of 1998 to 2013. The overall mean NR/ME is 1.7%, i.e. the average amount of repurchases is about 1.7 percent of market value of equity. During the beginning of the 2000s, the mean value of the ratio is less than one percent, and during the pick times (around 2006-2007 and 2011-2012), the mean value of the ratio of repurchases to market value is more than two percent. Average net repurchases over the sample period is 222.5 million dollars (560 million dollars for firms having positive share repurchases –NR/BE is greater than 1%)

A Tobit regression of share repurchases (NR/ME or NR/BE) is estimated as the following:

$$
\begin{aligned}
[NR/ME]_{it} \quad = \quad & \alpha + \beta EPS\ Dummies_{it} \ + \gamma_1 Firm\ size_{it-1} \ + \gamma_2 Cash_{it-1} + \gamma_3 FCF_{it-1} \\
& + \gamma_4 Profitability_{it-1} + \gamma_5 Payout\ Ratio_{it-1} + \gamma_6 Market\ to\ Book_{it-1} \\
& + \gamma_7 Leverage_{it-1} + \ \varepsilon_{it}. \qquad \text{(II.1)}
\end{aligned}
$$

Three different EPS dummy variables are used: *EPS-metric*, *CloseEPS* and *ExceedEPS.* In Table C.2, we find that the *EPS-metric* significantly and positively affects share repurchases. Model 3 or 5 shows that tying the executive contract to an absolute EPS-metric increases NR/ME by about one percent, consistent with our first hypothesis. Note that, *CloseEPS* and *ExceedEPS* are not significant, consistent with the results of Bennett et al. (2015).[12] This table clearly shows that there are both mechanical and economic relations between EPS-tied metrics and share repurchases. Having EPS-tied metrics in pay contracts increases the amount of buy backs significantly.

The next table shows an estimate of the following left-censored Tobit regression with EPS-metrics Added and EPS-metrics Removed dummy variables for all firms in the sample.

$$
\begin{aligned}
[NR/ME]_{it} \quad = \quad & \alpha + \beta_a EPSmetric\ Added_{it-1} \ + \beta_r EPSmetric\ Removed_{it-1} \\
& + \gamma_1 Firm\ size_{it-1} \ + \gamma_2 Cash_{it-1} + \gamma_3 FCF_{it-1} + \gamma_4 Profitability_{it-1} \\
& + \gamma_5 Payout\ Ratio_{it-1} + \gamma_6 Market\ to\ Book_{it-1} \\
& + \gamma_7 Leverage_{it-1} + \ \varepsilon_{it} \qquad \text{(II.2)}
\end{aligned}
$$

[12] Bennett et al. (2015) covers the period 2006-2012. They define repurchase as the percentage change in shares outstanding with respect to the previous fiscal year.

The first two columns of Table C.3 include firm and year fixed effects. *EPS-metrics Added* is significant at 10%, suggesting that adding EPS-tied performance metrics in CEO pay contract increases NR/ME by 0.5%. Compared to the overall average of 1.7%, the magnitude is not small. When year-fixed effects (or both firm and year fixed effects) are excluded, the results are consistent and more pronounced.

Next, only firms that buy back their shares are analyzed to emphasize the magnitude of the effect. This is because some firms may choose not to buy back their shares or buy back only a fraction of their shares for operational purposes. In Table C.4, the left-censored Tobit regression is repeated for only share-repurchasing firms. Positive net repurchase firms (Positive NR) include firms with (i) net repurchases is positive and (ii) NR/BE is greater than one percent. The second condition ensures that repurchases are sizeable. For example, a value close to zero could be driven by the firm buying back some stocks because employees want to exercise their employee stock options.

The coefficients of the *EPS-metrics Added* variable are positive. They are significant when fixed effects are excluded. Results suggest that adding EPS-tied metrics in CEO compensation plans increase the magnitude of the buyback for positive NR firms. The coefficients of EPS-metrics Removed (in NR/ME models) are negative (albeit statistically insignificant).

In Table C.5, the effect of adding (or removing) EPS-tied metrics on share repurchases is estimated. The Probit regression with positive NR dummy variable is estimated. In the first model, both year and industry-fixed effects are included. The probability of positive buybacks increase 19.3% when firms add EPS-tied absolute performance metrics in CEO compensation plans. Again, results are more pronounced when year-fixed effects (or firm and year fixed effects) are excluded. Note also that, cash and FCF variables are also positive and significant in Tables C.3-C.5.

Falsification tests

In Table C.6, the estimations in Table C.5 are repeated using firm characteristics from different fiscal years. We estimate the effect of EPS-metrics Added and EPS-metrics Removed variable on positive NR variables in different years. For example, the first model is an estimate of the effect of EPS-metrics variables on lags of share repurchases. Table C.6 shows that the effect of adding EPS-tied metrics on positive NR is only significant after adding EPS-metrics, not before. When compared to the original model in Table C.4, one-lag and one-lead models are not significant. Therefore, adding EPS-tied metrics affect share repurchases decisions after they are added to pay contracts.

Treatment effects

In this section, we use matching models to compare EPS-Added firm with a control firm with similar firm characteristics. We estimate the average treatment effect (ATE) using nearest-neighbor matching procedure. The treatment group includes firms adding EPS metrics in CEO compensation plans. (*EPS-metrics Added* variable) Matching variables include firm size, M/B, ROA, cash and dividend payout ratio. Mahalanobis distance metric (Abadie and Imbens, 2006, 2011) is used and Abadie-Imbens standard errors are reported in Table C.7.

Table C.7 shows that *EPS-metrics Added* causes the probability of positive net repurchase to be increased by an average of 12.8%. This result is consistent with the previous results in the Probit model. Also, EPS-metrics Added causes the ratio of net repurchase-to-book equity to be increased by an average of 0.7% (compared to 1% in Table C.4).

Overall, the EPS has a clear effect on share repurchases, consistent with the recent literature. It is also clear that adding EPS-tied metrics in the CEO contract increases both the magnitude of the share repurchases and the probability of positive buybacks. Falsification tests in Table C.6 suggest that EPS-Added firms are buying their stocks (or increasing NR/ME) after they add EPS metrics.

II.5.2 The effect of adding or removing EPS-tied metrics on firm value

In this section, adding (or dropping) EPS-tied metrics in CEO contracts and whether this is good or bad for shareholders is examined. Cheng, Harford, and Zhang (2015) discusses "the link between share purchases and CEO's private financial benefit" using manipulation channel. However, the channel between CEO incentives and firm value (through share repurchases) may not necessarily impose a cost on shareholders.

The effect of EPS-tied metrics on firm value is not always harmful (without ruling out manipulation channel). We predict that if a firm has good investment opportunities and a low free cash flow, having EPS factors in CEO pay contracts may hurt shareholders. However, if a firm has low investment opportunities and high free cash flows, then adding EPS metrics (incentivizing CEOs to buy back their shares) can be beneficial for shareholders.

Rajan and Wulf (2006) examine agency problems and executive perks by using cash flow and market-to-book ratio. They also use a dummy variable (called Jensen indicator) for firms with high free cash flow low growth (limited investment prospects). Fenn and Liang (2001) find that managerial share ownership provides incentives to increase payouts at firms with potentially the most severe agency problems. Fenn and Liang (2001) also consider few investment opportunities or high free cash flow as indicators for the agency problem. John, Knyazeva, and Knyazeva (2011) study the effect of geography on agency costs and firm payout policies and find that the effect is most noticeable for companies with limited investment opportunities and high free cash flow.

In this section, the cumulative abnormal returns (CARs) around the proxy filing date are used to determine the effect of “adding EPS metrics” or “removing EPS metrics” on shareholder value. As seen in Table 1, the sample is divided into four subgroups based on free cash flow (FCF) and market-to-book (MB) median values (median values in a fiscal year). Also, subgroups based on terciles are used as an alternative. In this case, only higher and lower groups are considered and the middle terciles are dropped.

It is expected that for high FCF/ low MB firms, EPS-tied absolute performance metrics could incentivize CEOs to buy back shares and this action may be an ideal choice for a firm (rather than a manipulating channel). On the other hand, for low FCF/high MB firms, there are possibly other investment opportunities with limited resources (limited free cash flow). Thus, EPS-tied metrics may increase the probability of share repurchases and increase the agency problem between the CEO and shareholders.

Table 1: Four subgroups based on free cash flow (FCF) and market-to-book (MB)

	Low MB	**High MB**
High FCF	EPS-metrics may help (high free cash flow with limited investment opportunities)	
Low FCF		EPS-metrics may hurt (low free cash flow with potential investment opportunities)

Table C.8 presents descriptive statistics for cumulative abnormal returns (CARs). Panel A shows mean values of abnormal returns for the sample and three subsamples (EPS-metric sample, EPS-metric Added sample and EPS-metric Removed sample). The average three-day abnormal return is about 11 basis points for full sample and 16 basis points for firms that include EPS-metrics in CEO pay contracts. This number is significantly larger for the EPS-metric Added sample (about 0.36%) and relatively smaller for the EPS-metric Removed sample (about 0.13%). The average seven-day abnormal return values are more pronounced.

Panel B and Panel C show mean CARs for four subgroups based on FCF and MB median values for EPS-metric Added and EPS-metric Removed samples, respectively. Statistical significance levels corresponding Z statistics (Patell, 1976) are reported.[13] Panel B shows that high FCF/low MB firms have significantly positive abnormal returns, as predicted by Hypothesis 2a. Average three-day abnormal returns for this group is 1.53%, i.e.

[13]Standardized cross-sectional test based on Boehmer, Masumeci, and Poulsen (1991) also gives very similar statistics.

firms with high cash flow and low investment opportunities have positive response from the market when they add EPS-metrics in managers' pay contracts. Similarly, Panel C reports the average three-day and seven-day abnormal returns for firms dropping EPS-metrics in CEO contracts. Results are consistent with Hypothesis 2b, albeit they are insignificant.

The next tables estimate weighted least squares regressions for cumulative abnormal returns (calculated using the market model) over three trading days (or seven trading days) around the proxy filing date – CAR(-1, +1) or CAR(-3, +3). The regressions are weighted by the variance (calculated from the market model) to reduce heteroskedasticity problems.[14] Standard errors are clustered at the firm level.

In Tables C.9 and C.10, the announcement effects of adding or dropping EPS-metrics in pay contract results are reported based on the median and 33% cut-off points (for FCF and MB variables). First, in Table C.9, the following regression for different investment and free cash flow categories is estimated.

$$\begin{aligned} CAR_{it} &= \alpha + \beta_a EPSmetric\ Added_{it} + \gamma_1 Firm\ size_{it-1} + \gamma_2 Cash_{it-1} \\ &\quad + \gamma_3 Profitability_{it-1} + \gamma_4 Leverage_{it-1} + \varepsilon_{it} \end{aligned} \tag{II.3}$$

CAR_{it} is either CAR(-1, +1) or CAR(-3, +3). *EPS-metrics Added* is an indicator for EPS-metrics Added firms. Industry and year fixed effects are included. Fama-French 48 industry classification is used.[15] For the brevity, only β_a coefficients are reported.

Table C.9 gives more evidence on the announcement effects of adding EPS-metrics.

[14] Reported WLS weights from Eventus (Market Model) are used. Precisely, $weight = 1/(n \times variance)$, i.e. more volatile returns get less weight.

[15] Results are robust for different industry classifications, including NAICS 3-digit, NAICS 2-digit and SIC 2-digit.

Panel A and Panel B illustrate that signs of the coefficients are consistent with the predictions outlined in the hypotheses development section. For example, high FCF/ low MB groups (based on median cut-offs) have positive and significant abnormal returns (1.11% for the three-day period and 1.6% for the seven-day period). The results show that investors reward companies that add EPS-tied compensations when firms have high FCF and low investment opportunities. In contrast, companies having low FCF and high investment opportunities observe a decline in stock prices when they add EPS-tied compensations.

Next, in Table C.10, the effect of removing EPS-tied performance metrics on firm value is examined. Again, the following regression for different investment and free cash flow categories are estimated (weighted least squares regression model is estimated for each of four categories):

$$\begin{aligned} CAR_{it} &= \alpha + \beta_r EPSmetric\ Removed_{it} + \gamma_1 Firm\ size_{it-1} + \gamma_2 Cash_{it-1} \\ &\quad + \gamma_3 Profitability_{it-1} + \gamma_4 Leverage_{it-1} + \varepsilon_{it} \qquad \text{(II.4)} \end{aligned}$$

CAR_{it} is either CAR(-1, +1) or CAR(-3, +3). *EPS-metrics Removed* is an indicator for EPS-metrics Removed firms. Similarly, industry and year fixed effects are included. In Table C.10, only β_r coefficients are reported.

Results show that low-FCF-high-MB firms have a positive investor shock when they remove EPS-tied goals. Panel B shows that a seven-day cumulative abnormal return around proxy filing is about 5.65% higher for firms dropping EPS-tied metrics. This result is also consistent with the predictions, suggesting that firms with high investment opportunities with lower free cash flows could be better off when they drop EPS-tied measures. Most of the reported coefficients from Tables C.9 and C.10 have predicted signs. Note that the magnitude of the coefficients relatively lower for clashed groups such as low-FCF-low-MB firms. In most cases, they are also insignificant.

This section explains clear (and reverse) predictions for two categories. Thus, in the following model, low FCF/high MB and high FCF/low MB groups are combined to test the predictions. Clashed groups (low FCF/low MB and high FCF/high MB firms) are dropped, because their predictions are ambiguous.

In Table C.11, the weighted least squares estimation is repeated for only the low FCF/high MB and the high FCF/low MB groups using following model.

$$\begin{aligned} CAR_{it} &= \alpha + \beta_1 EPSmetricAdded_{it} + \beta_2 EPSmetricRemoved_{it} + \gamma_1 RG \\ &\quad + \gamma_2 [EPSmetricAdded_{it} \times RG] + \gamma_3 [EPSmetricRemoved_{it} \times RG] \\ &\quad + \gamma_4 Firm\ size_{it-1} + \gamma_5 Cash_{it-1} + \gamma_6 Profitability_{it-1} \\ &\quad + \gamma_7 Leverage_{it-1} + \varepsilon_{it} \end{aligned} \tag{II.5}$$

CAR_{it} is either CAR(-1, +1) or CAR(-3, +3). Industry and year fixed effects are included. In this model, the main dummy variable *RG* (reasonable group) equals 1 for High FCF/Low MB group, and 0 for low FCF/high MB. In Table C.11, only and coefficients are reported. The coefficient (for interaction term) indicates that adding EPS-metrics may help firms if *RG* =1 (reasonable group). On the other hand, the coefficient (for interaction term) shows that dropping EPS-metrics may hurt the firms if *RG* =1 (reasonable group). Consequently, according to the hypotheses, it is predicted that is positive and is negative. Table C.11 shows consistent results with the predictions.

Again, results are consistent with the hypotheses: it is a better decision to make a contract that is tied to EPS when the firm has low investment opportunities and high free cash flow. It is also beneficial for shareholders to remove EPS-tied contracts when the firm has high investment opportunities and low free cash flow.

II.6 Robustness checks

Different industry classifications (including NAICS 3-digit, NAICS 2-digit and SIC 2-digit) are used instead of Fama-French 48 industry classification. Results are robust. For Tables C.9, C.10 and C.11, OLS regressions were run without using weights. The un-weighted results are quantitatively similar to the reported weighted results.

CEO contracts may include different types of accounting metrics. The popular metrics include EPS, Sales, Operating Income, Earnings, Cash flow and EBITDA. In addition to *EPS-metrics Added* variable, we define *Cash Flow Added* variable (in a similar way) and repeat the models in Table C.9 (i.e. the announcement effect of adding *Cash Flow metrics* in CEO pay contracts). The coefficient of *Cash Flow Added* variable is insignificant for each category. The results show that EPS is an important accounting-type metric and adding other types of accounting metrics may not significantly affect the equity value of the firm.

Furthermore, we use alternative definition of EPS-metric considering the vesting schemes. We define *vested-EPS-metric* such that *vested-EPS-metric* is equal to 1 if a firm has an EPS-tied absolute performance metric in the CEO's compensation plan in the current fiscal year, or it had EPS-tied metrics in previous years and their vesting period includes the current fiscal year. Results are quantitatively very similar when we use *vested-EPS-metric* instead of *EPS-metric*.[16]

Additionally, the Tobit regressions were run in Table C.2 for firms that have precise EPS targets in CEO contracts. Results are robust. Instead of using market-to-book ratio for proxy for investment opportunities, we use research and development (R&D) variable when we classify our subgroups. We find similar results. Finally. we run our results for the sample after 2006 and find consistent results.

II.7 Conclusions

This paper examines the effect of EPS performance metrics in a CEO's pay contract on the firm's share repurchases activity and firm value. We have two main findings. First, firms are more likely buy back their shares when their CEOs have EPS-tied performance metrics in their pay contracts. Second, the market reacts positively when EPS-tied goals are added in the CEO's pay contract in case a focus on enhancing EPS seems an advantageous incentive mechanism, i.e. when a firm has high free cash flows and low investment opportunities. Similarly, the market reacts negatively when EPS-tied goals are added in the CEO's pay contract in case a focus on enhancing EPS seems disadvantageous, i.e. when a firm has low free cash flows and high investment opportunities.

In sum, findings in this paper explore contracting benefits of EPS-based targets in

[16] There are only 155 firm-years (108 firms) where EPS-metric is zero and vested-EPS-metric is one (EPS metric is removed from the compensation plan but there are still vesting periods for the previous plans).

CEO compensation. We argue that different types of firms may have different goals and EPS-tied compensation may be beneficial for some of them while it is not the case for others. Therefore, policy makers should consider all sides when addressing the issues related to buybacks and compensation plans.

CHAPTER III

THE BRIGHT SIDE OF GIVING MANAGERS SHORT-HORIZON INCENTIVES

III.1 Introduction

The conventional academic wisdom suggests that corporate managers focusing on short-term goals may take suboptimal actions. This view of managerial compensation assumes that executives focus on short-term goals whereby they can benefit from short-term stock price changes. Investors focus more on long-term goals which avail themselves of long-term value increases. Executive short-termism, therefore, execarbates the existing incentive misalignment between the principal and the agent.[1] There are common calls in the press, most recently by a presidential candidate running for 2016 general elections, that incentives and/or tax laws should be changed to encourage long-term thinking.[2] In this paper, we present evidence that short-termism is not necessarily bad, at least when making an M&A investment. We show that the firms offering short-lived incentive packages realize better announcement abnormal returns, post-announcement stock price performance, and operating performance than the firms offering relatively long-term incentives.

[1]See Bebchuk and Fried (2010) for a discussion of how executive short-termism could cause myopic managerial actions. The model in Bolton, Scheinkman, and Xiong (2006) implies that in a speculative market, CEOs may pursue inefficient projects in short-run when a bubble exists. Bolton, Scheinkman, and Xiong (2006) argue that a way of avoiding such unwanted outcomes is to lengthen the vesting period of a CEO's compensation package. Gopalan et al. (2014) investigate how pay duration is related to short-term stock performance.

[2]*The Wall Street Journal*, 2015, The Imaginary Problem of Corporate Short-Termism, August 17. http://on.wsj.com/1NoU1OH.

Equity-based compensation packages are applauded as they are thought to provide a better incentive alignment between shareholders and managers. According to proponents of equity-based compensation, linking a CEO's pay to firm performance can help maximize intrinsic value in the long-run. Indeed, previous research suggests that providing equity-based compensation enhances the value of an acquiring firm.[3] The mypoia theories of executive compensation, however, underlines that it is not the weight of equity-based payment in the package but the payment horizon over which the benefits are vested. According to the myopia and other theories of executive compensation, one would expect that CEOs whose incentives are granted in a long period of time are more prone to make worse investments through acquisitions.[4] However, under certain circumstances when making important corporate decision, today's executives may be optimizing both short- and long-run value gains. Examining M&As, we lend support to the latter view that short-termism should not be seen as bad implied by the theories.

M&As, often seen as major, externally observable investments, offer relatively a more conducive setting to explore the relation between executive compensation design and the creation of shareholder wealth (Datta, Iskandar-Datta, and Raman, 2001). Corporate restructuring through takeovers are quite involved, hence the investors pay more attention. Firm managers expend a significant amount of time during a merger or an acquisition process beginning from searching for appropriate targets to closure stage. During such a

[3]Datta, Iskandar-Datta, and Raman (2001) reports that higher equity-based compensation is associated with higher short-run (two-day) acquirer abnormal returns. The authors also find that high EBC acquirers pay lower premiums.

[4]Managerial myopia has already been shown to negatively impact R&D investments. Edmans, Fang, and Lewellen (2013) document that newly-vesting equity is negatively associated with R&D investment.

long, involved process, managers use their discretion more carefully by taking into account various outcomes following the decision. Moreover, announcement period returns and their volatility change not only shareholder but also manager wealth. Hence, when making a target choice or structuring a deal, managers should think twice by taking into account the effects of possible outcomes on their personal wealth which is a fraction of the shareholder wealth at the same time. M&As, thus, provide us an ideal setting to explore the impacts of executive pay duration on the outcomes of an investment decision.

Gopalan et al. (2014) innovated a metric for executive pay duration by computing the weighted average of vesting durations of different pay components with the weight for each component being the portion of that component in the total compensation. However, due to inherent endogeneity, the authors cautiously admit that it is difficult to establish a causal link in understanding causes and consequences of pay duration. The use and length of stock- and option-based compensation have increased significantly over the past decades (see Figure E.1). Although we do not use exogeneity of such an increase in our tests, we believe exogenous increases in executive pay duration enables us to avoid the endogeneity issue to a degree.[5] Gopalan et al. (2014) propose two ways to deal with endogeneity: (1) finding a good instrument for the pay duration (2) using an exogenous shock. In addition to the exogenous change in the pay duration, visibility of the corporate action is also important from investor perspective. We take advantage of M&A announcements' inherent quasi-shock nature for the market by examining the reaction of investors to M&A

[5] Gopalan et al. (2014) use a data set provided by Equilar covering the years between 2006 and 2009. We build our sample from the data provided by Incentive Lab, and it covers all available years from the vendor, between 1998 and 2015.

announcements. Comparing market reactions to deals made by long- and short-horizon executives, we can investigate the consequences of providing incentives with varying vesting schedules on firm investment policies.

We first build a similar metric developed by Gopalan et al. (2014) using the data set provided by Incentive Lab. We borrow pay duration metric in Gopalan et al. (2014) and further compute a firm-wide executive pay duration, which is the weighted average pay durations of the top executives reported in proxy statements (SEC Form DEF14A). Using standard event study techniques and controlling for the variables often thought to impact the announcement period returns, we first use multivariate tests to see whether the announcement period returns of acquiring firms with short- and long-horizon executives are significantly different.[6]

Long-horizon executives make their firms realize worse abnormal returns around M&A announcements than short-horizon executives. When an acquiring firm has higher pay duration (above the median in that fiscal year) , it losses 78.6 basis points (0.79%) over the five-day announcement period and 76.7 basis points (0.77%) over the 3-day announcement period. When we use a continuous metric instead of a dummy version of the pay duration, we find that a 10-month increase in pay duration is associated with 0.42% decrease in five-day announcement period returns. Given significant empirical evidence that many M&As are value destroying at worst and value neutral at best for acquirers when the target is a publicly-traded firm, the lower likelihood of M&As by short-term managers

[6]We define "short-horizon" executives as those whose incentive packages have a life of less than the median pay duration of the sample. Likewise, "long-horizon" executives are those whose incentives are vested over a time period above the median pay duration.

is potentially beneficial.[7]

Next, we investigate whether the short-run benefits to the firms providing short-horizon incentives are present in the long-run performance of the same firms. First, to test the differences in long-run stock performances, we use buy-and-hold returns (BHARs) and long-run cumulative abnormal returns (LCARs). We find that in the long-run stocks of the firms with executives whose incentives are vested in relatively longer periods do not outperform those of firms offering incentives with lower duration. We also mimic operating performance models from Barber and Lyon (1996) and Hoberg and Phillips (2010) to further test the differences in operating performances of both groups. The differences in *ROA*, *Op. Inc./Assets* (operating income scaled by assets), and *Op. Inc./Sales* (operating income scaled by sales) are 1.2%, 0.7%, and 26.6% within three years of the M&A announcements. Together with long-run stock performance results, the operating performance regressions suggest that firms with short-horizon incentives appear to make more wealth-creating acquisitions and perform better following the acquisitions than firms with long-horizon incentives.

We also perform tests to see whether short-horizon executives make selective acquisitions. The takeover literature has documented that cross-industry acquisitions or mergers are generally detrimental to acquiring firm shareholders.[8] Cumulative announcement abnormal returns are also shown to be positively correlated with relative deal value to the

[7]See Fuller, Netter, and Stegemoller (2002) and Andrade, Mitchell, and Stafford (2001) for negative reactions by investors to the acquisitions of public firms by public firms.

[8]See DeLong (2001) how banks focusing on activity and geography enhances stockholder value. Morck, Shleifer, and Visnhy (1990) find that bidding firms realize higher negative announcement returns when they make diversifying acquisitions.

market value of an acquiring firm.[9] However, the joint effect of relative deal value and diversifying acquisitions is not clear. Given the less value destruction by bidders with short-horizon incentives, one would expect that the executives of these firms are also more careful as to selection of their targets. Consistent with this expectation, we find that long-horizon incentive group is more prone to buy big firms in different industries.

Our results imply that longer-term incentives are not necessarily optimal uniformly for all firms in all situations. We conjecture that short-term incentives (perhaps along with short-term pressure from investors) lead managers to be more selective when undertaking M&A projects, and choose only those that are more certain to produce value in the short term. The enhanced short-run wealth creation for shareholders, better operating performance following M&As, and less likelihood of engaging possibly wealth destroying acquisitions altogether suggest that managers incentivized with packages vested in the short-run take more optimal and at least less value-destroying M&A actions compared to long-horizon managers. Overall, the findings in this paper indicate that stock markets are more welcoming to the acquisitions made by short-horizon managers than those made by long-horizon managers. The results presented here provoke us to think twice as to blaming short-horizon incentive designs.

The remainder of the paper proceeds as follows. Section III.2 motivates our research question. Section III.3 summarizes the sampling procedures, construction of key variables, description of the data via key statistics, and presents the main econometrics models. We summarize our findings in Section III.4.

[9] See Asquith, Bruner, and Mullins (1983) and Fuller, Netter, and Stegemoller (2002).

III.2 Motivation

Executive compensation has been in the focus of both the society and researchers for several decades. Recently, it has become even more questioned not only by investors but also by politicians. The debate centers on how to design the pay of executives so that the managerial incentives better align with those of shareholders, who are investing the social wealth. Managers may over-invest (Jensen, 1986) and waste stockholders' cash (Harford, 1999) by engaging in empire building acquisitions. In a more complicated situation, managers may pursue short-term risky projects at the expense of long-run value to benefit from a likely bubble (Bolton, Scheinkman, and Xiong, 2006). The conventional view suggests that the problems of incentive design could be solved by granting more equity whose ultimate return depends upon performance of the underlying assets.

Even if the executive pay is offered as equity, managers may game with it at the expense of shareholders (principals) by timing certain disclosures and/or implementing policies that make the prices more volatile. Critics (see Bebchuk and Fried, 2010) of manager short-termism argue that self-interested, myopic managerial behavior can be remedied by certain principles.[10] According to advocates of long-term incentive designs, the incentive's vesting schedule should be long enough to prevent managers from risking long-horizon, value-adding investments. There is evidence that CEO pay-performance sensitivity is linked to policy choices and investment riskiness (Coles, Daniel, and Naveen, 2006).

We examine the issue in a setting which, we believe, provides us with sufficient tools

[10]Bebchuk and Fried (2010) propose eight principles that might help tying equity compensation to long term-performance.

to test whether there could be an investment process through which the causal impact of an incentive plan characterized by the length of pay components. As emphasized by Boulton, Braga-Alves, and Schlingemann (2014), M&A activities provide an important setting for examining the incentive effects of compensation plans because they are generally the biggest, and the riskiest, investments conducted by a firm. Similarly, Datta, Iskandar-Datta, and Raman (2001) underscores that visibility and discretionary nature of M&As, often long-term investments, make them ideal setting to investigate the relation between the investment decision processes and managerial incentives.

The M&A literature documents that acquirers of public firms realize either non-positive announcement abnormal returns.[11] It has also been shown that relative deal value to acquiring firm's value is negatively correlated with acquisition performance measured by cumulative announcement returns to the acquiring firm.[12] There is also evidence that cross-industry acquisitions have wealth-decreasing effect.[13]

On the incentive side of the M&A literature, the findings suggest that equity-based compensation structure is positively related to short-run shareholder wealth creation around the announcements.[14] While bad acquisitions may threat the throne of a CEO (Lehn and Zhao, 2006), acquisitions not wealth-destroying may reward the CEO (Harford and Li,

[11] Fuller, Netter, and Stegemoller (2002) and Andrade, Mitchell, and Stafford (2001) for negative reactions by investors to the acquisitions of public firms by other public firms.

[12] Fuller, Netter, and Stegemoller (2002) reports that acquiring firms lose about 2.56% upon announcement of acquisition of a publicly-traded company. See Asquith, Bruner, and Mullins (1983) for the first use of relative size defined as deal value scaled by acquirer's value. Moeller, Schlingemann, and Stulz (2004) shows that the M&A performance of big acquirers is worse than small acquirers.

[13] See Berger and Ofek (1995) and Lang and Stulz (1994) for negative wealth-effect of diversifying into a different line of business.

[14] Morck, Shleifer, and Visnhy (1988) report greater incentives do not imply better firm performance uniformly.

2007). CEOs' power on the board is shown to affect the acquisition outcomes (Grinstein and Hribar, 2004). The literature on the relationship between CEO characteristics and acquisition outcomes suggests that CEOs close to retirement tend to sell firms (Jenter and Lewellen, 2015). There is also evidence that CEOs with more stock and option holdings tend to engage in acquisitions (Cai and Vijh, 2007). The use and length of stock- and option-based compensation have increased significantly over the past decades (Figure E.1 and E.2).[15] None of the studies mentioned examined the pay duration and M&As in the same setting.

The closest paper to our study is Datta, Iskandar-Datta, and Raman (2001). The authors find that high equity-based compensation is positively associated with long-run stock performance of the acquirer. There are a number of differences between that study and ours. First, Datta, Iskandar-Datta, and Raman (2001) do not examine the relation between incentive length and acquiring firm performance. As Bebchuk and Fried (2010) indicate focusing on the magnitude of equity-based incentive may not solve the agency-principal problem in incentive setting. It is not only the magnitude but also the vesting schedule of equity-based payment that may impact the corporate policies. Second, Datta, Iskandar-Datta, and Raman (2001) focus more on long-run returns, use a more limited sample, and do not investigate the propensity of firms with different incentive horizons to acquire. Another paper that more directly investigates the relation between equity vesting and managerial incentive horizon is Edmans, Fang, and Lewellen (2013). The authors find

[15]Following the revision of FASB Statement No. 123, *Accounting for Stock-Based Compensation*, a significant number of public companies adopted Statement 123's fair-value-based method of accounting for share-based payment transactions with employees. FASB 123R has been in effect beginning July 15, 2005.

that R&D is negatively related to the stock price sensitivity of options and stocks that vest over the same year. The results lend support to managerial myopia theories. Our paper differs from Edmans, Fang, and Lewellen (2013) in selection of corporate action. R&D expenditures are easily unobservable to investors. They also do not offer a suitable quasi-natural event following which the outcomes of corporate policy change can be studied. We believe that M&As offer a better setting for studying effects of incentive horizon.

We acknowledge that there is little or no theoretical basis for why short-termism could be beneficial to shareholders. There are a couple of reasons we conjecture for why executives with short-term incentives could pursue more wealth-creating acquisitions. First, short-term incentives are more prone to be impacted by stock price changes. Hence, managers may avoid excessive risk. Second, in an M&A deal making process, the quality of target, method of payment, and deal structuring are vital for the success of a deal. Thus, short-horizon managers may be optimizing their and shareholder wealth both in the long- and short-run.

