Essays on top management and corporate behavior

Wu, H.T.

Human behavior is fascinating, and there is no exception to what its influences are on the financial market. This dissertation consists of three essays that examine corporate behavior that is affected by decisions made by the top management. The first essay studies the rationale for leveraged buyout syndication. It demonstrates discrepancies among the decisions made by managers with different educational backgrounds as well as a network effect when it comes to cooperation. The second essay investigates what firm attributes lead to CEO option date manipulation. It suggests that this practice is not a result of inferior corporate governance, and the passage of the 2002 SOX seems to change the considerations behind. The third essay explores whether the existence of family influences helps alleviate the traditional principal-agent problem in small corporations. The findings are consistent with family control acting as a substitute for pay performance as a corporate governance mechanism. Taken together, this dissertation contributes to the understanding not only the role played by the top management, but also the mechanisms involved in the process, either in decision making or in performance.

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Essays on Top Management and Corporate Behavior   Hui-Ting Wu

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Hui-Ting Wu

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	Prof. dr. Marc K. Francke
	Dr. Paolo F. Volpin

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謹將此博士論文獻給我最親愛的老爸老媽以及最敬愛的阿公.

Contents

Chapter 1

Introduction

Human behavior is fascinating, and there is no exception to what its influences are on the financial market. This dissertation consists of three essays that examine corporate behavior that is affected by decisions made by the top management. More specifically, I study the considerations involved in the decisions to syndicate leveraged buyout deals (Chapter 2), to backdate or otherwise manipulate top executive stock option grants (Chapter 3), along with the design of top executive compensation with regard to family ownership (Chapter 4). In addition, I relate those decisions to firm performance, which might in return help verify the rationale behind the decision making process.

On the surface, these topics seem unrelated. Nevertheless, these decisions which influence performance all involve the top management in the corporations, i.e. senior managers in private equity firms (Chapter 2), and chief executive officers in public firms (Chapter 3) as well as in small public firms (Chapter 4). Therefore, this dissertation aims to contribute to the understanding not only the role played by the top management, but also the mechanisms involved in the process, either in decision making or in performance.

1.1 Private Equity

Private equity is refered to the pool of money invested in firms that are not publicly traded on a stock exchange or invested as part of buyouts of publicly traded firms to make them privately owned. The origin of modern private equity[1] in the U.S. can be traced back to the

[1] Hereafter private equity refers to (leveraged) buyout investments, not including venture capital, real estate, and any other asset class at times regarded as private equity as well. In this dissertation, I would

1950s. The first wave of leveraged buyout (LBO) boom comes in the 1980s, and since then it has become an important phenomenon in the financial market. Due to the junk bond market crash in the late 1980s, many LBO firms go bankrupt, and the LBO activities almost come to a halt during the 1990s. It is not until the mid-2000s that we observe a second wave of boom which peaks in the middle of 2007.

The typical LBO firms are organized as a partnership or limited liability corporation. They are managed by General Partners (GPs), who make large acquisitions without committing all the capital required for the acquisition, mostly involving significant amount of outside debt financing[2] for the purpose of tax benefits, among others. In a typical LBO transaction, the private equity firm buys majority control of existing or mature firms, usually in constrast with young and emerging companies targeted by venture capital firms. Their investment funds have a roughly 10 to 14 years' life cycle. Usually, a new fund is initiated every 2 to 4 years, and there can be multiple funds simultaneously run by these firms. They raise funds from Limited Partners (LPs), mostly institutional investors nowadays, who are not allowed to add or withdraw their capital during the funds' life. There are three main channels (exits) that LBO firms realize their returns: an initial public offering (IPO), a merger or acquisition[3], and a recapitalization.

Among other proponents of leveraged buyouts, Jensen (1989) argues that private equity firms apply financial, governance, and operational engineering to their portfolio companies. Combining these three sets of changes improves firm operations and results in economic value creation. More specifically, compared with a typical public corporation with dispersed shareholders, low leverage, and weak corporate governance, private equity firm adopts highly leveraged capital structures, concentrated ownership, high-powered incentive managerial compensation, active governance, and a lean, efficient organization with minimal overhead costs. He thus predicts that this leveraged buyout organization would eventually become the

use the terms private equity and leveraged buyout interchangeably.

[2] Historically, the debt portion of an LBO transaction ranges from 60%-90% of the purchase price (Kaplan and Stromberg, 2009) .

[3] It includes: sold to strategic buyer, secondary buyout, sold to LBO-backed firm, and sold to management.

dominant form of corporations. Some critics dismiss this view and argue that value creation comes from tax breaks, superior information, and market timing (mispricing), without any real operational improvement.

Syndicated deals are common in the private equity industry. However, unlike the extensive study of venture capital syndication or loan syndication, the literature on leveraged buyout syndication is scarce. To fill the gap, in Chapter 2 ("Leveraged Buyout Syndication"), I use a sample of 947 LBO transactions mostly in the U.S. and Europe between 1991 and 2005 to study the considerations involved when senior managers in the private equity industry choose to syndicate the deals or not; and if yes, whom do they select to syndicate the deals with? Furthermore, I examine how the deal performance is driven by these two decisions, which helps verify the rationale for syndication in the first place. In short, I aim to examine the determinants as well as the consequences of leveraged buyout syndication. Moreover, since the decisions are made by the management team, my analysis focuses on the perspectives of the managers. In particular, I test whether their educational backgrounds might influence the decision to syndicate and whether there exists a networking effect when it comes to the selection of syndication partners.

1.2 Executive Stock Option Compensation

Since the 1980s, facing promising prospects but with financial constraints, firms have started to grant stock options to employees, especially in the high-technology industry. Stock options offer the recipients a right to buy company stock at a set price and usually have a vesting period of several years. These options are usually granted by directors and detailed by a compensation committee. In most cases, companies make their grants at the same time each year, avoiding the potential for date manipulation, but in fact no law requires this.

Apart from compensation, option grants aim to provide incentives that align the interests between ownership and control, which is viewed as an effective way to alleviate the principal-agent problems (Jensen and Meckling, 1976). As time goes by, taking options as an indispensable part of compensation packages becomes a common practice across firms. Hall and Murphy (2002) estimate that in 1998 the median values of stock and options owned by S&P's industrial and financial CEOs (chief executive officers) are $30 million and $55 million, respectively. Besides, Core and Guay (1999) find that, between 1992 and 1996, stock options contribute approximately one-third to the value of the median CEO's equity portfolio and one-half of total equity incentives, i.e. the sensitivity of portfolio value to stock price.

In the face of academic studies and comprehensive press coverage suggesting the wide use of executive stock option backdating among firms, in Chapter 3 ("Backdating or Otherwise Manipulating CEO Stock Option Grants"), I investigate what factors might lead to this practice. In contrast with the option repricing mechanism and the managerial power view, my alternative hypothesis is that option backdating or otherwise grant date manipulation is simply one way to reward and/or retain outperforming managers. To test this hypothesis, I study the universe of the U.S. top executive stock option grants. More specifically, the sample comprises 6,836 stock option grants of the top executives in the S&P 1500 companies during the period of 1999-2007.

Following Heron and Lie (2009), I estimate the likelihood of option manipulation based on the assumption that, in the absence of manipulation, the abnormal stock returns during the month preceding and following the grant dates should be centered around zero. One of the contributions is that, this study makes it possible for regulators and/or shareholders to identify firms that are more tempted to this practice. As a robustness check, I use a sub-sample of 126 companies being under internal review or (in)formal federal investigations regarding accounting and tax issues, and study whether the rationale still holds for this sub-sample.

Chapter 4 ("Small Family Firm, Agency Costs, and CEO Performance Pay") explores whether the existence of family influences helps alleviate the traditional principal-agent problem in small corporations. The literature on family firm is comprehensive, in particular regarding the relationship between family ownership and firm performance. However, few studies discuss the mechanisms involved in corporate governance. This chapter aims to provide a potential link, i.e. the design or the structure of CEO compensation. To that end, I construct a sample of 168 small publicly-traded U.S. firms between 2001 and 2005. I first evaluate the agency costs and examine how the family influences might mitigate, if any, the costs by the design of CEO compensation.

Chapter 2

Leveraged Buyout Syndication

Syndicated deals are common in the private equity industry, and in fact, approximately 25% of the deals are syndicated. But, unlike venture capital syndication or loan syndication, there is little literature on leveraged buyout syndication. In this chapter, I study its determinants from the perspectives of management team and how the performance is influenced by the selection of syndication partners as well as the management team attributes.

2.1 Introduction

Since the 1980s, the private equity (PE) industry has been playing an active role in the M&A market. Stromberg (2007) estimates the total value of leveraged buyout (LBO) transactions to be approximately $3.6 trillion between 1970 and 2007, corresponding to roughly 14,000 companies under management worldwide in the early 2007, the peak of the most recent cycle.

To find promising deals, PE managers evaluate information that they collect. Other things being equal, it is natural to expect discrepancies among deals managed by different teams since managers coming from various backgrounds might interpret information and evaluate situations from different perspectives[1]. Moreover, the team composition might affect the decision through the interactions among managers within the team, which might be critical to final performance of the deals (e.g. Naranjo-Gil, Hartmann, and Maas, 2008;

[1] Educational psychology studies psychology that includes both methods of study and a resulting knowledge base. Among others, it analyzes how different educational settings might influence student behavior and cognitive perspectives that might form a long term memory (e.g. Huitt, 2001, 2003).

Certo et al., 2006).

Syndication, a form of joint underwriting among investment parties, is one common deal type of LBO transactions[2] despite there is little literature on LBO syndicated investments. In this chapter, I examine the rationale for LBO syndication, and in particular, I am interested in how management team characteristics, mainly measured by managerial education backgrounds, might influence syndication decisions. More specifically, my aim is three-fold, at first, to understand why LBO management teams decide to syndicate. Furthermore, based on the decision to syndicate the deal, whom do they syndicate with? Do they syndicate more with those who share similar backgrounds? Lastly, by linking both syndication and management team composition to performance, I attempt to know how these two factors might drive performance, if any. The answer to the last question would not only shed some light on what kind(s) of management team composition work better, but, more importantly, help verify the rationale for LBO syndication.

Due to the lack of solid theoretical and empirical foundation for LBO syndication, similar to Officer, Ozbas, and Sensoy (2009), I formulate my testing hypotheses based on the well-established venture capital (VC) syndication literature. In this chapter, I use three of its determinants as controlled variables, i.e. geographic distance, investment size, and investor experience. In a nutshell, I hypothesize that geographic distance and investment size would increase, whereas investor experience decreases, the syndication likelihood. Firstly, for distance, syndication tends to diffuse information across industry boundaries and expand the spatial radius of transactions, and thus achieve diversification (e.g. Stuart and Sorensen, 2001). Additionally, for investment size, syndication can address financial constraint issues (e.g. Gerasymenko and Gottschalg, 2008). As for investor experience, younger firms might seek syndication in order to pool relevant signals and improve deal-screening process that is under uncertainties and with asymmetric information (e.g. Hopp and Rieder, 2006). In other words, syndication might also provide a certification by having more investors in deals.

[2] For instance, Boone and Mulherin (2009) estimate, between 2003 and 2007, 43% of the deals are co-invested by more than two PE firms. Officer, Ozbas, and Sensoy (2009) estimate, from 1984 to 2007, 35% of the deals conducted by prominent PE firms are syndicated.

Also pertinent to my study, a considerable body of literature focuses on how human capital and (social/educational) networks influence corporate policy and performance. Zarutskie (2007) argues that skill plays an important role in the heterogeneity and persistence of VC fund performance, and Hochberg, Ljungqvist, and Lu (2007) find that better networked VC firms show significant superior fund performance. In another asset class, Chevalier and Ellison (1999) find that mutual fund performance can be explained by the characteristics of fund managers which might indicate ability, knowledge, or effort. Alternatively, the top management team literature probes how the management team composition, either measured by homogeneous or heterogeneous skills, affects performance, if at all. Given the pros and cons in theory, not surprisingly, the evidence is ambivalent. In this chapter, I hypothesize that homogeneous teams would increase the syndication likelihood because heterogeneous (or complementary) skills are necessary to achieve superior performance when non-routine decisions are involved and essential for the outcome (e.g. Hambrick and Mason, 1984).

I hand-collect a unique dataset which contains information regarding the characteristics of 947 LBO transactions mostly in the U.S. and Europe between 1991 and 2005, along with the biographies of managers in the corresponding investment firms. The uniqueness of my dataset is two-fold: for one thing, other than the details of these transactions when initiated, the final performance is also known; for the other, the (historical) biographies of the management team members are available, in which the conventional databases usually provide merely the current team information. My empirical evidence shows that investment size, geographic distance, and investor experience are positively correlated with syndication propensity. Therefore, syndicating deals serves clearly for the purpose of diversification ahead of exit and also to overcome financial constraint. However, certification is less needed in the BO industry, because the portfolio companies are mostly mature ones with established track records, in contrast with those in venture capital deals.

Regarding the management team composition, I find that teams consisting of engineers and MBA graduates (MBAs) are prone to syndication. In particular, Harvard and INSEAD MBAs are more likely to syndicate deals. Once managers decide to syndicate the deal, the alternative hypothesis is that the selection of the partner(s) is for the purpose of value enhancing. Otherwise, the selection is likely in anticipation of future reciprocity of deals. Other things being equal, those who the managers already know are more likely to be in the pool of potential candidates for selection. To test the hypothesis, I form a subsample of 134 syndicated deals co-invested by only two firms and use the McFadden conditional logit model to examine the selection process for MBAs (and the subgroups). I find that, on average, MBAs tend to work with other MBAs and engineers, but, to a lesser extent, not with top managers having regular Master degrees. Moreover, I find discrepancies among MBAs coming from different major schools. Harvard MBAs tend to work with each other, but not with regular Master graduates. Columbia MBAs are more likely to work with each other and with engineers. Other MBAs do not show specific preferences.