Our approach in this paper is more of exploration rather than taking a side in the debate of incentive horizon. Conditioned on the benefits of ex-ante long-horizon incentives, one would expect that long-horizon managers would make better acquisitions whereby create less friction between them and shareholders. We leave the mechanism through which short-horizon managers engage in more wealth-creating acquisitions to future research.

III.3 Data and methods

III.3.1 Sampling procedures

We collected data as follows: (1) stock prices from Center for Security Prices Research (CRSP), (2) accounting and financial data from S&P Capital IQ's Compustat North America (Compustat), (3) mergers and acquisitions data from Thomson Reuter's SDC Platinum (SDC), (4) executive compensation data from S&P Capital IQ's ExecuComp, (5) governance characteristics from BoardEx, and (6) executive compensation plans and vesting schedules for executive officers (executives) including the CEOs from Incentive Lab. Similar to Equilar and ExecuComp, Incentive Lab collects the details of compensation plans from proxy statements for the largest 750 firms from 1998 onward.[16] Thus, our sample is limited to panel of firm-fiscal years between the 1998 and 2013.[17]

We start sampling with all domestic acquisitions for the study period in which a publicly company announces to make an M&A deal with another company. The targeted firms are either a public, private, or subsidiary of a parent firm. To be included in the sample, a deal must be in one of the following forms: acquisition, acquisition of assets, acquisition of majority interest, or merger. We exclude mergers and acquisitions with undisclosed values and specific transaction types such as leveraged buyouts, spin-offs, recapitalizations, minority stake purchases, repurchases, self-tenders, exchange offers, acquisitions

[16]Incentive Lab updates its database by back-filling and forward-filling. There may be more than one grant on a specific date for an executive. Incentive Lab provides the value of compensation component at grant-level and a table consolidating the values for the same compensation components. We use grant-level data to identify vesting length and fair value of stock and option grants, and use summary table to get salary, bonus, and other compensation data.

[17]Our data spans more years compare to Gopalan et al. (2014) where they cover compensation plans between 2006 and 2009.

of remaining interest, and privatizations as none of these restructuring activities represent traditional mergers or acquisitions.

Mulherin and Simsir (2015) find that some target firms are involved in merger-related activities before the primary announcement dates that are recorded in SDC. Using news articles in the Lexis-Nexis database, they identify M&A-related events that appear within one calendar year of the deal announcements. We correct the announcement dates in our sample with the dates corrected by Mulherin and Simsir (2015).[18]

We begin data compilation by merging the fiscal year-end accounting and financial data, in Compustat, before the announcements with the merging firms obtained from SDC's M&A files.[19] If a firm in Compustat does not have information on key financial data such as assets or sales, we drop them out. We exclude acquiring firms with SIC codes between 4900 and 4941 (utility firms). We also exclude small deals where the ratio of deal value to acquirer's market value of equity is less than 1%. Once the merger of CRSP, Compustat, and SDC data is completed, we compute cumulative abnormal returns (CARs) using Eventus. In the final stage of sampling, we merge the deals supplemented with CARs, financial data of merging firms, and CEO characteristics with pay duration measures constructed using the data from Incentive Lab. The final sample leaves us with of 3,412 deals after dropping unmatched observations from any of the data sources above and deleting the observations with missing key data items used in the tests or tables. In Probit Regressions,

[18]The corrected announcement dates in Mulherin and Simsir (2015) are available at: http://onlinelibrary.wiley.com/doi/10.1111/fima.12053/suppinfo. The results do not change materially when we do not correct the dates.

[19]SDC contains historical CUSIP numbers of merging firms. Since Compustat does not include historical CUSIP numbers, we use CRSP as a bridge to match the firms in Compustat and SDC.

we supplement the data with non-merging Compustat firms. We have total 1,600 firms with 10,363 firm-year observations in Probit Regressions. We lose additional observations when no data is recorded for a specific test or table item.

III.3.2 Construction of key variables

Following Gopalan et al. (2014), we construct a measure of pay duration using vesting schedules of stock options and non-equity incentive grants. For each executive, we calculate a pay duration using the vesting length (in months) of each pay component, i.e. stock options. As the pay duration is a weighted-average measure by construction, we use ratio of a component's grant date fair value to the sum of grant date fair value of all components as the weight of that component. The durations of salaries, bonuses, and unclassified pay components (other payment) are zero. We aggregate the same components if there are more than one compensation item granted in a given fiscal year. The following equation yields the pay duration of an executive in a fiscal year:

$$\text{Pay Duration} = \frac{\sum_{i=1}^{N} \text{Stock}_i \times \text{Vesting Length}_i + \sum_{j=1}^{M} \text{Option}_j \times \text{Vesting Length}_j}{\text{Salary + Bonus + Other} + \sum_{i=1}^{N} \text{Stock}_i + \sum_{j=1}^{M} \text{Option}_j} \quad \text{(III.1)}$$

where $Stock_i$ and $Option_j$ represent the dollar values of stocks and options granted to executives with the vesting lengths next to them ($Vesting\ Length_{i/j}$). *Salary*, *Bonus*, and *Other* represent the annual dollar values of remaining compensation components.[20]

Next, we calculate firm-wide pay duration, the paper's variable of interest, as the weighted-average of executive pay durations. Weights are the ratios of an executive's total

[20]Cadman and Sunder (2014) also developed a measure that is similar to Pay Duration. They study the relation between CEO pay duration and investor horizon using the initial public offerings (IPO).

compensation (in dollars) to the total executive compensation paid by a firm. In statistical tests, we use three different versions of pay duration: *Duration (cont.)* is a continuous pay duration variable, *Duration (median)* and *Duration (> 36 months)* are dummies where the former takes the value of "1" if the firm-wide pay duration is greater than the median calculated for each fiscal year, and the latter takes the value of "1" if the firm-wide pay duration is greater than 36 months.

Other key variables include *Delta*, the dollar change in CEO wealth for one percent change in stock price, using the methodology described in Core and Guay (2002), and CEO tenure (*Tenure*) taken from ExecuComp and BoardEx. Descriptions of other control and definitive variables in the Appendix D (on page 118).

III.3.3 Descriptive analyses of the data

In Table F.1, we double-sort the deals first according to acquirers/targets and second according to pay duration. Numbers of the acquisitions are 1,714 and 1,698 for long-duration and short-duration acquirers respectively. The distribution of deals across Fama-French 12 Industries differ significantly for both groups in almost all industries. Between the acquirers sorted with respect to pay durations, there are significant differences among industries of the firms. Although drawing a pattern is difficult, it seems that there are significant differences between the number of acquisitions made by long-duration and short-duration acquirers except for *Telecommunication*, *Shops*, and *Finance*. When sorted with respect to target industries, number of the deals made by long-duration firms is smaller than number of the deals made by short-duration firms in all industries except *Business Equip-*

ment and *Healthcare*. Overall, as Gopalan et al. (2014) documented, certain industries have different pay duration.

In Figure E.3, average value of the deals are presented over the sample period for short and long-duration acquirers. Average price paid to the targets by long-duration and short-duration are close to each other in the recent years (2009-2013). There are some differences between average deal values before 2009. For example, in 1998 (around the start of Internet Bubble), short-duration managers made more high-value acquisitions than long-duration ones. The differences in 2001 and 2002 are also striking. An opposite pattern exists in years 2000, 2005, and 2008, in which long-duration managers spend more money than short-duration managers.

Table F.2 presents the summary statistics (mean, median, and number of observations) of key variables. The short-duration group represents the acquirers with pay duration below the median pay duration, whereas the long-duration group represents the acquirers with pay duration above the median pay duration. The medians are calculated using the firms within the same fiscal year. The average number of months in which executive grants are vested are 32.64 and 13.00 for long-duration and short-duration groups, respectively. Although *Tenure* variables are similar for both groups, there are significant differences between long- and short-duration firms in *Total Executive Pay* and *Delta*. Importantly, *Total Executive Pay* paid by short-duration firms is almost one half (16.24 versus 27.93) of that of long-duration firms. The possible explanation for this difference is that long-duration managers have more contract items.

Panel B of Table F.2 (on page 126) displays acquirer characteristics.[21] On average, acquirers with long-duration plans are growth firms (*M/B*=1.01) whereas the short-duration firms are income firms (*M/B*=0.88), and the difference between two groups is significant. Long-duration firms are, on average, larger than short-duration firms. The M&A liquidity, measured by total value of deals in the same industry divided by total assets, are similar for both groups. More importantly, the number of deals announced by short-duration group (1.70 per year on average) is smaller than the number of deals announced by long-duration group (1.77 per year on average). The difference is significant, and it provides a stylized fact that the acquiring firms with short-duration compensation plans are less acquisitive. We discuss this issue in the last section.

The characteristics of deals made by two groups also differ in some dimensions. Relative deal value to acquiring firm's market value of equity (*Value/Acq. MVE*) is larger (9.71%) for short-duration firms than long-duration firms (8.47%). Long-duration firms use cash more frequently (42%) than do short-duration firms (39%) to finance the acquisitions. The most striking item in Panel C is the number of big acquisitions made by both of the acquirer types. We define an acquisition as "big" if the price (deal value), paid by the acquirer, relative to its market capitalization exceeds 10% threshold. Short-duration firms make "big" acquisitions more frequently than long-duration acquisitions. Although there seems differences between number of bids received by the firms targeted by both types of the acquiring firms, the difference is not significant. There is no economical or statis-

[21]For private and subsidiary targets, we are unable to collect financial data. SDC does not provide reliable financial data on private and subsidiary targets. Market value of private and subsidiary firms are also unavailable.

tical significance in the percentage of acquirers that made deal payments with stock fully (*Paid by Stock*), percentage of not-public targets (*Non-public*), percentage of diversifying acquisitions (*Different 3-SIC*), and percentage of tender offers made to target shareholders (*Tender*) for both acquirer types.

Table F.2 also provides the three- and five-day cumulative abnormal announcement returns (*3-day and 5-day CAR*) of both acquirer types. Across all types of targets, short-duration acquirers enjoyed better announcement returns (0.19%), on average. However, the distribution of CARs to short-duration acquirers is negatively skewed, making its median smaller (-0.03%) than that (0.05%) of the long-duration group of acquirers. Additionally, we compare CARs for only big acquisitions and big-and-cross-industry acquisitions.[22] The difference is significant for big deals. 3-day CAR for big acquirers with short-horizon incentives is 0.78% and significantly higher than those with long-horizon incentives (-0.46%).

Panel E of Table F.2 reports monthly idiosyncratic volatility around M&A announcements.[23] The differences are significant in the month a deal announced and in the following month (t and $t+1$). The differences are not significant from $t+2$ to $t+12$. Additionally, Figure E.4 shows average monthly idiosyncratic volatility for short-duration and long-duration acquirers. It is worth noting that idiosyncratic volatility increases during the

[22] Big acquisitions are the deals where deal value paid by the acquirer relative to its market capitalization exceeds 10% threshold. Big-and-cross-industry acquisitions are the subset of big acquisitions where the targets are from different industries. We use 3-digit SIC code.

[23] Following Bali and Cakici (2008), we run the three-factor Fama and French (1993) regression and calculate monthly idiosyncratic volatility as the standard deviation of residuals from the regressions. We calculate *Ivol* for each stock using at least 17 daily observations for each month. Fama-French factors are from Kenneth French's web site at Dartmouth.

months deals announced for all acquirers.

III.3.4 Econometric methods

To investigate the question whether the vesting schedules of executive compensation plans have an impact on the short-run price changes surrounding merger or acquisition announcements, we run OLS regression where the variable examined on the left-hand side is the 3-day or 5-day cumulative announcement abnormal returns of acquiring firms obtained from a widely-used, standard event-study methodology – Market Model.

The cumulative abnormal returns (CARs) are measured as the difference between actual and expected returns. The expected returns are calculated from the Market Model using the value-weighted market index. CARs are winsorized at 1% and 99% percentiles of the distribution. We use the following regression model:

$$\text{Acquirer CAR}_{i,j} = \alpha_i + \beta_1 \times \text{Pay Duration}_{i,j} + \gamma \cdot \mathbf{X} + \varepsilon_{i,j} \qquad \text{(III.2)}$$

where the vector of control variables (**X**) includes firm size (log sales), market-to-book ratio, relative deal value scaled to acquirer market value of equity, M&A liquidity and indicators for paid-by-cash, paid-by-stock, tender offers, different industry deals, non-public targets, and multiple bids for the target. We add industry and year fixed effects to control for industry-wide and temporal unobserved factors. The results based on equation (III.2) are reported in Table F.3.

Following Lyon, Barber, and Tsai (1999) and Bhojraj et al. (2009), we calculate portfolio-matched buy-and-hold abnormal returns (BHARs) for 6, 12, 24 and 36 months after the deal announcement date to test the differences in post-announcement stock performance. The BHAR for firm i over the holding period $(1,h)$ is defined as:

$$\text{BHAR}_i(h) = \prod_{t=1}^{h}(1+\text{R}_{it}) - \prod_{t=1}^{h}(1+\text{R}_{benchmark,t}) \tag{III.3}$$

where $R_{benchmark}$ is the benchmark portfolio return. Following Fama and French (1993), value-weighted size/book-to-market portfolio returns are constructed and each firm is assigned to one of the 25 size/book-to-market portfolios at the beginning of the deal announcement year.

Second, we calculate abnormal returns by summing them (instead of compounding). For each firm i, we calculated long-run cumulative abnormal returns (LCARs) as follows:

$$\text{LCAR}_i(h) = \sum_{t=1}^{h}(\text{R}_{it} - \text{R}_{benchmark,t}) \tag{III.4}$$

To calculate $R_{benchmark}$, the same portfolio matching procedure is used for BHARs. LCAR is the sum of differences between benchmark portfolio return and acquirer returns over 6, 12, 24 and 36 months following the announcements.

To test whether there are changes in various performances metrics of acquiring firms from pre- to post-announcement period, we employ two sets of operating performance tests based on Hoberg and Phillips (2010) and Barber and Lyon (1996). Namely, we test whether the set of firms receiving positive reaction from the market also experience favorable changes in long-run accounting-based performances. We use *ROA*, operating income scaled by book value of assets (*Op. Inc./Assets*), operating income scaled by sales (*Op. Inc./Sales*), percentage change in sales (*Sales Growth*), asset turnover (*Sales/Assets*), and operating expenses scaled by sales (*Op. Exp./Sales*) as operating performance indicators ($\text{PI}_{i,t}$).

As indicated in Barber and Lyon (1996), specification of performance tests are difficult. A benefit of Barber and Lyon (1996) is that models rely on firm and benchmark industry performances. In their tests, models beased on peformance- and size-based matching are well specified and more powerful. We use a slight variation of Barber and Lyon (1996) models. First, when finding the benchmarks we do not impute missing values if a firm does not have industry peers with defined search criteria. Second, we use three-digit SIC to begin searching for the industry benchmarks instead of two-digit SIC code. Hence, we select the benchmarks from group of firms that fall into the same three-digits SIC code within [70% – 130%] book value of assets window. Third, we add the pay duration dummy variable. *Pay Duration* captures the difference in performances of firms providing long- and short-horizon incentives.

Formally, we specify the following model for the operating performance indicators ($\text{PI}_{i,t}$) given above:

$$\text{PI}_{i,t} = \alpha + \beta_1 \times \text{Pay Duration}_{i,-1} + \beta_2 \times \text{PI}_{i,-1} + \beta_3 \times \Delta\text{PI}^{\text{IND}}_{i,-1 \text{ to } t} + \varepsilon_i \qquad \text{(III.5)}$$

where $t = 2, 3, 4$, or 5, *PI* represents the firm performance indicator for firm *i*, and PI^{IND} indicates median industry performance indicator.[24] We are interested in *Pay Duration* variable (β_1) to see whether there is significant differences in abnormal operating performances between the firms with long- and short-horizon incentives.

[24] We do not use t=1 as it takes about at least six months to fully integrate for the merging firms. Especially, when the two merging firms are public, the integration and reporting process may take much longer compared to small, private firms.

Acknowledging the caveat of not accounting for the carried pre-event performance over the post-event period, Hoberg and Phillips (2010) underscores that if the firms are not fully merged, i.e. partial interests are acquired by the bidder, comparing pre- and post-event changes may not be appropriate. While this may be alleviated by using only post-announcement operating performance indicators, the model specification assumptions draw hardlines. We omit partial interest acquisitions in our sample. However, using Barber and Lyon (1996) models may omit some of the factors explaining variations in performance metrics. Hence, we make few adjustments in Hoberg and Phillips (2010) to further test the differences in performance metrics. First, to account for the impact previous performance, we calculate the change in industry-adjusted performance metrics from $t-1$ to t+2, 3, 4, or 5. Second, we add *Pay Duration* as the variable of interest in the equation.

The following model is slightly modified version of the ones used in Hoberg and Phillips (2010):

$$\Delta \text{ IA PI}_{i,-1 \text{ to } t} = \alpha + \beta_1 \times \text{Pay Duration}_{i,-1} + \gamma \cdot \mathbf{X} + \varepsilon_i \qquad \text{(III.6)}$$

where $t = 2$, 3, 4, or 5, *IA PI* represents industry-adjusted performance indicator, and **X** represents the vector of factors supposed to affect the performance change.[25] Similar to its counterpart in Equation III.5, β_1 captures any difference in industry-adjusted acquiring firm performance metric due to incentive horizon changes, i.e. the difference between long- and short-run incentive groups.

[25] We use a similar set of control variables used in equation III.2. ***X*** represents control variables taken from the M&A literature, namely firm size (log sales), market-to-book ratio, relative size of the deal (deal value scaled by acquirer market value of equity), M&A liquidity and indicators for paid-by-cash, paid-by-stock, tender offers, different industry deals (using 3-digit SIC code), and multiple deals.

III.4 Results

We summarize our main findings in the following subsections. First, we present the results from CAR regressions whereby we show that higher executive pay duration is negatively associated with higher acquirer announcement CARs. Next, we provide evidence that shorter pay duration has no negative impact on long-run stock performance of the merged firms. Long-run operating performance results also provide similar findings.

III.4.1 Pay duration and acquisition announcement returns

In this section, we examine whether there is an association between acquiring firms' announcement returns, measures by cumulative abnormal announcement returns described in Section III.3.4, and average vesting length of their compensation plans. In Table F.3 (page 128), we present the results of OLS regressions of acquiring firms' announcement abnormal returns (*Acquirer CAR*) on *Pay Duration* and other control variables.

Table F.3 shows the results based on Model (III.2). The variables of interest are *Duration (cont.)*, *Duration (> 36 months)*, and *Duration (dummy)*.[26] We report the regression results where the dependent variables are three-day (*3-day CAR*) and five-day (*5-day CAR*) announcement returns. The results show that all of the three pay duration measures are negatively associated with *Acquirer CAR*. Namely, the coefficient estimate of *Duration (cont.)* (-0.032) suggests that a 10-month increase in pay duration of an acquiring

[26] *Duration (cont.)* is the number of months over which the executive's pay is vested. Derived from executive pay duration, *Duration (dummy)* is an indicator variable taking the value of "1" if the executive pay duration is above the median pay duration within the same fiscal year, and "0" otherwise. *Duration (>36 months)* is an indicator variable taking the value of "1" if the executive pay duration is above 36 months, and "0" otherwise.

firm is associated with 0.32% decrease in 3-day announcement returns.[27] The magnitude of the effect is amplified when we use 5-day CAR. Column (3) and (4) repeat the tests by replacing *Duration (cont.)* with *Duration (> 36 months)*. The coefficient estimate of *Duration (> 36 months)* is -0.992 and significant at 10% level. It indicates that if a firm has company-wide vesting length greater than 36 months, upon an acquisition announcement it loses around 1% of its value. A similar pattern exists in Column (5) and (6) confirming the results found in Column (1)–(4); i.e., the acquiring firms with above-median compensation-vesting schedules experience 77 and 79 basis points decreases (both statistically significant at 5%-level) in Column (5) and (6) respectively.

As a robustness check, we report the relationship between CEO pay duration and acquisition announcement returns in Table F.7. Again, we find that all of the three pay duration measures are negatively associated with *Acquirer CAR*. However, the results are statistically significant for only *CEO Duration (cont.)* variable in Column (1) and (2).

In this section, we showed that there is an association between stock price changes of acquiring firms and their compensation-vesting schedules. We find that firms with long vesting schedules are the ones suffering from announcement period wealth losses as much as 1%. The evidence here suggests that firms with managers that have short-horizon compensation packages do not lose as much value as the ones with managers having long-horizon packages. Managers with short-horizon compensations may be more careful when

[27]For illustration purposes and to save space, we use percentage returns in left-hand sides of the regressions. Thus, a unit change in any right-hand side variable directly shows percent change in the left-hand side variable. For example, -0.042 in Column (2) of Table F.3 (page 128) implies that a 1-month increase in executive pay duration is positively associated with 0.042% change whereby a 24-month increase is associated with 1.01% change in 5-day acquirer announcement abnormal return.

selecting targets as their compensation may be more affected by prices changes in the short-run. Focusing on announcement returns, they may avoid wealth losses due to stock price sensitivity feature of their compensation portfolio.

As a last sort in this section, we present the joint effect of *Tenure* and *Duration* captured by *Tenure* $\times$ *Duration* in Table F.3 (page 128). The coefficient estimate of *Tenure* $\times$ *Duration* in Table F.3 (page 128) is positive and statistically significant when we use *Pay Duration (cont.)* and *Pay Duration (dummy)* in Table F.3.

III.4.2 Pay duration and post-announcement stock performance

Table F.4 shows long-run stock performance of short-duration and long-duration acquirers. Panel A shows buy-and-hold abnormal returns (BHARs) for short-duration and long-duration firms. We report equal-weighted and value-weighted average BHARs for each group within 6, 12, 24 and 36 months after the deal announcements. The results based on equal-weighted (EW) averages show that short-duration firms perform better than long-duration firms. The difference between two groups widens from 6-month to 36-month interval. The results based on equal-weighted (VW) averages show significant negative performances for both groups while the difference is insignificant.

Panel B Table F.4 displays long-run cumulative abnormal returns (LCARs). The difference is significant in all intervals on EW basis results and in 24-month interval on VW basis results. At the 24-month interval, on EW basis results, short-duration firms outperform long-duration firms by 5.08% (p-value = 0.00). On VW basis results, the difference is 3.71% (p-value = 0.00). Overall, long-run stock performance results suggest that long-duration firms do not outperform short-duration firms in the long-run. These results are consistent with our previous findings.

III.4.3 Pay duration and post-announcement operating performances

In this section, we further pursue the question whether there are long-run changes in the combined firm's operating performances once an acquisition or a merger is completed and whether these changes are linked to the length (horizon - duration) of compensation packages' vesting schedules.

The real effects of an attribute on a firm following an acquisition it pursued is probably best measured by examining post-announcement changes in operating performances. We examine *Return on Assets* (*ROA*), *Operating Income* scaled by *Assets* or *Sales* (*Op. Inc./Assets* or *Op. Inc./Sales*), *Sales Growth*, *Asset Turnover* (*Sales/Assets*), and *Operating Expenses* scaled by *Sales* (*Op. Exp./Sales*) as operating performance proxies. We rely on two sets of tests that, we believe, capture operating changes in the merged firms' post-announcement life cycle. Namely, we mimic the tests used in Barber and Lyon (1996) and Hoberg and Phillips (2010). The former one is particularly designed to capture changes around and event while the latter is aimed at avoiding complications associated when comparing two entities *before* and *after* an event as two entities may have different unobservable characteristics affecting the tests. Our main results presented here are similar using both methods.

Table F.5 (page 132) displays the results based on Hoberg and Phillips (2010) performance regressions in 2, 3, 4, and 5 years following the acquisition announcements.[28] We keep only completed acquisitions, thus all surviving firms following the acquisitions in our sample completed the transactions and survived as single entity. We only report the coefficient of *Pay Duration* variable.[29] When we compare short-horizon and long-horizon firms, there is a clear path that operating performance of short-horizon firms are better. The coefficient of *ROA* in the following two years (year = 2 and 3) are 1.4% and 1.2%. Operating income divided by assets also smaller for long-horizon firms in years 3 and 4 after the completion of acquisitions (70 and 60 basis points, respectively). Similarly, operating income divided by sales numbers are smaller by 6.9%, 26.6%, and 10.6% percent respectively in years 2, 3, and 4 after the merger.

Table F.6 displays the results based on Barber and Lyon (1996) performance regressions in 2, 3, 4, and 5 years following the acquisition announcements. The results are confirming our previous findings: short-horizon firms often performs better than long-horizon firms. When we look at *Sales/AT* metric in operation performance regressions, short-horizon firms perform better in years 3, 4 and 5 after the completion of acquisitions. (2.4%, 3.3.% and 4.1%, respectively)[30]

[28] To avoid complications within one year of the announcements, we start to examine post-announcement returns beginning in year two. We believe it takes some time to integrate the new firm into the acquirer.

[29] *Pay Duration* is an indicator variable taking the value of “1” if the executive pay duration is above the median pay duration within the same fiscal year, and “0” otherwise.

[30] We expect reverse signs for the last metric (operating expense divided by sales), i.e. the longer the pay duration, the bigger the expenses.

III.4.4 Pay duration and large wealth destruction

Moeller, Schlingemann, and Stulz (2005) documents the apparent losses of acquiring firms during the merger announcements and report that they are due to a small set of deals with negative synergy gains by companies with extremely high valuations. The equity value of acquiring company would have increased without these deals. In addition, acquirers with large losses perform poorly later. In this section we test whether short- or long-duration acquirers realize large losses.

Following Moeller, Schlingemann, and Stulz (2005), we calculate wealth destruction around the deal announcement date. *Large loss deal* is a dummy variable where change in market capitalization from day -2 to day +1 is greater than 1 billion dollars. (in 2001 dollars) There are 185 *Large loss deal* in our sample (74 and 111 for short-duration and long duration acquirers, respectively). Among short-duration acquirers, 5.2% of deals result in large loss in shareholder wealth while this number is significantly larger (7.5%) for long-duration acquirers. The findings in this section implies that long-duration acquirers do not only experience higher percentage losses but also larger dollar losses.

III.4.5 Pay duration and acquisition propensity

Next, we study the effect of executive pay duration on the propensity of a firm to acquire. We first explain the econometric methods and then document results.

To examine the propensity of a firm to acquire another one, we use Probit regressions where the left-hand side variable ($\text{Acquirer}_{i,j}$) takes the value of ”1” if the firm acquired a company in a given year and ”0” otherwise. Formally, we run the following model:

$$\text{Acquirer}_{i,j} = \alpha_i + \beta_1 \times \text{Pay Duration}_{i,j} + \gamma \cdot \mathbf{W} + \varepsilon_{i,j} \tag{III.7}$$

where $\mathbf{W}$ is the vector of control variables and γ is the vector of coefficients corresponding to these variables. Control variables include firm size (log of total assets), market-to-book ratio, operating income /scaled by assets, price runup and leverage. Industry and year fixed effects are added.[31]

The variable of interest in Model (III.7) is *Pay Duration*. The estimate of β_1 allows us to test whether firms, that have firm-wide aggregate compensation plans with longer vesting schedules, are, all else equal, more prone to engage in takeover activities.

While firms with longer vesting schedules may make acquisitions more frequently, size of the deals made by these firms may vary. We also hypothesize that the same set of firms prefer to buy or merge with firms in different industries, where difference is measured by the closeness of merging firms' SIC codes. To further analyze what type of acquisitions are made by the firms with longer vesting schedules, we run Model (III.7) using two different sub-samples: (1) the sample where the targets are defined as big (2) the sample where the targets are both big and in an industry different from the acquirer's. One of the important findings in this section is that firms that design their executives' compensation plans to be vested in longer periods engage in M&A activities more often than do the firms with shorter vesting compensation schedules. Table F.8 displays the results from Probit Regressions where propensity of a firm to make an acquisition deal is regressed on pay

[31] We exclude hostile takeovers because there are only a few hostile takeovers in our sample period.

duration and other control variables.

In the first row of Table F.8 (page 136), the continuous variable, *Duration (cont.)*, represents firm-wide average number of months that take executives vest their options. We first run Model (III.7) using the full sample. The coefficient estimate (β_1) of *Duration (cont.)* is 0.014, positive and statistically significant in Column (1), supporting our hypothesis that longer compensation vesting schedules of firms are positively associated with takeover activity. When we use an indicator variable having the value of "1" if a firm's pay duration is greater than the median, the estimate of β_1 ($\hat{\beta}_1$) becomes 0.36, significant at 5%-level.

Column (2) of Table F.8 (page 136) shows that the results in Column (1) and (4) are partially driven by big acquisitions, where big sample comprises of the deals whose values are greater than 10% of their acquirers. When we further narrow down the sample by limiting the deals where acquirers and targets are in different industries defined by 3-digit SIC code, $\hat{\beta}_1$ is equal to 0.015 in Column (3) (significant at 5% significance level). This finding is particularly important as it suggests that the firms with longer compensation vesting schedules on average pursue big targets in different industries. Long-run firms appear to acquire difficult-to-integrate targets. Overall, the evidence in Column(1) to (4) of Table F.8 points out that the average executive compensation duration of firms is positively associated with propensity to make more and ”difficult” acquisitions.

On the other hand, Column (5) and (6) of Table F.8 show that the results disappear after 2006. There are two main changes around 2006. First, disclosure requirements concerning executive compensation have changed. Second, after the revision of FASB Statement No. 123, *Accounting for Stock-Based Compensation*, a significant number of public companies started to adopt fair-value-based method of accounting for share-based payment transactions with employees.

In addition to control variables used in the literature (see Zhao, 2009), we add *Tenure* and its interaction with *Duration* to see if CEOs with more experience in the acquiring firm tend to make more acquisitions when they have a longer compensation vesting schedules compared to average CEO. CEO tenure has a negative impact on the firm's acquisitiveness (significant in Column 4). Following Core and Guay (2002), we calculate *Delta* of each CEO's portfolio consisting of options. *Delta*, "sensitivity to stock price", is the change in CEO's option portfolio value for a 1% annual change in the stock price. Thus, *Delta* in Model (III.7) captures the effect of CEO's option portfolio's sensitivity to the firm's stock price on the firm's acquisitiveness. Interacted with *Duration*, it allows us to test whether the effect of *Duration* on the firm's propensity to acquire is amplified with *Delta*.

Interestingly, *Delta* is positively associated with propensity to acquire. The estimates of *Delta* ranges from 0.069 to 0.105, all significant at least 5% significance level in Columns (1)-(4). Similar to pay duration variables, the significance disappear after 2006 (in Column (5) and (6).

Our variable of interest is *Delta* $\times$ *Duration*, and its coefficient estimate is negative and significant in all specifications except for Column (5) and (6). The negative coefficient estimate of *Delta* $\times$ *Duration* suggests that price sensitivity of the CEO's option portfolio decreases the impact of *Duration* on the probability of a firm's M&A engagement. This finding is intuitive given volatility in a CEO's option portfolio following an acquisition may cause the CEO carefully examine an acquisition opportunity.

Overall, the results in Table F.8 form mixed findings. *Duration* has positive impact on a public firm's takeover activity, but results disappear after 2006. Moreover, the price sensitivity of a CEO's option portfolio negates the impact of her compensation vesting schedule. Again results disappear when we only investigate firms after 2006.

III.5 Conclusions

There has been almost a common consensus among policymakers and researchers on that long-term incentives –especially in the form of equity– better align shareholder (principal) and manager (agent) interests. More recently, researchers have come to the conclusion that it is not only the form of payment but also the vesting schedules of payment that play significant role as to how managers decide on crucial corporate actions. In general, short-termism has a bad reputation as it is thought to motive managers to focus on short-term personal gains rather than long-term shareholder wealth creation. The metrics to gauge the length of incentives have just been introduced or revised by academicians. This paper aims at filling a gap in the literature by investigating the relation between pay duration and crucial, visible corporate actions, i.e. M&As.

We document new evidence on the relation between duration of performance contracts and M&A activities. In this paper, "short-horizon" managers are defined as those who have compensation package vested shortly. Using alternative proxies for short-horizon incentives (managers), we find that M&As conducted by short-horizon managers have stronger announcements returns. Our empirical findings also indicate that post-M&A accounting and/or operating performances of short-horizon managers are better when compared to those of firms with long-horizon executives. These findings are surprising given almost given a number of common calls that managers with short-term incentives may not pursue strategies that could benefit the shareholders both in the long- and short-run.

We also examine whether short-horizon managers are more acquisitive and, if the answer "yes", whether they buy firms relatively large in different industries. The reason we check this is to see if the managers of firms providing long-term incentives engage in wealth-destroying M&As more frequently. The results of Probit Models suggest that managers incentivized with long-term packages are indeed more acquisitive, which in turn may exacerbate the value destruction during announcement periods even following acquisitions or mergers.

The results in this paper imply that long-term incentives are not necessarily optimal for all firms in all situations. Managers with short-term incentives could also sign corporate actions that wealth-creating in the short-run. It would be interesting to check whether short-termism, as granted, is positively associated with other major corporate policies. We leave these and other unexplored aspects of pay duration to future research agenda.

CHAPTER IV

ON LONG-RUN STOCK RETURNS AFTER CORPORATE EVENTS

IV.1 Introduction

Major controversy in the financial economics literature surrounds the question of whether long-run abnormal stock returns are associated with major corporate events. Based on buy-and-hold abnormal returns (BHARs), Ritter (1991) and Loughran and Ritter (1995) document post-announcement underperformance for initial public offerings (IPOs). Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) similarly report underperformance for seasoned equity offerings (SEOs). Other studies by Asquith (1983), Agrawal, Jaffe, and Mandelker (1992), and Mitchell and Stafford (2000) report negative long-run abnormal returns for acquiring firms in mergers and acquisitions (M&As). Billett, Flannery, and Garfinkel (2011) find that much worse performance occurs after multiple issuances of different kinds of financial claims than after single finance events. And, Michaely, Thaler, and Womack (1995) find positive long-run abnormal stock returns for firms initiating dividends. A common explanation for anomalous abnormal returns is overreaction as hypothesized by behavioral decision theory (Kahneman and Tversky, 1982).[1]

Other studies report conflicting evidence. For example, Eckbo, Masulis, and Norli (2000) find significant underperformance for IPOs and SEOs using BHARs but insignif-

[1]See Fama (1998) for a comprehensive discussion of long-run return anomalies and potential explanations, including market efficiency and behavioral models. In this regard, studies by Mitchell and Stafford (2000), Brav, Geczy, and Gompers (2000), Eckbo and Norli (2005), Lyandres, Sun, and Zhang (2008), and How, Ngo, and Verhoeven (2011) provide different explanations for anomalous long-run stock returns after these corporate events.

icant results using calendar time portfolio alphas. Brav and Gompers (1997) obtain insignificant long-run results for IPOs after taking into account size and book-to-market ratios (see also Gompers and Lerner, 2003). Another study by Loughran and Vijh (1997) reports negative abnormal returns for M&As in general but positive returns for cash deals. Also, dividend initiation tests by Brav (2000) do not detect abnormal long-run returns after adjusting for size and book-to-market ratios, and further tests by Boehme and Sorescu (2002) yield mixed results.

A recent paper by Bessembinder and Zhang (2013) argues that long-run abnormal returns associated with these corporate events are explained by imperfect matching of event firms and control firms. They propose a regression model of abnormal returns using systematic and unsystematic factors that are normalized by taking positive (negative) values for factors and converting them to percentile ranks. With the exception of SEOs, tests of estimated intercepts (or alphas) indicate significant long-run abnormal returns for IPOs, M&As, and dividend initiations. However, their results change dramatically with the addition of squared terms for market and firm-specific characteristics in the model, as all four corporate events' alphas become insignificant. Based on these findings, they infer that long-run abnormal returns do not exist and conclude that calendar time regression results that adjust for risk reconcile previously mixed evidence. Another recent paper by Fu and Huang (2015) finds long-run abnormal returns after share repurchases and SEOs before 2002 but not after 2003. They contend that changing market environment account for the disappearance of long-run abnormal returns in recent years.

In this paper we contribute to the continuing controversy about the significance of long-run abnormal returns associated with major corporate events by implementing a battery of different test approaches, including Bessimbinder and Zhang regression model approach, well-known BHAR and three-factor calendar time regressions, and a recent standardized abnormal return (ASR) approach. Our purpose is to make inferences based on the weight of evidence from alternative tests. Upon repeating Bessembinder and Zhang's regression analyses with updated samples drawn from the period 1980 to 2007, we replicate their findings for the most part. However, our analyses show that their results are primarily driven by the normalization procedure, which affects the regression coefficients (and associated t-values), destabilizes alpha estimates, and inflates alpha standard errors. When we repeat their regression analyses using non-normalized factors that have been standardized for comparison purposes, abnormal returns are significant even including squared terms for all four corporate events under study.

Regarding other test method results, BHAR suggests significant long-run abnormal underperformance over a 5-year horizon after M&As, IPOs, and SEOs but not dividend initiations. Using an adjusted Fama-French three-factor model, calendar time abnormal returns are negative and significant for M&As even after 3-to-5 years. For these tests IPOs and SEOs did not exhibit significant long-run abnormal returns but did indicate significant overperformance over shorter horizons of 1-to-6 months. Dividend initiations are associated with significant post-event underperformance after 3 years. Finally, ASR results strongly indicate significant post-event underperformance for M&As, IPOs, and SEOs, and significant overperformance for dividend initiations.

In sum, all of the different test methods consistently detect long-run abnormal performance surrounding corporate events. Despite advantages and disadvantages of different tests, the weight of the evidence corroborates significant abnormal returns over 3- and 5-year horizons for the corporate events under study. Also, for IPOs and SEOs, a common reversal pattern is evident with 1-month overperformance followed by accumulating underperformance that becomes significant after about 3 years. Graphs using monthly ASRs clearly illustrate this pattern (See Figure G.5). Moreover, robustness checks that subdivide samples before and after 2003 do not confirm Fu and Wang, as a consistent pattern of long-run abnormal returns disappearing in recent times is not evident. We conclude that evidence from available long-run event study tests consistently supports the existence of anomalous returns associated with M&A, IPO, SEO, and dividend initiations.

The next section overviews data and methodology. Section IV.3 gives the empirical results of alternative long-run abnormal return test approaches. Section IV.4 concludes.

IV.2 Data and methodology

In this section we describe sample selection, define abnormal return metrics, and specify alternative test statistics.

IV.2.1 Sample selection

The M&A sample consists of completed U.S. mergers and acquisitions in the Thomson ONE (SDC) database between 1986 and 2007 with transactions value $5 million or more. Our samples end in 2007 to allow for 5-year, post-event return analyses. Also, unlike the other corporate events sampled from 1980, sample data begins in 1986 due to few SDC observations from 1980 to 1985. Following Betton, Eckbo, and Thorburn (2008), we apply two filters: (1) the acquisition takes the form of a merger (M), majority interest (AM), remaining interest (AR), or partial interest (AP); and (2) the acquisition is a control bid wherein the acquirer owns at least 50% of the target after the deal. Also, we require that the relative size of the deal (deal size divided by the market value of the acquirer) is greater than 5% to eliminate small deals. Altogether we have 4,294 acquisitions.

We select a control firm for each firm by matching size and book-to-market ratio (BM) characteristics using CRSP and Compustat databases. Following Eckbo, Masulis, and Norli (2007) and Bessembinder and Zhang (2013) , for each M&A deal completion, matched firms have closest BM among firms with firm size between 70% and 130% of the bidder firm. We eliminate matching firms that are in our sample of bidders within ten years around the event date. In this case, we choose the next candidate, i.e., the next closest BM.

Firm size (market capitalization) is calculated at the end of December prior to the M&A deal completion date. BM is the ratio of the book equity to the market equity at the end of year $t-1$. Following Fama and French (1993), book equity is defined as the Compustat book value of stockholders equity, plus balance sheet deferred taxes and investment tax credits (if available), minus the book value of preferred stock. Depending on availability, the redemption, liquidation, or par value (in that order) is used to estimate the value of preferred stock.

Table H.1 shows the distribution of the acquisitions in our sample period. Before 1994 the number of transactions ranged from only 19 in 1986 to 82 in 1993. Transactions peaked in the period 1996–2000 ranging from 365 to 431. Subsequently, the number of deals dropped to a low of 193 in 2002 and then climbed to 263 in 2007.

The IPO sample includes all completed US initial public offerings (IPOs) in the Thomson ONE (SDC) database between 1980 and 2007, excluding Real Estate Investment Trusts, closed-end funds, and American Depository Receipts. We select matching firms among the firms having CRSP data using market capitalization. Following Loughran and Ritter (2000), for each IPO event, the matched firm has the closest but greater market capitalization at the end of December following the IPO. Matching firms must have been publicly traded for more than 5 years. If this is not the case, we choose the next candidate, i.e., the next closest (but greater) market capitalization. There are 7,454 IPO events. Table H.1 shows that the number of IPOs increases in the 1990s and thereafter generally declines.

The SEO sample consists of completed U.S. SEOs in the Thomson ONE (SDC) database between 1980 and 2007, excluding American Depository Receipts, Global Depository Receipts, and unit offerings. Financial and utility firms are also excluded. The procedure for selecting matching firms is similar to the M&A sample. There are 6,737 SEO events. Table H.1 shows the distribution of the SEOs over time.

The dividend initiations (DIV) sample includes cash dividend initiations in the CRSP database between 1980 and 2007. Following Boehme and Sorescu (2002) and Bessembinder and Zhang (2013) , we apply the criteria that common stocks are listed on the NYSE, NYSE MKT (AMEX), or NASDAQ (viz., share code is 10 or 11, and exchange code is 1, 2 or 3), stocks have been included in the CRSP for more than two years, dividends are ordinary cash (USD), and they are paid regularly[2]. We apply the same matching procedures as for M&A and SEO samples. There are 2,151 dividend initiations. Table H.1 shows that the mid-1990s were peak years with around 150 initiations per year.

Note that the numbers of event firms in our paper are greater (especially in the dividend initiations sample) compared to Bessembinder and Zhang (2013) due to our process of searching for next available candidates in our matching procedures.[3] Also, the numbers of firms used in the regressions vary because of monthly data availability for the 5-year post-event period.

IV.2.2 Abnormal return metrics

We measure long-run abnormal returns using a variety of available approaches. Buy-and-hold abnormal returns (BHARs) (Lyon, Barber, and Tsai, 1999) over the holding period $(1,h)$ are defined as:

$$\mathtt{BHAR}_i(h) = \prod_{t=1}^{h}(1+R_{it}) - \prod_{t=1}^{h}(1+R^c_{it}), \tag{IV.1}$$

where R_{it} and R^c_{it} are returns on the test asset and its matching control firm, respectively.

Following Boehme and Sorescu (2002) (see also Mitchell and Stafford, 2000, Sec-

[2]The frequency of dividends is monthly, quarterly, semiannual, annual, or unspecified. As noted by Boehme and Sorescu (2002), unspecified frequencies are mostly quarterly.

[3]For example, in the DIV sample, if the first matching firm (the closest BM) is in our sample within ten years around the dividend initiation, we match with the second closest BM. We repeat this procedure for up to 10 candidates to match our event firm. In most cases we match with the best or second-best candidate.

tion V), calendar time abnormal returns (CTARs) are estimated from an adjusted Fama-French model in which the return difference between a test asset and its size/book-to-market matched control stock is regressed on the Fama-French factors. Given that the control stock has similar characteristics as the test asset, this approach potentially eliminates all unknown common factors from abnormal returns. We follow this practice in forming calendar time portfolios by estimating

$$(R_{\texttt{test}} - R_{\texttt{control}})_{pt} = \alpha_p + \beta_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + e_{pt}, \tag{IV.2}$$

where α_p defines the abnormal return, $(R_{\texttt{test}} - R_{\texttt{control}})_{pt}$ is the monthly portfolio return difference (equal- or value-weighted) between the simple returns of each test asset and its matched control firm, R_{mt} is the monthly return on the value-weighted market index, R_{ft} is the monthly return on one-month Treasury bills, *SMB* is the monthly Fama-French small-minus-big size factor return, and *HML* is the monthly Fama-French high-minus-low book equity to market equity factor return. Fama-French factors are downloaded from Kenneth French's online data library. In month t the portfolio return $(R_{\texttt{test}} - R_{\texttt{control}})_{pt}$ includes all stocks whose event period includes the month. Thus, the number of stocks, n_t, can vary monthly from zero to the total number of sampled stocks. The month index t runs from the earliest to the latest month among the event periods of the stocks in the sample, and months with $n_t = 0$ are discarded from the analysis.

Bessembinder and Zhang (2013) contend that BHAR's matched control procedure does not fully control for risk in estimating long-run abnormal returns. As a modification of the above calendar time approach, they point out that the continuously compounded abnormal return between an event and matched control firm, or $\texttt{CCAR}_{it} = \log(1+R_{it}) - \log(1+R^c_{it})$, in which R_{it} and R^c_{it} are the simple returns of the event and matched control firm, respectively, corresponds to a log wealth relative as defined by Loughran and Ritter (1995). To test for long-run abnormal returns, Bessembinder and Zhang (2013) specify the following regression model:

$$\begin{aligned}\texttt{CCAR}_{it} = \alpha &+ \beta_1 \Delta\texttt{beta}_{it} + \beta_2 \Delta\texttt{size}_{it} + \beta_3 \Delta\texttt{BM}_{it} \\ &+ \beta_4 \Delta\texttt{mom}_{it} + \beta_5 \Delta\texttt{illiq}_{it} + \beta_6 \Delta\texttt{isv}_{it} + \beta_7 \Delta\texttt{inv}_{it} + u_{it} \qquad \text{(IV.3)}\end{aligned}$$

where Δ denotes the monthly difference in firm characteristics between event firm and matching firm, `beta` for July of year t to June of year $t+1$ is estimated from the market model using monthly stock returns during years $t-5$ to $t-1$, `size` is the market equity at the end of the latest June, `BM` for July of year t to June of year $t+1$ is the book value of the common equity to the market value of common equity at the end of fiscal year $t-1$, `mom` is momentum computed using cumulative returns for months -12 to -2, `illiq` is illiquidity in July of year t to June of year $t+1$ proxied by the average ratio of daily absolute stock return to dollar trading volume from July of year $t-1$ to June of year t (see Amihud, 2002)[4], `isv` is idiosyncratic volatility as measured by the annualized standard deviation of the residuals obtained in a Fama and French three-factor regression using daily returns in month -2, and `inv` is capital investment in July of year t to June of year $t+1$ based on the annual change in gross property, plant, and equipment in fiscal year t divided by

[4]Following Amihud (2002), average market illiquidity in the denominator is calculated using illiquidity of all stocks satisfying the following conditions: (1) the stock has return and volume data for more than 200 days (from July of year $t-1$ to June of year t), (2) the stock price is greater than \$5, (3) the stock has data on market capitalization available, and (4) illiquidity outliers are eliminated at the highest or lowest 1%.

assets at the beginning of fiscal year t. In an effort to make estimated slope coefficients in regression (IV.3) comparable, they normalize the explanatory variables via transforming in each calendar month separately negative and positive values cross-sectionally to positive and negative rank numbers and then sorting them into negative and positive percentile ranks such that the values in each month range from -1 to $+1$.

Unfortunately, serious econometric problems arise in Bessembinder and Zhang's normalization process of factors that renders estimated alphas statistically and even economically indistinguishable from zero. One problem is that cross-sectional normalization of factors in a pooled panel regression randomizes potential regression relationships, such that in each calendar month a stock's factor (explanatory variable) values become dependent on those of other stocks. Indeed, it is possible that (for example) two original values ascending by magnitude (for a firm in different years) could become descending after cross-sectional normalization, which would weaken the regression results.

Another problem is that normalization induces unnecessary nonlinearity into the regressions. Even if the original relationship of a factor is linear with dependent variable returns, nonlinearity arises from transforming the original distribution of the explanatory variables to uniform or, more precisely, a mixture of two uniform distributions.[5] This nonlinearity suggests a kind of mirrored S-shaped curve in which third or higher order terms in their regressions could be more significant than second order terms.

[5]For example, suppose that y and x have a bivariate normal distribution, which implies that the marginal distributions of the variables are normal and the regression of y on x is linear. A simplified (theoretical) version of Bessembinder and Zhang's transformation maps x to a uniform distribution via $z = F(x)$, where F is the cumulative normal distribution function of x. Because $z = F(x)$ is a nonlinear function of x, the original linear regression of y on x becomes nonlinear on z.

Additionally, it is well known that regression t-values and other test statistics used for inferences are invariant with respect to scaling. Also, the regression intercept itself is invariant with respect to the scaling of explanatory variables by a constant. These invariance properties are lost in their procedure, as scaling and shifting origins of the regressors are performed within subsets of observations (i.e., cross-sectionally over contemporaneous calendar months). Because the original values of the regressors are detached from their context by subset-wise transformation to scaled rank numbers, this procedure is likely to have unpredictable outcomes.

Deformation of observations according to subsets not only affects the coefficients, including the intercept, and their t-values, but affects the whole risk adjustment process. As observed by Kothari and Warner (2007), even a small error in risk adjustment can cause sizable errors over long horizons. To avoid these issues, we run regressions based on equation (IV.3) without normalization. To allow comparability of estimated coefficients, rather than normalize characteristics, we standardize the firm characteristics by their respective standard deviations. Unlike cross-sectional normalization, standardization does not affect the regression fit, estimated intercept (abnormal return), and related statistics.

Finally, based on extensive simulation analyses, recent work by Dutta et al. (2015) demonstrates that standardized returns (ASRs) improve materially size, power, and robustness in long-run event study tests. Because they are standardized returns (i.e., returns divided by their standard deviation), they are weighted by their statistical precision. In turn, superior size and power of the tests statistics are gained, which is well documented in short-run event studies (e.g., Patell, 1976; Boehmer, Masumeci, and Poulsen, 1991; Kolari and Pynnönen, 2010; and others) as well as in long-run event study tests by Dutta et al. (2015). The authors further document that standardized return tests of long-run abnormal returns are much less sensitive to outliers than existing test methods, such as BHAR and CTAR. And, because returns are divided by their standard deviation, there is some degree of total risk adjustment of abnormal returns. They define abnormal standardized returns (ASRs) as follows:

$$\mathtt{ASR}_{it} = \mathtt{sr}_{it} - \mathtt{sr}_{it}^{c} \tag{IV.4}$$

where

$$\mathtt{sr}_{it} = \frac{r_{it}}{s_{it}} \tag{IV.5}$$

is the month t standardized return of the ith stock in terms of log-returns, $r_{it} = \log(1+R_{it})$ with R_{it} the simple return, and s_{it} is the month t return standard deviation. We compute monthly standard deviations, s_{it}, from daily returns to capture time-varying volatilities. In the same manner, $\mathtt{sr}_{it}^{c}$ is the month t standardized return of the matched control firm.

Altogether, we utilize four different return metrics to test abnormal behavior of the events. BHAR focuses on the buy-and-hold return difference of equal-weighted portfolios, CTAR represents the monthly average (simple) return difference unexplained by Fama and French factors, CCAR measures the monthly continuously compounded return difference unexplained by the seven risk factors, and ASR captures the return difference adjusted for measurement precision.

IV.2.3 Test statistics

The t-ratio for testing BHAR, or $\texttt{BHAR-T}$, is defined as follows:

$$t_{\texttt{bhar}} = \frac{\overline{\texttt{BHAR}}(h)\sqrt{n}}{s_{\texttt{BHAR}}}, \tag{IV.6}$$

where

$$\overline{\texttt{BHAR}}(h) = \frac{1}{n}\sum_{i=1}^{n} \texttt{BHAR}_i(h) \tag{IV.7}$$

is the mean of $\texttt{BHAR}_i(h)$s and

$$s_{\texttt{BHAR}} = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(\texttt{BHAR}_i(h) - \overline{\texttt{BHAR}}(h))^2} \tag{IV.8}$$

is the standard deviation of $\texttt{BHAR}_i(h)$s.

The calendar time abnormal return (CTAR) α_p in equation (IV.2) is tested via the estimated regression t-ratio of the intercept coefficient, or $\texttt{CALENDAR-T}$. In the same manner, the alpha in regression (IV.3) is tested by its respective t-statistic, in which we utilize recent clustering techniques (e.g., Cameron, Gelbach, and Miller, 2012) to account for cross-sectional correlation due to overlapping event months.

Lastly, abnormal standardized returns (ASRs) for the holding period from h_1 to h_2 with $1 \le h_1 \le h_2 \le h$ are tested by means of $\texttt{ASR-T}$ statistics defined as follows:

$$t_{\texttt{asr}}(h_1, h_2) = \frac{\overline{\texttt{ASR}}(h_1, h_2)}{\texttt{s.e}(h_1, h_2)}, \tag{IV.9}$$

where

$$\overline{\texttt{ASR}}(h_1, h_2) = \frac{1}{n(h_2 - h_1 + 1)}\sum_{i=1}^{n}\sum_{t=h_1}^{h_2} \texttt{ASR}_{it} \tag{IV.10}$$

is the holding period average $\texttt{ASR}_{it}$ per month over the n event firms. In computing standard errors, or $\texttt{s.e}(h_1, h_2)$, application of clustering robust standard errors (e.g., see Cameron, Gelbach, and Miller, 2012) is a straightforward approach to account for cross-sectional correlation and other issues (see Dutta et al., 2015).[6]

IV.3 Empirical results

This section provides empirical results using different test methods for long-run abnormal returns associated with M&As, IPOs, SEOs, and dividend initiations. We begin with the regression model approach recently proposed by Bessembinder and Zhang (2013). Our results confirm econometric issues discussed in the previous section that make inferences based on normalized factors unreliable. Extending their regression approach, we standardize (rather than normalize) factors to make them comparable, which substantially alters the regression model results. To comprehensively evaluate abnormal returns, further tests using BHAR, CTAR, and ASR methods are reported.

IV.3.1 Regression-based approaches

Tables H.2 and H.3 report the estimated regression coefficients based on equation (IV.3) with normalized factors. In the bottom portion of these tables, F-tests of the joint significance of the squared terms are shown, in addition to mean CCARs and their cross-sectional correlation adjusted t-values. The analyses include all stocks for which regressors and returns are available for the 60-month holding period or the month of delisting,

[6]Clustering robust standard errors are available in modern statistical packages such as SAS and Stata. One can easily utilize these by arranging $\mathtt{ASR}_{it}$ observations in the holding periods from h_1 to h_2 into a pooled panel data set. Clustering robust standard errors and associated t-statistics are computed by estimating the regression $\mathtt{ASR}_{it} = \alpha + u_{it}$, i.e., a regression on the constant term using the clustering standard error option of the package. The OLS-estimate $\hat{\alpha}$ equals $\overline{\mathtt{ASR}}(h_1, h_2)$, and the cluster robust standard error of $\hat{\alpha}$ gives $\mathtt{s.e}(h_1, h_2)$ in equation (IV.9).

whichever occurred first. Thus, these results reflect average monthly abnormal returns for firms surviving up to 60 months rather than the 5-year average monthly abnormal return performance. Tables H.4 and H.5 replicate regressions in Tables H.2 and H.3 with non-normalized, standardized factors. As mentioned earlier, to make magnitudes of the slope coefficients directly comparable, the factors are standardized by their standard deviations computed over the pooled panel observations, such that all the factors have unit variances.

Figures G.1 to G.4 plot firm characteristics used in the regressions. The figures show pre- and post-event median values of the characteristics for the event and matching control firms.[7] In addition to the characteristics used in the regressions, median monthly volatilities are shown to demonstrate the dynamics of aggregate total risk during the event months.

Regarding M&As in Figure G.1, the most obvious differences between event and matching control firms among regressor factors are investment activity around the event month and disparities in size and book-to-market values after the event month. Given the nature of the the event, these differences are expected. Focusing initially on the linear and second order models in Table H.2 for M&As comparable to those reported in Bessembinder and Zhang (2013, Panel C of Table 4), it is notable that second order (i.e., squared) terms are jointly highly insignificant. Among estimated coefficients associated with squared terms, only momentum is significant at the 5% level. In Bessembinder and Zhang (2013, Panel C of Table 4), the squared term of beta is significant at the 5% level, and the squared term of the idiosyncratic volatility is borderline significant at the 10% level. In our case, inclusion

[7] Since pre-event values are not available in the IPO sample, Figure G.2 shows only post-event values.

of these terms inflates the standard error of alpha from 0.105 to 0.253 in Table H.2 or 141%. In their regression the standard error is inflated by 90%. Like their results, our regressions indicate highly significant alphas without the squared terms but insignificant alphas after including squared terms.

It is true that the alpha-estimates decrease with the addition of squared terms to the linear model. However, as discussed in Section IV.2.2, nonlinearity caused by the normalization is very likely to call for higher order terms in order to adequately capture the implied extra nonlinearity. Indeed, enhancing the M&A regression model with third and fourth powers of the explanatory variables reveals that third order terms become the dominate (and only significant) factors in the regression. Also, as shown by the F-test reported in the middle panel of Table H.2, third power terms are the only jointly significant terms in the model. Even though alpha remains insignificant, its magnitude jumps from -0.067 to -0.316, which indicates even higher abnormal returns compared to the highly significant alpha of -0.290 for the linear model. Thus, inflated standard errors and widely varying alphas from one regression to another suggest that the estimates become highly unstable due to the weak explanatory power of these factors, such that the noise component becomes sizeable. Also, higher order terms induce other symptoms such as multicollinearity and outlier effects, both of which can substantially affect the OLS intercept term.

The IPO columns of Table H.2 report regression equation (IV.3) results for CCAR. The results differ considerably from those for M&As. All linear as well as higher order terms are jointly statistically significant. Also, unlike Bessembinder and Zhang (2013, Panel B of Table 4), alpha remains statistically significant even with the squared and higher order terms. In their study alpha is statistically significant only in the regression without the squared terms. Inclusion of squared terms inflate the standard errors by 53% in Table H.2 compared to 66% in their regression results. In spite of the high significance of estimated alphas in all models, again the inflated standard errors suggest growing instability in the estimates even though the higher order terms are jointly significant. In sum, our IPO findings support those of many earlier studies that have documented material underperformance of IPOs (for example, see Betton, Eckbo, and Thorburn, 2008, among others).

The SEO columns of Table H.3 provide CCAR regression results. Unlike other corporate events, estimated alphas are insignificant in both samples with or without squared terms. Again the squared terms of the normalized factors are jointly insignificant. These results for the linear and squared term regressions are consistent with those in Bessimbinder and Zhang. However, the results become less clear cut with the inclusion of third and fourth order terms. Consistent with our earlier discussion in Section IV.2.2, third order terms are highly significant. With these terms, the magnitude of alpha increases dramatically and becomes economically significant with an abnormal return of approximately 5.5% per year. However, due to inflated standard errors, this large alpha is only borderline significant at the 5% level. In sum, the results for SEOs are mixed.

Results for dividend initiations (DIVs) in the last three columns of Table H.3 are similar to those for M&As. Estimated alpha is highly significant in the normalized factors regression without the squared or higher terms but insignificant with the inclusion of these terms. The addition of higher order terms at worst almost quadruples the standard errors of alphas rendering them insignificant even in the case of an estimate equal to 0.455, or about 5.5% per year. Like M&As, IPOs, and SEOs, third order terms are jointly significant.

Due to problems of cross-sectional normalization of explanatory variables in panel data analyses, we repeat the regression analyses using non-normalized factors that have been standardized as discussed earlier. Tables H.4 and H.5 show that, particularly with respect to the inclusion of squared terms, the results are quite different from those with normalized factors. Regardless of whether or not higher order terms are included, all estimated alphas are highly significant with values deviating from zero by 2.34 standard errors or more. Notably, the standard errors of alphas remain virtually unchanged across different model choices. The only exception is the fourth order regression of DIVs in which alpha becomes insignificant and all higher order terms are jointly significant. This exception is not surprising in view of implied multicollinearity caused by the inclusion of higher order terms as well their high sensitivity to potential outliers. These empirical results confirm potential normalization problems. More importantly, they suggest long-run underperformance after M&As, IPOs, and SEOs and overperformance after dividend initiations.

IV.3.2 BHAR, CTAR, and ASR approaches

We next report the results based on BHARs, CTARs, and ASRs for post-event return differences between event firm and matched control firms associated with M&A, IPO, SEO, and dividend initiation (DIV) events.

Merger and acquisition results for the sample period 1986 to 2007 as well as results for certain subperiods are shown in Table H.6. Although not necessary for ASRs and CTARs, the analyses include only those M&As that have the full 60-month event-period return history to facilitate BHAR computations. Panels A and B, respectively, give results for the full sample of 1,838 M&As and trimmed sample of 1,828 M&As wherein 0.5% of the most extreme M&As from both ends of the 5-year return distribution were removed. Trimming drops 10 of the 1,838 M&As from the sample. In spite of the large sample size of over 1,800 observations, these 10 extreme returns influence BHAR and its test statistics over longer horizons.

Typically, exclusion of the extreme cases strengthens evidence of abnormality in terms of the `BHAR-T` statistic. For example, for the full event period of 5 years, `BHAR-T` indicates no evidence of abnormality in the full sample but is highly significant ($p < 0.01$) after dropping 10 returns. In this case, if a few extreme cases are excluded, M&A firms highly underperform their reference firms with average 5-year BHARs of −22.92% (third row of Panel B), which is about the same as reported earlier by Betton, Eckbo, and Thorburn (2008). On the other hand, including the outliers gives a BHAR of −6.70%, which is close to −7.09% reported in Bessembinder and Zhang (2013, Table 3) and −6.5% reported by Loughran and Vijh (1997). We infer that trimmed BHAR results suggest long-run, post-event underperformance among M&As.

CTARs and related *t*-tests confirm significant negative long-run stock performance over 3- and 5-year horizons in untrimmed and trimmed samples. Unlike BHAR, CTAR appears to be insensitive to outliers. For the untrimmed sample in Panel A of Table H.6, ASRs and related test statistics `ASR-T` corroborate significant negative long-run performance over 3- and 5-year periods as well as 6-month and 1-year periods. For the trimmed sample results in panel B, 3- and 5-year abnormal returns are not significant but 6-month and 1-year returns are significant, which subperiod analyses further support. An advantage of the ASR approach is that monthly standardized abnormal returns over time can be computed. The M&A graph in Figure G.5 illustrates post-event ASRs, which reveal a pattern of substantive underperformance during the first year, after which the behavior appears random.

Initial public offering results are reported in Table H.7. As before, though not as striking as M&As, removal of only a few outliers (Panel B) affects BHAR results. ASR and BHAR indicate highly statistically (and economically) significant abnormal 3- and 5-year underperformance. Calendar time α_p is negative but not significant over this long horizon. However, calendar time results can be difficult to interpret due to the fact that, in each post-event month, the portfolio contains stocks with different durations in the sample. Some stocks may be newly-issued IPOs and others 5 years old. Thus, heterogeneous portfolio values in different months can be expected to affect the estimation of the intercept term and particularly its standard error. The results in Panel B of Table H.7 confirm the latter issue, as the 5-year alpha estimate is -0.26% per month, which translates to about -16% 5-year underperformance, but alpha is still insignificant.

In the first month after the IPO month, Panels A and B show that, in terms of all abnormal return metrics, large positive and highly significant abnormal returns occur. After this first month, the IPO graph in Figure G.5 shows that subsequent abnormal returns measured in terms of ASRs are almost all negative over the remainder of the 5-year holding period. Regarding BHARs, notice that the 1-month positive abnormal return affects the 2-month BHAR due to compounding. Also, because calendar time alphas measure average monthly abnormal returns, the 1-month positive abnormal returns appear to affect the average for up to 6 months after IPO events. Nonetheless, a clear reversal pattern emerges from different test approaches of short-run overperformance followed by long-run underperformance.