For teams consisting of high levels of MBAs (the subgroups), in general they tend to work with each other and with engineers. However, Harvard MBAs still prefer to work with each other only, and Chicago MBAs again do not show particular preferences. Also, having more Harvard MBA graduates in the team increases the number of syndication partners. These findings suggest that Harvard MBAs are more capable of syndication via their renowned alumni network. Once looking at all syndicated investments, syndication tends to reinforce the existing team attributes that have low ratios. In fact, syndication increases the skill heterogeneity of the team, which does affect the decision to syndicate. Namely, though not the first order concern, teams with homogeneous education backgrounds might seek syndication to complement skills or abilities that the team lacks.

When it comes to performance, I do not expect a linear relationship between syndication and performance to exist. At first glance, if firms are certain about the prospects of the deal (e.g. NPV>0) under consideration and the capability of conducting the deal alone, there seems no obvious reason to search for syndication partners to begin with. Hence, syndicated investments should yield lower returns. On the other hand, the opposite holds true if syndication renders value-adding services. Brander, Amit and Antweiler (2002) use data in Canada and show that syndicated VC investments outperform their counterparts, suggesting that syndication enhances value. Nonetheless, since both factors can be simultaneously at play, there is no clear prediction how syndication should affect deal performance.

To illustrate, I build up a simple two-stage game, in which, based on the payoff structure[3], I would predict two performance patterns depending on these two transaction forms. That is, 1. non-syndicated > syndicated > non-syndicated ≅ syndicated; 2. syndicated > non-syndicated > non-syndicated ≅ syndicated. My data shows that performance of syndicated investments clusters, compared with that of non-syndicated ones. It thus indicates that the best and the worst performers tend to be non-syndicated deals, and performance of syndicated ones would lie somewhere in between. In other words, the benefits derived from syndication are not large enough to make up for the "loss" as if the deal were a non-syndicated one. Due to the inherent inferior nature of syndicated deals, I can view syndication as a "treatment", and in that regard I still do not find a linear relationship between syndication and performance.

When simultaneously taking into account these three factors, i.e. syndication decisions, management team composition, and performance, I find that, investment size and geographic distance are detrimental to performance, which might explain why these two factors lead to the decision to syndicate deals in the beginning. In terms of deal types, MBAs enhance performance in non-syndicated ones, but not in syndicated ones. For deals syndicated by two investors, the only team combination that consistently enhances performance is having (more) Harvard MBAs in both firms. Another same-school combination which seems to generate synergies arises with Chicago MBAs. It thus suggests that, for (Harvard) MBAs, seeking to work with each other is not simply because they know each other (and their abilities), but also, more importantly, because by working together they can contribute to performance.

All in all, my study demonstrates that, the rationale for syndication is to make deals that otherwise might not be able to. It serves for the purpose of diversification and overcomes

[3] More specifically, whether the value added by syndicated partners is large enough to compensate for the value that does not make it a non-syndicated investment during the pre-deal screening stage.

financial constraint, despite of less need for certification. When it comes to the selection of syndication partners, Harvard MBAs prefer to work with each other, and those from other major schools tend to work with each other and also with engineers, potentially aiming to attract complementary expertise. Moreover, for non-syndicated investments, MBAs enhance deal performance, despite they exert no significant influence on syndicated ones. It thus suggests that MBAs are good at pre-deal screening, and might further explain why they would seek outside expertise, on top of the typical deal size and geography considerations for syndication, and those who they know are easier to be in the pool of candidates for syndication. Since the only syndication match that increases deal value is the "Harvard MBA-and-Harvard MBA" pair, it suggests that Harvard MBAs might choose to syndicate with each other because a personal acquaintance enables a better match of skills. For other teams, the choice of syndication partner(s) is more likely to reflect diversification needs and/or future deal reciprocity.

My study contributes to the current literature mainly in the following four fronts. First of all, I provide evidence that management team matters for corporate policy. Unlike Bottazzi and Da Rin (2007) that use managerial characteristics to determine investor activism in the venture capital industry, I use LBO transactions to show the importance of human capital. Secondly, I find the rationale for cooperation among investment parties is to complement (substitute) some factors that are beneficial (detrimental) to final performance. Thirdly, I show that the considerations for LBO and VC syndication are similar, but discrepancies remain. That should attribute to their different inherent nature, along with the uncertainties and risks that both face. Lastly, I add to the top management team literature that simply looking at the homogeneity or heterogeneity of the team does not help to understand how the team performs, if any. Instead, my results suggest that different specific compositions of management team might be what really matters for performance.

The remainder of this chapter proceeds as follows: Section 2 gives a brief literature review that relates to possible determinants of LBO syndication. Section 3 contains hypotheses to be tested. Section 4 describes the dataset and the sample formation used in the analyses. Section 5 shows the estimation methods and testing results. Section 6 concludes. Section 7 displays the tables and figures.

2.2 Literature Review

To my best knowledge, up to date there is still little study on LBO syndication, regardless of the fact that it is a common investment form in the private equity industry. Officer, Ozbas, and Sensoy (2009) study the pricing and characteristics of club deals in the public U.S. companies that are conducted by prominent PE firms. They find that target shareholders receive roughly 10% less of pre-bid firm equity value in club deals compared to their sole-sponsored counterparts. This phenomena exists mostly before 2006 in target companies that have low institutional ownership. Moreover, they find little evidence for benign motivations for club deals based on capital constraints and diversification, or for the purpose of better deal terms such as favorable debt level or pricing, despite club deals seem to reduce post-annoucement competition. Boone and Mulherin (2009) analyze whether PE consortiums facilitate collusion in takeover bidding on the public U.S. companies. They do not find negative effects of consortiums on either takeover competition or target returns, and it thus suggests that collusion not be a motivation when it comes to consortium formation.

On the other hand, the related literature on the VC syndication that has interesting parallels to its LBO counterpart is rich. Hence, I apply it in my settings and use some of those determinants as my controlled variables for the subsequent testing.

2.2.1 Determinants of Venture Capital Syndication

For practitioners, the motivations for syndication are straightforward: to get mutual consent on the deals, to secure follow-on financing, and to spread risks. The literature on venture capital provides two main reasons for syndication, i.e. screening for deal flow improvement and adding value to portfolio companies. For the latter, it facilitates the sharing of information, contacts, and resources among VCs. Bygrave (1988) finds that the top 21 high innovative venture capitalists (HIVCs) comprise a tightly coupled network because of the high uncertainty they encounter. By comparison, a group of the top 21 firms investing mainly in low innovative technology companies has a more loosely bound. Other value-adding possibilities are to expand the customer bases or strategic alliance partners for portfolio companies (PCs). On the other hand, for the purpose of pre-deal screening, at least four considerations, described as follows, might be at play.

Future Reciprocity

VC firms (VCs) syndicate in anticipation of future reciprocity. Lerner (1994a) argues that early-round investors might do so, hoping that their partners will share investing opportunities in later rounds of their deals. Consequently, VCs should offer shares in the best deals to those most able to reciprocate, that is, the well-established venture firms.

Certification

Under severe uncertainty and asymmetric information regarding the investment prospects, syndication aims to pool correlated signals and select better investments. Sah and Stiglitz (1986) show that hierarchical organizations might be superior, or more efficient, in which investment decisions are made only if more than one independent observer agrees. That being said, having other VCs' willingness to co-invest might attribute to the decision of investing in a promising deal. Moreover, Hopp and Rieder (2006) show that, for VCs, the number of realized funds and the (subsequent) ability of deal evaluation are positively connected.

In this aspect, the issue regarding the uncertainty and asymmetric information facing BO investments is much less of a concern for BO firms because the portfolio companies involved are usually more established, concentrating in the mature industries.

Diversification

Syndication could diffuse information across sector boundaries and also expand the spatial radius of transactions, and thus achieve diversification. Stuart and Sorensen (2001) show that evolution of VC relationships appears to facilitate information sharing, eroding of geographic and industrial boundaries in the VC asset allocation. Therefore, VC syndication makes a promising deal that otherwise would not be possible. They also argue that, institutions supported by broad participation among market players must precede the expansion of the spatial range of exchange in markets that reply on private information or require a high degree of trust for transactions to occur. In this context, VC syndication indeed provides the institutional infrastructure needed.

Financial Constraint

Financial consideration might also contribute to VC syndication. Gerasymenko and Gottschalg (2008) find evidence supporting the argument that some deals require capital that is more than a single fund's capability or willingness due to its investment strategy. In addition, De Clerq and Dimov (2004) show that high financial requirement of late-stage deals is the main reason for syndication, compared to early-stage counterparts. However, Brander et al. (2002) find syndication occurs in small deals as well.

2.2.2 Networks, Human Capital, and Performance

In the private equity domain, the skills and networks of managers are regarded as important attributes, among others, to its recent seemingly out-performance, along with its persistence. For one thing, before investing, managers must be able to identify and evaluate prospective portfolio companies. After investing, they usually play an active role in both monitoring and advising their funds' portfolio companies, e.g. Kaplan and Stromberg (2001). One additional benefit from providing these value-adding services is that private equity firms might stand in a favorable position for the best deals, e.g. Gompers and Lerner (2001). Consequently, the skills and networks of managers matter for performance heterogeneity, and thus its persistence.

Networks and Performance

In financial markets, agents can gain informational advantages through their social networks. Cohen, Frazzini, and Malloy (2008) collect data on educational backgrounds of sell-side equity analysts and also that of senior officers and board members of companies, and show that analysts outperform on stock recommendations when they have an education link to the firms under analysis. They suggest two mechanisms which allow information transferred within the networks: cheaper access to firm-specific information and better access to managerial quality. After the passage of Regulation FD in 2000, which is designed to curb selective disclosure, this abnormal return pattern almost disappears. As a result, selective disclosure is regarded as the main information pathway along educational networks.

Due to the inherently high uncertainty and few tangible assets, syndication, the cooperation among financial institutions, is commonplace within the VC industry. It is believed to affect the two main drivers of its performance: the ability to screen for high-quality deal flows and that to nurture investments by providing value-adding services. Hochberg, Ljungqvist, and Lu (2007) investigate the association between the fund performance and network in the VC industry. They find that better networked VC firms show significant superior fund performance, measured by the portfolio company exit percentage, either through IPO or resale. Also, the portfolio companies of better networked VCs have a higher tendency to refinance and eventual exit.

Human Capital and Performance

Chevalier and Ellison (1999) use a sample of 492 mutual fund managers between 1988 and 1994, and examine the relationship between mutual fund performance and the characteristics of fund managers which might indicate ability, knowledge, or effort. After controlling for behavioral differences between managers and selection biases, the original significant performance heterogeneity is greatly reduced. Even so, some differences remain, and managers who attend higher SAT undergraduate institutions have systematically higher risk-adjusted excess returns.

By using the first-time VC fund data, Zarutskie (2007) argues that skill plays an important role in heterogeneity and persistence of fund performance and further shows which measures of skill matter and when. In particular, those VC teams equipped with venture investing and/or start-up management experiences enhance fund performance, in terms of higher percentages of portfolio company exits. More, the founding team features on performance indicate higher explanatory power in seed stage funds than that in later stage ones. Lastly, different team composition seems to affect how portfolio company exits, and the predictive ability of VC characteristics persists in follow-on investments.

2.2.3 Management Team Composition

As closely related to the topic of management team composition, the top management team (TMT) literature has been debating whether complementary skills or the heterogeneity within the management team are required for superior performance[4], especially when non-routine decisions are involved and crucial for the outcome (Hambrick and Mason, 1984). For example, heterogeneity can enhance performance via the following channels: multiple perspectives (Bantel and Jackson, 1989) and increased levels of information (Williams and O'Reilly, 1998). In addition, group heterogeneity serves a proxy for cognitive heterogeneity associated with task conflicts which can generate better decisions (Pelled et al., 1999, and Amason, 1996).

On the contrary, heterogeneity can jeopardize performance because of interpersonal conflicts which might hinder the group's ability to make effective decisions (Amason, 1996). The conflicts could come from different attitudes and values (Bantel and Jackson, 1989). Moreover, the use of categorization, e.g. (negative) stereotypes, which might result in emotional conflicts between group members (Pelled et al., 1999). Both reasoning might affect two main drivers of team performance, i.e. social integration and communication, either formal or informal (Smith et al., 1994, Williams and O'Reilly, 1998). Under this circumstance,

[4] Lopez-de-Silanes and Phalippou (2008) show that, in the buyout transactions, the concentration of managerial background in the investment team might result in inferior performance.

homogeneous teams are often associated with speedy and efficient coordination (Carpenter, 2002, and Hambrick et al., 1996), which would eventually lead to superior performance.

Weighing the pros and cons that the heterogeneity of the management team might bring to performance, it is not surprising that the empirical results are mixed. Even so, I tend to think that complementary skills are necessary for successful deals, and thus homogeneous management teams might be prone to syndication in order to supplement the skills lacked among the existing team members.