The seasoned equity offering results are shown in Table H.8. Again, comparing results in Panels A and B, BHAR proves to be sensitive to a few outliers, especially at the longest 5-year horizon. The 5-year BHAR test statistic is weakly significant in Panel A but highly significant in Panel B. Both CTAR and ASR tests in Panels A and B indicate significant long-run underperformance of SEOs at a 3-year horizon and 3- and 5-year horizons, respectively. Significant negative 3-year calendar time α_ps for untrimmed and trimmed samples further support long-run underperformance. It should be noted that 3- and 5-year ASRs are significant despite the higher volatility profile of SEO firms relative to matching firms (see the last panel of Figure G.3). We infer that event-induced volatility associated with SEOs compared to their matches did not alter the inference of long-run underperformance.

Like IPOs, SEOs exhibit short-run outperformance in the 1-to-6 month event window. Calendar time and ASR tests in Panels A and B are highly significant for 1- and

3-months after IPOs. As shown by the SEO graph of ASRs in Figure G.5, these findings can be attributed largely to the sizeable 1-month overperformance. The ASR graph clearly shows an unmistakable reversal from highly positive abnormal return in the first month to steadily accumulating negative long-run abnormal returns that become significant by the third year.

Table H.9 reports test results for dividend initiations. Unlike the above samples, in unreported results BHARs do not change when the sample is trimmed and therefore are not affected by outliers.[8] In terms of ASRs, there is highly positive and significant 5-year overperformance among dividend initiators, which agrees with the standardized CCARs in Table H.5 discussed earlier. The unscaled return metric, or BHAR, is generally positive but insignificant, except for being negative and significant at the 5% level in the 13–36 month subperiod. The calendar time approach suggests negative but normally insignificant post-event performance, except for the 3-year horizon and the 13–36 month subperiod. We further investigated the latter findings by using an unmodified (value-weighted) CTAR regression (i.e., regressing $(R_{\texttt{test}} - R_f)_{pt}$ rather than $(R_{\texttt{test}} - R_{\texttt{control}})_{pt}$ on the Fama-French factors in equation (IV.2)), which generated positive but insignificant estimated alphas for these two horizons equal to 0.200 with t-value = 1.20 (p-value = 0.230) and 0.057 with t-value = .284 (p-value = .776), respectively.

Monthly ASRs in Figure G.5 show that the 5-year overperformance is due to persistent positive ASRs over the 60-months holding period. Referring back to the last graph in Figure G.4 (showing median monthly volatility), event firms' volatility dropped well

[8] We do not report trimmed results.

below that of matching firms' volatility a few months before the event month. Hence, much of the overperformance in terms of ASRs can be attributed to the lowered total risk of dividend paying firms, which the BHAR and calendar time approaches do not take into account.

IV.3.3 Robustness checks

Recent work by Fu and Huang (2015) finds that long-run abnormal returns for stock repurchases and SEOs are significantly positive and negative, respectively, using samples in 1984–2002 but disappear for samples in 2003–2012. The authors utilize conventional BHAR and CTAR tests, in addition to the IRATS test by Ibbotson (1975). In the earlier 1984–2002 period, all three tests confirm significant three-year abnormal returns. However, in the later 2003–2012 period, BHAR and CTAR tests are insignificant, whereas IRATS is significantly negative for both corporate events. They attribute the disappearance of abnormal returns in the later period to changing external market and internal firm factors.

We repeat their comparative analyses for our corporate event samples in 1980-2002 versus 2003-2014.[9] Tables H.10 to H.13 provide the results for M&As, IPOs, SEOs, and dividend initiations, respectively. Sample sizes after trimming (based on BHAR distributions) are reported. In the earlier 1980–2002 period, most of the results are similar to those in the previous subsection in sample period 1980–2007. One exception is that long-run

[9]We should note that Fu and Huang (2015) select control stocks using conventional size and book-to-market matches to event stocks in addition to a six-month, pre-event momentum return match. Consistent with the previous section, we follow the common practice of matching on size and book-to-market firm characteristics.

abnormal returns for M&As are less negative than before. CTAR tests are significantly negative in months 1 to 3, and BHAR is significant in month 60. However, ASR tests are insignificant in general but positive and marginally significant (at the 10% level) in month 48. Turning to the later 2003-2014 period, in contrast to Fu and Huang (2015), most results remain unchanged. M&A and SEOs have post-event abnormal returns that are negative and highly significant for all three tests, and dividend initiations are positive and significant in ASR tests but insignificant for BHAR and CTAR tests. Interestingly, IPO abnormal returns are generally insignificant, except for a marginally significant negative ASR test in month 6.

Figures G.6 and G.7 graphically depict the monthly ASRs for trimmed samples of the corporate events in the earlier and later sample periods, respectively. Visual comparisons of these graphs for each event show that the results can differ between the earlier and later period to some degree. For example, the pattern of long-run abnormal returns for M&As looks weakly positive in Figure G.6 for the early period but clearly negative in Figure G.7 for the later period. The abnormal return pattern for IPOs is strongly negative in the earlier period but less consistently so in the later period. SEO patterns appear to stay predominantly negative in both periods. Lastly, dividend initiations are positive in both periods but less consistently so in the later period.

As a further robustness check, we formed samples in 1980–2007 versus 2008–2014. In unreported results, the findings for 2008-2014 and 2003–2014 are very similar (e.g., ASR graphs are very similar).

In sum, we find that long-run abnormal returns associated with major corporate events can vary to some degree across subperiods. However, unlike Fu and Huang (2015), we do not find a consistent pattern of long-run abnormal returns disappearing in more recent times.

IV.4 Conclusions

This paper sought to contribute a broad set of evidence on the controversial question of whether long-run abnormal returns are associated with major corporate actions. A battery of tests is implemented, including the regression approach of Bessembinder and Zhang (2013) , well-known BHAR and calendar time approaches, as well as a recent standardized abnormal return (ASR) approach. All four methods detect long-run abnormal performance for IPOs, SEOs, M&As, and dividend initiations. Upon repeating Bessembinder and Zhang seven-factor regressions, we were able to replicate their findings using factors normalized by their procedure, with the exception of significant underperformance for IPOs. However, we found that their regression model results are primarily driven by the normalization procedure, which affects the regression coefficients (and associated t-values), destabilizes alpha estimates, and inflates alpha standard errors. When the regression analyses were repeated using non-normalized factors that were standardized, abnormal returns of the factor models were significant for all four corporate events.

Further BHAR, calendar time, and ASR tests were generally consistent with the standardized seven-factor regression model results. BHAR tests yielded negative and significant long-run abnormal underperformance over a 5-year horizon after M&As, IPOs, and SEOs but not dividend initiations. Tests based on an adjusted Fama-French three-factor model suggested calendar time abnormal returns were negative and significant for M&As even after 3-to-5 years but for IPOs and SEOs. However, contrary to the other methods, these calendar time tests for dividend initiations were negative (rather than positive) and significant at a 3-year horizon, which was most likely due to inherent bad model problems.

Lastly, ASR results strongly indicated negative and significant long-run abnormal returns for M&As, IPOs, and SEOs, in addition to positive and significant performance for dividend initiations. Also, for IPOs and SEOs, a common reversal pattern was 1-month overperformance followed by accumulating underperformance that becomes significant after about 3 years. Graphs using monthly ASRs clearly illustrated this pattern. Moreover, in robustness checks updating our samples and dividing them before and after 2003 as in Fu and Huang (2015), unlike their study, long-run abnormal returns did not consistently disappear in more recent times. Based on corroborating findings from different test methods and sample periods, we conclude that anomalous long-run abnormal returns occur over different post-event horizons. Further research is recommended to better understand what explains long-run abnormal return patterns.

CHAPTER V

CONCLUSIONS

In this dissertation, three topics related to corporate governance and major corporate events are studied using short-run and long-run performance metrics. In particular, earnings per share (EPS) metrics in CEO compensations schemes are examined in the first part of the dissertation. Then, the relation between duration of pay contracts and mergers and acquisitions (M&A) activities are examined. Finally, long-run abnormal returns associated with major corporate events are investigated.

In the first essay, we examine the role of EPS–tied performance metrics on the firm's share repurchases activity and firm value. We have two main findings. First, firms are more likely buy back their shares when their CEOs have EPS-related triggers in their compensation plans. Second, the market reacts positively when EPS-tied goals are added in the CEO's pay contract when a firm has high free cash flows and low investment opportunities. A focus on enhancing EPS seems an advantageous incentive mechanism for this group of firms. Similarly, the market reacts negatively when EPS-tied goals are added in the CEO's pay contract when a firm has low free cash flows and high investment opportunities. In this case, a focus on enhancing EPS seems disadvantageous.

In the second essay, we study the effects of managers' pay duration on M&As activities. We find evidence that short-termism is not necessarily bad, at least when making an M&A deal. We find that firms offering short-term incentives realize better announcement abnormal returns than firms offering relatively long-term incentives. Our empirical findings also indicate that post-M&A accounting and operating performances of short-horizon managers are better when compared to those of firms with long-horizon executives. The results are surprising when viewed against the conventional wisdom that giving managers short-term incentives is suboptimal. The results in this essay imply that long-term incentives are not necessarily optimal for all firms in all situations.

In the third essay, we investigate long-run abnormal returns associated with major corporate events. Our long-run analyses investigate M&As, initial public offerings (IPOs), seasoned equity offerings (SEOs), and dividend initiations. We implement a battery of different test approaches, including Bessimbinder and Zhang regression approach (Bessembinder and Zhang, 2013), buy-and-hold returns (BHARs), three-factor calendar time regressions, and a recent standardized abnormal return (ASR) approach (Dutta et al., 2015). Evidence from available long-run event study tests generally supports the existence of anomalous returns associated with M&A, IPO, SEO, and dividend initiations. Based on corroborating findings from different test methods and sample periods, we conclude that anomalous abnormal returns occur over different post-event horizons. Further research is recommended to better understand what explains long-run abnormal return patterns.

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APPENDIX A

VARIABLE DEFINITIONS FOR CHAPTER II

This appendix defines the variables used in the empirical analyses in Chapter II. In parentheses, we indicate which Compustat variables, if any, have been used.

Book Equity (BE): The book value of stockholders' equity plus balance sheet deferred taxes and investment tax credit (if available) minus the book value of preferred stock. To estimate the book value of preferred stock, we use the redemption or liquidation or par value of preferred stock (in that order). Negative BE values are excluded.

Cash: The amount of cash and cash equivalents (che) scaled by the book value of assets (at)

CloseEPS: Dummy =1 if firm just missed or exceeded EPS goal in CEO compensation plan. That is, $-0.02 < \text{ActualEPS - TargetEPS} < 0.02$. Actual EPS is from Compustat and Target EPS is from Incentive Lab.

EPS-metric: Dummy=1 if a firm has an EPS-tied absolute performance metric in the CEO's compensation plan.

EPS-metric Added: Dummy =1 if a firm adds an EPS-tied absolute performance metric in the CEO's compensation contract for the first time.

EPS-metric Removed: Dummy =1 if a firm removes an EPS-tied absolute performance metrics (and never uses it again) in the CEO's compensation contract.

ExceedEPS: Dummy=1 if a firm just exceeds the EPS goal in the CEO compensation plan. That is: $0 \leq$ ActualEPS - TargetEPS $< +0.02$. Actual EPS is from Compustat and Target EPS is from Incentive Lab.

Firm size: Log of total assets (at)

Free Cash Flow (FCF): The sum of operating income before depreciation (oibdp) minus total interest related expenses (xint) minus total income taxes (txt) minus cash dividend (dv), divided by total assets (at)

Leverage: Ratio of sum of long-term debt and debt in current liabilities to book value of assets. (dlc+dltt)/at

Market to Book (MB): The market value of equity plus the book value of interest-bearing debt divided by the book value of assets. (((prcc_f*csho) + dlc + dltt) / at)

Market value of equity (ME): The share price times the number of common shares outstanding (prcc_f*csho), both measured at the end of the fiscal year.

MissedEPS: Dummy =1 if a firm just missed EPS goal in CEO compensation plan. That is: $-0.02 <$ ActualEPS - TargetEPS < 0 Actual EPS is from Compustat and Target EPS is from Incentive Lab.

Net Repurchase (NR): The increase in common treasury stock (tstkc). If treasury stock is zero in the current and prior year, net repurchase is the difference between stock purchase (prstkc) and stock issuance (sstk). If either of these two amounts is negative, net repurchase is set to zero.

Payout Ratio: The ratio of dividend paid to net income (dvc/ni)

Profitability (ROA): The ratio of net income to total assets (ni/at)

Vested-EPS-metric: Dummy =1 if a firm has an EPS-tied absolute performance metric in the CEO's compensation plan in that fiscal year or it has EPS-tied metrics in previous years and their vesting period includes the current fiscal year.

APPENDIX B

FIGURES FOR CHAPTER II

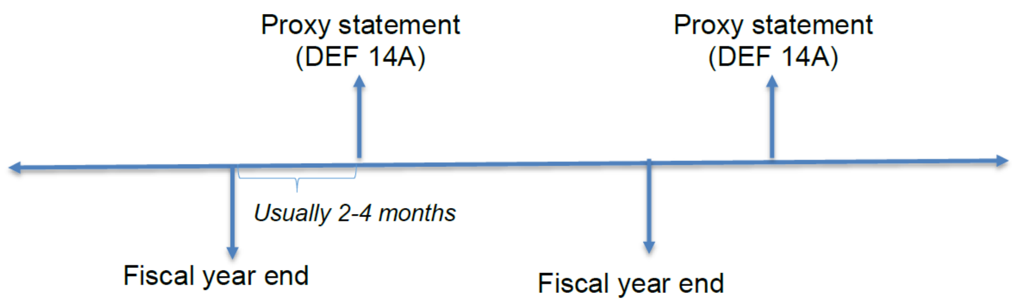

Figure B.1: Timeline

Figure B.1 shows the timeline of events. Proxy filings are usually reported three months after the fiscal year end. Compensation-plan variables are merged with the recent fiscal year accounting variables from Compustat.

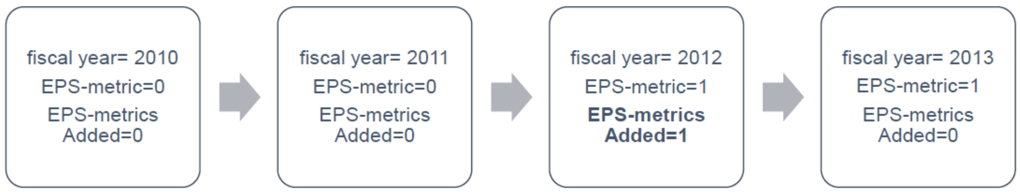

Figure B.2: Adding EPS-metrics

Figure B.2 graphically shows when the EPS metric and EPS-metrics Added dummies are 0 or 1 in the regression data.
Example: Time Warner Inc. added EPS metrics in the CEO pay contract in the proxy statement after 2012 fiscal year end.

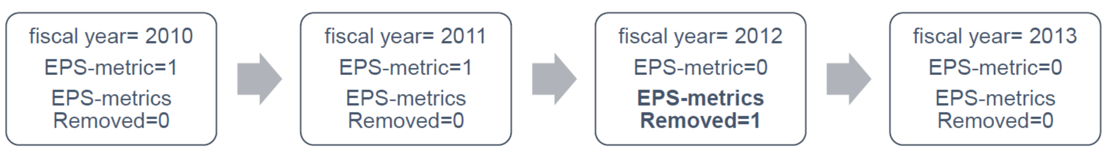

Figure B.3: Removing EPS-metrics

Figure B.3 graphically shows when the EPS metric and EPS-metrics Removed dummies are 0 or 1 in the regression data.
Example: Dr Pepper Snapple Group Inc. removed EPS metrics from the CEO pay contract in the proxy statement after 2012 fiscal year end.

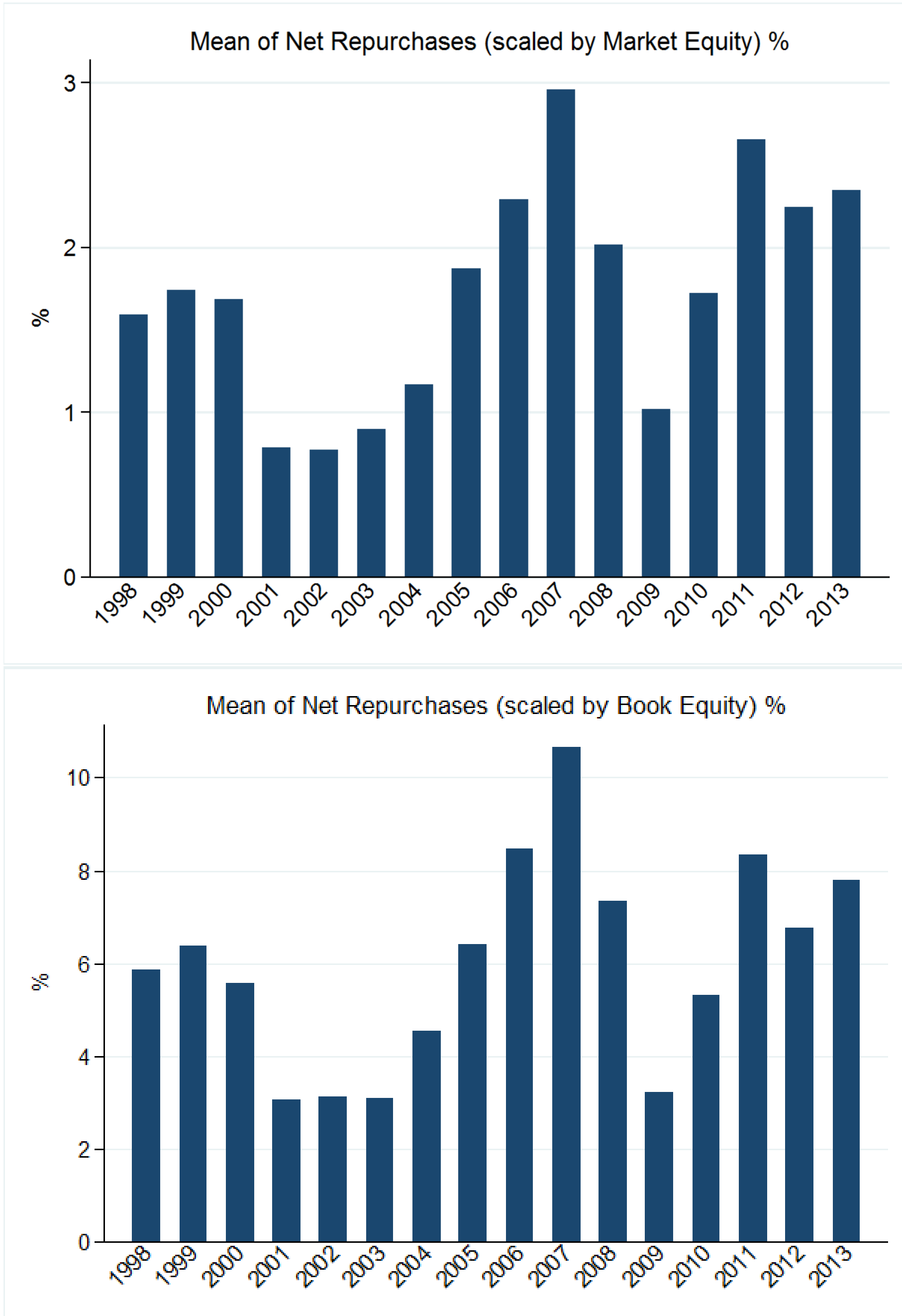

Figure B.4: Net Repurchases

Figure B.4 shows the mean value of net repurchases (NR) scaled by market equity and book equity from 1998 to 2013 (fiscal year). Repurchases are defined in Appendix A. The overall mean of NR scaled by market equity is 1.7%, i.e., the average amount of repurchases is about 1.7 percent of the market value of equity. Average NR over the sample period is 222.5 million dollars (560 million dollars for firms having positive share repurchases –i.e. firms with positive NR with NR/BE is greater than 1%)

APPENDIX C

TABLES FOR CHAPTER II

Table C.1 : Descriptive Statistics

Table C.1 Panel A presents descriptive statistics for the sample. Panel B presents mean values of firm characteristics for different sub-samples. All variables are defined in Appendix A. The sample consists of 1,343 firms with 13,411 firm-years for the fiscal years 1998-2013. Accounting variables are winsorized at 1%.

Panel A

	N	Mean	SD	Median	1%	99%
Firm size	13,411	7.935	1.481	7.88	4.17	11.671
Cash	13,409	0.166	0.185	0.096	0.001	0.815
FCF	12,425	0.078	0.094	0.086	-0.397	0.292
Profitability	13,408	0.034	0.13	0.053	-0.661	0.288
Leverage	13,369	0.247	0.203	0.224	0	0.999
Payout Ratio	13,392	0.165	0.431	0	-1.241	2.81
MB	13,343	1.961	1.698	1.416	0.415	10.676
NR/ME	13,089	0.017	0.031	0	0	0.162
NR/BE	12,748	0.06	0.125	0	0	0.751
ExceedEPS	13,411	0.002	0.045	0	0	0
MissedEPS	13,411	0.003	0.054	0	0	0
CloseEPS	13,411	0.005	0.07	0	0	0

Table C.1 continued

Panel B

	EPS-metric Sample Mean	EPS-metric Added Mean	EPS-metric Removed Mean
Firm size	8.39	8.03	8.124
Cash	0.117	0.128	0.141
FCF	0.098	0.1	0.076
Profitability	0.068	0.061	0.025
Leverage	0.242	0.246	0.279
Payout Ratio	0.221	0.172	0.156
MB	1.781	1.92	1.578
NR/ME	0.024	0.024	0.025
NR/BE	0.086	0.086	0.085
ExceedEPS	0.009	0.007	0
MissedEPS	0.013	0.012	0
CloseEPS	0.022	0.019	0
N	2957	411	181

Table C.2: The effect of EPS-metrics on Net Repurchases

Table C.2 presents left-censored Tobit regressions. The dependent variable is net repurchases scaled by the market value of equity or net repurchases scaled by book equity All variables are defined in Appendix A. Standard errors (in parentheses) are corrected for heteroskedasticity and clustered at the firm level. ***, **, and * denote significance at less than 1%, 5%, and 10% levels (two-sided), respectively.

	NR/BE	NR/ME	NR/BE	NR/ME	NR/BE	NR/ME
EPS-metrics	0.059***	0.015***	0.040***	0.010***	0.040***	0.010***
	(0.008)	(0.002)	(0.008)	(0.002)	(0.008)	(0.002)
CloseEPS	−0.010	0.003			−0.002	0.006
	(0.028)	(0.008)			(0.028)	(0.009)
ExceedEPS	−0.059	−0.015			−0.049	−0.014
	(0.043)	(0.013)			(0.039)	(0.013)
Firm size			0.026***	0.006***	0.026***	0.006***
			(0.003)	(0.001)	(0.003)	(0.001)
Cash			0.149***	0.032***	0.149***	0.032***
			(0.030)	(0.007)	(0.030)	(0.007)
FCF			0.770***	0.134***	0.769***	0.134***
			(0.084)	(0.021)	(0.084)	(0.021)
Profitability			0.100*	0.022*	0.100*	0.022*
			(0.057)	(0.013)	(0.057)	(0.013)
Payout Ratio			−0.000	−0.000	−0.000	−0.000
			(0.000)	(0.000)	(0.000)	(0.000)
Market to Book			0.001	−0.004***	0.001	−0.004***
			(0.002)	(0.001)	(0.002)	(0.001)
Leverage			−0.003	−0.020***	−0.003	−0.020***
			(0.027)	(0.007)	(0.027)	(0.007)
Constant	−0.108**	−0.022**	−0.384***	−0.072***	−0.383***	−0.072***
	(0.046)	(0.009)	(0.046)	(0.008)	(0.045)	(0.008)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	12688	13028	11501	11993	11501	11993
Pseudo R^2	0.191	−0.149	0.387	−0.256	0.387	−0.256

Table C.3: The effect of Adding and Dropping EPS-metrics on Net Repurchases

Table C.3 presents left-censored Tobit regressions. The dependent variable is net repurchases scaled by the market value of equity or net repurchases scaled by book equity All variables are defined in Appendix A. Standard errors (in parentheses) are corrected for heteroskedasticity and clustered at the firm level. ***, **, and * denote significance at less than 1%, 5%, and 10% levels (two-sided), respectively.

	NR/BE	NR/ME	NR/BE	NR/ME	NR/BE	NR/ME
EPS-metrics Added	0.019*	0.005*	0.036***	0.009***	0.045***	0.011***
	(0.011)	(0.003)	(0.011)	(0.003)	(0.011)	(0.003)
EPS-metrics Removed	0.006	0.001	−0.001	−0.001	0.000	−0.000
	(0.019)	(0.005)	(0.019)	(0.005)	(0.019)	(0.005)
Firm size	0.026***	0.007***	0.031***	0.008***	0.028***	0.007***
	(0.004)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)
Cash	0.135***	0.027***	0.154***	0.033***	0.122***	0.029***
	(0.033)	(0.008)	(0.033)	(0.008)	(0.031)	(0.007)
FCF	0.816***	0.141***	0.822***	0.143***	0.800***	0.147***
	(0.090)	(0.022)	(0.096)	(0.024)	(0.098)	(0.024)
Profitability	0.096	0.021	0.115	0.027	0.124	0.029
	(0.059)	(0.013)	(0.072)	(0.017)	(0.080)	(0.019)
Payout Ratio	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market to Book	0.002	−0.003***	0.003	−0.003***	0.003	−0.003***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Leverage	−0.012	−0.022***	−0.026	−0.023**	−0.038	−0.022**
	(0.030)	(0.008)	(0.030)	(0.009)	(0.031)	(0.011)
Constant	−0.400***	−0.078***	−0.453***	−0.097***	−0.349***	−0.071***
	(0.061)	(0.015)	(0.063)	(0.016)	(0.035)	(0.007)
Year FE	Yes	Yes	No	No	No	No
Industry FE	Yes	Yes	Yes	Yes	No	No
N	9556	9938	9556	9938	9602	9985
Pseudo R^2	0.410	−0.259	0.333	−0.192	0.229	−0.133

Table C.4:
The effect of Adding and Dropping EPS-metrics on NR for firms having positive NR

Table C.4 reports left-censored Tobit regressions for firms having positive share repurchases in the last fiscal year (if net repurchases is positive and NR/BE is greater than 1%). The dependent variable is net repurchases scaled by the market value of equity or net repurchases scaled by book equity All variables are defined in Appendix A. Standard errors (in parentheses) are corrected for heteroskedasticity and clustered at the firm level. ***, **, and * denote significance at less than 1%, 5%, and 10% levels (two-sided), respectively.

	NR/BE	NR/ME	NR/BE	NR/ME	NR/BE	NR/ME
EPS-metrics Added	0.015	0.006	0.034**	0.009***	0.035**	0.010***
	(0.013)	(0.004)	(0.014)	(0.004)	(0.014)	(0.004)
EPS-metrics Removed	0.023	0.008	0.007	0.005	0.011	0.004
	(0.022)	(0.006)	(0.023)	(0.007)	(0.023)	(0.007)
Firm size	0.012***	0.002***	0.015***	0.003***	0.012***	0.003***
	(0.004)	(0.001)	(0.004)	(0.001)	(0.004)	(0.001)
Cash	0.161***	0.036***	0.185***	0.043***	0.145***	0.041***
	(0.047)	(0.009)	(0.047)	(0.009)	(0.043)	(0.008)
FCF	0.520***	0.064**	0.457***	0.049*	0.409***	0.053**
	(0.110)	(0.028)	(0.110)	(0.026)	(0.107)	(0.026)
Profitability	0.354***	0.062***	0.413***	0.080***	0.431***	0.076***
	(0.095)	(0.018)	(0.095)	(0.018)	(0.094)	(0.018)
Payout Ratio	−0.001	−0.000	−0.001	−0.000	−0.001	−0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market to Book	0.020***	−0.005***	0.021***	−0.004***	0.022***	−0.004***
	(0.004)	(0.001)	(0.005)	(0.001)	(0.005)	(0.001)
Leverage	0.185***	−0.003	0.158***	−0.006	0.163***	−0.003
	(0.037)	(0.004)	(0.038)	(0.005)	(0.039)	(0.005)
Constant	−0.285***	−0.021*	−0.319***	−0.036***	−0.193***	−0.010
	(0.053)	(0.011)	(0.053)	(0.011)	(0.038)	(0.007)
Year FE	Yes	Yes	No	No	No	No
Industry FE	Yes	Yes	Yes	Yes	No	No
N	3833	3953	3833	3953	3848	3968
Pseudo R^2	2.330	−0.081	1.711	−0.036	1.285	−0.022

Table C.5 :
The effect of EPS-metrics Added and EPS-metrics Removed on Net Repurchases

Table C.5 reports Probit regressions. The dependent variable is a dummy variable for positive net repurchases (=1 if net repurchases is positive and NR/BE is greater than 1%). All variables are defined in Appendix A. Standard errors (in parentheses) are corrected for heteroskedasticity and clustered at the firm level. ***, **, and * denote significance at less than 1%, 5%, and 10% levels (two-sided), respectively.

	(1) Positive NR	(2) Positive NR	(3) Positive NR
EPS-metrics Added	0.180**	0.237***	0.308***
	(0.070)	(0.068)	(0.067)
EPS-metrics Removed	−0.008	−0.041	−0.036
	(0.117)	(0.117)	(0.114)
Firm size	0.200***	0.221***	0.192***
	(0.020)	(0.019)	(0.018)
Cash	0.412**	0.523***	0.459***
	(0.164)	(0.158)	(0.140)
FCF	3.234***	3.163***	3.166***
	(0.489)	(0.502)	(0.463)
Profitability	0.465	0.558	0.565
	(0.295)	(0.358)	(0.371)
Payout Ratio	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)
Market to Book	−0.001	0.002	0.008
	(0.012)	(0.011)	(0.011)
Leverage	−0.535***	−0.538***	−0.567***
	(0.171)	(0.175)	(0.209)
Constant	−1.893***	−2.210***	−2.019***
	(0.486)	(0.481)	(0.159)
Year Fixed Effects	Yes	No	No
Industry Fixed Effects	Yes	Yes	No
N	9920	9920	9988
Pseudo R^2	0.143	0.115	0.082

Table C.6: Falsification Tests

This table repeats Probit regression from Table C.5 using one lag and one lead of all dependent and independent variables (except EPS-metrics Added and EPS-metrics Removed). The dependent variable is a dummy variable for positive net repurchases (=1 if net repurchases is positive and NR/BE is greater than 1%). All variables are defined in Appendix A. Standard errors (in parentheses) are corrected for heteroskedasticity and clustered at the firm level. ***, **, and * denote significance at less than 1%, 5%, and 10% levels (two-sided), respectively.

	(1) Positive NR (one lag)	(2) Positive NR	(3) Positive NR (one lead)
EPS-metrics Added	0.0425	0.1801**	0.1018
	(0.0710)	(0.0702)	(0.0729)
EPS-metrics Removed	−0.0610	−0.0075	−0.2178*
	(0.1184)	(0.1174)	(0.1207)
Control variables	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
N	9689	9920	9835
Pseudo R^2	0.138	0.143	0.171

Table C.7: Treatment Effects

Table C.7 provides average treatment effect (ATE) results from nearest-neighbor matching. The first and second column include the full sample. The third and fourth column only include positive net repurchases (=1 if net repurchases is positive and NR/BE is greater than 1%) The treatment group includes firms adding EPS metrics in CEO compensation plans. The matching variables include firm size, MB, ROA, cash and dividend payout ratio. The Mahalanobis distance metric is used. Abadie-Imbens standard errors are in parentheses. ***, **, and * denote significance at less than 1%, 5%, and 10% levels (two-sided), respectively.

	(1) Positive NR	(2) Positive NR	(3) NR/ME	(4) NR/ME
EPS-metrics Added	0.099***		0.009***	
	(0.027)		(0.003)	
Lag of EPS-metrics Added		0.128***		0.007**
		(0.028)		(0.003)
N	12296	10760	4733	4242
Sample	Full Sample	Full Sample	NR>0 firms	NR>0 firms

Table C.8: Cumulative Abnormal Returns (CARs) Descriptive Statistics

Panel A presents mean cumulative abnormal returns (CARs) for the full sample and for three subsamples. CARs are calculated using the market model with the value-weighted market index. Panel B and Panel C show the mean CARs for four subgroups based on FCF and MB median values for EPS-metric Added and EPS-metric Removed samples, respectively. ***, **, and * denote significance at less than 1%, 5%, and 10% levels corresponding to Patell Z statistics (Patell, 1976)

Panel A. Descriptive Statistics

	Full sample	EPS-metric	EPS-metric Added	EPS-metric Removed
CAR(-1,+1)	0.11%***	0.16%***	0.36%**	0.13%
CAR(-3,+3)	0.18%**	0.37%***	0.51%**	−0.26%
N	13350	2955	411	181

Panel B. EPS-metric Added results for four subgroups based on median cut-offs

CAR(-1,+1)	Prediction	Low MB	N	Prediction	High MB	N
High FCF	(+)	1.53%***	66		0.08%	155
Low FCF		0.15%	113	(-)	-0.12%	45

CAR(-3,+3)	Prediction	Low MB	N	Prediction	High MB	N
High FCF	(+)	1.39%**	66		0.70%**	155
Low FCF		0.20%	113	(-)	-0.91%	45

Panel C. EPS-metric Removed results for four subgroups based on median cut-offs

CAR(-1,+1)	Prediction	Low MB	N	Prediction	High MB	N
High FCF	(-)	-0.93%	31		-0.32%	50
Low FCF		0.47%	68	(+)	0.64%	21

CAR(-3,+3)	Prediction	Low MB	N	Prediction	High MB	N
High FCF	(-)	-1.97%	31		-0.28%	50
Low FCF		0.18%	68	(+)	-0.41%	21

Table C.9: The announcement effect of adding EPS metrics in the CEO pay contracts

This table shows the announcement effect (CAR) of adding EPS metrics in the CEO's compensation contract. It provides weighted least squares regression results for the following model.

$CAR_{it} = \alpha + \beta_a EPSmetric\,Added_{it} + \gamma_1 Firm\ size_{it-1} + \gamma_2 Cash_{it-1} + \gamma_3 Profitability_{it-1} + \gamma_4 Leverage_{it-1} + \varepsilon_{it}$

The dependent variable is CAR(-1, +1) or CAR(-3, +3) from the Market Model. All variables are defined in Appendix A. Panel A shows results for four subgroups based on median cut-offs, while Panel B shows results for four subgroups based on terciles. Only β_a coefficients are reported for brevity. Industry and year fixed effects are included. The regressions are weighted by the variance calculated from the market model. Standard errors (in parentheses) are clustered at the firm level. ***, **, and * denote significance at less than 1%, 5%, and 10% levels (two-sided), respectively.

Panel A. EPS-metric Added results for four subgroups based on median cut-offs

CAR(-1,+1)	Prediction	Low MB	Prediction	High MB
High FCF	(+)	1.11%***		0.18%
Low FCF		-0.04%	(-)	0.22%

CAR(-3,+3)	Prediction	Low MB	Prediction	High MB
High FCF	(+)	1.60%***		0.54%
Low FCF		-0.01%	(-)	-0.69%

Panel B. EPS-metric Added results for four subgroups based on terciles

CAR(-1,+1)	Prediction	Low MB	Prediction	High MB
High FCF	(+)	-0.05%		0.19%
Low FCF		0.08%	(-)	-1.12%

CAR(-3,+3)	Prediction	Low MB	Prediction	High MB
High FCF	(+)	1.10%		0.36%
Low FCF		0.15%	(-)	-3.88%***

Table C.10: The announcement effect of removing EPS metrics in the CEO pay contract

This table shows the announcement effect (CAR) of removing EPS metrics in the CEO's compensation contract. It provides weighted least squares regression results for the following model.

$$CAR_{it} = \alpha + \beta_r EPSmetric\ Removed_{it} + \gamma_1 Firm\ size_{it-1} + \gamma_2 Cash_{it-1} + \gamma_3 Profitability_{it-1} + \gamma_4 Leverage_{it-1} + \varepsilon_{it}$$

The dependent variable is CAR(-1, +1) or CAR(-3, +3) from the Market Model. All variables are defined in Appendix A. Panel A shows results for four subgroups based on median cut-offs, while Panel B shows results for four subgroups based on terciles. Only β_r coefficients are reported for brevity. Industry and year fixed effects are included. The regressions are weighted by the variance calculated from the market model. Standard errors (in parentheses) are clustered at the firm level. ***, **, and * denote significance at less than 1%, 5%, and 10% levels (two-sided), respectively.

Panel A. EPS-metric Removed results for four subgroups based on median cut-offs

CAR(-1,+1)	Prediction	Low MB	Prediction	High MB
High FCF	(-)	-0.51%		-0.82%***
Low FCF		0.03%	(+)	0.68%

CAR(-3,+3)	Prediction	Low MB	Prediction	High MB
High FCF	(-)	-0.15%		-0.71%*
Low FCF		-0.08%	(+)	0.21%

Panel B. EPS-metric Removed results for four subgroups based on terciles

CAR(-1,+1)	Prediction	Low MB	Prediction	High MB
High FCF	(-)	-1.81%*		-1.09%***
Low FCF		0.86%	(+)	8.59%***

CAR(-3,+3)	Prediction	Low MB	Prediction	High MB
High FCF	(-)	-1.99%		-1.23%**
Low FCF		0.52%	(+)	5.65%***

Table C.11:
The announcement effect of adding/removing EPS metrics in the CEO pay contract

This table provides weighted least squares regression results for the following model. The sample includes only Low FCF/High MB and High FCF/Low MB firms.
$CAR_{it} = \alpha + \beta_1 EPSmetricAdded_{it} + \beta_2 EPSmetricRemoved_{it} + \gamma_1 RG + \gamma_2[EPSmetricAdded_{it} \times RG] + \gamma_3[EPSmetricRemoved_{it} \times RG] + \gamma_4 Firm\ size_{it-1} + \gamma_5 Cash_{it-1} + \gamma_6 Profitability_{it-1} + \gamma_7 Leverage_{it-1} + \varepsilon_{it}$
The dummy variable RG=1 (reasonable group=1) if a firm is included in High FCF/Low MB group in previous year. The dependent variable is CAR(-1, +1) or CAR(-3, +3) from the Market Model. All variables are defined in Appendix A. Only γ_1, γ_2 and γ_3 coefficients are reported for brevity. Industry and year fixed effects are included. The regressions are weighted by the variance calculated from the market model. Standard errors (in parentheses) are corrected for heteroskedasticity and clustered at firm level. ***, **, and * denote significance at less than 1%, 5%, and 10% levels (two-sided), respectively.

		Prediction	CAR(-1, +1)	CAR(-3, +3)
Reasonable group (High FCF/Low MB) coefficient	γ_1	-	-0.28%**	-0.34%*
Adding EPS metrics for reasonable group (High FCF/Low MB)	γ_2	+	0.71%	2.21%**
Removing EPS metrics for reasonable group (High FCF/Low MB)	γ_3	-	-1.16%	-0.38%
Year Fixed Effects			Yes	Yes
Industry Fixed Effects			Yes	Yes
N			3750	3750
R^2			0.020	0.024

APPENDIX D
VARIABLE DEFINITIONS FOR CHAPTER III

This appendix defines the variables used in Chapter III.

3/5-day CAR: computed for acquirer as the sum of the differences between actual returns and predicted returns, based on the market model with two parameters (intercept and the market return) over the three/five-day period centered on the deal announcement date.

Deal Value/Acq. MVE: Ratio of deal value (reported as Value by SDC) to acquirer's market value of equity at the end of the last fiscal year prior to announcement.

Delta: Delta equals the dollar change in CEO wealth for a 1% change in stock price. Natural log transformation, $log(1+Delta)$, is also applied to reduce right skewness.

Different 3-SIC: A dummy variable that takes the value of '1' if acquirer and target do not have the same three-digit SIC code at, and '0' otherwise.

Idiosyncratic Volatility : Each month for each stock, we run the three-factor Fama and French (1993) regression and measure monthly idiosyncratic volatility (ivol) with the standard deviation of the residual.

Incentive Duration (Pay Duration, Duration): The value-weighted average of the vesting periods of the different components of executive compensation (including restricted stocks units (RSU), stock options, salary and bonus). The weight for each component is the fraction of that component in the total compensation plan.

Leverage: Ratio of sum of long-term debt and debt in current liabilities to book value of assets.

Log Sales: Natural logarithm of sales.

M/B: Natural logarithm of ratio of sum of long-term debt and debt in current liabilities and market value of equity to book value of assets.

M&A Liquidity: Total value of deals in similar industry (2-digit SIC code) scaled by total assets.

N Bidders > 1: A dummy variable that takes the value of '1' if more than one acquirer bid for the target, and '0' otherwise .

Non-public: A dummy variable that takes the value of '0' if the target is a publicly-held company, and '1' otherwise.

Op. Inc./Assets: Operating income before depreciation, interest, and taxes scaled by assets.

Op. Exp./Sales: Operating expenses scaled by sales.

Op. Inc./Sales: Operating income before depreciation, interest, and taxes scaled by sales.

Paid by Cash: A dummy variable that takes the value of '1' if the acquirer paid for 100% of the target's assets with cash, and '0' otherwise.

Paid by Stock: A dummy variable that takes the value of '1' if the acquirer paid for the 100% of the target's assets with stock, and '0' otherwise.

Price runup: Percentage change in stock price of acquiring firm from previous fiscal year to the current fiscal year in which the announcement is made.

ROA: Net income scaled by assets.

Sales/Assets: Sales scaled by assets.

Sales Growth: Percentage change in sales from year -2 to year 0.

Tender: A dummy variable that takes the value of ‘1’ if acquirer’s offer to target’s shareholders is tender, and ‘0’ otherwise.

Tenure: Number of years the CEO has served the acquiring company.

APPENDIX E
FIGURES FOR CHAPTER III

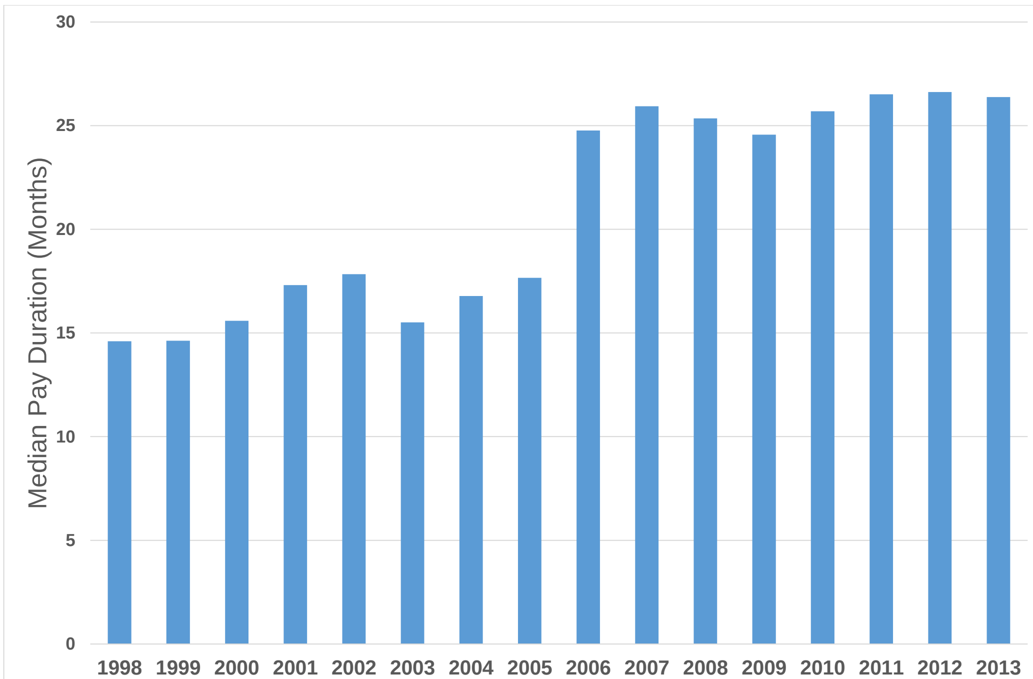

Figure E.1: Change in Pay Duration

Figure E.1 presents median pay duration of the firms included in the sample over the study period: 1998–2013. Vertical axis represents the median firm-wide pay duration in months and horizontal axis represents the fiscal years. For the full sample, median pay duration is 23.55 months.

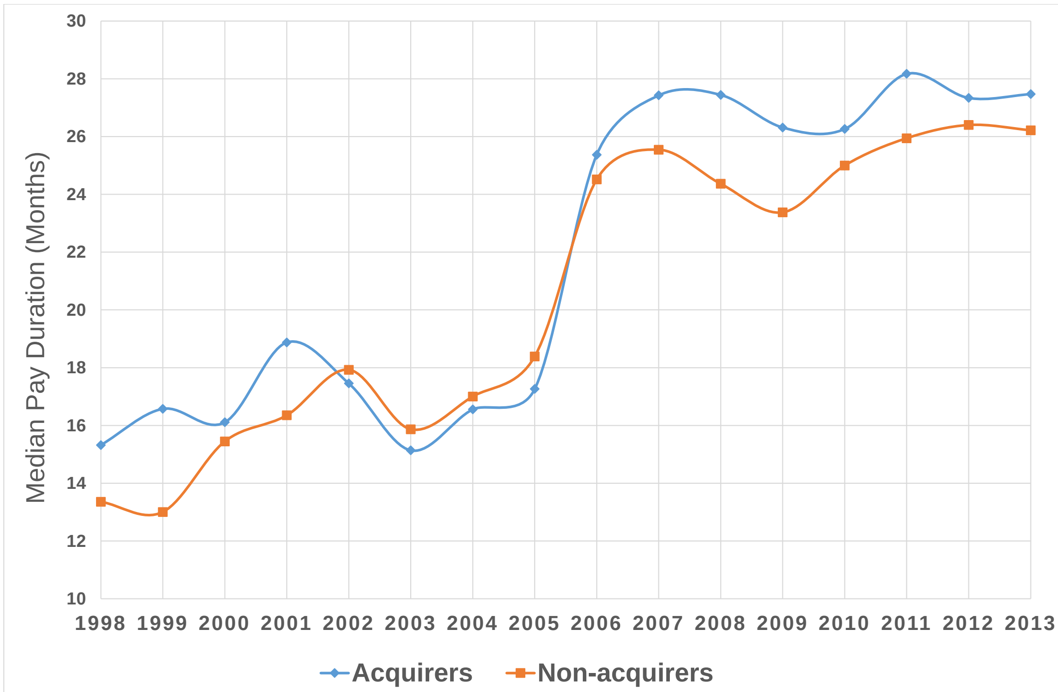

Figure E.2: Pay Duration for Acquirers and Non-acquirers

Figure E.2 presents median pay duration for acquirers and non-acquirers over the sample period. Vertical axis represents the median firm-wide pay duration in months and horizontal axis represents the fiscal years.

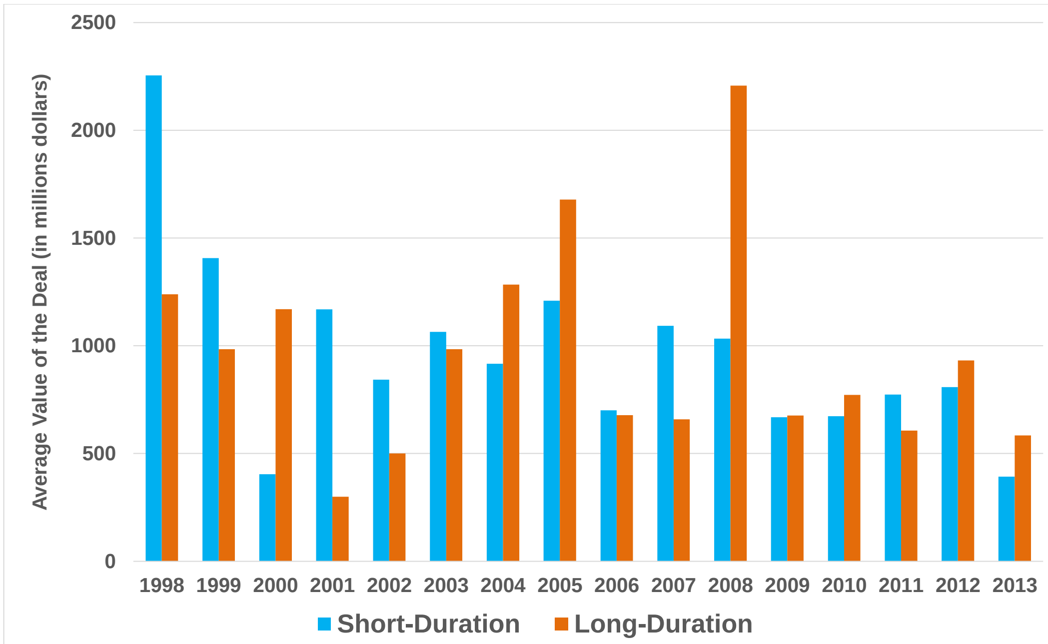

Figure E.3: Average Value of the Deals by Year for Short and Long-duration Acquirers

Figure E.3 presents average value of the deals for short-duration and long-duration acquirers over the sample period. The short-duration group represents the acquirers with pay duration below the median pay duration, whereas the long-duration group represents the acquirers with pay duration above the median pay duration.

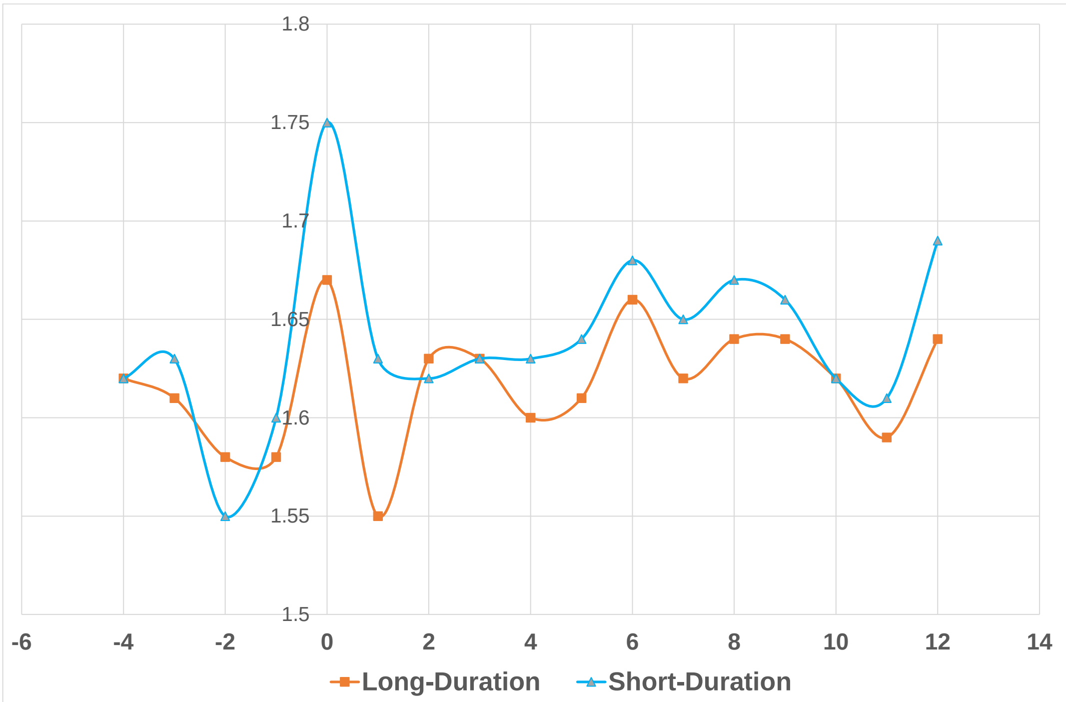

Figure E.4: Average Monthly Idiosyncratic Volatility for Short and Long-duration Acquirers

Figure E.4 shows average of monthly idiosyncratic volatility for short-duration and long-duration acquirers from t-4 month to t+12 month (t=0 for deal announcement month). We run the three-factor Fama and French (1993) regression for each stock and calculate monthly idiosyncratic volatility with the standard deviation of the residual. The short-duration group represents the acquirers with pay duration below the median pay duration, whereas the long-duration group represents the acquirers with pay duration above the median pay duration. Vertical axis represents monthly idiosyncratic volatility (residual, in percentage terms) and horizontal axis represents the months around deal announcement month.

APPENDIX F
TABLES FOR CHAPTER III

Table F.1: Industrial Distribution of the Deals

Table F.1 displays industrial distribution of the M&A deals announced between 1998 and 2013 based on Fama-French 12 industries. The sample contains public, private, and subsidiary targets. The short-duration group represents the acquirers with pay duration below the median pay duration, whereas the long-duration groups represents the acquirers with pay duration above the median pay duration. The medians are calculated using the firms within the same fiscal year.

	Acquirers		Targets	
Industry	Long-Duration	Short-Duration	Long-Duration	Short-Duration
Non-durables	55	85	51	85
Durables	19	34	12	29
Manufacturing	146	180	120	142
Energy	90	133	86	131
Chemicals	27	46	24	40
Bus. Eqp.	464	331	506	362
Telecom	111	100	87	90
Shops	84	88	97	101
Healthcare	204	129	222	149
Finance	385	410	319	336
Other	129	162	190	233
Total	1,714	1,698	1,714	1,698

Table F.2: Summary Statistics

Table F.2 presents the means and medians of the variables along with the number of available observations for each item. The short-duration group represents the acquirers with pay duration below the median pay duration, whereas the long-duration group represents the acquirers with pay duration above the median pay duration. The medians are calculated using the firms within the same fiscal year. The variable descriptions are in Appendix D. ***, **, and * stand for statistical significances obtained from *t*-tests for the differences in means of the variables for for groups and represent 1%, 5%, and 10%-level, respectively.

	Long-Duration			Short-Duration		
Variable	N	Mean	Median	N	Mean	Median
Panel A. Executive characteristics						
Pay Duration	1,714	32.64	31.71	1,698	13.00***	12.62
Total Executive Pay	1,714	27.93	15.36	1,698	16.24***	8.63
Tenure	1,510	7.14	6.00	1,483	7.23	5.20
Delta	1,437	6.49	6.54	1,329	6.02***	5.98
Panel B. Acquirer characteristics						
M/B	1,712	1.01	0.93	1,698	0.87***	0.80
Log Sales	1,713	8.01	7.92	1,697	7.87**	7.70
M&A Liquidity	1,708	0.07	0.03	1,687	0.07	0.03
Number of deals	1,714	1.77	1	1,698	1.70*	1
Panel C. Deal characteristics						
Value/Acq. MVE	1,712	8.47%	2.16%	1,698	9.71%*	2.84%
Big Acquisitions	1,714	18.96%	0	1,698	22.50%**	0
Paid in Cash	1,714	41.89%	0	1,698	38.69%*	0
Paid by Stock	1,714	7.29%	0	1,698	7.83%	0
N Bidders > 1	1,714	1.34%	0	1,698	0.94%	0
Non-public	1,714	75.32%	1	1,698	75.91%	1
Different 3-SIC	1,714	86.06%	1	1,698	86.28%	1
Tender	1,714	4.61%	0	1,698	4.59%	0

Table F.2 continued

Variable	Long-Duration N	Long-Duration Mean	Long-Duration Median	Short-Duration N	Short-Duration Mean	Short-Duration Median
Panel D. CARs and around M&A announcements						
3-day CAR (All)	1,714	0.11%	0.05%	1,698	0.19%	-0.03%
5-day CAR (All)	1,714	0.15%	0.08%	1,698	0.17%	0.07%
3-day CAR (Big)	325	−0.46%	-0.46%	382	0.78%**	0.47%
5-day CAR (Big)	325	−0.63%	-0.53%	382	0.75%**	0.23%
3-day CAR (Big & Diff.)	155	−0.76%	-0.24%	173	0.42%	0.19%
5-day CAR (Big & Diff.)	155	−1.02%	-0.37%	173	0.49%*	0.42%
Panel E. Monthly Idiosyncratic Volatility (ivol) around M&A announcements						
ivol at t-1	1,521	1.58	1.31	1,454	1.60	1.36
ivol at t	1,527	1.67	1.40	1,461	1.75*	1.48
ivol at t+1	1,525	1.55	1.27	1,453	1.63**	1.37
ivol at t+2	1,520	1.63	1.29	1,450	1.62	1.36

Table F.3: Pay Duration and Acquirer Announcement Returns

Table F.3 presents the results from OLS Regressions of three-day or five-day announcement period cumulative abnormal returns of acquirers (*3-day CAR or 5-day CAR*) on executive pay duration and other control variables. Executive pay duration is the weighted average of pay durations of the executives covered in Incentive Lab for the study period between 1998 and 2013. *Duration (cont.)* is the number of months over which the executive's pay is vested. Derived from executive pay duration, *Duration (dummy)* is an indicator variable taking the value of "1" if the executive pay duration is above the median pay duration within the same fiscal year, and "0" otherwise. *Duration (>36 mon.)* is an indicator variable taking the value of "1" if the executive pay duration is above 36 months, and "0" otherwise. *Pay Duration* in the interaction term *Tenure* × *Pay Duration*, takes the value of pay duration measures in the first three columns in each model. Detailed descriptions of the variables are in the Appendix D. Absolute values of *t*-values are below the coefficient estimates and based on heteroskedasticity-adjusted, robust standard errors. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% levels, respectively.

Independent Variable	(1) 3-day CAR	(2) 5-day CAR	(3) 3-day CAR	4) 5-day CAR	(5) 3-day CAR	(6) 5-day CAR
Pay Duration (cont.)	-0.032^{**}	-0.042^{***}				
	2.45	2.69				
Pay Duration (>36 mon.)			-0.660	-0.992^{*}		
			1.35	1.72		
Pay Duration (dummy)					-0.767^{**}	-0.786^{**}
					2.22	1.97
Tenure	-0.017	-0.024	0.046^{**}	0.050^{**}	0.016	0.017
	0.52	0.60	2.37	2.15	0.65	0.59
Tenure x Duration	0.004^{***}	0.004^{***}	0.080	0.088	0.094^{***}	0.103^{**}
	2.90	2.76	1.59	1.53	2.67	2.48
Log Sales	-0.158^{*}	-0.145	-0.159^{*}	-0.149	-0.150^{*}	-0.140
	1.77	1.46	1.78	1.48	1.69	1.41
M/B	0.501^{**}	0.496^{*}	0.479^{**}	0.477^{*}	0.495^{**}	0.473^{*}
	2.31	1.94	2.20	1.85	2.28	1.84

Table F.3 continued

Independent Variable	(1) 3-day CAR	(2) 5-day CAR	(3) 3-day CAR	4) 5-day CAR	(5) 3-day CAR	(6) 5-day CAR
Deal Value/Acq MVE	−0.252	−0.687	−0.240	−0.673	−0.247	−0.670
	0.25	0.60	0.24	0.59	0.25	0.58
Paid in Cash	0.206	0.176	0.218	0.192	0.218	0.191
	0.83	0.61	0.88	0.67	0.88	0.66
Paid in Stock	−1.068*	−0.856	−1.078*	−0.865	−1.062*	−0.841
	1.83	1.39	1.84	1.40	1.81	1.36
Tender	0.578	0.216	0.571	0.216	0.598	0.234
	0.95	0.34	0.94	0.34	0.99	0.37
N Bidders > 1	−0.226	−0.317	−0.194	−0.274	−0.184	−0.277
	0.18	0.25	0.16	0.22	0.15	0.22
Different 3-SIC	−0.277	0.204	−0.255	0.236	−0.285	0.195
	0.76	0.49	0.70	0.57	0.78	0.47
Liquidity	0.728	0.883	0.757	0.914*	0.698	0.846
	1.27	1.62	1.32	1.70	1.24	1.60
Non-public	1.934***	1.754***	1.919***	1.738***	1.943***	1.766***
	5.43	4.41	5.38	4.36	5.45	4.44
Constant	−1.877	−0.982	−2.435	−1.709	−2.095	−1.326
	0.70	0.33	0.94	0.61	0.78	0.46
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	2,160	2,160	2,160	2,160	2,160	2,160
Adj R^2	0.06	0.04	0.06	0.04	0.06	0.04

Table F.4: Pay Duration and Post-announcement Stock Performance

Table F.4 Panel A displays average compounded buy-and-hold abnormal returns (BHARs) for short-duration and long-duration firms. Short-duration (long-duration) is defined where the executive pay duration is below (above) the median pay duration within the same fiscal year. Returns are compounded 6, 12, 24 and 36 months after the deal announcements. 25 Book-to-Market/Size portfolios are used as benchmark returns. Equal-weighted and value-weighted average returns are reported. VW returns are calculated by using firm's size at the beginning of announcement year, scaled by CRSP VW index. Panel B presents long-run cumulative abnormal returns (LCARs) for short-duration and long-duration firms. For LCAR results, matching portfolio return is subtracted each month and then abnormal returns are summed over 6, 12, 24 and 36 months after the deal announcements. Returns are expressed as percentages.

Panel A: Buy-and-Hold Abnormal Returns (BHARs)

		Equal-Weighted		Value-Weighted	
Month		BHAR	p-value	BHAR	p-value
6	Short Duration	0.51	0.37	−2.46	0.00
	Long Duration	−0.85	0.11	−2.40	0.00
	Difference	1.36	0.08	−0.06	0.93
12	Short Duration	1.32	0.13	−4.69	0.00
	Long Duration	−0.99	0.21	−5.33	0.00
	Difference	2.30	0.05	0.64	0.50
24	Short Duration	5.59	0.00	−6.21	0.00
	Long Duration	1.63	0.15	−5.99	0.00
	Difference	3.96	0.03	−0.23	0.86
36	Short Duration	8.26	0.00	−7.38	0.00
	Long Duration	3.88	0.01	−6.58	0.00
	Difference	4.38	0.07	−0.79	0.62

Table F.4 continued

Panel B: Long-run Cumulative Abnormal Returns (LCARs)

		Equal-Weighted		Value-Weighted	
Month		LCAR	p-value	LCAR	p-value
6	Short Duration	0.77	0.18	−2.12	0.00
	Long Duration	−0.48	0.37	−2.17	0.00
	Difference	1.25	0.11	0.05	0.95
12	Short Duration	1.73	0.03	−4.61	0.00
	Long Duration	−0.49	0.54	−5.66	0.00
	Difference	2.22	0.05	1.04	0.32
24	Short Duration	6.67	0.00	−4.46	0.00
	Long Duration	1.59	0.16	−8.16	0.00
	Difference	5.08	0.00	3.71	0.02
36	Short Duration	9.28	0.00	−6.95	0.00
	Long Duration	3.88	0.00	−9.23	0.00
	Difference	5.41	0.00	2.28	0.24

Table F.5:
Pay Duration and Post-announcement Operating Performance (Hoberg-Phillips Regressions)

Table F.5 displays the coefficient estimates of long-duration dummy from regressions based on the Hoberg and Phillips (2010). We specify operating performance regressions as follows:

Δ IA $PI_{i,-1 \text{ to } t} = \alpha + \beta_1 \times \text{Pay Duration}_{i,-1} + \gamma \cdot \mathbf{X} + \varepsilon_i$

where t = 2, 3, 4, or 5, *IA PI* represents industry-adjusted performance indicator, and **X** represents the vector of factors supposed to affect the performance change. *PI* is one of the following financial ratio: *ROA*, *Op. Inc./Assets*, *Op. Inc./Sales*, *Sales Growth*, *Sales/Assets*, or *Op. Exp./Sales*. *Pay Duration* is an indicator variable taking the value of "1" if the executive pay duration is above the median within the same fiscal year, and "0" otherwise. Each block of three rows represents the coefficient estimates of *Pay Duration* variable (β_1), *p*-values, and number of the observations (N). Detailed descriptions of the performance measures are in Appendix D.