2.3 Hypotheses

As mentioned in the beginning, my primary research question is whether the management team characteristics, in terms of education backgrounds, are among the determinants of LBO syndication decisions? As a result, based on the theoretical implications in the VC literature, described in the previous section, my alternative hypotheses are the following,

H1: The managerial backgrounds (in education) play a role in syndication decisions

H1a: The syndication likelihood increases with the homogeneity level (in terms of skills) of the management team

Control variables:

1. geographic distance (to test the diversification hypothesis):

   H1: The syndication likelihood increases with the geographic distance between location of the portfolio company and that of the investor

2. investor experience (to test the certification hypothesis):

   H1: The syndication likelihood decreases with the (previous) experience of the investor

3. investment size (to test the financial constraint hypothesis):

   H1: The syndication likelihood increases with the investment size

4. fixed effects: PC location and industry, BO firm, and transaction year

2.4 Data and Sample

2.4.1 Institutional Background

LBO firms, managed by General Partners (GPs), make large acquisitions without committing all the capital required for the acquisition, mostly involving significant amount of debt financing for the purpose of tax benefits. Their investment funds, co-invested by Limited Partners (LPs), mainly institutional investors, who are not allowed to add or withdraw their capital during the funds' life, have a life cycle of approximately 10 to 14 years. Usually a new fund is initiated every 2 to 4 years, and there can be multiple funds simultaneously run by these firms.

2.4.2 Data

My main data source comes from the hand-collected Private Placement Memorandum (PPMs)[5] of LBO firms mainly in the U.S. and Europe. In the PPMs, I observe the equity invested, total amount distributed, and the valuation of any unsold stake, at the time when the PPM was compiled, for each investment. Its multiple, i.e. valuation divided by capital invested, as one of the performance measures, is always reported. Additionally, in most cases the following information is also available: month and year of acquisition and exit, internal rate of return (IRR), investment type and status (realized or unrealized), exit route, the industry and the country of the PCs, and the biography of senior managers, including those who already left the firm.

The original dataset consists of 6611 investments that can be traced back to as early as 1971. Then, I apply the following screening criteria, i.e. transactions occurred after 1990, buyout related, exit already, with identifiable fund and portfolio company information, and a sample of 1317 investments remains. Next, in order to gather information on syndication

[5]When LBO firms raise money to start a new fund, they would distribute fund raising prospectuses, the so-called Private Placement Memorandum (PPMs), to the public. The PPMs outline the terms of securities to be offered in a private placement. In this case, they include the performance of all previous investments done by the firms.

and also for the purpose of data correction, I match this sample with whatever is available in Capital IQ and VentureXpert that meets my needs. For instance, both databases provide, among others, a list of investors involved in the transactions. In the end, I verify 947 investments, which constitute the final sample in this chapter.

As for the management team characteristics, I complement the data by using several other sources, such as Galante's Directory, zoominfo, linkedin, and the website of firms. In short, my dataset contains comprehensive information regarding LBO transactions and the biographies of senior managers[6] involved in those transactions. However, for those I cannot determine when they join (and leave) the firm, I would exclude them. Therefore, the uniqueness of my dataset is two-folds. For one thing, the final performance of these transactions is known. For the other, the historical management team characteristics are available. The conventional databases usually cover only current management teams.

2.4.3 Sample

Table 1 shows the sample statistics in terms of investments (value of capital invested in Panel A and year in Panel B), portfolio companies (geographic location in Panel C and industry orientation in Panel D), and LBO firms (geographic location in Panel E and firm type in Panel F). Firstly, by and large, more than three-quarters of the sample, syndicated or not, has investment size less than 50 million dollars, adjusted for inflation (deflated by CPI of December 2006). Compared with non-syndicated investments, syndicated ones tend to involve larger capital input, although there exist some outliers for non-syndicated investments. Except larger ones, for most of size category, the ratio between non-syndicated and syndicated investments remains roughly 2 to 1. As for the timing of the sample deals, more than half (57.33%) of the transactions occur between 1995 and 1999, which coincides

[6] Titles include: managing director, partner (but exclude operating, administrative, advisor, recruiting, technology, venture and special partner), principal (exclude finance principal), director (exact), executive director (exclude (independent or former) non-executive director), senior director, controller, senior manager, investment director, chief executive, chairman (exclude vice chairman), chief financial officer, founder, and some with discretions (e.g. Director in the syndicated team). Exclude titles related to: vice president, analyst, investment manager, investor relations, associate director, marketing, associate, assistant, account, and advisor.

the booming period of the buyout industry in the last decade. The patterns for syndicated and non-syndicated transactions are similar during the whole sample period, which also fits the time trend of the whole buyout industry described in Stromberg(2007).

In addition, the majority (54.59%) of the sample PCs is located in the U.S., and around 21% in the U.K. PCs in the U.S., the U.K., and France together comprise more than 80% of the sample, in which a similar pattern of geographic distribution holds for the LBO firms. The sample PCs concentrate in two industries, manufacturing (chemical/related and industrial) and services, around 28% and 24%, respectively. Lastly, at least 65% of the LBO firms are private investment firms, and around 13% belong to the financial service investment arm category.

On the other hand, Table 3 shows another set of sample statistics[7] in terms of management teams (team size in Panel A, managerial nationality in Panel B, education backgrounds in Panel C, and school of MBAs in Panel D). Taking all the transactions as a whole, approximately one-third of the sample is conducted by teams with 5 to 10 professionals. Management teams with up to 20 professionals conduct almost 90% of transactions in the sample. The syndicated and non-syndicated transactions share a similar pattern for size distribution, though there is long tail for non-syndicated transactions. On average, the syndicated deals are done by two more professionals than that for the non-syndicated ones. As for managerial nationality, it is not surprising to see that the majority of the professionals in the sample are from the U.S. (60.71%), and the U.K. (19.26%).

Panel C shows the team attributes[8] for the 1304 professionals (firm-personnel) involved in the sample transactions. Note that more than 70% and almost half of the professionals have business backgrounds[9] and own a MBA degree, respectively. Moreover, about 20% of the professionals are Harvard alumni, which suggests that being in the Harvard network might influence corporate policy. Panel D shows the school distribution of the MBAs.

[7] We consider only the sample LBO firms, excluding the syndicated partners in this part.

[8] These characteristics are not exclusive. For instance, a Harvard MBA graduate who qualifies as a CPA would be assigned to CFA/CPA/CA, MBA, Business, Harvard MBA, and Harvard Alumni at the same time.

[9] It includes specialization in Accountancy, Commerce, Economics, Business, Marketing, and Finance.

Among them, about 30% of the MBAs come from Harvard, followed by Wharton (8.32%), Columbia (7.69%), and Stanford (7.54%).

2.5 Estimation and Testing Results

2.5.1 Determinants of LBO Syndication

Mean- and Median-Test Analysis

Firstly, I conduct several mean- and median-tests on the explanatory variables prior to the regression analyses. In general, the testing results for the control variables in Table 2 suggest that investment size, geographic factors, and investor experience might all affect syndication decisions. For one thing, capital invested size is significantly larger for syndicated investments. For another, geographic factors, measured by the geographic distance between the acquirer and the target, there exist significant discrepancies between investments made by single and multiple investors. In particular, the distance is shortened for syndicated investments when considering the whole investment partners. As for the investor experience, the test results of firm age, measured by the difference between the founding year of the LBO firm and the acquiring year of the portfolio company, show that more experienced firms tend to syndicate more. And therefore, it seems that the uncertainty and asymmetric information consideration is less severe in the buyout industry, contrary to the VC industry.

Syndication and Investment Size

Figure A.1 and A.2 demonstrate the three estimated relations between syndication propensity and investment size. When the size is small, less than approximately 7 million dollars, there exists a positive relationship, but the upward trend diminishes thereafter until the size reaches around 100 million dollars, in which the trend reverses and turns downward sloping, possibly due to the outliers. In sum, the evidence of positive linear relationship between syndication and investment size is consistent with Gerasymenko and Gottschalg

(2008), despite the relationship is not obvious anymore once I relax the estimation method.

Syndication and Geographic Distance

According to Figure A.3, the relationship between syndication and geographic distance is not obvious, and a weak positive correlation might exist before some threshold, e.g. 6000 kilometers. However, Figure A.4 shows that this relationship is more likely non-linear, and more specifically, the syndication propensity has a spike when the geographic distance is small, and then increases gradually after it reaches around 2000 kilometers. This pattern is interesting and, in fact, more in line with my prior expectation since I do not know who initiate(s) the syndication in the first place. Figure A.5 and A.6 consider the entire syndicated partners, and the patterns are more prominent.

Compared with the findings of Stuart and Sorensen (2001) who argue that VC network enhances the probability to invest in distant target that otherwise might not be possible, I also find evidence that syndication propensity increases with geographic distance between the LBO firm and its target.

Syndication and Investor Experience

The estimated relationship between syndication and investor experience, as displayed in Figure A.7 and A.8, indicates that there is an upward trend between the two. Nevertheless, unlike the previous two factors, this relationship is relatively weak. It is not surprising since the targets are usually mature companies, and the consideration for certification is not pressing. Therefore, there is less need for syndication.

Syndication and Management Team Composition

Regarding the managerial characteristics, I primarily consider education backgrounds, at the same time controlling for two other features, whether qualifying as CFA/CPA/CA and/or being founder of the LBO firm. In terms of education, I categorize each professional with 5 various kinds of educational training, i.e. MBA, Law[10], Business, Engineering, and

[10] Includes: J.D., L.L.M., and L.L.B. degrees.

(general) Master[11] degrees. Due to the significant proportion of the Harvard graduates among the professionals, I add one variable, Harvard MBA, to see if it would also be influential in my analyses. Moreover, to test whether the concentration of backgrounds affects the decision to syndicate deals, I create a "skill concentration" variable which adopts the calculation similar to the Herfindahl Index, and it consists of three different skills, i.e. Law, Business, and Engineering.

To begin with, I am interested to know how different, if any, the management teams in syndicated and non-syndicated transactions are. The variables of interest are measured by density, which is the ratio of the number of professionals who have specific characteristics to the team size, with value between 0 and 1, except the skill concentration variable. The reason that I use density, instead of absolute number, of specific team attributes is mainly to reduce potential influences of team size. As a matter of fact, I do find that team size in syndicated deals is significantly larger than that in non-syndicated deals, by both mean- and median-tests. Moreover, it is common that different job titles are adopted across firms, and thus the construction of management teams often requires discretionary judgement. Last but not the least, that data coverage varies across firms also leads to the choice of density for analysis.

The mean test in Table 4 shows that professionals being the founding partners of the firm favor syndication less. In contrast, professionals who are MBA, Engineering, and Harvard graduates are prone to syndication. Apart from that, in other aspects, there exist no significant differences between these two groups. Note that syndicated investments seem conducted by teams with higher homogeneous skills, insignificant though. On the other hand, the median test suggests a similar and, in some cases, even stronger relationship between syndication and management team composition.

[11] Excludes: MBA, J.D., and L.L.M. degrees.

Regression Analyses

My purpose is to test the main null hypothesis that managerial backgrounds do not play a role in syndication decisions, controlling for other possible determinants such as geographic distance, investment size, and investor experience. Following the preceding analyses, in this section I conduct two sets of regression analysis and investigate which factors might affect: 1. the decision to syndicate; 2. the selection of syndication partners.

Syndication Decision: Whether to Syndicate or Not?

By applying the linear probability estimation, I regress syndication, a binary variable, on factors that I intend to test. In other words, by incorporating these factors into one regression, I allow for the so-called "horse race" among several alternative hypotheses, and the outcome might shed some light on the importance of different aspects when it comes to syndication decisions. The specification is as follows,

Syndication Propensity =

f(Managerial Team Attributes, Investment Size, Geographic Distance, Investor Experience), while I control for: transaction year, LBO firm, and PC industry and location.

Table 5 reports the correlation matrix of the explanatory variables, and Table 6 shows the regression results in which the management team characteristics are quantified by the density variables introduced in the previous section. In Panel A (general models), Specification (1), (2), (3), and (4) are the basic models while Specification (5)-(8) control for transaction year and PC industry fixed effects. In Panel B (restricted models with MBA team attributes only), Specification (1)-(8) do not control for fixed effects, while Specification (9)-(10) do.

On the face of it, I find that investment size, geographic distance, and investor experience do matter in syndication decisions, with unequal statistical significances[12]. All three factors

[12] Panel A in Table 13 shows the alternative results from the binomial probit estimation. Both estimations result in very similar outcome, but on the whole the linear probability estimation gives slightly stronger estimates.

are positively associated with syndication propensity, although only investor experience remains significant once I control for all four fixed effects. To illustrate, for instance, a 10 million increase of investment size would significantly increase roughly 5% of syndication propensity. Likewise, a 10 kilometer increase of geographic distance would have, on average, 2% more chance to syndicate. Lastly, the influence of investor experience is much less than the former two factors, merely 0.2%. In other words, that syndication occurs can be because the invested capital is too large (either capable to handle or not), and/or the firm considers to enter a new market (for diversification or expansion). On the other hand, it is less of a concern that young firms syndicate more to overcome the uncertainty and information asymmetry issues.

As for the team composition, what stands out is that teams with engineers and MBAs[13] tend to syndicate more. In particular, having one engineer in a 10-member team would raise the syndication propensity by approximately 3%. On the other hand, the concentration on skills within the team does not influence the decision to syndicate. So, I cannot reject the null hypothesis H1a, and syndication decisions is not associated with the homogeneity level (in skills) of management team.

Syndication Decision: Whom to Syndicate with?