Hoberg-Phillips Regressions

Performance Indicator	*j*+2 Acq. Year+2	*j*+3 Acq.Year+3	*j*+4 Acq. Year+4	*j*+5 Acq. Year+5
ROA	−0.014*	−0.012**	−0.006	0.001
p-value	0.085	0.049	0.488	0.851
N	1759	1518	1314	1119
Op Income/Assets	−0.001	−0.007*	−0.006	0.000
p-value	0.709	0.068	0.182	0.962
N	1759	1518	1314	1119
Op Income/Sales	−0.069*	−0.266	−0.106*	−0.334*
p-value	0.096	0.219	0.079	0.085
N	1759	1517	1312	1118
Sales Growth	−0.075	−0.261*	−0.128	−0.032
p-value	0.551	0.052	0.262	0.764
N	1743	1508	1297	1108
Sales/Assets	−0.025	−0.017	−0.023	−0.056**
p-value	0.191	0.397	0.347	0.029
N	1759	1518	1314	1119
Op. Exp/Sales	0.068*	0.266	0.111*	0.336*
p-value	0.100	0.218	0.065	0.083
N	1759	1517	1312	1118

Table F.6:
Pay Duration and Post-announcement Operating Performance (Barber-Lyon Regressions)

Table F.6 displays the coefficient estimates of long-duration dummy from regressions based on the Barber and Lyon (1996). We specify operating performance regressions as follows:

$PI_{i,t} = \alpha + \beta_1 \times \text{Pay Duration}_{i,-1} + \beta_2 \times PI_{i,-1} + \beta_3 \times \Delta PI^{IND}_{i,-1 \text{ to } t} + \varepsilon_i$

where $t = 2, 3, 4$, or 5, *PI* represents the firm performance indicator for firm *i*, and PI^{IND} indicates median industry performance indicator. *PI* is one of the following financial ratio: *ROA*, *Op. Inc./Assets*, *Op. Inc./Sales*, *Sales Growth*, *Sales/Assets*, or *Op. Exp./Sales*. *Pay Duration* is an indicator variable taking the value of "1" if the executive pay duration is above the median within the same fiscal year, and "0" otherwise. Each block of three rows represents the coefficient estimates of *Pay Duration* variable (β_1), *p*-values, and number of the observations (N). Detailed descriptions of the performance measures are in Appendix D.

Barber-Lyon Regressions				
	j+2	*j*+3	*j*+4	*j*+5
Performance Indicator	Acq. Year+2	Acq. Year+3	Acq. Year+4	Acq. Year+5
ROA	−0.016	−0.012**	−0.005	0.001
p-value	0.115	0.018	0.454	0.869
N	1736	1517	1315	1128
Op inc/AT	−0.002	−0.004	−0.003	0.003
p-value	0.543	0.164	0.473	0.585
N	1736	1517	1315	1128
Op inc/Sales	−0.001	0.000	−0.014	0.023
p-value	0.94	0.984	0.568	0.131
N	1736	1516	1313	1127
Sales Growth	0.209***	−0.160*	−0.022	0.026
p-value	0.002	0.084	0.32	0.322
N	1722	1504	1302	1117
Sales/AT	−0.014	−0.024**	−0.033***	−0.041***
p-value	0.133	0.030	0.005	0.002
N	1736	1517	1315	1128
Op Exp/Sales	0.006	0.004	0.022	−0.018
p-value	0.691	0.783	0.360	0.234
N	1736	1516	1313	1127

Table F.7: Pay Duration of CEOs and Acquirer Announcement Returns

Table F.7 presents the results from OLS Regressions of three-day or five-day announcement period cumulative abnormal returns of acquirers (*3-day CAR or 5-day CAR*) on CEO pay duration and other control variables. *Duration (cont.)* is the number of months over which the CEO's pay is vested. Derived from CEO pay duration, *Duration (dummy)* is an indicator variable taking the value of "1" if the pay duration is above the median pay duration within the same fiscal year, and "0" otherwise. *Duration (>36 mon.)* is an indicator variable taking the value of "1" if the pay duration is above 36 months, and "0" otherwise. *Pay Duration* in the interaction term *Tenure* × *Pay Duration*, takes the value of pay duration measures in the first three columns in each model. Detailed descriptions of the variables are in the Appendix D. Absolute values of *t*-values are below the coefficient estimates and based on heteroskedasticity-adjusted, robust standard errors. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% levels, respectively.

Independent Variable	(1) 3-day CAR	(2) 5-day CAR	(3) 3-day CAR	4) 5-day CAR	(5) 3-day CAR	(6) 5-day CAR
CEO Pay Duration (cont.)	−0.028**	−0.034**				
	2.17	2.24				
CEO Pay Duration (>36m)			−0.508	−0.519		
			1.11	0.98		
CEO Pay Duration (dummy)					−0.510	−0.528
					1.34	1.21
Tenure	0.017	0.027	0.067***	0.090***	0.053	0.073**
	0.38	0.55	2.74	3.32	1.58	1.97
Tenure x Duration	0.003*	0.003*	0.070	0.050	0.060	0.055
	1.84	1.80	1.44	0.91	1.44	1.18
Log Sales	−0.092	−0.083	−0.094	−0.085	−0.087	−0.078
	0.99	0.79	1.00	0.81	0.94	0.75

Table F.7 continued

Independent Variable	(1) 3-day CAR	(2) 5-day CAR	(3) 3-day CAR	4) 5-day CAR	(5) 3-day CAR	(6) 5-day CAR
M/B	0.533**	0.522*	0.518**	0.506*	0.516**	0.498*
	2.37	1.96	2.30	1.90	2.30	1.87
Deal Value/Acq MVE	−1.046	−1.462	−1.047	−1.467	−1.023	−1.443
	1.26	1.53	1.26	1.54	1.24	1.51
Paid in Cash	0.374	0.372	0.379	0.379	0.376	0.377
	1.42	1.22	1.44	1.24	1.43	1.23
Paid in Stock	−1.051*	−0.794	−1.040*	−0.792	−1.069*	−0.817
	1.78	1.29	1.75	1.28	1.81	1.32
Tender	0.577	0.189	0.549	0.173	0.574	0.182
	0.89	0.28	0.85	0.25	0.89	0.27
N Bidders > 1	−0.326	−0.406	−0.330	−0.410	−0.322	−0.405
	0.28	0.33	0.29	0.34	0.28	0.33
Different 3-SIC	−0.321	0.112	−0.341	0.091	−0.341	0.089
	0.87	0.27	0.93	0.22	0.93	0.22
Liquidity	0.767	0.870	0.778	0.882	0.754	0.859
	1.24	1.52	1.27	1.57	1.25	1.54
Non-public	1.814***	1.736***	1.825***	1.742***	1.818***	1.739***
	5.01	4.30	5.05	4.33	5.03	4.32
Constant	−2.893	−2.142	−3.457	−2.855	−3.319	−2.682
	0.94	0.63	1.17	0.89	1.10	0.81
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	1,882	1,882	1,882	1,882	1,882	1,882
Adj R^2	0.07	0.05	0.07	0.05	0.07	0.05

Table F.8: Pay Duration and Propensity to Acquire

Table F.8 presents the results from Probit Regressions where, in an unbalanced panel data, propensity to be an acquirer (*Acquirer = Yes (1)/No (0)*) is regressed on executive pay duration (*Pay Duration (cont.)* and *Pay Duration (dummy)*), *Tenure*, *Delta*, interactions of *Tenure* and *Delta* with *Duration*, and other control variables. Pay duration is the weighted average of executives' pay durations from the firms within the study period (1998–2013) . *Pay Duration (cont.)* is the number of months over which the executive's pay is scheduled. *Pay Duration (dummy)* is an indicator variable taking the value of "1" if the executive pay duration is above the median pay duration within the same fiscal year, and "0" otherwise. In Column (1) and (4), we use the entire sample of merging and non-merging firms. For the results displayed in Column (2), we use "big" acquisitions only where the ratio of deal value to market value of the acquirer is greater than 10%. In Column (3), we use both "big" and cross-industry acquisitions (*Diff. 3-SIC*). In a cross-industry acquisition, both the acquirer and the target do not share the same three-digit SIC code. In Column (5) and (6), we use all firms after 2006. Detailed descriptions of the variables are in the Appendix D. Absolute values of the *t*-statistics are beneath the coefficient estimates and based on heteroskedasticity-adjusted robust standard errors. ***, **, and * stand for statistical significance at the 1%, 5%, and 10%-level, respectively.

Independent Variable	(1) All	(2) Big	(3) Big & Diff. 3-SIC	(4) All	(5) All- after 2006	(6) All- after 2006
Duration (cont.)	0.014**	0.015**	0.015*		0.004	
	2.45	2.20	1.76		0.46	
Duration (dummy)				0.360**		−0.009
				2.36		0.04
Tenure	−0.006	−0.005	−0.003	−0.010**	−0.014	−0.015***
	1.18	0.72	0.34	2.45	1.60	2.64
Tenure x (Duration)	−0.000	−0.000	−0.000	0.001	−0.000	0.001
	0.74	1.44	1.47	0.11	0.12	0.08
Delta	0.089***	0.076***	0.105***	0.069***	0.046	0.031
	3.64	2.58	2.81	3.63	1.09	1.14
Delta x (Duration)	−0.002**	−0.002*	−0.002	−0.059**	−0.000	0.013
	2.25	1.90	1.30	2.22	0.20	0.35

Table F.8 continued

Independent Variable	(1) All	(2) Big	(3) Big & Diff. 3-SIC	(4) All	(5) All- after 2006	(6) All- after 2006
Log Sales	0.031*	0.013	0.010	0.031*	0.068***	0.067***
	1.92	0.69	0.39	1.93	3.20	3.17
M/B	−0.019	−0.049	−0.018	−0.020	−0.022	−0.025
	0.65	1.40	0.43	0.66	0.59	0.65
Op income/Assets	0.242	0.366	0.509*	0.243	0.108	0.113
	1.18	1.50	1.73	1.19	0.43	0.45
Price runup	0.007	0.006	0.005	0.007	−0.005	−0.006
	1.07	0.60	0.41	1.17	0.54	0.56
Leverage	−0.376***	−0.417***	−0.383***	−0.376***	−0.358***	−0.356***
	3.92	3.56	2.63	3.92	3.01	2.99
Constant	−0.847**	−0.954**	−1.524***	−0.689*	−0.453	−0.346
	2.15	2.06	2.92	1.81	0.86	0.69
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	5,957	5,064	4,492	5,957	3,543	3,543
Pseudo R^2	0.07	0.07	0.08	0.07	0.08	0.08

APPENDIX G
FIGURES FOR CHAPTER IV

This appendix lists figures for Chapter IV. First, median firm characteristics of event firms and their matched control firms are plotted. Then, average monthly behavior of ASRs are plotted for each event.

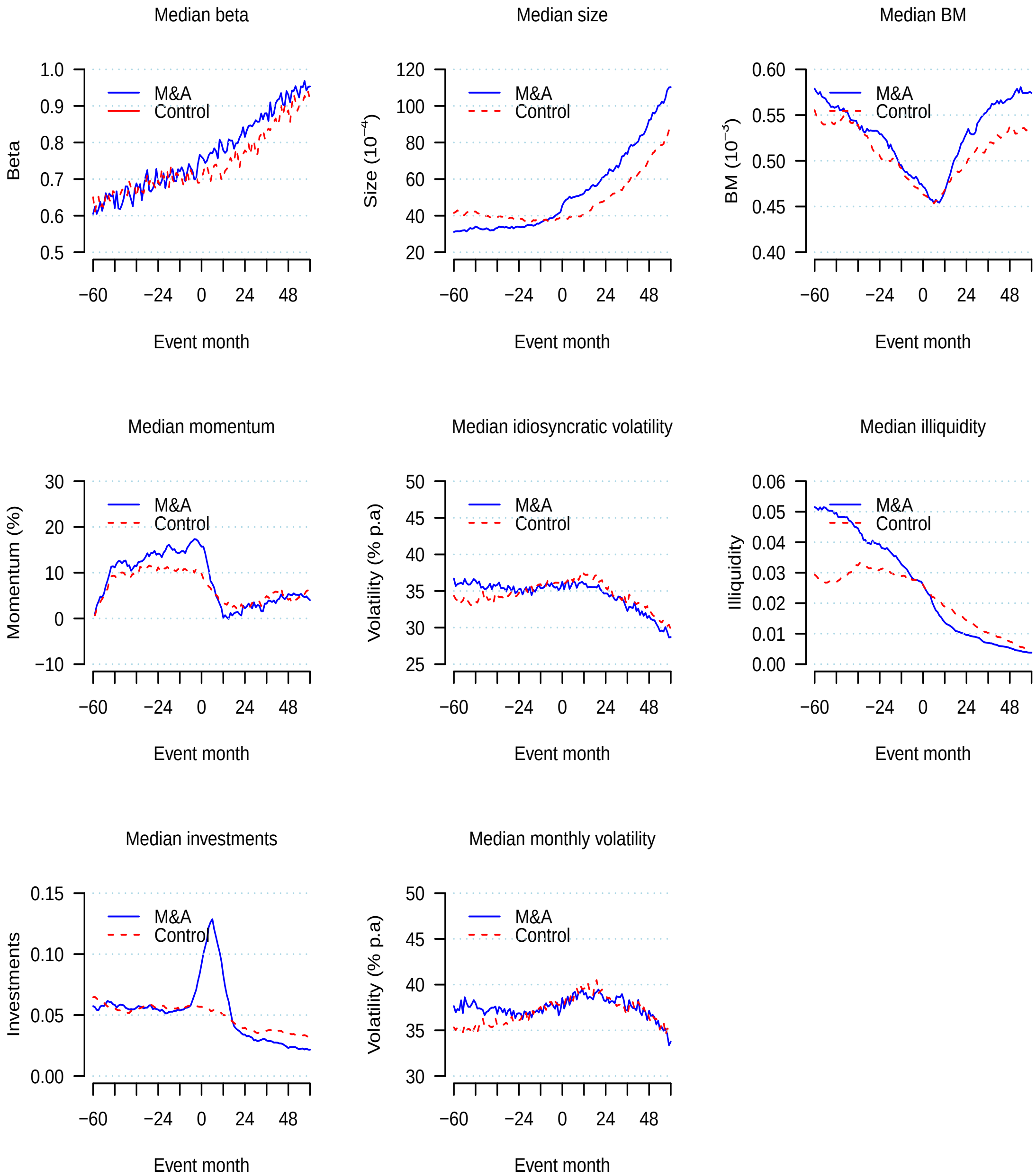

Figure G.1: Characteristics of M&A firms and their matched control firms

Characteristics of M&A firms and their matched control firms for 60-month event periods before and after the M&A month ($t = 0$). Following Bessembinder and Zhang (2013), the plots report median beta, size, BM, momentum, idiosyncratic volatility, illiquidity, and investments. The event sample consists of $n = 4{,}294$ M&As in the CRSP database from January 1986 to December 2007.

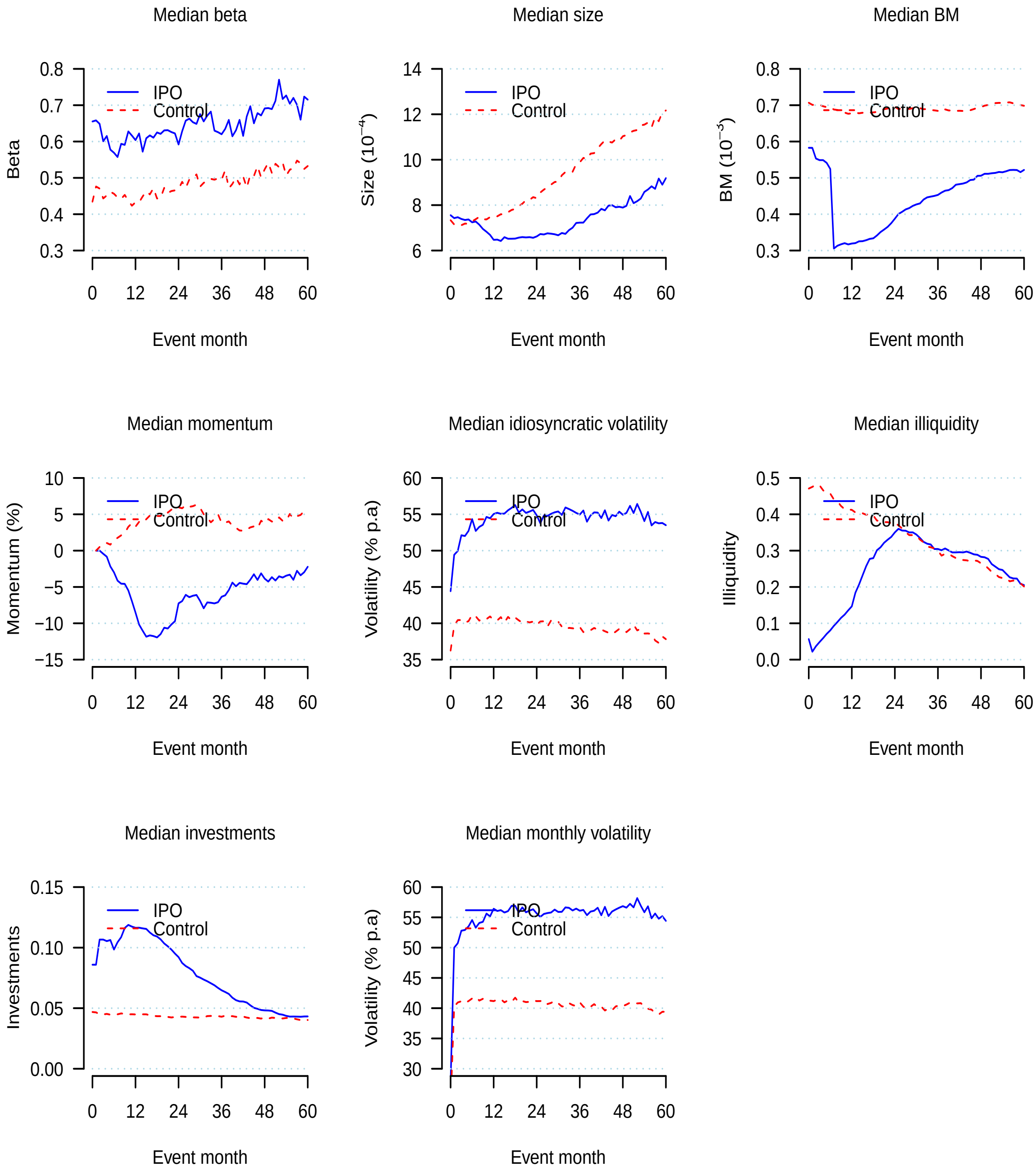

Figure G.2: Characteristics of IPO firms and their matched control firms

Characteristics of IPO firms and their matched control firms for 60-month event periods after the IPO month ($t = 0$). Following Bessembinder and Zhang (2013), the plots report median beta, size, BM, momentum, idiosyncratic volatility, illiquidity, and investments. The event sample consists of $n = 7{,}454$ IPOs in the CRSP database from January 1980 to December 2007.

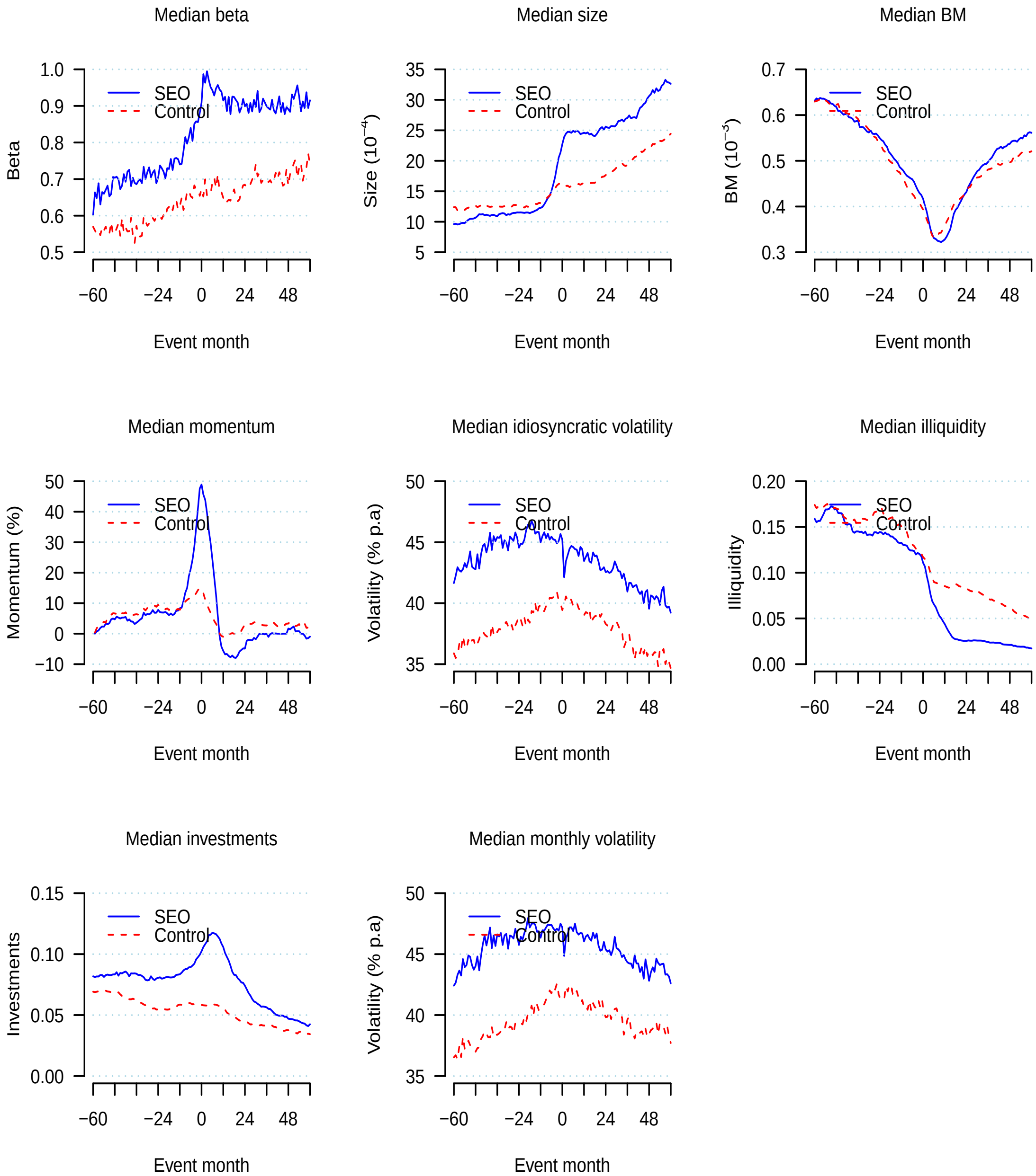

Figure G.3: Characteristics of SEO firms and their matched control firms

Characteristics of SEO firms and their matched control firms for 60-month event periods before and after the SEO month ($t = 0$). Following Bessembinder and Zhang (2013), the plots report median beta, size, BM, momentum, idiosyncratic volatility, illiquidity, and investments. The event sample consists of $n = 6{,}737$ SEOs in the CRSP database from from January 1980 to December 2007.

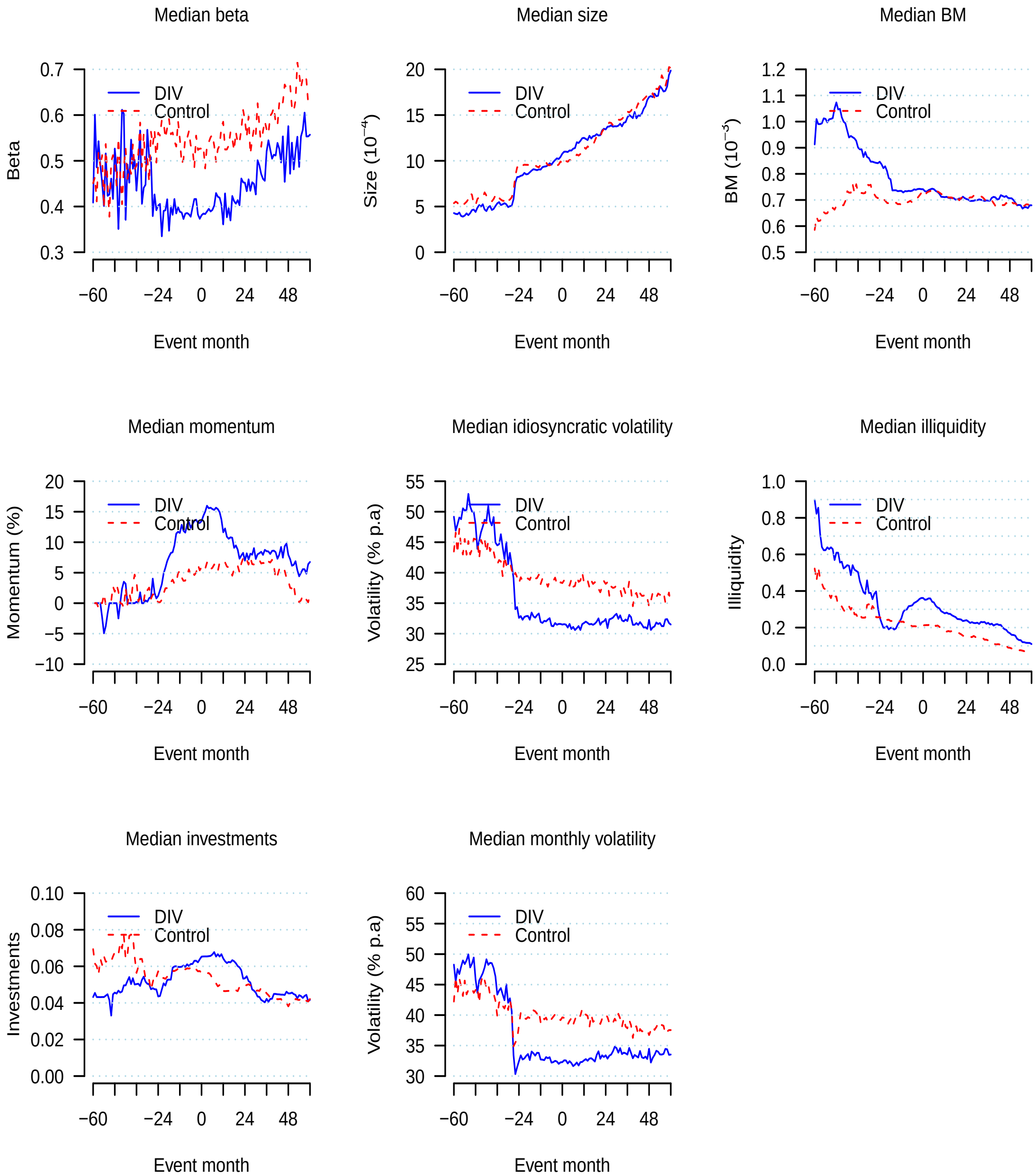

Figure G.4: Characteristics of dividend initiation firms and their matched control firms

Characteristics of dividend initiation (DIV) firms and their matched control firms for 60-month event periods before and after the DIV month ($t = 0$). Following Bessembinder and Zhang (2013), the plots report median beta, size, BM, momentum, idiosyncratic volatility, illiquidity, and investments. The event sample consists of $n = 2{,}151$ dividend initiations in the CRSP database from January 1980 to December 2007.

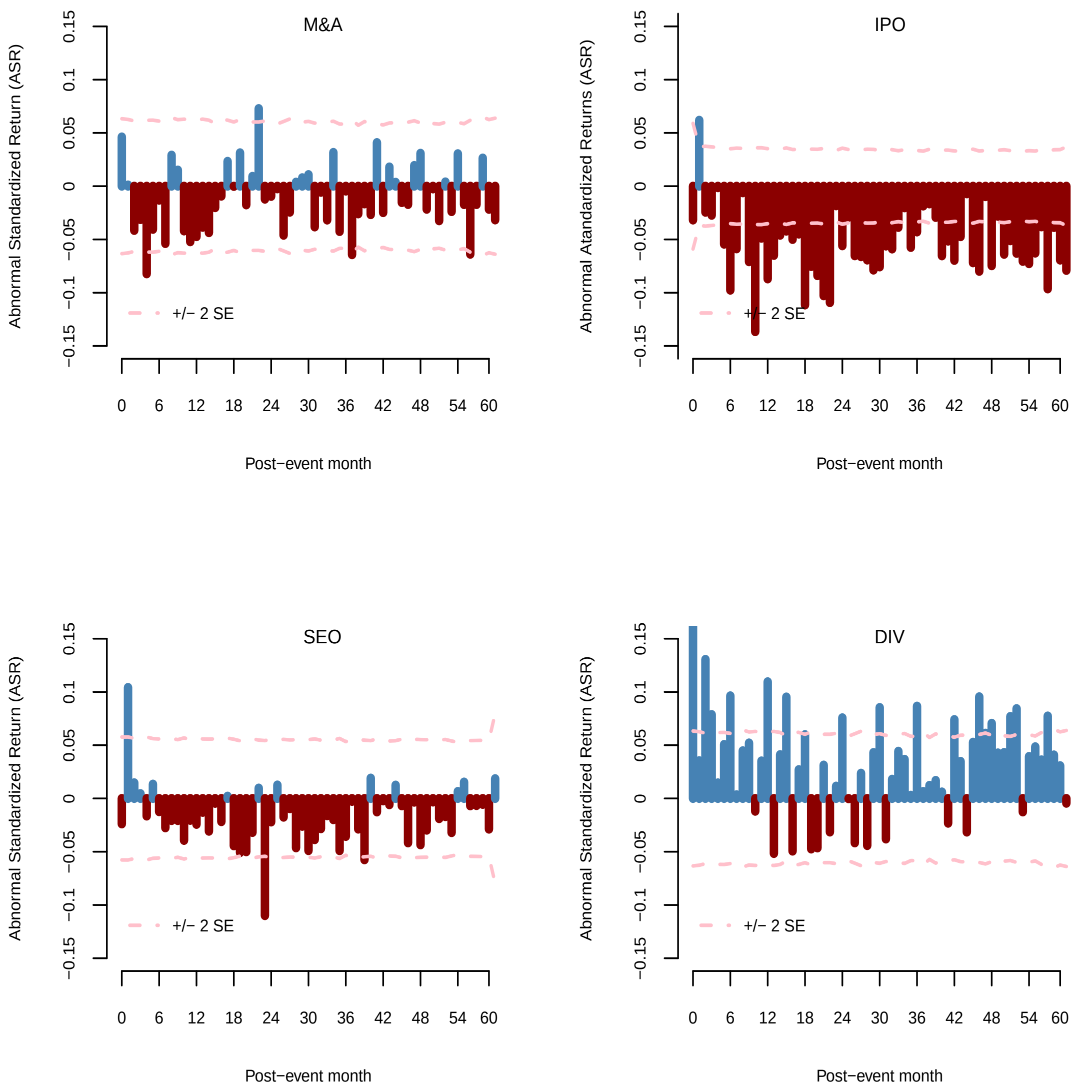

Figure G.5: Monthly abnormal standardized returns (ASRs) for M&As, IPOs, SEOs, and DIVs.

The plots report average monthly behavior of ASRs. Monthly standardized returns are defined as $\mathtt{sr}_t = r_t/s_t$, where r_t is the month t log-return of a firm and s_t is the month t standard deviation estimated from daily log-returns in the month. Monthly ASRs are defined as $\mathtt{sr}_{it} - \mathtt{sr}^c_{it}$, where $\mathtt{sr}^c_{it}$ is the standardized return of the size and book-to-market (BM) ratio matched control firm of the ith event firm. The event sample consists of 1,838 M&As, 3,077 IPOs, 3,052 SEOs, and 970 dividend initiations (DIVs) in the CRSP database between January 1980 (1986 for M&As) and December 2007 that have 60 months post-event return data available.