Since there is evidence that different team educational attributes influence syndication propensity, the next question of interest is: if they are prone to syndication, whom they choose to syndicate with? To that end, I form a subsample with 134 deals co-invested by two firms only so that I can avoid factors that might affect deals conducted by more than 2 investors. Moreover, I assume that, for these deals, firms only attempt to seek one (best) syndication partner. In this setup, I use the McFadden conditional logit model for the syndication partner selection process, since that model works best for the selection of one alternative among many. Each investment firm(f) at time t can choose among all other investing firms(i) in the sample with available team attributes data at time t. The

[13] Among the subgroups of MBA graduates, Harvard and INSEAD MBA graduates are more likely to syndicate deals.

dependent variable is a dummy variable equal to one for the investing-candidate pairs that co-invest with each other at time t.

More specifically, similar to the modeling in Kuhnen (2009), the selection process follows the random utility model of McFadden (1974). For each firm f, the utility from choosing syndication partner $i \in \{0, ..., I\}$ is $y^*_{fi} = \beta' x_{fi} + \epsilon_{fi}$. Here, x_{fi} is a vector of observable attributes of the firm and of the syndication partner, while ϵ_{fi} indicates unobservable characteristics that might affect the utility. Let i be the choice of firm f that maximizes its utility: $y_f = \arg u \max(y^*_{f0}, y^*_{f1}, ..., y^*_{fI})$. McFadden (1974) shows that if $\{\epsilon_{fi}\}_{i \in 0,1,...,I}$ are independently distributed with Weibull distribution $F(\epsilon_{fi}) = \exp(-e^{-\epsilon_{fi}})$, then the probability that candidate i is selected is:

$$\Pr ob(y_f = i | x_f) = \frac{e^{\beta' x_{fi}}}{\sum_{h=0}^{I} e^{\beta' x_{fh}}}$$

Since I am interested in the mutual relations, I only consider interaction terms of the team attributes between firms. In other words, the attributes of the available team matches (choices), rather than the attributes of individual firms[14], are what matter in the selection process. (Individual) explanatory variables are measured in percentages (absolute levels of team attributes). In general, the specification is as follows,

Matching Propensity =

f(MBA(f)*MBA(i), MBA(f)*Engineer(i), MBA(f)*Law(i), MBA(f)*Master(i))

Table 7 shows the coefficient estimates of the predictors of syndication partner selection for MBAs. Specification (1) is the basic model for MBAs in general. Specification (2) to (7) provide estimates for different subgroups. Top MBAs include those who are graduated from Harvard, Wharton, Stanford, Columbia, Chicago, INSEAD, or MIT business schools. I find that, Harvard MBAs tend to work with each other, but not with regular Master graduates. Columbia MBAs are more likely to work with both each other and engineers. Other MBAs

[14] Econometrically, it is not feasible to add individual team attributes to the regressions due to the lack of variations for each investment.

do not show specific preferences.

Alternatively, instead of percentages, I use dummy variables to estimate the predictors, as displayed in Panel A (B) in Table 14, in which the interaction terms are dummy variables that are assigned to 1 as long as the absolute values for both the investment firm and the syndicated partner exceed the median (third quartile) value among all sample firms at the time when the deal is initiated. The results show that, for teams consisting with high levels of MBAs (the subgroups), they tend to work with each other and engineers. However, Harvard MBAs still prefer to work with each other only, and Chicago MBAs again do not show particular preferences.

Robustness: Number of Syndication Partners

Alternatively, instead of two stage process, it is possible that the syndication decisions is contingent on the availability of syndication partners. By applying ordinary least square estimation, I regress the number of syndication partners, a discrete variable, on the same set of explanatory variables. Note that, for non-syndicated investments, the number of syndicated partners is zero. The specification is as follows,

Number of Syndication Partners =

g(Managerial Team Attributes, Investment Size, Geographic Distance, Investor Experience), while I control for: transaction year, LBO firm, and PC industry.

The estimation results in Table 13 (Panel B) suggest that, similar to the previous syndication determinants, geographic distance, and teams with engineers and Harvard MBAs solely determine how many syndication partners would be in the transactions. This is not surprising, since other than the predilection for syndication, engineers and Harvard MBAs are more capable of finding syndication partners via their renowned (alumni) networks. Similarly, the concentration on skills within the team does not affect the number of the partners for the syndicated investments.

To sum up, there is evidence supporting the three (controlling) alternative hypotheses that investment size, geographic distance, and investor experience are among the issues that managers might be pondering during the syndication decisions making process[15]. When considering the management team composition, teams with engineers and (Harvard) MBAs syndicate more. Meanwhile, teams with engineers and Harvard MBAs are more capable of finding and working with multiple syndicated partners. Nevertheless, the concentration of skills within the team, the proxy for the homogeneity level, does not influence the syndication propensity, and thus not the main consideration for syndication.

Discussions

Based on the findings, management team composition seems to play a role in syndication decisions. However, is it part of the consideration? More specifically, are deals syndicated for the purpose of adjusting the existing team composition that might be crucial to final performance? To that end, I check, for the syndicated investments, the change of the team composition before and after the syndication. The mean- and median-test results in Table 8 suggest that, syndication reinforces some of the existing team composition, instead of reducing it. However, since the entire enhancement relates to characteristics which have low proportions to start with, syndication might in fact increase the heterogeneity of the team. Indeed, the concentration level of skills is reduced after syndication. Therefore, teams with homogeneous education backgrounds might complement skills or abilities that the team lacks by means of syndication. To simply put it, the adjustment of the team composition is more likely the by-product, not the cause, of syndication itself.

2.5.2 Syndication, Management Team, and Performance

So far, I find that LBO firms syndicate deals to address issues such as financial constraint, diversification, and/or certification. But ultimately, the inevitable question is, does syndication really pay off? Moreover, since management team composition matters for syndication decisions, does it matter for performance as well, either through syndication or not?

[15] The deal can be contingent on the syndication decision.

Syndication and Performance

As mentioned before, syndication might happen for two main reasons, for superior deal selection and value-adding services. Brander, Amit and Antweiler (2002) argue that, if the former holds true, syndicated investments should have lower returns since firms have no obvious reasons to share deals that they regard as promising, less uncertain, and meanwhile capable of conducting alone. On the contrary, if the latter holds true, the reverse should hold, and I should expect syndication would result in higher returns. They use Canadian data and find that syndicated investments have higher returns, which supports the value-adding interpretation. Nonetheless, both considerations can be simultaneously at play, and if so, there is no clear prediction how syndication might affect deal performance. As a matter of fact, my data shows that the correlation between performance and syndication is slightly negative, without statistical significance.

Even though it can be eventually an empirical question, I believe that it is more likely that firms would not turn to syndication if they do not necessarily have to. I postulate a very simple two-stage game, as illustrated in Figure 1, that in the first stage, firms evaluate deals and if needed, they enter the second stage to search for outside assistance. In the first stage, there are three outcomes for a typical deal, NPV_1=A>0, NPV_1<0, and NPV_1=0. Firms would disregard ones with negative NPV, and invest deals with positive NPV, alone. For the rest, such as deals that need others' value-adding services or with uncertain NPV, syndication is more probable. In this game, three possible NPVs that the syndicated partner can generate are, NPV_{12}=B>0, NPV_{12}<0, and NPV_{12}=0, and I assume profits are shared equally between the two firms. The worst investments can be non-syndicated and syndicated. However, the best performers can be either one, depending on which of the following conditions holds,

$$\left\{ \begin{array}{l} \text{if } A \geqslant (1/2) * B \;\; => \text{non-syndicated} > \text{syndicated} > \text{non-syndicated} = \text{syndicated...(1)} \\ \text{if } 0 < A < (1/2) * B => \text{syndicated} > \text{non-syndicated} > \text{non-syndicated} = \text{syndicated...(2)} \end{array} \right\}$$

Table 9 shows the performance distribution (ranked by deciles) of the sample investments, by two measures, multiple (Panel A) and gross internal rate of return (Panel B). In addition, Figure 2 and 3 display the corresponding histograms, winsorized at 5% level, for both the non-syndicated and the syndicated investments. Consistent with my priors, regardless of which proxy that I use, performance of non-syndicated investments is more dispersed whereas that of syndicated ones clusters in the middle, suggesting (1) holds in my data. That being said, the benefits reaped from syndication are not able to cover the inherent "loss" from being inferior in nature.

Syndication, MBA Team Attributes, and Performance

Since syndicated investments are more likely to be inherently inferior, I may regard the act of syndication itself as a "treatment". Therefore, to know how syndication and management team composition might influence performance, I apply the treatment-effects model that generates two-step consistent estimates, in which the results are presented in Table 10. As expected, syndication has no impact on performance, no matter which proxy in use. Teams with Harvard MBAs outperform teams with other characteristics. As for the control variables, the negative relations that geographic distance and investment size have with performance might be exactly why they determine syndication in the first place. The skill concentration variable has no impact on performance. In summary, syndication itself is not associated with performance, but management team composition does affect performance.

When separately considering these two types of investments, Table 11 shows that MBAs enhance performance of non-syndicated ones (except INSEAD MBAs), but in general exert no influences on syndicated ones. Furthermore, Table 12 shows that, for deals syndicated by only two co-investors, the only team combination that matters for performance is having (more) Harvard MBAs in both firms, and its effect is significantly positive, regardless which performance proxy in use[16]. It thus suggests that for Harvard MBAs, seeking to work with each other is not simply because they know each other, but also because by working together

[16] The "Stanford MBA-and-Stanford MBA" team combination is beneficial to performance when using Gross IRR as the proxy.

they can contribute to final performance. That being said, for other MBAs, syndication is more likely to anticipate future reciprocity (from each other).

Discussions

Since non-syndicated and syndicated investments seem to be different in nature, I expect management team in general would exert influence on performance in different ways, if any. In this section, I use two criteria, syndication and performance[17], and form four sub-groups. By conducting several mean- and median-test analyses, I attempt to understand whether management team composition varies between superior and inferior investments. And if yes, what kind(s) of composition are beneficial (detrimental) to performance, conditional on syndication decisions?

Table A.1 (Panel A and B) shows the mean and median test results for Multiple, while the results for IRR are exhibited in Panel C and D, respectively. Generally speaking, no matter which performance proxy in use, I find that, for non-syndicated deals, there indeed exist differences between the two groups. In terms of Multiple, founders, business skills, and Harvard MBAs are valuable. Similar to Zarutskie (2007), having entrepreneurship is constructive to performance. Furthermore, enhancing the homogeneity level of skills is beneficial to performance. On the other hand, regarding IRR, engineers and regular Master graduates are valuable. Meanwhile, the mean test results show that business skills and Harvard MBA are beneficial to performance, while lawyers appear to jeopardize performance.

As for syndicated investments, management team composition does not seem to matter. It is not surprising since I need to take into account the whole syndicated partners in order to understand the real team composition. Table A.2 shows how the change in team composition due to syndication might affect performance. On the whole, there is no obvious relationship between the change and performance, despite having more engineers through syndication is harmful. This finding might explain why even though management team

[17] More specifically, high (low) performance refers to deals having the highest (lowest) 25% performance, either with proxy IRR or Multiple.

composition might be among the issues considered during the syndication decisions making process, it does not have the first order importance.

2.6 Conclusion

Syndicated investments are commonplace in the private equity industry. The reasons to syndicate deals can be to alleviate risks and uncertainties encountered during the pre-deal screening process, and also to provide post-deal value-adding services. However, unlike VC syndication being the most similar type of investments, LBO syndication has drawn little attention in academia. In this chapter, by examining 947 LBO transactions conducted mostly between 1990 and 2006, I investigate the rationale for syndication. There are four alternative hypotheses for testing, that is: whether investment size, geography, investor experience, and management team composition (in education) affect syndication decisions. The last hypothesis is what my focus is. I show that, concerns about investment size and geography lead to syndication decisions in order to overcome financial constraint limitation and to achieve diversification, respectively. Meanwhile, syndication might help alleviate issues regarding uncertainty and information asymmetry, though it is much less severe in the buyout industry.

When it comes to team attributes, teams with engineers and MBAs are prone to syndication. By using a subsample of 134 syndicated deals conducted by only two investors, I find that, on average, MBAs tend to work with other MBAs and engineers, but, to a lesser extent, not with top managers having regular Master degrees, despite discrepancies remain among MBAs coming from different major schools. For instance, Harvard MBAs tend to work with each other. Columbia MBAs are more likely to syndicate with both each other and engineers. For teams with high levels of MBAs from different schools, they tend to work with each other and engineers as well. Still, Harvard MBAs prefer to work with each other only, and Chicago MBAs do not show particular preferences. Since having more Harvard MBAs increases the number of syndication partners, it suggests that Harvard MBAs might be more capable of syndication (through their alumni network). More, syndication tends to reinforce the existing team attributes with low proportions, and thus increases the heterogeneity of the team. In other words, teams with homogeneous education backgrounds might conduct syndication to complement skills or abilities that the team lacks, which is not the primary consideration though.

With regard to performance, I find a non-linear relationship between syndication and performance. I postulate that, in theory, the worst performers can be both transaction forms, while the best can be either non-syndicated or syndicated, hinging on whether the benefits from syndication are large enough to make up for being inherently inferior. My data shows that the best and the worst investments are non-syndicated, and the syndicated ones cluster in the middle. When simultaneously taking into account syndication decisions, management team composition, and performance, I find that, for non-syndicated investments, team composition matters for performance, but not so for syndicated ones, even after controlling for team attributes of the entire syndicated partners. I also show that investment size and geographic distance are detrimental to performance. In other words, that size and distance are the determinants of the decision to syndicate deals is not only because they overcome the financial constraint and achieve diversification, but also because both factors are, in substance, harmful to performance. Team wise, management teams with lawyers and Harvard MBAs are beneficial to performance. For deals syndicated by two co-investors, the only team combination that matters for performance is having (more) Harvard MBAs in both firms, and its effect is significantly positive.