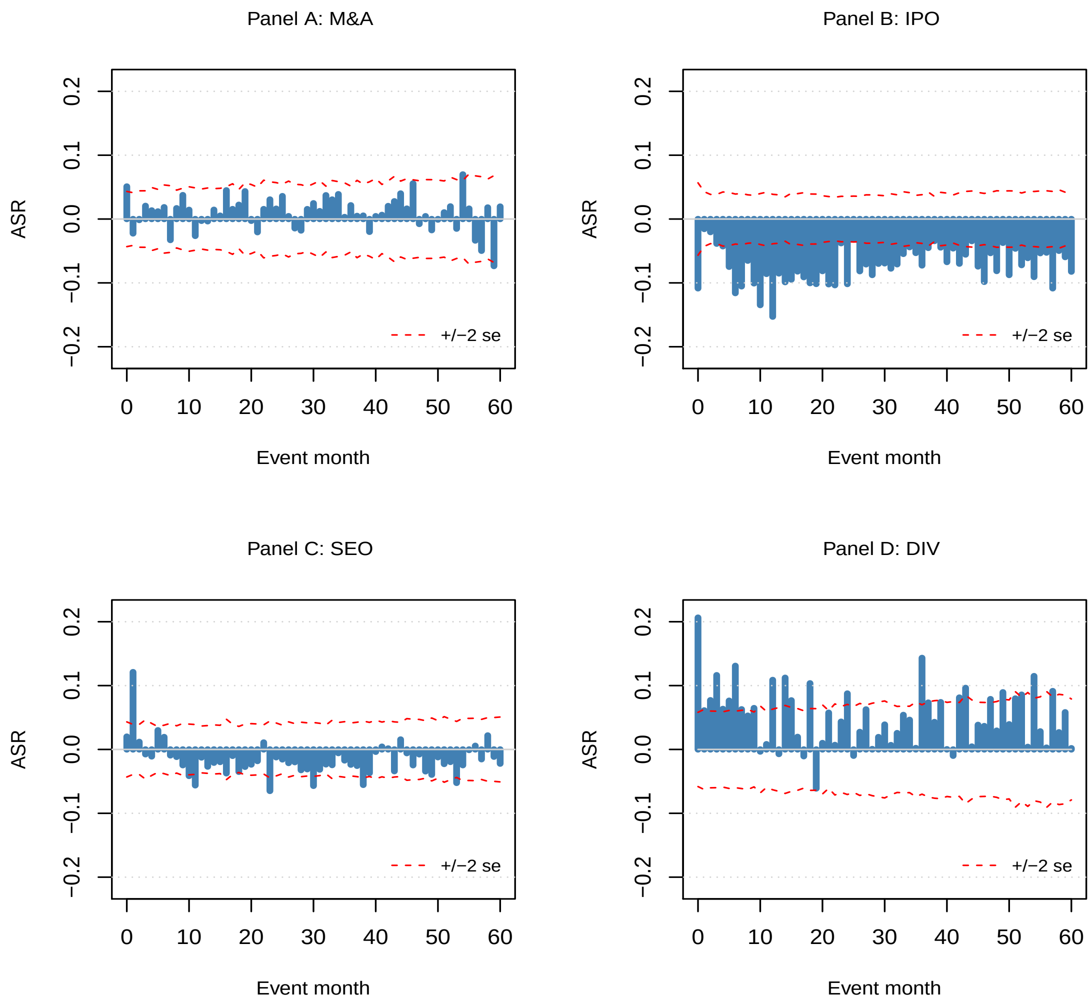

Figure G.6: Monthly abnormal standardized returns for M&As, IPOs, SEOs, and DIVs from 1980 (1986 for M&As) to 2002.

The plots report monthly averages of abnormal standardized returns (ASRs), $\overline{\texttt{ASR}}_t = \overline{\texttt{sr}}_t - \overline{\texttt{sr}}^c_t$, where $\overline{\texttt{sr}}_t$s are sample averages of event firm standardized returns $\texttt{sr}_{it} = \log(1+R_{it})/s_{it}$ in event month t and control firm standardized returns $\texttt{sr}^c_{it} = \log(1+R_{it})/s^c_{it}$, respectively. The monthly standard deviations, s_{it} and s^c_{it}, are computed from the daily returns in month t. Months that have less than 10 trading days available are dropped from the sample. The sample period covers events from January 1986 to December 2007 for M&As and from January 1980 to December 2007 for the others. The standard errors in the $\pm 2\,\texttt{se}$ bands are cross-sectional correlation robust standard errors estimated by clustering over overlapping calendar months. Also, ASRs are trimmed each month such that one percent of the most extreme observations are dropped (i.e., 0.5% from both tails of the distribution). The number of firms in terms of monthly averages (number of clusters in standard errors) vary from 1,326 to 3,077 (185 to 198) for M&As, from 3,115 to 7,403 (265 to 273) for IPOs, from 2,575 to 5,643 (271 to 274) for SEOs, and from 776 to 1,726 (245 to 271) for DIVs.

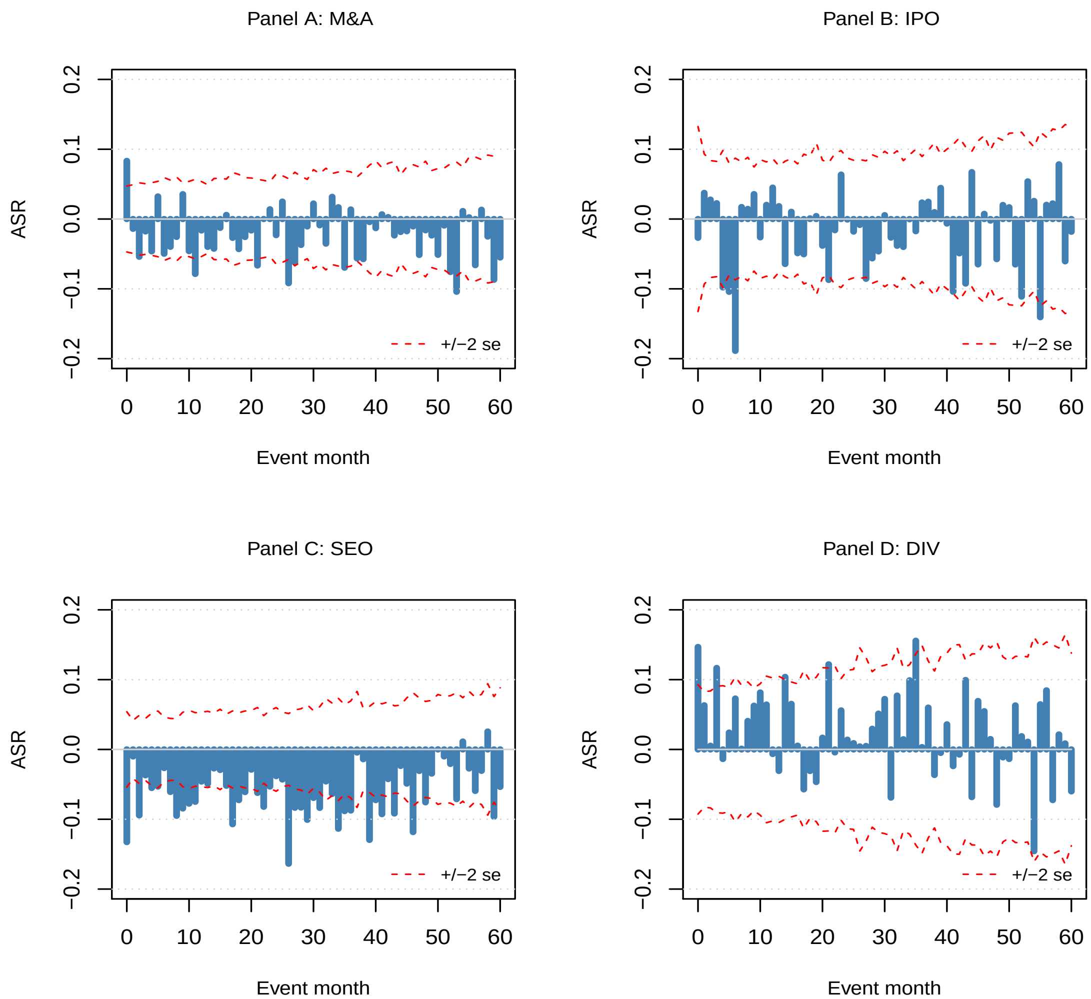

Figure G.7: Monthly abnormal standardized returns for M&As, IPOs, SEOs, and DIVs from 2003 to 2014.

The plots report monthly averages of abnormal standardized returns (ASRs), $\overline{\texttt{ASR}}_t = \overline{\texttt{sr}}_t - \overline{\texttt{sr}}_t^c$, where $\overline{\texttt{sr}}_t$s are sample averages of event firm standardized returns $\texttt{sr}_{it} = \log(1+R_{it})/s_{it}$ in event month t and control firm standardized returns $\texttt{sr}_{it}^c = \log(1+R_{it})/s_{it}^c$, respectively. The monthly standard deviations, s_{it} and s_{it}^c, are computed from the daily returns in month t. Months that have less than 10 trading days available are dropped from the sample. The sample period covers events from January 2008 to December 2014. The standard errors in the $\pm 2\,\texttt{se}$ bands are cross-sectional correlation robust standard errors estimated by clustering over overlapping calendar months. Also, ASRs are trimmed each month such that one percent of the most extreme observations are dropped (i.e., 0.5% most from both tails of the distribution). The number of firms in terms of monthly averages (number of clusters in standard errors) vary from 732 to 2,142 (84 to 144) for M&As, from 340 to 1,226 (70 to 134) for IPOs, from 886 to 3,320 (84 to 144) for SEOs, and from 200 to 632 (76 to 134) for DIVs.

APPENDIX H

TABLES FOR CHAPTER IV

This appendix presents tables for Chapter IV. First, number of M&As, IPOs, SEOs, and dividend initiations (DIV) are summarized in Table H.1. Next, normalized firm characteristics and long-run abnormal returns are showed for each event based on the regression approach of Bessembinder and Zhang (2013) in Table H.2 and Table H.3. Then, the firm characteristics are standardized by their standard deviations (computed over the pooled panel observations) such that all the factors have unit variances. Using regression approach with standardized firm characteristics, long-run abnormal returns are reported in Table H.4 and Table H.5.

Additional tests of long abnormal returns are presented in Tables H.6 to H.9. Finally, long abnormal returns are reported for two subsets (1980-2002 and 2003-2014) in Tables H.10 to H.13.

Table H.1: Number of M&As, IPOs, SEOs, and dividend initiations (DIV) in different years.

The M&A sample consists of completed US mergers and acquisitions with transaction values of $5 million or more. Acquisitions must take the form of a merger, acquisition of majority interest, acquisition of remaining interest, or acquisition of partial interest. The acquisition must be a control bid (the acquirer owns at least 50% of the target after the deal). The relative size of the deal must be greater than 5%. The SEO sample excludes American Depository Receipts, Global Depository Receipts, unit offerings, and financial and utility firms. The IPO sample excludes Real Estate Investment Trusts, closed-end funds, and American Depository Receipts. Lastly, the dividend initiations (DIV) sample includes common stocks listed on the NYSE, NYSE MKT (AMEX), or NASDAQ with CRSP data available for more than two years. Dividends are ordinary cash in dollars that are paid regularly.

Year	M&A	IPO	SEO	DIV
1980		83	147	48
1981		227	160	31
1982		91	165	52
1983		510	396	47
1984		240	100	55
1985		240	143	80
1986	19	487	211	69
1987	37	373	148	54
1988	31	155	74	91
1989	25	142	113	117
1990	23	133	112	58
1991	42	283	241	43
1992	69	401	222	39
1993	82	506	307	53
1994	115	423	252	129
1995	267	440	309	166
1996	366	647	401	147
1997	415	423	358	96
1998	431	261	253	94
1999	394	396	240	94
2000	365	284	315	112
2001	263	61	302	77
2002	193	57	288	50
2003	205	59	288	91
2004	246	148	386	63
2005	221	129	259	52
2006	222	123	282	63
2007	263	132	265	80
Total	4,294	7,454	6,737	2,151

Table H.2: Normalized firm characteristics and long-run abnormal returns on M&As and IPOs.

The table presents OLS regressions of monthly continuously compounded abnormal returns (CCARs) of M&As and IPOs based on normalized differences of firm and market characteristics specified by Bessembinder and Zhang (2013). The length of the event period for each stock is the number of months until 60 months or the time of delisting, whichever comes first. The t-values of the regression coefficients are in parentheses, and standard errors of alphas are in brackets. The middle portion of the table reports F-statistics and their p-values separately for the joint significance of the linear, squared, and cubic terms in the regressions. The bottom portion reports mean CCARs and their t-values as well as number of clusters over which the cross-sectional correlation robust standard errors by Cameron, Gelbach, and Miller (2012) (see also Petersen, 2009) are computed. All the t-values, standard errors of alphas, and F-values in the table are based on these cross-sectional correlation robust standard error computations. The mean CCARs should be interpreted as the average monthly abnormal returns for stocks with event periods up to 60 months rather than 5-year average monthly abnormal returns. It is notable that the number of clusters (N clusters) reported in the bottom portion is the effective number of observations for inferences instead of the considerably higher number of months (N months) or number of firms (N firms) reported in the last two rows at the bottom. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

Table H.2 continued						
		M&A			IPO	
	Linear	2nd order	4th order	Linear	2nd order	4th order
Δbeta	−0.424	−0.404	−0.215	−0.414	−0.415	−0.280
	(−1.16)	(−1.13)	(−0.60)	(−1.55)	(−1.60)	(−0.75)
$(\Delta\texttt{beta})^2$		−0.309	−0.035		−0.353	−0.392
		(−1.04)	(−0.04)		(−1.22)	(−0.48)
$(\Delta\texttt{beta})^3$			−0.341			−0.243
			(−0.55)			(−0.46)
$(\Delta\texttt{beta})^4$			−0.303			0.097
			(−0.31)			(0.09)
Δsize	−0.304	−0.321	−0.157	−0.291	−0.282	−0.398
	(−1.35)	(−1.43)	(−0.30)	(−1.10)	(−1.07)	(−0.91)
$(\Delta\texttt{size})^2$		−0.227	0.285		0.786^c	3.531^c
		(−0.74)	(0.31)		(2.62)	(3.97)
$(\Delta\texttt{size})^3$			−0.403			0.129
			(−0.64)			(0.27)
$(\Delta\texttt{size})^4$			−0.483			-2.888^c
			(−0.56)			(−3.47)
ΔBM	−0.042	−0.064	−0.075	0.761^c	0.713^c	1.442^c
	(−0.24)	(−0.36)	(−0.23)	(3.33)	(3.05)	(3.45)
$(\Delta\texttt{BM})^2$		0.377	1.340		−0.231	0.809
		(1.56)	(1.60)		(−0.99)	(1.09)
$(\Delta\texttt{BM})^3$			0.004			-1.241^b
			(0.01)			(−2.33)
$(\Delta\texttt{BM})^4$			−1.124			−1.413
			(−1.22)			(−1.56)
Δmom	1.266^c	1.284^c	0.543	1.677^c	1.658^c	1.809^c
	(2.96)	(3.00)	(1.24)	(5.17)	(5.14)	(4.90)
$(\Delta\texttt{mom})^2$		-0.556^b	−1.027		−0.186	−0.648
		(−2.10)	(−1.34)		(−0.78)	(−0.82)
$(\Delta\texttt{mom})^3$			1.103^a			−0.284
			(1.80)			(−0.55)
$(\Delta\texttt{mom})^4$			0.527			0.450
			(0.57)			(0.52)
Δilliq	0.255	0.258	−0.538	0.728^c	0.693^c	−0.180
	(1.16)	(1.18)	(−1.14)	(3.14)	(2.97)	(−0.48)
$(\Delta\texttt{illiq})^2$		−0.205	0.274		0.839^b	2.353^b
		(−0.56)	(0.27)		(2.00)	(2.28)
$(\Delta\texttt{illiq})^3$			1.454^b			1.461^c
			(2.19)			(2.65)

Table H.2 continued

	M&A			IPO		
	Linear	2nd order	4th order	Linear	2nd order	4th order
$(\Delta\texttt{illiq})^4$			−0.370			−1.624
			(−0.33)			(−1.51)
$\Delta\texttt{isv}$	-1.647^c	-1.648^c	0.188	-2.259^c	-2.220^c	-1.236^c
	(−4.19)	(−4.22)	(0.46)	(−5.74)	(−5.77)	(−2.61)
$(\Delta\texttt{isv})^2$		0.218	0.067		−0.401	0.959
		(0.70)	(0.08)		(−1.11)	(1.13)
$(\Delta\texttt{isv})^3$			-3.158^c			-1.754^c
			(−4.62)			(−2.63)
$(\Delta\texttt{isv})^4$			0.264			−1.334
			(0.26)			(−1.25)
$\Delta\texttt{inv}$	−0.258	−0.227	0.183	−0.168	−0.129	−0.463
	(−1.21)	(−1.05)	(0.50)	(−0.80)	(−0.62)	(−1.40)
$(\Delta\texttt{inv})^2$		0.079	−0.035		-0.514^a	1.525^b
		(0.34)	(−0.04)		(−1.90)	(2.03)
$(\Delta\texttt{inv})^3$			−0.772			0.480
			(−1.48)			(1.07)
$(\Delta\texttt{inv})^4$			0.194			-2.380^c
			(0.20)			(−2.77)
$\hat{\alpha}$	-0.290^c	−0.067	−0.316	-0.760^c	-0.792^c	-1.714^c
	(−2.77)	(−0.26)	(−0.97)	(−4.27)	(−2.90)	(−5.26)
Std. Error ($\hat{\alpha}$)	[0.105]	[0.253]	[0.327]	[0.178]	[0.273]	[0.326]
Adjusted R^2	0.004	0.005	0.004	0.005	0.004	0.006
F for linear terms	5.13	5.23	0.48	14.99	14.73	5.01
p-value	0.000	0.000	0.846	0.000	0.000	0.000
F for 2nd order terms		1.14	0.62		2.51	4.60
p-value		0.335	0.741		0.016	0.000
F for 3rd order terms			5.15			3.08
p-value			0.000			0.004
F for 4th order terms			0.37			4.27
p-value			0.921			0.000
Mean(CCAR)	-0.447^c			-1.376^c		
t-value	−3.78			−5.37		
N clusters	323			377		
N months	103,218			148,632		
N firms	2,703			4,650		

Table H.3: Normalized firm characteristics and long-run abnormal returns on SEOs and DIVs.

The table presents OLS regressions of monthly continuously compounded abnormal returns (CCARs) of SEOs and dividend initiations (DIVs) based on normalized differences of firm and market characteristics specified by Bessembinder and Zhang (2013). The length of the event period for each stock is the number of months until 60 months or the time of delisting, whichever comes first. The t-values of the regression coefficients are in parentheses, and standard errors of alphas are in brackets. The middle portion of the table reports F-statistics and their p-values separately for the joint significance of the linear, squared, and cubic terms in the regressions. The bottom portion reports mean CCARs and their t-values as well as number of clusters over which the cross-sectional correlation robust standard errors by Cameron, Gelbach, and Miller (2012) (see also Petersen, 2009) are computed. All the t-values, standard errors of alphas, and F-values in the table are based on these cross-sectional correlation robust standard error computations. The mean CCARs should be interpreted as the average monthly abnormal returns for stocks with event periods up to 60 months rather than 5-year average monthly abnormal returns. It is notable that the number of clusters (N clusters) reported in the bottom portion is the effective number of observations for inferences instead of the considerably higher number of months (N months) or number of firms (N firms) reported in the last two rows at the bottom. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

Table H.3 continued

	SEO			DIV		
	Linear	2nd order	4th order	Linear	2nd order	4th order
Δbeta	−0.296	−0.288	0.060	−0.137	−0.106	0.044
	(−1.39)	(−1.37)	(0.24)	(−0.61)	(−0.47)	(0.11)
$(\Delta\text{beta})^2$		−0.154	0.781		0.417	−1.452
		(−0.82)	(1.30)		(1.41)	(−1.44)
$(\Delta\text{beta})^3$			−0.622[a]			−0.309
			(−1.67)			(−0.48)
$(\Delta\text{beta})^4$			−1.027			2.156[a]
			(−1.45)			(1.83)
Δsize	−0.447[c]	−0.435[c]	−0.755[b]	−0.350[a]	−0.329[a]	−0.573
	(−2.83)	(−2.75)	(−2.26)	(−1.95)	(−1.83)	(−1.39)
$(\Delta\text{size})^2$		−0.180	−0.587		−0.273	−0.965
		(−0.80)	(−0.82)		(−0.81)	(−0.87)
$(\Delta\text{size})^3$			0.390			0.282
			(0.92)			(0.51)
$(\Delta\text{size})^4$			0.471			0.822
			(0.66)			(0.74)
ΔBM	−0.072	−0.083	0.424[a]	−0.087	−0.092	0.045
	(−0.56)	(−0.64)	(1.86)	(−0.48)	(−0.51)	(0.12)
$(\Delta\text{BM})^2$		0.405[b]	0.367		−0.412	−0.975
		(2.06)	(0.58)		(−1.31)	(−1.01)
$(\Delta\text{BM})^3$			−0.897[b]			−0.230
			(−2.42)			(−0.42)
$(\Delta\text{BM})^4$			0.008			0.701
			(0.01)			(0.64)
Δmom	1.311[c]	1.324[c]	1.349[c]	1.571[c]	1.528[c]	1.394[c]
	(4.87)	(4.94)	(4.68)	(6.61)	(6.46)	(3.62)
$(\Delta\text{mom})^2$		0.177	1.292[b]		0.245	0.090
		(0.89)	(2.18)		(0.73)	(0.09)
$(\Delta\text{mom})^3$			−0.073			0.165
			(−0.16)			(0.26)
$(\Delta\text{mom})^4$			−1.306[a]			0.151
			(−1.90)			(0.13)
Δilliq	0.468[c]	0.478[c]	−0.003	0.417[a]	0.376[a]	−0.100
	(3.01)	(3.01)	(−0.01)	(1.86)	(1.68)	(−0.24)
$(\Delta\text{illiq})^2$		−0.183	0.046		0.588	1.290
		(−0.70)	(0.06)		(1.39)	(1.08)
$(\Delta\text{illiq})^3$			0.902[b]			0.899
			(2.26)			(1.39)

Table H.3 continued						
		SEO			DIV	
	Linear	2nd order	4th order	Linear	2nd order	4th order
$(\Delta\texttt{illiq})^4$			−0.097			−0.968
			(−0.12)			(−0.74)
$\Delta\texttt{isv}$	-1.674^c	-1.672^c	−0.275	-1.241^c	-1.195^c	0.263
	(−6.22)	(−6.25)	(−0.89)	(−5.60)	(−5.42)	(0.64)
$(\Delta\texttt{isv})^2$		−0.128	0.920		0.462	−0.512
		(−0.57)	(1.41)		(1.32)	(−0.47)
$(\Delta\texttt{isv})^3$			-2.433^c			-2.533^c
			(−5.53)			(−3.75)
$(\Delta\texttt{isv})^4$			−1.141			1.098
			(−1.37)			(0.83)
$\Delta\texttt{inv}$	0.024	0.034	0.272	−0.099	−0.123	−0.157
	(0.17)	(0.24)	(1.26)	(−0.61)	(−0.76)	(−0.43)
$(\Delta\texttt{inv})^2$		0.052	−0.261		0.097	−0.082
		(0.25)	(−0.42)		(0.32)	(−0.09)
$(\Delta\texttt{inv})^3$			−0.460			−0.002
			(−1.30)			(0.00)
$(\Delta\texttt{inv})^4$			0.405			0.208
			(0.55)			(0.20)
$\hat{\alpha}$	−0.135	−0.136	-0.458^b	0.337^c	0.011	0.455
	(−1.32)	(−0.79)	(−1.97)	(3.43)	(0.04)	(1.16)
Std. Error ($\hat{\alpha}$)	[0.102]	[0.172]	[0.232]	[0.098]	[0.263]	[0.391]
Adjusted R^2	0.003	0.004	0.003	0.004	0.004	0.005
F for linear terms	14.10	14.50	5.25	12.06	11.36	2.11
p-value	0.000	0.000	0.000	0.000	0.000	0.042
F for 2nd order terms		0.83	1.53		2.10	0.77
p-value		0.563	0.154		0.042	0.610
F for 3rd order terms			6.83			2.41
p-value			0.000			0.020
F for 4th order terms			1.26			0.81
p-value			0.268			0.582
Mean(CCAR)	-0.357^c			0.422^c		
t-value	−3.11			4.14		
N clusters	396			393		
N months	213,855			47,222		
N firms	5,556			1,170		

Table H.4: Standardized firm characteristics and long-run abnormal returns on M&As and IPOs.

The table presents OLS regressions of monthly continuously compounded abnormal returns (CCARs) of M&As and IPOs, SEOs, and dividend initiations (DIVs) based on normalized differences of firm and market characteristics specified by Bessembinder and Zhang (2013). Unlike Table H.2 above as well as Table 4 in Bessembinder and Zhang, original non-normalized values of the factors are used. However, we standardize the factors by means of dividing by their standard deviations computed over the pooled panel observations, such that all the factors have unit variances. Like Table H.2, the length of the event period for each stock is the number of months until 60 months or the time of delisting, whichever comes first. The t-values of the regression coefficients are in parentheses, and standard errors of alphas are in brackets. The middle portion of the table reports F-statistics and their p-values for the joint significance of the squared terms in the regressions. The bottom portion reports mean CCARs and their t-values as well as number of clusters over which the cross-sectional correlation robust standard errors by Cameron, Gelbach, and Miller (2012) (see also Petersen, 2009) are computed. All the t-values, standard errors of alphas, and F-values in the table are based on these cross-sectional correlation robust standard error computations. The mean CCARs should be interpreted as the average monthly abnormal returns for stocks with event periods up to 60 months rather than 5-year average monthly abnormal returns. It is notable that the number of clusters (N clusters) reported in the bottom portion is the effective number of observations for inferences instead of the considerably higher number of months (N months) or number of firms (N firms) reported in the last two rows at the bottom. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

Table H.4 continued

		M&A			IPO	
	Linear	2nd order	4th order	Linear	2nd order	4th order
Δbeta	−0.315	−0.300	−0.336	−0.314[b]	−0.317[b]	−0.436[c]
	(−1.57)	(−1.50)	(−1.52)	(−2.26)	(−2.29)	(−2.96)
$(\Delta\texttt{beta})^2$		−0.023	−0.073[b]		0.025	−0.017
		(−1.42)	(−2.17)		(0.67)	(−0.34)
$(\Delta\texttt{beta})^3$			0.003[a]			0.009[c]
			(1.94)			(3.05)
$(\Delta\texttt{beta})^4$			0.000			0.001[b]
			(1.44)			(2.26)
Δsize	−0.081	−0.115	−0.197[a]	0.069	0.079	0.045
	(−1.24)	(−1.37)	(−1.79)	(0.57)	(0.64)	(0.26)
$(\Delta\texttt{size})^2$		0.003	0.012[b]		−0.003	−0.008
		(0.91)	(2.07)		(−1.18)	(−1.48)
$(\Delta\texttt{size})^3$			0.000			0.000
			(1.00)			(−0.11)
$(\Delta\texttt{size})^4$			0.000[b]			0.000
			(−2.20)			(1.41)
ΔBM	0.166[a]	0.017	0.297	0.519[c]	0.498[c]	0.638[c]
	(1.72)	(0.10)	(0.99)	(4.09)	(3.76)	(4.29)
$(\Delta\texttt{BM})^2$		0.001	−0.054		−0.013	−0.009
		(1.01)	(−1.22)		(−0.90)	(−0.35)
$(\Delta\texttt{BM})^3$			0.001			−0.004[c]
			(1.09)			(−3.89)
$(\Delta\texttt{BM})^4$			0.000			0.000
			(−1.04)			(−1.39)
Δmom	0.462[a]	0.477[a]	0.656[b]	0.496	0.520[a]	0.793[c]
	(1.83)	(1.84)	(2.28)	(1.63)	(1.65)	(2.75)
$(\Delta\texttt{mom})^2$		−0.004	−0.010		−0.014	−0.046[c]
		(−0.69)	(−0.88)		(−1.13)	(−3.01)
$(\Delta\texttt{mom})^3$			−0.002[c]			−0.003[c]
			(−3.31)			(−3.18)
$(\Delta\texttt{mom})^4$			0.000[c]			0.000[c]
			(3.10)			(3.83)
Δilliq	0.563	0.875[b]	1.663[b]	0.254[b]	0.309[b]	0.368[a]
	(1.37)	(1.97)	(2.50)	(2.17)	(2.18)	(1.72)
$(\Delta\texttt{illiq})^2$		−0.102[a]	−0.242		0.004	0.001
		(−1.88)	(−1.23)		(1.01)	(0.11)
$(\Delta\texttt{illiq})^3$			−0.038[a]			0.000
			(−1.76)			(−0.69)

Table H.4 continued

	Linear	M&A 2nd order	4th order	Linear	IPO 2nd order	4th order
$(\Delta\texttt{illiq})^4$			0.004			0.000
			(1.35)			(−0.52)
$\Delta\texttt{isv}$	-1.062^c	-1.068^c	-1.279^c	-1.232^c	-1.144^c	-1.714^c
	(−3.02)	(−3.04)	(−3.19)	(−3.50)	(−3.21)	(−4.68)
$(\Delta\texttt{isv})^2$		0.024	0.075		−0.078	0.096
		(0.58)	(1.17)		(−0.84)	(0.99)
$(\Delta\texttt{isv})^3$			0.012^a			0.030^c
			(1.89)			(3.46)
$(\Delta\texttt{isv})^4$			−0.001			-0.003^b
			(−1.02)			(−2.32)
$\Delta\texttt{inv}$	-0.221^a	−0.302	−0.288	−0.015	−0.002	−0.037
	(−1.87)	(−1.59)	(−1.48)	(−0.15)	(−0.02)	(−0.26)
$(\Delta\texttt{inv})^2$		0.014	0.034		−0.003	−0.018
		(0.79)	(0.86)		(−0.41)	(−1.14)
$(\Delta\texttt{inv})^3$			−0.002			0.000
			(−0.42)			(0.60)
$(\Delta\texttt{inv})^4$			0.000			0.000
			(0.19)			(0.86)
$\hat{\alpha}$	-0.332^c	-0.312^c	-0.292^c	-0.831^c	-0.775^c	-0.651^c
	(−3.34)	(−3.09)	(−2.84)	(−4.82)	(−4.48)	(−3.96)
Std. Error ($\hat{\alpha}$)	[0.099]	[0.101]	[0.103]	[0.172]	[0.173]	[0.164]
Adjusted R^2	0.003	0.004	0.003	0.004	0.004	0.006
F for linear terms	3.05	3.31	4.03	5.24	4.70	7.71
p-value	0.004	0.002	0.000	0.000	0.000	0.000
F for 2nd order terms		1.37	1.80		0.83	2.51
p-value		0.219	0.087		0.564	0.016
F for 3rd order terms			3.40			5.21
p-value			0.002			0.000
F for 4th order terms			4.17			4.04
p-value			0.000			0.000
Mean(CCAR)	-0.447^c			-1.376^c		
t-value	−3.78			−5.37		
N clusters	323			377		
N months	103,218			148,632		
N firms	2,703			4,650		

Table H.5: Standardized firm characteristics and long-run abnormal returns on SEOs and DIVs.