In sum, I argue that, the rationale for LBO syndication is to make deals that otherwise might not be able to. The considerations behind might be to overcome the financial constraint and to diversify the investment portfolios of the firm. When managers decide to syndicate, Harvard MBAs prefer to work with each other, and those from other major schools tend to work with engineers as well as each other. Since, for non-syndicated investments, MBAs enhance deal performance, but have no influences on syndicated ones, it suggests better pre-deal screening abilities and explains why they would need to seek outside expertise when needed. Other things being equal, those who they know are easier to be in the pool of candidates for syndication. Due to the fact that the only syndication match that increases deal value is the "Harvard MBA-and-Harvard MBA" pair, Harvard MBAs working with each other is not simply because they know each other (and their abilities), but also because working together contributes to the performance. That also suggests, for other MBAs, syndication is more likely to anticipate future deal reciprocity and/or to diversify.

There are two more general implications from my study. Firstly, to firms, their management teams are influential in, not only the decision making but also the performance. Hence, when considering corporate behaviour, assuming homogeneous managers either within the firm or across firms would run the risk of spurious relations and ramifications. Secondly and more vitally, when I analyze team composition, rather than evaluating merely the homogeneity or heterogeneity of the team, I should examine specific compositions and take into account the possible interactions between different attributes of the team. To conclude, my work shows that human capital does matter, and its roles should not be neglected.

2.7 Table and Figure

Table 1
Sample Statistics: LBO Investments

This table provides a summary of the sample LBO investments. The full sample consists of 947 identifiable investments that meet the following criteria: (1) acquiring year from 1991 (except 16 KKR and 1 Kelso & Company investments); (2) BO related; (3) already exited. Panel A and B show the size distribution and the time trend of sample investments, respectively. Panel C and D show the geographic distribution and industrial orientation, based on the SIC codes, of the portfolio companies of sample investments. Panel E and F show the geographic distribution and company type of the LBO firms of sample investments.

Panel A: Size

Value of Capital Invested (US$ million. deflated)	LBO Investments				
	Total	Non-Syndicated		Syndicated	
	Number	Number	Fraction in %	Number	Fraction in %
< 50	748	461	61.63	287	38.37
50 – 100	92	51	55.43	41	44.57
100 – 150	47	24	51.06	23	48.94
150 – 200	14	9	64.29	5	35.71
200 – 250	12	7	58.33	5	41.67
250 – 300	5	2	40.00	3	60.00
300 - 350	5	4	80.00	1	20.00
350 – 400	6	3	50.00	3	50.00
400 – 450	4	2	50.00	2	50.00
450 – 500	3	3	100.00	0	0.00
> 500	11	6	54.55	5	45.45
Mean	55.50	58.03		51.63	
Median	20.82	18.58		23.97	
Standard Deviation	224.43	278.43		94.97	
Maximum	6143.15	6143.15		905.58	
Minimum	0.01	0.01		0.06	
Sample Size	947	572	60.40	375	39.60

Panel B: Time Trend

Year	LBO Investments				
	Total	Non-Syndicated		Syndicated	
	Number	Number	Fraction in %	Number	Fraction in %
< 1990	17	17	100.00	0	0.00
1991	52	27	51.92	25	48.08
1992	56	32	57.14	24	42.86
1993	85	50	58.82	35	41.18
1994	83	53	63.86	30	36.14
1995	104	63	60.58	41	39.42
1996	137	75	54.74	62	45.26
1997	120	74	61.67	46	38.33
1998	103	74	71.84	29	28.16
1999	79	43	54.43	36	45.57
2000	40	27	67.50	13	32.50
2001	31	17	54.84	14	45.16
2002	19	7	36.84	12	63.16
2003	5	3	60.00	2	40.00
2004	11	7	63.64	4	36.36
2005	4	3	75.00	1	25.00
2006	1	0	0.00	1	100.00
Sample Size	947	572	60.40	375	39.60

Panel C: Geography (Portfolio Company)					
		LBO Investments			
Country	Total	Non-Syndicated		Syndicated	
	Number	Number	Fraction in %	Number	Fraction in %
United States	517	332	64.22	185	35.78
United Kingdom	206	115	55.83	91	44.17
France	51	23	45.10	28	54.90
Sweden	31	20	64.52	11	35.48
Germany	30	18	60.00	12	40.00
Canada	20	15	75.00	5	25.00
Switzerland	17	11	64.71	6	35.29
Netherlands	15	6	40.00	9	60.00
Spain	12	6	50.00	6	50.00
Italy	11	5	45.45	6	54.55
Denmark	7	6	85.71	1	14.29
Finland	6	2	33.33	4	66.67
Austria	5	2	40.00	3	60.00
Other Countries	19	11	57.89	8	42.11
Sample Size	947	572	60.40	375	39.60

Panel D: Industry (Portfolio Company)					
		LBO Investments			
Classification	Total	Non-Syndicated		Syndicated	
	Number	Number	Fraction in %	Number	Fraction in %
Agriculture & Food	65	41	63.08	24	36.92
Mining	5	3	60.00	2	40.00
Construction	8	7	87.50	1	12.50
Oil & Petroleum	10	7	70.00	3	30.00
Small Scale Manufacturing	20	7	35.00	13	65.00
Chemicals/related Manufacturing	145	98	67.59	47	32.41
Industrial Manufacturing	115	75	65.22	40	34.78
Computers & Electronic Parts	48	22	45.83	26	54.17
Printing & Publishing	19	9	47.37	10	52.63
Transportation	30	16	53.33	14	46.67
Telecommunication	75	44	58.67	31	41.33
Utilities	14	11	78.57	3	21.43
Wholesale	52	37	71.15	15	28.85
Retail	32	19	59.38	13	40.63
Services	227	129	56.83	98	43.17
Financials	50	28	56.00	22	44.00
Software & Technology	19	10	52.63	9	47.37
Biotech	10	7	70.00	3	30.00
Sample Size	944	570	60.38	374	39.62

Panel E: Geography (LBO Firm)		
Country – The Headquarter	Number	Fraction in %
United States	234	60.78
United Kingdom	62	16.10
France	31	8.05
Italy	13	3.38
Canada	11	2.86
Netherlands	7	1.82
Sweden	6	1.56
Spain	5	1.30
Denmark	4	1.04
Germany	3	0.78
Switzerland	3	0.78
Austria	2	0.52
Belgium	1	0.26
Japan	1	0.26
Norway	1	0.26
Poland	1	0.26
Sample Size	385	100.00

Panel F: Type (LBO Firm)		
Company Type	Number	Fraction in %
Private Investment Firm	252	65.45
Financial Service Investment Arm	49	12.73
Private Company	35	9.09
Public Company	19	4.94
Corporate Investment Arm	13	3.38
Public Investment Firm	12	3.12
Public Fund	5	1.30
Sample Size	385	100.00

Table 2
Mean- and Median-Test Analysis of LBO Investments on Deal Types

This table shows the mean- and median-test results of LBO Investments between two deal types. Investment size has a proxy of the deflated investment value in US million dollars. Geographic distance is measured by the distance between the capital city of the portfolio company and that of its corresponding investment firm. Geographic distance (Investment Team) is the equal-weighted average distance between the capital city of the portfolio company and that of each investor in the investment team. Firm experience is the difference between the founding year of the investment firm and the acquiring year of the portfolio company. Panel A shows the mean test, using t-test for equality. Panel B shows the median test, and, using Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. P-values are reported in the parentheses, and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Mean Test			
	Non-Syndicated (N)	Syndicated (S)	Difference (N,S)
Investment Size	58.03	51.63	6.40 (0.6679)
Geographic Distance	524.49	775.25	250.76** (0.0268)
Geographic Distance (Investment Team)	524.49	755.85	231.36** (0.0224)
Firm Experience	13.08	15.12	2.04** (0.0188)
Sample Size	572	375	

Panel B: Median Test			
	Non-Syndicated (N)	Syndicated (S)	Difference (N,S)
Investment Size	18.58	23.97	5.39** (0.0174)
Geographic Distance	0	0	0** (0.0262)
Geographic Distance (Investment Team)	0	0	0*** (0)
Firm Experience	10	12	2*** (0.0021)
Sample Size	572	375	

Table 3
Sample Statistics: Management Teams

This table provides a summary of the managerial characteristics involved in the sample LBO investments. Panel A shows the size distribution of investment firm, in which size is measured by the number of professionals in the firm when one investment occurs. Panel B shows the nationality distribution of those professionals involved in the investments, in which Panel C shows other characteristics. Panel D provides the list of business schools where people received their MBA degrees.

Panel A: Size

Number of Professionals	Total	LBO Investments			
		Non-Syndicated		Syndicated	
	Number	Number	Fraction in %	Number	Fraction in %
< 5	159	104	65.41	55	34.59
5 – 10	317	216	68.14	101	31.86
10 – 15	207	124	59.90	83	40.10
15 – 20	129	71	55.04	58	44.96
20 – 25	29	12	41.38	17	58.62
25 – 30	36	12	33.33	24	66.67
30 – 35	31	11	35.48	20	64.52
35 – 40	8	3	37.50	5	62.50
≥ 40	10	8	80.00	2	20.00
Mean	11.42	10.42		12.95	
Standard Deviation	0.27	0.33		0.46	
Median	9	8		11	
Minimum	1	1		1	
Maximum	46	46		45	
Sample Size	926	561	60.58	365	39.42

Panel B: Nationality

Country	Number of Professionals	Fraction in %
United States	788	60.71
United Kingdom	250	19.26
France	61	4.70
Sweden	28	2.16
Germany	27	2.08
Canada	24	1.85
Netherlands	22	1.69
Italy	20	1.54
Denmark	13	1.00
Switzerland	12	0.92
South Africa	7	0.54
Spain	7	0.54
Other Countries	39	3.00
Sample Size (firm-person)	1,298	100.00

Panel C: Characteristics		
Attributes	Number of Professionals	Fraction in %
CFA/CPA/CA	198	15.18
Founder of the Firm	202	15.49
MBA	637	48.85
Law	133	10.20
Business	953	73.08
Engineering	131	10.05
Master	241	18.48
Harvard MBA	199	15.26
Sample Size (firm-person)	1,304	100.00

Panel D: MBA Schools		
Attributes	Number of Professionals	Fraction in %
Harvard	199	31.24
Wharton	53	8.32
Columbia	49	7.69
Stanford	48	7.54
University of Chicago	39	6.12
INSEAD	28	4.40
Dartmouth	18	2.83
NYU	15	2.35
London Business School	12	1.88
Northwestern	11	1.73
Darden	9	1.41
Others	156	24.49
Sample Size (firm-person)	637	100.00

Panel E: MBA Graduates						
Attributes	Engineering	(%)	Law	(%)	Master	(%)
Harvard	25	12.56	22	11.06	15	7.54
Wharton	2	3.77	3	5.66	4	7.55
Columbia	6	12.24	3	6.12	7	14.29
Stanford	11	22.92	1	2.08	6	12.50
University of Chicago	4	10.26	3	7.69	3	7.69
INSEAD	7	25.00	2	7.14	10	35.71
Dartmouth	0	0.00	0	0.00	0	0.00
NYU	0	0.00	1	6.67	1	6.67
London Business School	4	33.33	0	0.00	0	0.00
Northwestern	1	9.09	0	0.00	1	9.09
Darden	2	22.22	0	0.00	0	0.00
Others	20	12.82	6	3.85	22	14.10
Total	82	12.87	41	6.44	69	10.83

Table 4
Mean- and Median-Test Analysis of Management Teams on Deal Types

This table shows the mean- and median-test results of managerial team characteristics, in terms of density, between two deal types. The density is defined as the proportion of the professionals who have specific characteristics compared with the whole managerial team within a firm. The "Skill Concentration" variable adopts the calculation similar to the Herfindahl Index, and it consists of three different skills, i.e. Law, Business, and Engineering. Panel A shows the mean test, using t-test for equality. Panel B shows the median test, and, using Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. P-values are reported in the parentheses, and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Mean Test			
Characteristics	Non-Syndicated (N)	Syndicated (S)	Difference (N,S)
CFA/CPA/CA	0.1492	0.1513	0.0021 (0.8588)
Founder of the Firm	0.2368	0.1994	-0.0374** (0.0229)
MBA	0.4811	0.5207	0.0396** (0.0234)
Law	0.1174	0.1117	-0.0057 (0.5374)
Business	0.7304	0.7466	0.0162 (0.2069)
Engineering	0.0777	0.0962	0.0185** (0.0158)
Master	0.1648	0.1681	0.0033 (0.7966)
Harvard MBA	0.1507	0.1815	0.0308** (0.0189)
Skill Concentration	0.6226	0.6451	0.0225 (0.2128)
Sample Size	561	365	

Panel B: Median Test			
Characteristics	Non-Syndicated (N)	Syndicated (S)	Difference (N,S)
CFA/CPA/CA	0.1	0.0833	-0.0167 (0.7846)
Founder of the Firm	0.1667	0.125	-0.0417** (0.0394)
MBA	0.5	0.5769	0.0769** (0.0150)
Law	0.0833	0.0909	0.0076 (0.8374)
Business	0.75	0.7778	0.0278 (0.1889)
Engineering	0	0.0435	0.0435** (0.0182)
Master	0.1111	0.12	0.0089 (0.4316)
Harvard MBA	0.0556	0.0909	0.0353** (0.0364)
Skill Concentration	0.6378	0.6406	0.0028 (0.2624)
Sample Size	561	365	

Table 5
Correlation Matrix of Explanatory Variables for LBO Syndication Likelihood

This table reports the correlation matrix of the explanatory variables for LBO syndication likelihood. Investment size has a proxy of (log of) the deflated investment value in US million dollars. Geographic distance is measured by (log of) the distance between the capital city of the portfolio company and that of the investing firm. Firm experience is the difference between the founding year of the investing firm and the acquiring year of the portfolio company. The investment team characteristics are proxied by using density variables, i.e. defined as the number of the professionals who have specific characteristics, scaled by the number of the whole investment team members within a firm. The "Skill Concentration" variable adopts the calculation similar to the Herfindahl Index, and it consists of three different skills, i.e. Law, Business, and Engineering.

	Law	Business	Engineering	Master	MBA	Harvard MBA	Skill Concentration	Geographic Distance	Investment Size	Firm Experience
Law	1									
Business	-0.093	1								
Engineering	-0.196	-0.051	1							
Master	-0.270	0.080	0.195	1						
MBA	0.148	0.578	-0.010	-0.182	1					
Harvard MBA	0.200	0.356	0.056	-0.151	0.617	1				
Skill Concentration	0.112	0.928	0.072	0.057	0.566	0.355	1			
Geographic Distance	-0.203	0.148	0.101	0.076	0.060	0.051	0.114	1		
Investment Size	0.192	0.089	-0.096	-0.185	0.181	0.176	0.081	-0.012	1	
Firm Experience	-0.148	-0.222	0.134	0.087	-0.160	-0.195	-0.286	0.022	0.136	1

Table 6
Determinants of LBO Syndication Likelihood

This table provides linear probability estimation of determinants of LBO syndication, in which investment team characteristics are quantified by density measurement. The dependent variable is assigned to 1 for LBO transactions by multiple investors and 0 for transactions by one investor only. For the explanatory variables, investment size has a proxy of (log of) the deflated investment value in US million dollars. Geographic distance is measured by (log of) the distance between the capital city of the portfolio company and that of the investing firm. Firm experience is the difference between the founding year of the investing firm and the acquiring year of the portfolio company. The investment team characteristics are proxied by using density variables, i.e. defined as the number of the professionals who have specific characteristics, scaled by the number of the whole investment team members within a firm. The "Skill Concentration" variable adopts the calculation similar to the Herfindahl Index, and it consists of three different skills, i.e. Law, Business, and Engineering. Panel A and B show the coefficient estimates for general team attributes and MBA specific attributes, respectively. Top MBA graduates include those who are graduated from Harvard, Wharton, Stanford, Columbia, Chicago, INSEAD, or MIT business schools. Standard deviations are reported in the parentheses and the symbols ^{a}, ^{b}, and ^{c} represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: General Models								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Team Attributes:								
Law	-0.018	-0.026			0.089	0.097		
	(0.131)	(0.131)			(0.143)	(0.145)		
Business	0.005	0.055			-0.024	0.057		
	(0.111)	(0.095)			(0.112)	(0.097)		
Engineering	0.295^{b}	0.278^{a}			0.336^{b}	0.340^{b}		
	(0.147)	(0.148)			(0.151)	(0.153)		
Master	0.019	0.006	0.049	0.039	-0.037	-0.060	-0.028	-0.047
	(0.093)	(0.092)	(0.091)	(0.089)	(0.095)	(0.094)	(0.093)	(0.091)
MBA	0.135^{a}		0.135^{a}		0.151^{a}		0.149^{a}	
	(0.081)		(0.078)		(0.082)		(0.079)	
Harvard MBA		0.171^{a}		0.187^{b}		0.113		0.143
		(0.094)		(0.09)		(0.097)		(0.093)
Skill Concentration			0.016	0.047			0.015	0.062
			(0.077)	(0.067)			(0.077)	(0.068)
Controls:								
Geographic Distance	0.022^{a}	0.021^{a}	0.024^{b}	0.024^{b}	0.021^{a}	0.021	0.021^{a}	0.021^{a}
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)	(0.012)	(0.012)
Investment Size	0.052^{a}	0.050	0.046	0.042	0.063^{a}	0.064^{a}	0.059^{a}	0.058^{a}
	(0.031)	(0.031)	(0.031)	(0.031)	(0.033)	(0.033)	(0.033)	(0.033)
Firm Experience	0.002^{a}	0.003^{a}	0.003^{b}	0.003^{b}	0.002	0.002	0.002	0.002^{a}
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
PC Industry FE	No	No	No	No	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	Yes	Yes	Yes	Yes
Adjusted R^2	0.0155	0.0161	0.0132	0.0145	0.0523	0.05	0.0486	0.0473
Sample Size	926	926	926	926	926	926	926	926

Panel B: Restricted Models with MBA Team Attributes										
Explanatory Variables	(1) General MBA	(2) Top MBA	(3) Harvard MBA	(4) Wharton MBA	(5) Stanford MBA	(6) Columbia MBA	(7) Chicago MBA	(8) INSEAD MBA	(9) General MBA	(10) Top MBA
MBA:										
MBA	0.138[b]	0.227[c]	0.201[b]	0.155	0.133	-0.067	0.023	0.692[c]	0.178	0.416[a]
	(0.064)	(0.07)	(0.085)	(0.212)	(0.179)	(0.224)	(0.25)	(0.255)	(0.197)	(0.239)
Controls:										
Geographic	0.011[b]	0.011[b]	0.011[b]	0.012[b]	0.012[b]	0.012[b]	0.012[b]	0.010[a]	-0.004	-0.004
Distance	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)
Investment	0.019	0.011	0.018	0.024[a]	0.022	0.025[a]	0.024[a]	0.025[b]	0.023	0.020
Size	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.021)	(0.021)
Firm	0.003[b]	0.003[b]	0.003[b]	0.002[a]	0.002[a]	0.002[a]	0.002[a]	0.002	0.171[a]	0.174[a]
Experience	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.095)	(0.095)
Firm FE	No	No	No	No	No	No	No	No	Yes	Yes
PC Industry FE	No	No	No	No	No	No	No	No	Yes	Yes
Year FE	No	No	No	No	No	No	No	No	Yes	Yes
PC Country FE	No	No	No	No	No	No	No	No	Yes	Yes
Adjusted R^2	0.0149	0.0209	0.0158	0.0104	0.0104	0.0099	0.0099	0.0177	0.1476	0.1502
Sample Size	926	926	926	926	926	926	926	926	926	926

Table 7
MBA Selection of LBO Syndication Partners

This table shows the coefficient estimates from the conditional logit model of syndication partner selection process for MBA graduates. Each investment firm(f) at time t can choose among all other investing firms(i) in the sample with available team attributes data at time t. The dependent variable is a dummy variable equal to one for the investment firm-candidate pairs that co-invest with each other at the time when the deal is initiated. (Individual) explanatory variables are measured in percentages (absolute levels of team attributes). Specification (1) is the basic model for MBA graduates in general. Specification (2) to (8) provide estimates for different subgroups. Top MBA graduates include those who are graduated from Harvard, Wharton, Stanford, Columbia, Chicago, INSEAD, or MIT business schools. Standard deviations are reported in the parentheses and the symbols [a], [b], and [c] represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

	(1) General MBA	(2) Top MBA	(3) Harvard MBA	(4) Wharton MBA	(5) Stanford MBA	(6) Columbia MBA	(7) Chicago MBA	(8) INSEAD MBA
MBA:								
MBA(f)*MBA(i)	2.567[b]	3.200[c]	6.085[c]	11.837	6.909	29.482[c]	23.496	1.098
	(1.05)	(1.070)	(1.754)	(9.053)	(5.145)	(11.087)	(14.366)	(6.064)
MBA(f)*Engineer(i)	5.399[c]	5.663[c]	3.696	18.642[b]	1.081	19.179[b]	7.372	5.307
	(1.769)	(2.036)	(2.971)	(7.362)	(4.907)	(8.535)	(8.009)	(4.935)
MBA(f)*Law(i)	2.576	2.183	3.183	-4.453	3.625	6.949	-22.383	-30.188
	(2.136)	(2.397)	(3.297)	(12.901)	(2.89)	(11.683)	(17.092)	(18.386)
MBA(f)*Master(i)	-2.737[a]	-3.871[b]	-5.400[b]	-5.701	-5.745	-4.333	-1.991	-1.376
	(1.431)	(1.687)	(2.51)	(6.318)	(4.065)	(7.082)	(6.445)	(4.194)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald Chi^2	17.3	18.62	17.63	7.58	6.23	9.51	5.25	4.33
Probability > Chi^2	0.0017	0.0009	0.0015	0.1081	0.1823	0.0495	0.2629	0.3627
Investments	134	134	134	134	134	134	134	134
Observations	22,370	22,370	22,370	22,370	22,370	22,370	22,370	22,370

Table 8
Mean- and Median-Test Analysis of Management Teams for Syndicated LBO Investments

This table shows the mean- and median-test results of managerial team attributes for syndicated deals. Geographic distance is measured by the distance between the capital city of the portfolio company and that of its corresponding investment firm. Firm experience is the difference between the founding year of the investment firm and the acquiring year of the portfolio company. The team attributes are measured by density, defined as the proportion of the professionals who have specific characteristics compared with the whole managerial team within a firm. The "Skill Concentration" variable adopts the calculation similar to the Herfindahl Index, consisting of three different skills, i.e. Law, Business, and Engineering. Panel A shows the mean test, using t-test for equality. Panel B shows the median test, and, using Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. P-values are reported in the parentheses, and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Mean Test (Paired)			
Characteristics	Investment Firm (F)	Investment Team (T)	Difference (F,T)
CFA/CPA/CA	0.1513	0.1603	0.0090 (0.1425)
Founder of the Firm	0.1994	0.1793	-0.0202*** (0.0098)
MBA	0.5207	0.5242	0.0035 (0.7022)
Law	0.1117	0.1066	-0.0051 (0.2937)
Business	0.7467	0.7440	-0.0026 (0.6942)
Engineering	0.0963	0.1015	0.0053 (0.2569)
Master	0.1681	0.1721	0.0041 (0.5201)
Harvard MBA	0.1815	0.1866	0.0051 (0.3998)
Skill Concentration	0.6452	0.6156	-0.0296*** (0.003)
Sample Size	365	365	

Panel B: Median Test (Paired)			
Characteristics	Investment Firm (F)	Investment Team (T)	Difference (F,T)
CFA/CPA/CA	0.0833	0.125	0 (0.3995)
Founder of the Firm	0.125	0.1304	0 (0.8988)
MBA	0.5769	0.5692	0 (0.3577)
Law	0.0909	0.0923	0 (0.6944)
Business	0.7778	0.7727	0** (0.0221)
Engineering	0.0435	0.0909	0 (0.5178)
Master	0.12	0.15	0 (0.6165)
Harvard MBA	0.0909	0.1538	0 (1)
Skill Concentration	0.6406	0.6406	0 (0.1462)
Sample Size	365	365	

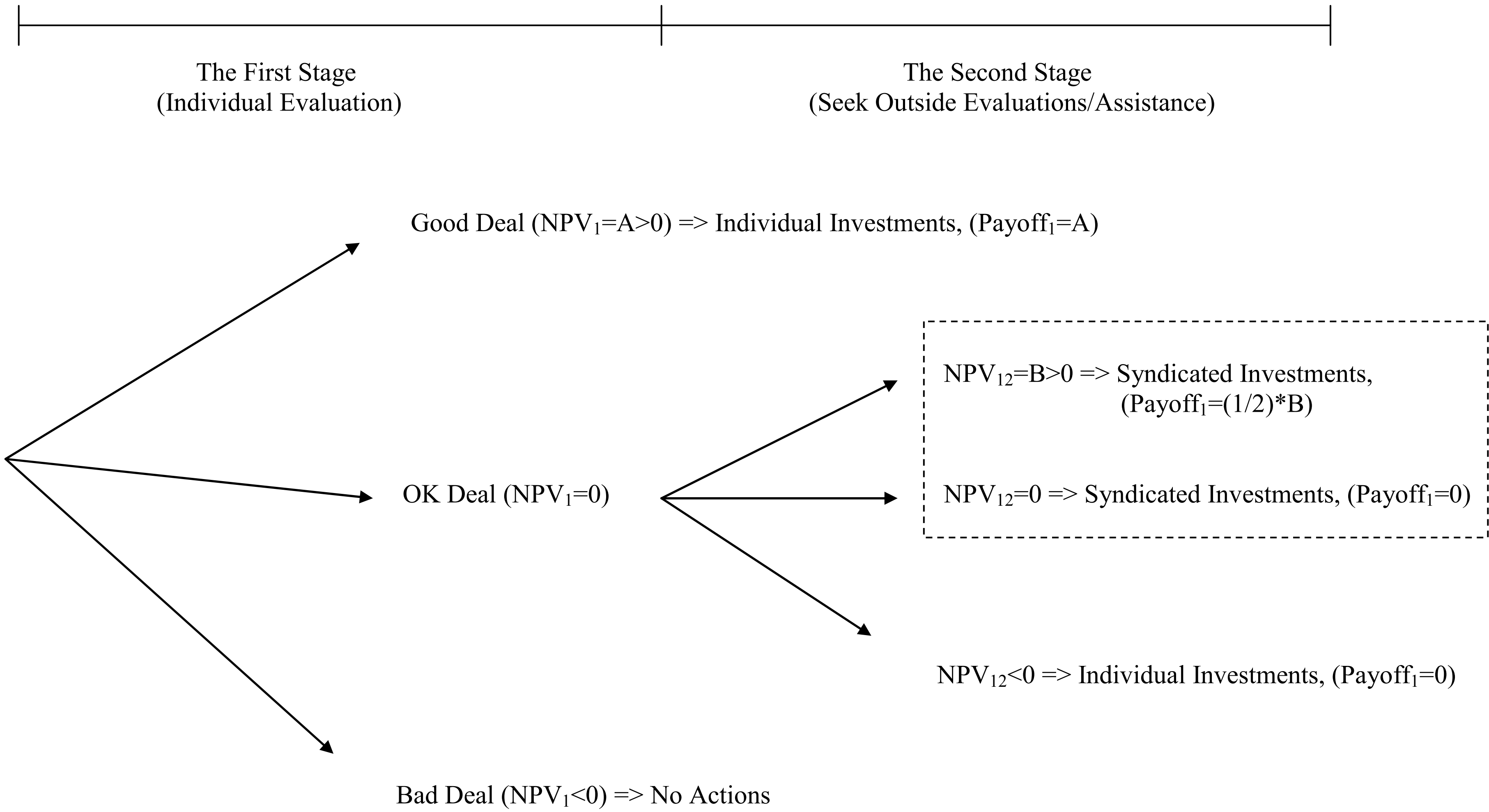


Figure 1 Illustration of the Relationship between Investment Type and Performance

Table 9
Sample Statistics: LBO Performance

This table shows a summary of the distribution of LBO investment performance. Panel A and B rank the performance by multiple and gross internal rate of return, in which Figure 10 and 11 provide their corresponding histograms, respectively.