The table presents OLS regressions of monthly continuously compounded abnormal returns (CCARs) of SEOs and dividend initiations (DIVs) based on normalized differences of firm and market characteristics specified by Bessembinder and Zhang (2013). Unlike Table H.3 above as well as Table 4 in Bessembinder and Zhang, original non-normalized values of the factors are used. However, we standardize the factors by means of dividing by their standard deviations computed over the pooled panel observations, such that all the factors have unit variances. Like Table H.3, the length of the event period for each stock is the number of months until 60 months or the time of delisting, whichever comes first. The t-values of the regression coefficients are in parentheses, and standard errors of alphas are in brackets. The middle portion of the table reports F-statistics and their p-values for the joint significance of the squared terms in the regressions. The bottom portion reports mean CCARs and their t-values as well as number of clusters over which the cross-sectional correlation robust standard errors by Cameron, Gelbach, and Miller (2012) (see also Petersen, 2009) are computed. All the t-values, standard errors of alphas, and F-values in the table are based on these cross-sectional correlation robust standard error computations. The mean CCARs should be interpreted as the average monthly abnormal returns for stocks with event periods up to 60 months rather than 5-year average monthly abnormal returns. It is notable that the number of clusters (N clusters) reported in the bottom portion is the effective number of observations for inferences instead of the considerably higher number of months (N months) or number of firms (N firms) reported in the last two rows at the bottom. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

Table H.5 continued						
		SEO			DIV	
	Linear	2nd order	4th order	Linear	2nd order	4th order
Δbeta	−0.306[b]	−0.294[b]	−0.273[a]	−0.188	−0.101	−0.127
	(−2.37)	(−2.29)	(−1.91)	(−1.37)	(−0.75)	(−0.83)
$(\Delta beta)^2$		−0.015	−0.052[a]		0.085[a]	0.187[c]
		(−0.83)	(−1.92)		(1.74)	(2.80)
$(\Delta beta)^3$			0.001			0.013
			(0.30)			(1.47)
$(\Delta beta)^4$			0.000			−0.003[b]
			(1.58)			(−2.29)
Δsize	−0.079	−0.092	−0.100	−0.146	−0.161	−0.197
	(−1.52)	(−1.54)	(−1.00)	(−1.28)	(−0.96)	(−1.23)
$(\Delta size)^2$		0.001	0.003		0.000	0.019
		(0.67)	(1.19)		(0.01)	(0.59)
$(\Delta size)^3$			0.000			0.000
			(−0.04)			(0.08)
$(\Delta size)^4$			0.000			0.000
			(−0.57)			(−0.59)
ΔBM	0.079	0.053	−0.023	−0.080	−0.129	0.093
	(0.88)	(0.60)	(−0.24)	(−0.60)	(−0.89)	(0.60)
$(\Delta BM)^2$		0.008	0.030[b]		−0.014[a]	−0.001
		(0.96)	(2.27)		(−1.66)	(−0.04)
$(\Delta BM)^3$			0.001[a]			−0.001
			(1.67)			(−1.42)
$(\Delta BM)^4$			0.000[b]			0.000
			(−2.35)			(−1.03)
Δmom	0.434[b]	0.424[b]	0.499[b]	0.545[c]	0.639[c]	0.910[c]
	(2.12)	(2.12)	(2.35)	(3.46)	(3.70)	(5.39)
$(\Delta mom)^2$		0.008	0.000		0.033[a]	0.042
		(0.60)	(0.00)		(1.76)	(1.52)
$(\Delta mom)^3$			−0.001[b]			−0.012[c]
			(−2.12)			(−5.00)
$(\Delta mom)^4$			0.000			0.000[c]
			(0.40)			(−5.63)
Δilliq	0.195[b]	0.540[b]	0.834[c]	0.069	0.482	0.527
	(2.13)	(2.22)	(2.65)	(0.36)	(1.04)	(0.81)
$(\Delta illiq)^2$		0.005	0.004		0.005	−0.053
		(1.57)	(0.24)		(0.85)	(−0.51)
$(\Delta illiq)^3$			−0.002[a]			−0.005
			(−1.73)			(−0.30)

Table H.5 continued						
		SEO			DIV	
	Linear	2nd order	4th order	Linear	2nd order	4th order
$(\Delta\texttt{illiq})^4$			0.000[a]			0.000
			(−1.76)			(−0.27)
$\Delta\texttt{isv}$	−1.034[c]	−1.066[c]	−1.299[c]	−0.699[c]	−0.711[c]	−1.001[c]
	(−4.22)	(−4.32)	(−4.82)	(−3.48)	(−3.36)	(−4.38)
$(\Delta\texttt{isv})^2$		−0.023	0.029		−0.006	0.080
		(−0.59)	(0.60)		(−0.58)	(1.57)
$(\Delta\texttt{isv})^3$			0.009[b]			0.027[c]
			(2.12)			(3.23)
$(\Delta\texttt{isv})^4$			0.000			0.001[c]
			(−0.98)			(2.91)
$\Delta\texttt{inv}$	−0.101	−0.141[a]	−0.125	−0.151	−0.134	−0.240
	(−1.30)	(−1.79)	(−1.20)	(−1.41)	(−1.29)	(−1.56)
$(\Delta\texttt{inv})^2$		0.008	0.028[c]		−0.003	−0.011
		(1.23)	(3.02)		(−0.52)	(−0.55)
$(\Delta\texttt{inv})^3$			0.000			0.000
			(−0.03)			(0.59)
$(\Delta\texttt{inv})^4$			0.000			0.000
			(−1.03)			(−0.03)
$\hat{\alpha}$	−0.274[c]	−0.247[b]	−0.268[c]	0.315[c]	0.239[b]	0.061
	(−2.61)	(−2.35)	(−2.65)	(3.40)	(2.34)	(0.59)
Std. Error ($\hat{\alpha}$)	[0.105]	[0.105]	[0.101]	[0.093]	[0.102]	[0.102]
Adjusted R^2	0.003	0.002	0.003	0.003	0.004	0.005
F for linear terms	4.19	4.27	5.19	4.80	4.82	8.39
p-value	0.000	0.000	0.000	0.000	0.000	0.000
F for 2nd order terms		0.99	2.67		1.59	2.17
p-value		0.439	0.010		0.136	0.036
F for 3rd order terms			2.53			5.76
p-value			0.015			0.000
F for 4th order terms			1.95			6.66
p-value			0.061			0.000
Mean(CCAR)	−0.357[c]			0.422[c]		
t-value	−3.11			4.14		
N clusters	396			393		
N months	213,855			47,222		
N firms	5,556			1,170		

Table H.6: Additional tests of merger and acquisition (M&A) abnormal returns.

The sample contains M&As in the period January 1986 to December 2007 that have 60 months post-event returns available. Panel A reports results for all M&As, and Panel B excludes 1% of M&As with the most extreme post-event holding period returns (i.e., 0.5% from both tails). BHAR is the buy-and-hold abnormal return defined in equation (IV.1), CTAR(α_p), or calendar time abnormal return, is the intercept term of the modified Fama-French three-factor model defined in equation (IV.2) estimated using weighted least squares (WLS), and ASR is the average per month abnormal standardized return defined in equation (IV.10). The t-values below the abnormal returns for BHAR and ASR are defined by equations (IV.6) and (IV.9), respectively, and for CTAR(α_p) as the intercept t-ratio of the regression in equation (IV.2). Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

Panel A: Post-event subperiod statistics (N = 1,838)

		Post-Event Periods										
	M&A							Subperiod (Months)				
	Month	1 Month	2 Month	6 Month	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
BHAR(%)	0.51	−1.56^{c}	−1.22^{b}	−4.26^{c}	−6.56^{c}	−10.23^{c}	−6.70	−3.63^{c}	−2.65^{b}	−5.57^{c}	−4.06	−0.10
t-val	1.03	−3.36	−2.16	−3.47	−2.96	−2.65	−0.63	−3.25	−2.32	−2.86	−1.03	−0.03
CTAR(α_p)	−0.19	−2.39^{c}	−1.76^{c}	−0.62^{b}	−0.41^{a}	−0.30^{b}	−0.15	−0.40	0.01	−0.27	−0.32^{a}	−0.04
t-val	−0.24	−3.21	−3.32	−2.06	−1.71	−2.18	−1.26	−1.12	0.03	−1.06	−1.90	−0.20
ASR	0.05	0.00	−0.03	−0.08^{b}	−0.10^{c}	−0.09^{a}	−0.10^{a}	−0.09^{c}	−0.06^{a}	−0.11^{c}	−0.03	−0.05
t-val	1.49	0.04	−0.78	−2.41	−2.71	−1.94	−1.89	−2.79	−1.85	−2.89	−0.84	−1.27

Panel B: Post-event subperiod statistics, 1% trimmed sample (N = 1,828)

		Post-Event Periods										
	M&A							Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
BHAR(%)	0.48	−1.65^{c}	−1.29^{b}	−4.44^{c}	−6.85^{c}	−11.81^{c}	−22.92^{c}	−3.74^{c}	−2.63^{b}	−5.81^{c}	−4.45	−1.83
t-val	0.98	−3.54	−2.28	−3.61	−3.09	−3.13	−4.31	−3.36	−2.31	−2.98	−1.13	−0.54
CTAR(α_p)	−0.34	−2.28^{c}	−1.78^{c}	−0.63^{b}	−0.42^{a}	−0.32^{b}	−0.20^{a}	−0.41	0.01	−0.28	−0.33^{b}	−0.10
t-val	−0.43	−3.06	−3.32	−2.10	−1.74	−2.28	−1.68	−1.17	0.02	−1.07	−1.98	−0.55
ASR	0.04	0.00	−0.03	−0.09^{b}	−0.11^{c}	−0.09^{b}	−0.10^{b}	−0.10^{c}	−0.06^{a}	−0.11^{c}	−0.03	−0.05
t-val	1.41	−0.09	−0.85	−2.56	−2.80	−2.01	−1.97	−2.90	−1.85	−2.96	−0.88	−1.34

Table H.7: Additional tests of initial public offering (IPO) abnormal returns.

The sample contains IPOs in the period January 1980 to December 2007 that have 60 months post-event returns available. Panel A reports results for all IPOs, and Panel B excludes 1% of IPOs with the most extreme holding period returns (i.e., 0.5% from both tails). BHAR is the buy-and-hold abnormal return defined in equation (IV.1), CTAR(α_p), or calendar time abnormal return, is the intercept term of the modified Fama-French three-factor model defined in equation (IV.2) estimated using weighted least squares (WLS), and ASR is the average per month abnormal standardized return defined in equation (IV.10). The t-values below the abnormal returns for BHAR and ASR are defined by equations (IV.6) and (IV.9), respectively, and for CTAR(α_p) as the intercept t-ratio of the regression in equation (IV.2). Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

	IPO	Post-Event Periods										
								Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
Panel A: Post-event subperiod statistics (N = 3,077)												
BHAR(%)	0.01	1.75^{c}	3.15^{c}	1.04	−2.57	-16.75^{c}	-33.56^{c}	−1.16	-2.80^{b}	-4.86^{b}	-6.59^{a}	−0.01
t-val	0.03	3.58	4.23	0.71	−1.16	−3.51	−3.68	−0.95	−2.55	−2.38	−1.91	0.00
CTAR(α_p)	1.01	2.97^{c}	2.12^{c}	0.77^{b}	0.36	0.12	−0.05	0.30	0.45	0.11	0.25	−0.20
t-val	1.42	4.18	3.91	1.99	1.21	0.58	−0.31	0.77	1.10	0.36	1.06	−0.86
ASR	−0.03	0.06^{b}	0.03	−0.06	-0.16^{c}	-0.34^{c}	-0.43^{c}	-0.09^{b}	-0.17^{c}	-0.19^{c}	-0.30^{c}	-0.26^{c}
t-val	−0.76	2.00	0.80	−1.41	−3.17	−5.68	−6.48	−2.33	−4.14	−3.77	−6.22	−5.82
Panel B: Post-event subperiod statistics, 1% trimmed sample (N = 3,061)												
	IPO	Post-Event Periods										
								Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
BHAR(%)	0.03	1.77^{c}	3.17^{c}	1.08	−2.91	-19.06^{c}	-47.03^{c}	−1.13	-2.84^{c}	-5.11^{b}	-7.15^{b}	−1.26
t-val	0.07	3.62	4.24	0.73	−1.33	−4.28	−7.88	−0.92	−2.59	−2.53	−2.07	−0.41
CTAR(α_p)	1.19^{a}	3.00^{c}	2.11^{c}	0.78^{b}	0.35	0.07	−0.17	0.27	0.47	0.08	0.17	-0.44^{a}
t-val	1.71	4.21	3.90	2.03	1.18	0.33	−1.02	0.70	1.18	0.26	0.71	−1.89
ASR	−0.03	0.06^{b}	0.03	−0.06	-0.16^{c}	-0.34^{c}	-0.43^{c}	-0.09^{b}	-0.16^{c}	-0.18^{c}	-0.30^{c}	-0.26^{c}
t-val	−0.76	1.98	0.79	−1.38	−3.13	−5.71	−6.54	−2.28	−4.11	−3.73	−6.27	−5.88

Table H.8: Additional tests of seasonal equity offerings (SEO) abnormal returns.

The sample contains SEOs in the period January 1980 to December 2007 that have 60 months post-event returns available. BHAR is the buy-and-hold abnormal return defined in equation (IV.1), CTAR(α_p), or calendar time abnormal return, is the intercept term of the modified Fama-French three-factor model defined in equation (IV.2) estimated using weighted least squares (WLS), and ASR is the average per month abnormal standardized return defined in equation (IV.10). The t-values below the abnormal returns for BHAR and ASR are defined by equations (IV.6) and (IV.9), respectively, and for CTAR(α_p) as the intercept t-ratio of the regression in equation (IV.2). Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

		Post-Event Periods										
	SEO							Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
Panel A: Post-event subperiod statistics (N = 3,052)												
BHAR(%)	0.49	0.24	1.18^{b}	2.06^{b}	−0.61	-9.54^{c}	-9.91^{a}	0.48	-2.12^{b}	-2.68^{b}	-4.37^{a}	4.63^{a}
t-val	1.25	0.61	2.33	2.11	−0.42	−3.34	−1.84	0.56	−2.20	−1.98	−1.77	1.87
CTAR(α_p)	0.26	1.87^{c}	0.83^{b}	0.22	−0.07	-0.29^{b}	−0.17	−0.10	−0.20	−0.25	-0.51^{c}	−0.03
t-val	0.37	3.34	2.12	0.77	−0.32	−1.97	−1.31	−0.32	−0.69	−1.08	−3.33	−0.16
ASR	−0.02	0.10^{c}	0.08^{c}	0.04	−0.01	-0.12^{c}	-0.13^{c}	0.00	-0.06^{b}	−0.05	-0.14^{c}	-0.06^{a}
t-val	−0.87	4.35	3.10	1.42	−0.37	−2.72	−2.64	0.06	−2.03	−1.29	−3.68	−1.66
Panel B: Post-event subperiod statistics (1% trimmed sample (N = 3,036)												
		Post-Event Periods										
	SEO							Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
BHAR(%)	0.52	0.23	1.18^{b}	2.00^{b}	−0.58	-10.67^{c}	-17.05^{c}	0.41	-2.01^{b}	-2.63^{a}	-5.10^{b}	3.57
t-val	1.31	0.58	2.33	2.04	−0.40	−3.80	−4.03	0.48	−2.09	−1.94	−2.10	1.50
CTAR(α_p)	0.31	2.00^{c}	0.89^{b}	0.21	−0.07	-0.32^{b}	-0.25^{a}	−0.13	−0.18	−0.25	-0.56^{c}	−0.10
t-val	0.44	3.60	2.27	0.73	−0.30	−2.19	−1.95	−0.41	−0.63	−1.06	−3.70	−0.56
ASR	−0.02	0.10^{c}	0.08^{c}	0.04	−0.01	-0.12^{c}	-0.13^{c}	0.00	-0.06^{b}	−0.05	-0.14^{c}	-0.06^{a}
t-val	−0.82	4.30	3.05	1.35	−0.38	−2.73	−2.66	0.00	−1.98	−1.29	−3.70	−1.68

Table H.9: Additional tests of dividend initiations (DIV) abnormal returns.

The sample contains dividend initiations (DIVs) in the period January 1980 to December 2007 that have 60 months post-event returns available ($N = 970$). BHAR is the buy-and-hold abnormal return defined in equation (IV.1), CTAR(α_p), or calendar time abnormal return, is the intercept term of the modified Fama-French three-factor model defined in equation (IV.2) estimated using weighted least squares (WLS), and ASR is the average per month abnormal standardized return defined in equation (IV.10). The t-values below the abnormal returns for BHAR and ASR are defined by equations (IV.6) and (IV.9), respectively, and for CTAR(α_p) as the intercept t-ratio of the regression in equation (IV.2). Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

		Post-Event Periods										
	DIV							Subperiod (Months)				
	Month	1 Month	2 Months	6 Months	1 Year	3 Years	5 Years	2-6	7-12	2-12	13-36	37-60
Panel A: Post-event subperiod statistics (N = 970)												
BHAR(%)	1.36^{b}	−0.18	0.49	0.37	0.15	−2.40	5.94	0.01	0.84	−0.10	-7.83^{b}	3.16
t-val	2.53	−0.31	0.61	0.25	0.06	−0.46	0.65	0.01	0.62	−0.05	−2.04	0.74
CTAR(α_p)	1.56^{b}	0.14	0.22	−0.25	−0.07	-0.44^{a}	−0.27	−0.29	0.08	−0.10	-0.70^{c}	0.03
t-val	2.22	0.18	0.35	−0.63	−0.23	−1.90	−1.40	−0.71	0.20	−0.32	−2.63	0.12
ASR	0.20^{c}	0.04	0.12^{c}	0.17^{c}	0.18^{c}	0.16^{c}	0.24^{c}	0.17^{c}	0.10^{b}	0.18^{c}	0.07	0.18^{c}
t-val	4.55	0.91	2.82	3.47	3.89	3.04	3.96	3.61	2.17	3.91	1.35	3.61

Table H.10: Abnormal returns after Mergers and Acquisitions (M&A) events for sub-periods 1986–2002 and 2003–2014.

The sample contains M&As in the period January 1986 to December 2014 divided into two subsamples. The first subsample includes events from 1986 to 2002 and second subsample from 2003 to 2014. BHAR is the buy-and-hold abnormal return defined in equation (IV.1), CTAR, or calendar time abnormal return, is the intercept of the Fama-French three-factor model defined as $(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + e_{pt}$, and ASR is the average per month abnormal standardized return defined in equation (IV.10). The t-values below the abnormal returns for BHAR and ASR are defined by equations (IV.6) and (IV.9), respectively, and for CTAR(α_p) as the intercept t-ratio of the above Fama-French three-factor regression. Because BHAR is sensitive to few outliers as documented in (Dutta et al., 2015), the holding period return distributions are 1 percent trimmed by dropping 0.5 percent of firms from both tails of the period's BHAR distribution. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

	M&A	Post-Event Periods								
	Month	1 Month	2 Months	3 Months	6 Months	12 Months	24 Months	36 Months	48 Months	60 Months
Panel A: Events during 1986–2002										
BHAR(%)	0.63^a	−0.48	−0.57	−0.49	−0.52	−1.84	−2.74	−0.89	−2.70	-6.17^b
t-val	1.79	−1.38	−1.21	−0.83	−0.63	−1.48	−1.54	−0.40	−1.09	−2.28
CTAR(α_p)	0.31	-0.81^c	-0.56^b	-0.38^a	−0.24	−0.29	−0.17	−0.02	0.08	0.11
t-val	1.09	−3.17	−2.47	−1.81	−1.33	−1.49	−0.94	−0.14	0.53	0.78
ASR	0.05^b	−0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01^a	0.01
t-val	2.20	−0.39	−0.13	0.51	0.86	0.56	1.09	1.42	1.75	1.26
N of Firms	3,067	3,012	3,015	3,015	3,016	3,016	3,016	3,016	3,016	3,016
N of Months	3,067	3,012	6,002	8,975	17,679	34,194	62,740	86,270	105,897	122,816
N of Clusters	198	198	203	205	208	214	226	238	250	262
Panel B: Events during 2003–2014										
BHAR(%)	0.95^c	−0.27	-0.85^a	-1.22^b	-1.77^b	-3.93^c	-7.02^c	-7.85^c	-9.01^c	-9.31^c
t-val	3.01	−0.83	−1.89	−2.28	−2.24	−3.47	−4.36	−4.31	−4.22	−4.15
CTAR(α_p)	0.80^c	−0.31	-0.37^a	-0.30^a	-0.34^c	-0.32^c	−0.14	−0.13	−0.14	−0.14
t-val	3.13	−1.31	−1.84	−1.89	−2.71	−3.22	−1.40	−1.28	−1.36	−1.35
ASR	0.08^c	0.00	−0.03	-0.03^a	-0.02^a	-0.03^b	-0.02^c	-0.02^c	-0.02^c	-0.03^c
t-val	3.13	0.06	−1.49	−1.79	−1.73	−2.43	−2.96	−3.02	−3.02	−3.35
N of Firms	2,136	2,095	2,095	2,095	2,095	2,096	2,097	2,097	2,098	2,098
N of Months	2,136	2,095	4,161	6,203	12,186	23,295	42,133	57,315	69,368	78,935
N of Clusters	144	143	143	143	143	143	143	143	143	143

Table H.11: Abnormal returns after Initial Public Offering (IPO) events for sub-periods 1980–2002 and 2003–2014.

The sample contains IPOs in the period January 1980 to December 2014 divided into two subsamples. The first subsample includes events from 1980 to 2002 and second subsample from 2003 to 2014. BHAR is the buy-and-hold abnormal return defined in equation (IV.1), CTAR, or calendar time abnormal return, is the intercept term of the Fama-French three-factor model defined as $(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + e_{pt}$, and ASR is the average per month abnormal standardized return defined in equation (IV.10). The t-values below the abnormal returns for BHAR and ASR are defined by equations (IV.6) and (IV.9), respectively, and for CTAR(α_p) as the intercept t-ratio of the above Fama-French three-factor regression. Because BHAR is sensitive to few outliers as documented in (Dutta et al., 2015), the holding period return distributions are 1 percent trimmed by dropping 0.5 percent of firms from both tails of the period's BHAR distribution. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

	IPO	Post-Event Periods								
	Month	1 Month	2 Months	3 Months	6 Months	12 Months	24 Months	36 Months	48 Months	60 Months
Panel A: Events during 1980–2002										
BHAR(%)	−0.23	0.83^c	1.24^c	1.45^c	−0.77	-8.08^c	-16.20^c	-23.39^c	-27.96^c	-35.15^c
t-val	−0.71	3.26	3.34	3.14	−1.18	−8.54	−11.27	−13.10	−13.47	−15.49
CTAR(α_p)	−0.07	1.80^c	1.36^c	1.09^c	0.47^b	0.01	−0.10	−0.02	0.05	0.10
t-val	−0.17	5.13	4.60	4.07	2.10	0.03	−0.48	−0.12	0.29	0.57
ASR	-0.13^c	0.01	−0.01	−0.01	-0.04^c	-0.08^c	-0.09^c	-0.08^c	-0.08^c	-0.07^c
t-val	−3.88	0.34	−0.30	−0.73	−2.80	−5.47	−7.39	−7.82	−7.86	−8.06
N of Firms	4,131	7,430	7,495	7,512	7,523	7,529	7,529	7,530	7,530	7,530
N of Months	4,131	7,430	14,862	22,272	44,401	87,651	164,710	227,281	277,342	317,947
N of Clusters	266	273	276	278	281	287	299	311	323	335
Panel B: Events during 2003–2014										
BHAR(%)	0.32	1.56^c	2.91^c	3.65^c	−0.42	1.87	0.11	−1.96	−2.32	−3.57
t-val	0.56	3.14	3.85	3.91	−0.33	0.99	0.05	−0.66	−0.71	−1.07
CTAR(α_p)	1.10^b	0.90^a	1.04^b	0.95^b	0.02	−0.02	−0.02	0.01	0.04	0.06
t-val	2.06	1.67	2.29	2.31	0.07	−0.09	−0.07	0.05	0.18	0.27
ASR	−0.06	0.06	0.04	0.03	-0.05^a	−0.02	−0.02	−0.02	−0.02	−0.02
t-val	−0.77	1.17	1.04	0.81	−1.76	−0.91	−1.19	−1.26	−1.21	−1.30
N of Firms	687	1,229	1,229	1,229	1,229	1,229	1,229	1,229	1,229	1,229
N of Months	687	1,229	2,442	3,637	7,164	13,698	24,396	32,632	38,786	43,398
N of Clusters	115	134	139	142	142	142	142	142	142	142

Table H.12: Abnormal returns after Seasoned Equity Offering (SEO) events for sub-periods 1980–2002 and 2003–2014.

The sample contains SEOs in the period January 1980 to December 2014 divided into two subsamples. The first subsample includes events from 1980 to 2002 and second subsample from 2003 to 2014. BHAR is the buy-and-hold abnormal return defined in equation (IV.1), CTAR, or calendar time abnormal return, is the intercept term of the Fama-French three-factor model, $(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + e_{pt}$, and ASR is the average per month abnormal standardized return defined in equation (IV.10). The t-values below the abnormal returns are obtained from their associated t-ratios that for BHAR and ASR are defined by equations (IV.6) and (IV.9), respectively, and for CTAR(α_p) as the intercept t-ratio of the above Fama-French three-factor regression. Because BHAR is sensitive to few outliers as documented in (Dutta et al., 2015), the holding period return distributions are 1 percent trimmed by dropping 0.5 percent of firms from both tails of the period's BHAR distribution. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

	SEO	Post-Event Periods								
	Month	1 Month	2 Months	3 Months	6 Months	12 Months	24 Months	36 Months	48 Months	60 Months
Panel A: Events during 1980–2002										
BHAR(%)	1.28^{c}	2.14^{c}	2.02^{c}	2.36^{c}	3.19^{c}	0.29	-4.30^{c}	-7.24^{c}	-8.59^{c}	-9.76^{c}
t-val	4.70	8.16	5.49	5.24	4.99	0.31	−3.40	−4.67	−4.60	−4.54
CTAR(α_p)	0.33	1.25^{c}	0.58^{c}	0.44^{c}	0.26^{a}	−0.08	-0.23^{a}	−0.21	−0.12	−0.05
t-val	1.17	5.17	3.28	2.64	1.80	−0.56	−1.70	−1.57	−0.97	−0.44
ASR	0.02	0.14^{c}	0.07^{c}	0.05^{c}	0.03^{b}	0.00	−0.01	-0.02^{a}	-0.02^{b}	-0.02^{b}
t-val	0.78	6.75	4.36	3.12	2.37	0.05	−1.23	−1.88	−2.05	−2.12
N of Firms	5,652	5,607	5,620	5,621	5,623	5,623	5,623	5,623	5,624	5,624
N of Months	5,652	5,607	11,173	16,690	32,896	63,832	119,031	165,674	204,720	237,648
N of Clusters	274	274	277	278	281	287	299	311	323	335
Panel B: Events during 2003–2014										
BHAR(%)	−0.25	0.39	−0.54	−0.75	-1.47^{a}	-4.50^{c}	-7.29^{c}	-13.13^{c}	-14.90^{c}	-16.18^{c}
t-val	−0.61	1.18	−1.12	−1.25	−1.70	−3.51	−4.20	−6.48	−6.76	−6.90
CTAR(α_p)	−0.47	-0.53^{a}	-0.83^{c}	-0.76^{c}	-0.65^{b}	-0.61^{b}	-0.51^{b}	-0.45^{a}	-0.42^{a}	-0.40^{a}
t-val	−0.89	−1.70	−2.95	−2.88	−2.57	−2.60	−2.27	−1.95	−1.82	−1.76
ASR	-0.13^{c}	−0.01	-0.05^{b}	-0.05^{c}	-0.05^{c}	-0.06^{c}	-0.06^{c}	-0.06^{c}	-0.06^{c}	-0.06^{c}
t-val	−4.84	−0.29	−2.58	−2.89	−3.71	−4.69	−4.94	−5.61	−5.64	−5.41
N of Firms	3,319	3,284	3,284	3,284	3,286	3,287	3,289	3,293	3,295	3,296
N of Months	3,319	3,284	6,525	9,721	19,062	36,011	63,693	84,662	100,744	112,721
N of Clusters	144	143	143	143	143	143	143	143	143	143

Table H.13: Abnormal returns after Dividend Initiation (DIV) events for sub-periods 1980–2002 and 2003–2014.

The sample contains dividend initiations in the period January 1980 to December 2014 divided into two subsamples. The first subsample includes events from 1980 to 2002 and second subsample from 2003 to 2014. BHAR is the buy-and-hold abnormal return defined in equation (IV.1), CTAR, or calendar time abnormal return, is the intercept term of the Fama-French three-factor model, $(R_{pt} - R_{ft}) = \alpha_p + \beta_p(R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + e_{pt}$, and ASR is the average per month abnormal standardized return defined in equation (IV.10). The t-values below the abnormal returns are obtained from their associated t-ratios that for BHAR and ASR are defined by equations (IV.6) and (IV.9), respectively, and for CTAR(α_p) as the intercept t-ratio of the above Fama-French three-factor regression. Because BHAR is sensitive to few outliers as documented in (Dutta et al., 2015), the holding period return distributions are 1 percent trimmed by dropping 0.5 percent of firms from both tails of the period's BHAR distribution. Superscripts represent significance levels for two-tailed t-tests as follows: $a = 0.10$, $b = 0.05$, and $c = 0.01$.

	DIV	Post-Event Periods								
	Month	1 Month	2 Months	3 Months	6 Months	12 Months	24 Months	36 Months	48 Months	60 Months
Panel A: Events during 1980–2002										
BHAR(%)	2.35^{c}	0.73^{a}	1.18^{b}	1.90^{c}	3.80^{c}	4.66^{c}	5.81^{b}	7.85^{b}	10.57^{c}	11.63^{c}
t-val	5.92	1.81	2.08	2.76	3.88	2.92	2.39	2.53	2.85	2.72
CTAR(α_p)	1.93^{c}	0.90^{c}	0.85^{c}	0.97^{c}	0.95^{c}	0.80^{c}	0.71^{c}	0.61^{c}	0.56^{c}	0.52^{c}
t-val	6.26	3.05	3.96	5.14	6.15	6.36	5.80	5.20	5.04	4.84
ASR	0.21^{c}	0.06^{b}	0.07^{c}	0.09^{c}	0.09^{c}	0.07^{c}	0.06^{c}	0.05^{c}	0.05^{c}	0.05^{c}
t-val	6.85	1.98	3.16	4.25	5.93	6.57	5.53	5.10	5.27	5.54
N of Firms	1,742	1,719	1,729	1,734	1,735	1,736	1,737	1,737	1,737	1,737
N of Months	1,742	1,719	3,422	5,123	10,050	19,325	35,731	49,513	61,307	71,230
N of Clusters	271	271	277	278	281	287	299	311	323	335
Panel B: Events during 2003–2014										
BHAR(%)	1.63^{c}	0.69	0.17	1.11	−0.21	−0.33	−1.77	−1.00	−2.55	−2.04
t-val	2.97	1.21	0.21	1.13	−0.14	−0.15	−0.60	−0.28	−0.60	−0.49
CTAR(α_p)	1.46^{c}	0.12	0.00	0.20	0.21	0.19	0.11	0.06	0.01	−0.07
t-val	3.79	0.33	−0.01	0.89	1.26	1.32	0.86	0.44	0.07	−0.53
ASR	0.13^{c}	0.05	0.02	0.06^{b}	0.04^{a}	0.04^{b}	0.03^{b}	0.03^{b}	0.03^{b}	0.02^{b}
t-val	2.75	1.07	0.62	2.04	1.90	2.32	2.13	2.49	2.47	2.11
N of Firms	630	622	622	622	622	622	622	622	622	622
N of Months	630	622	1,227	1,821	3,551	6,742	12,091	16,176	19,453	22,102
N of Clusters	134	133	142	143	143	143	143	143	143	143