Panel A: Multiple				
Ranking (%)	Non-Syndicated		Syndicated	
	Number	Fraction in %	Number	Fraction in %
<10	63	67.02	31	32.98
10-20	58	61.70	36	38.30
20-30	62	65.96	32	34.04
30-40	56	59.57	38	40.43
40-50	59	62.77	35	37.23
50-60	45	47.87	49	52.13
60-70	45	47.87	49	52.13
70-80	55	58.51	39	41.49
80-90	59	62.77	35	37.23
90-100	70	71.43	28	28.57
Mean	16.09		3.61	
Median	2.5		2.72	
Standard Deviation	251.20		4.76	
Maximum	6000		63.22	
Minimum	0		0	
Sample Size	572	60.59	372	39.41

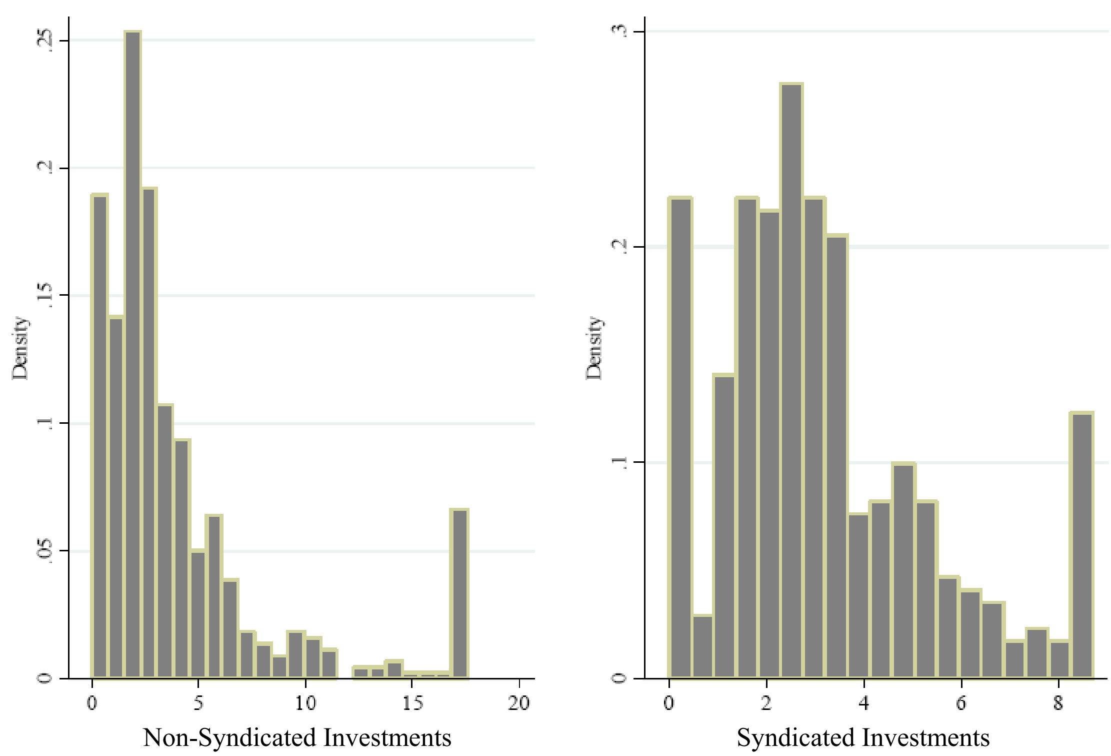


Figure 2 Histogram of Multiple of Investments (winsorized at 5% level)

Panel B: Gross Internal Rate of Return (Gross IRR)				
Ranking (%)	Non-Syndicated		Syndicated	
	Number	Fraction in %	Number	Fraction in %
<10	53	65.43	28	34.57
10-20	58	71.60	23	28.40
20-30	49	60.49	32	39.51
30-40	43	53.09	38	46.91
40-50	47	58.02	34	41.98
50-60	50	61.73	31	38.27
60-70	39	48.15	42	51.85
70-80	47	58.02	34	41.98
80-90	51	62.96	30	37.04
90-100	52	65.00	28	35.00
Mean	1.28		1.12	
Median	0.45		0.48	
Standard Deviation	4.70		4.73	
Maximum	50		66.36	
Minimum	-1		-1	
Sample Size	489	60.44	320	39.56

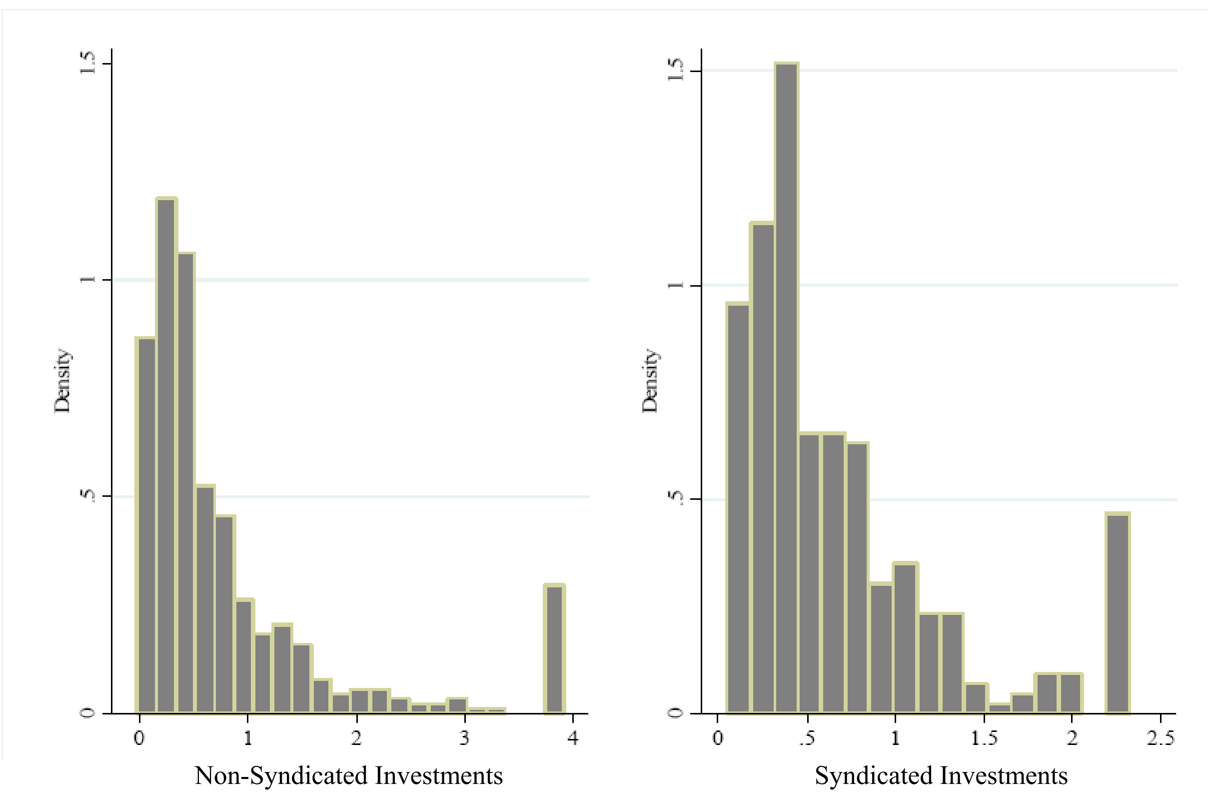


Figure 3 Histogram of Gross IRR of Investments (winsorized at 5% level)

Table 10
Syndication, Management Team, and Performance

This table shows the two-stage treatment effect estimation results on how managerial team characteristics, in terms of density, and syndication decision affect final investment performance. The investment team characteristics are proxied by using density variables, i.e. defined as the number of the professionals who have specific characteristics, scaled by the number of the whole investment team members within a firm. The "Skill Concentration" variable adopts the calculation similar to the Herfindahl Index, and it consists of three different skills, i.e. Law, Business, and Engineering. Geographic distance is measured by (log of) the distance between the capital city of the portfolio company and that of the investing firm. Investment size has a proxy of (log of) the deflated investment value in US million dollars. Firm experience is the difference between the founding year of the investing firm and the acquiring year of the portfolio company. Panel A and B adopt multiple and gross internal rate of return as proxy for performance, respectively, in which performance is winsorized at the 5% level. Standard deviations are reported in the parentheses and the symbols [a], [b], and [c] represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Multiple				
	(1)	(2)	(3)	(4)
Team Attributes:				
CFA/CPA/CA	-0.751	-0.950	-0.976	2.629
	(0.628)	(0.61)	(0.609)	(1.785)
Founder of the Firm	0.391	0.406	0.106	-2.324[a]
	(0.47)	(0.465)	(0.465)	(1.396)
Law	1.599[a]		0.955	-0.399
	(0.82)		(0.85)	(2.084)
Business	0.812		0.852	-1.036
	(0.591)		(0.569)	(1.587)
Engineering	-0.461		-1.015	0.205
	(1.474)		(1.533)	(4.659)
Master	0.736	0.530	1.173[b]	-3.762[b]
	(0.573)	(0.559)	(0.555)	(1.794)
Harvard MBA	1.643[a]	2.091[c]	1.301	1.670
	(0.893)	(0.721)	(0.905)	(3.438)
Skill Concentration		0.441		
		(0.407)		
Controls:				
Geographic Distance	-0.075	-0.067[a]	-0.093[a]	-0.036
	(0.051)	(0.04)	(0.052)	(0.161)
Investment Size	-0.541[c]	-0.485[c]	-0.525[c]	-0.360
	(0.111)	(0.083)	(0.116)	(0.296)
Syndication	1.310	-0.380	2.683	-7.121
	(3.765)	(2.3)	(3.842)	(14.437)
Selection Attributes:				
Engineering				0.767[b]
				(0.376)
Harvard MBA				0.494[b]
				(0.225)
Geographic Distance				0.027[a]
				(0.014)
Investment Size				0.050[a]
				(0.03)
Firm Experience				0.006[a]
				(0.003)
Hazard:				
Lambda	-0.992	0.051	-1.803	4.412
	(2.326)	(1.423)	(2.371)	(8.917)
Rho	-0.327	0.017	-0.589	1.000
Sigma	3.036	2.941	3.063	4.209

Panel A: Multiple				
	(1)	(2)	(3)	(4)
Firm FE	No	No	No	Yes
PC Industry FE	No	No	Yes	Yes
Year FE	No	No	Yes	Yes
PC Country FE	No	No	No	Yes
Wald Chi^2	99.95	95.79	251.48	428.59
Probability > Chi^2	0	0	0	0
Sample Size	923	923	923	923

Panel B: Gross Internal Rate of Return				
	(1)	(2)	(3)	(4)
Team Attributes:				
CFA/CPA/CA	-0.214	-0.242	-0.259	0.173
	(0.165)	(0.159)	(0.164)	(0.664)
Founder of the Firm	-0.103	-0.087	0.070	-0.103
	(0.124)	(0.122)	(0.127)	(0.517)
Law	0.082		0.185	1.155
	(0.214)		(0.228)	(0.774)
Business	-0.026		-0.059	-0.088
	(0.155)		(0.154)	(0.588)
Engineering	0.042		0.027	-2.048
	(0.47)		(0.47)	(1.858)
Master	0.348[b]	0.340[b]	0.331[b]	0.267
	(0.146)	(0.142)	(0.145)	(0.681)
Harvard MBA	0.507[b]	0.524[c]	0.413[a]	0.446
	(0.24)	(0.19)	(0.241)	(1.158)
Skill Concentration		-0.069		
		(0.107)		
Controls:				
Geographic Distance	-0.015	-0.016	-0.016	-0.030
	(0.014)	(0.011)	(0.014)	(0.054)
Investment Size	-0.124[c]	-0.125[c]	-0.127[c]	-0.151
	(0.038)	(0.025)	(0.039)	(0.137)
Syndicated	0.478	0.552	0.522	2.871
	(1.196)	(0.624)	(1.192)	(5.251)
Selection Attributes:				
Engineering				0.847[b]
				(0.396)
Harvard MBA				0.421[a]
				(0.245)
Geographic Distance				0.024
				(0.015)
Investment Size				0.067[b]
				(0.033)
Firm Experience				0.005
				(0.004)
Hazard:				
Lambda	-0.327	-0.371	-0.352	-1.737
	(0.739)	(0.386)	(0.736)	(3.242)
Rho	-0.429	-0.480	-0.479	-1.000
Sigma	0.761	0.774	0.735	1.481

Panel B: Gross Internal Rate of Return				
	(1)	(2)	(3)	(4)
Firm FE	No	No	No	Yes
PC Industry FE	No	No	Yes	Yes
Year FE	No	No	Yes	Yes
PC Country FE	No	No	No	Yes
Wald Chi^2	77.77	71.19	169.21	182.32
Probability > Chi^2	0	0	0	0.716
Sample Size	793	793	793	793

Table 11
MBA Team Attributes, Syndication, and Performance

This table shows how MBA team attributes affect final performance for non-syndicated and syndicated investments. The team attribute, MBA(f), is a density variable, defined as the number of the professionals who have (specific) MBA degrees, scaled by the number of the whole investment team members within the firm. Geographic distance is measured by (log of) the distance between the capital city of the portfolio company and that of the investing firm. Investment size has a proxy of (log of) the deflated investment value in US million dollars. Panel A and B adopt multiple and gross internal rate of return as proxy for performance, respectively, in which performance is winsorized at the 1% level. Each specification provides coefficient estimates for different subgroups of MBA graduates. Top MBA graduates include those who are graduated from Harvard, Wharton, Stanford, Columbia, Chicago, INSEAD, or MIT business schools. Standard deviations are reported in the parentheses and the symbols ^{a}, ^{b}, and ^{c} represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Multiple

	Non-Syndicated Investments							Syndicated Investments						
Explanatory Variables	(1) General MBA	(2) Top MBA	(3) Harvard MBA	(4) Stanford MBA	(5) Columbia MBA	(6) Chicago MBA	(7) INSEAD MBA	(8) General MBA	(9) Top MBA	(10) Harvard MBA	(11) Stanford MBA	(12) Columbia MBA	(13) Chicago MBA	(14) INSEAD MBA
MBA:														
MBA(f)	2.416^{a}	5.700^{c}	5.843^{c}	9.628^{c}	6.586	4.292	-14.238^{b}	0.504	1.559^{a}	1.920^{a}	1.701	4.331	2.880	-3.791
	(1.233)	(1.354)	(1.664)	(3.635)	(4.069)	(4.581)	(6.964)	(0.854)	(0.899)	(1.091)	(2.271)	(3.377)	(3.718)	(2.92)
Controls:														
Investment	-1.569^{c}	-1.778^{c}	-1.609^{c}	-1.710^{c}	-1.493^{c}	-1.460^{c}	-1.456^{c}	-0.728^{c}	-0.781^{c}	-0.778^{c}	-0.740^{c}	-0.740^{c}	-0.717^{c}	-0.739^{c}
Size	(0.245)	(0.247)	(0.24)	(0.256)	(0.239)	(0.239)	(0.238)	(0.185)	(0.187)	(0.187)	(0.187)	(0.185)	(0.184)	(0.185)
Geographic	-0.140	-0.124	-0.140	-0.105	-0.130	-0.122	-0.105	-0.086	-0.090	-0.092	-0.077	-0.096	-0.078	-0.071
Distance	(0.105)	(0.103)	(0.104)	(0.105)	(0.105)	(0.105)	(0.105)	(0.068)	(0.068)	(0.068)	(0.069)	(0.069)	(0.068)	(0.069)
Adjusted R^2	0.0664	0.089	0.0804	0.0717	0.0644	0.0615	0.067	0.0366	0.0437	0.0439	0.0372	0.0401	0.0373	0.0402
Sample Size	561	561	561	561	561	561	561	362	362	362	362	362	362	362

Panel B: Gross Internal Rate of Return

	Non-Syndicated Investments							Syndicated Investments						
Explanatory Variables	(1) General MBA	(2) Top MBA	(3) Harvard MBA	(4) Stanford MBA	(5) Columbia MBA	(6) Chicago MBA	(7) INSEAD MBA	(8) General MBA	(9) Top MBA	(10) Harvard MBA	(11) Stanford MBA	(12) Columbia MBA	(13) Chicago MBA	(14) INSEAD MBA
MBA:														
MBA(f)	-0.474	0.519	0.478	1.959^{b}	-0.904	1.011	-1.185	0.045	0.316	0.530	0.112	-2.213	0.251	0.581
	(0.305)	(0.344)	(0.423)	(0.87)	(0.996)	(1.11)	(1.789)	(0.295)	(0.313)	(0.382)	(0.767)	(1.356)	(1.274)	(0.968)
Controls:														
Investment	-0.332^{c}	-0.378^{c}	-0.361^{c}	-0.400^{c}	-0.345^{c}	-0.351^{c}	-0.349^{c}	-0.075	-0.087	-0.088	-0.076	-0.052	-0.075	-0.071
Size	(0.062)	(0.064)	(0.062)	(0.065)	(0.061)	(0.061)	(0.061)	(0.067)	(0.068)	(0.067)	(0.067)	(0.068)	(0.067)	(0.067)
Geographic	-0.023	-0.024	-0.026	-0.020	-0.025	-0.023	-0.023	0.004	0.003	0.001	0.005	0.009	0.005	0.002
Distance	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Adjusted R^2	0.065	0.0648	0.0628	0.0702	0.0619	0.0619	0.0612	-0.0055	-0.002	0.0007	-0.0055	0.0031	-0.0054	-0.0044
Sample Size	482	482	482	482	482	482	482	311	311	311	311	311	311	311

Table 12
MBA Selection of Syndicated Partners and Performance

This table shows how MBA team attributes affect final performance for the subsample of investments co-invested by only two investors. The team attribute, MBA(f), is a density variable, defined as the number of the professionals who have (specific) MBA degrees, scaled by the number of the whole investment team members within the firm. The interaction terms are dummy variables that are assigned to 1 as long as the absolute values for both the investment firm and the syndicated partner exceed the third quartile value among all sample firms at the time when the deal is initiated. Geographic distance is measured by (log of) the distance between the capital city of the portfolio company and that of the investing firm. Investment size has a proxy of (log of) the deflated investment value in US million dollars. Panel A and B adopt multiple and gross internal rate of return as proxy for performance, respectively, in which performance is winsorized at the 1% level. Each specification provides coefficient estimates for different subgroups of MBA graduates. Top MBA graduates include those who are graduated from Harvard, Wharton, Stanford, Columbia, Chicago, INSEAD, or MIT business schools. Standard deviations are reported in the parentheses and the symbols [a], [b], and [c] represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Multiple														
Explanatory Variables	(1) General MBA	(2) Top MBA	(3) Harvard MBA	(4) Stanford MBA	(5) Columbia MBA	(6) Chicago MBA	(7) INSEAD MBA	(8) General MBA	(9) Top MBA	(10) Harvard MBA	(11) Stanford MBA	(12) Columbia MBA	(13) Chicago MBA	(14) INSEAD MBA
MBA:														
MBA(f)	0.205	1.196	2.463[b]	1.441	0.722	-0.194	-6.522[b]	0.692	1.655	0.680	0.634	0.968	-3.535	-4.765
	(0.932)	(0.958)	(1.216)	(1.726)	(4.056)	(4.039)	(2.894)	(1.057)	(1.144)	(1.472)	(1.953)	(4.828)	(4.409)	(3.323)
MBA(f)*MBA(i)								-0.287	-0.010	1.760[b]	1.039	-0.394	3.028[c]	-0.742
								(1.256)	(0.917)	(0.842)	(0.886)	(0.986)	(1.04)	(0.908)
MBA(f)*Engineer(i)								-1.328	-1.053		-0.277	0.425	-0.569	-0.708
								(1.195)	(1.131)		(0.904)	(0.984)	(1.047)	(0.858)
Controls:														
Investment Size	-0.195	-0.243	-0.269	-0.207	-0.195	-0.188	-0.221	-0.230	-0.270	-0.287	-0.308	-0.192	-0.164	-0.244
	(0.203)	(0.205)	(0.202)	(0.202)	(0.204)	(0.201)	(0.198)	(0.207)	(0.207)	(0.199)	(0.22)	(0.206)	(0.196)	(0.199)
Geographic	-0.076	-0.075	-0.069	-0.069	-0.079	-0.076	-0.042	-0.066	-0.064	-0.035	-0.063	-0.080	-0.050	-0.037
Distance	(0.078)	(0.078)	(0.077)	(0.078)	(0.081)	(0.078)	(0.078)	(0.079)	(0.081)	(0.078)	(0.079)	(0.083)	(0.077)	(0.079)
R^2	0.0142	0.0255	0.044	0.0191	0.0141	0.0139	0.0509	0.024	0.0326	0.0754	0.0295	0.0166	0.0751	0.0603
Sample Size	134	134	134	134	134	134	134	134	134	134	134	134	134	134

Panel B: Gross Internal Rate of Return														
Explanatory Variables	(1) General MBA	(2) Top MBA	(3) Harvard MBA	(4) Stanford MBA	(5) Columbia MBA	(6) Chicago MBA	(7) INSEAD MBA	(8) General MBA	(9) Top MBA	(10) Harvard MBA	(11) Stanford MBA	(12) Columbia MBA	(13) Chicago MBA	(14) INSEAD MBA
MBA:														
MBA(f)	0.168	0.486	0.874	0.045	-2.631	-0.317	1.260	0.396	0.244	-0.445	-0.866	-1.631	-0.040	2.295
	(0.509)	(0.525)	(0.67)	(0.945)	(2.203)	(2.205)	(1.607)	(0.578)	(0.609)	(0.8)	(1.033)	(2.62)	(2.485)	(1.84)
MBA(f)*MBA(i)								-0.120	1.275[b]	1.302[c]	1.482[c]	-0.384	-0.092	-0.707
								(0.686)	(0.488)	(0.457)	(0.468)	(0.535)	(0.586)	(0.502)
MBA(f)*Engineer(i)								-0.635	-1.135[a]		-0.751	-0.093	-0.096	0.051
								(0.653)	(0.602)		(0.478)	(0.534)	(0.59)	(0.475)
Controls:														
Investment Size	0.091	0.074	0.068	0.096	0.121	0.096	0.103	0.075	0.054	0.054	-0.055	0.126	0.096	0.088
	(0.111)	(0.112)	(0.111)	(0.11)	(0.111)	(0.11)	(0.11)	(0.113)	(0.11)	(0.108)	(0.117)	(0.112)	(0.111)	(0.11)
Geographic	0.005	0.005	0.007	0.005	0.018	0.004	-0.001	0.009	0.037	0.032	0.015	0.024	0.003	-0.007
Distance	(0.043)	(0.042)	(0.042)	(0.043)	(0.044)	(0.043)	(0.043)	(0.043)	(0.043)	(0.042)	(0.042)	(0.045)	(0.043)	(0.044)
R^2	0.0069	0.0126	0.0189	0.0061	0.0168	0.0062	0.0107	0.0144	0.0734	0.0768	0.082	0.0211	0.0067	0.0261
Sample Size	134	134	134	134	134	134	134	134	134	134	134	134	134	134

Table 13
Robustness Checks: Determinants of LBO Syndication

This table provides two robustness checks regarding LBO syndication decisions. Panel A shows the binomial probit estimation of determinants of LBO syndication likelihood, and Panel B shows the ordinary least square estimation of determinants of the number of LBO syndication partners, in which investment team characteristics are quantified by density measurement. For the explanatory variables, investment size has a proxy of (log of) the deflated investment value in US million dollars. Geographic distance is measured by (log of) the distance between the capital city of the portfolio company and that of the investing firm. Firm experience is the difference between the founding year of the investing firm and the acquiring year of the portfolio company. The investment team characteristics are defined as the number of the professionals who have specific characteristics, scaled by the number of the whole investment team members within a firm. The "Skill Concentration" variable adopts the calculation similar to the Herfindahl Index, and it consists of three different skills, i.e. Law, Business, and Engineering. Standard deviations are reported in the parentheses and the symbols [a], [b], and [c] represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: LBO Syndication Likelihood										
Dependent Variable	indicator assigned to 1 for syndicated investments									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Team Attributes:										
Law	-0.014	-0.022			0.098	0.107			0.374	0.463
	(0.133)	(0.133)			(0.152)	(0.153)			(0.486)	(0.474)
Business	0.009	0.060			-0.022	0.069			0.806[b]	0.699[b]
	(0.114)	(0.097)			(0.121)	(0.104)			(0.409)	(0.339)
Engineering	0.299[b]	0.281[a]			0.351[b]	0.353[b]			1.162[b]	1.106[b]
	(0.148)	(0.149)			(0.159)	(0.16)			(0.48)	(0.473)
Master	0.016	0.003	0.047	0.038	-0.035	-0.062	-0.027	-0.047	-0.788[a]	-0.685[a]
	(0.096)	(0.094)	(0.092)	(0.09)	(0.102)	(0.1)	(0.098)	(0.096)	(0.415)	(0.405)
MBA	0.137[a]		0.135[a]		0.166[a]		0.159[a]		-0.189	
	(0.082)		(0.079)		(0.088)		(0.084)		(0.322)	
Harvard MBA		0.169[a]		0.185[b]		0.121		0.148		0.566
		(0.094)		(0.091)		(0.102)		(0.098)		(0.418)
Skill Concentration			0.018	0.051			0.020	0.071		
			(0.078)	(0.068)			(0.083)	(0.073)		
Controls:										
Geographic Distance	0.022[a]	0.021[a]	0.024[b]	0.024[a]	0.023[a]	0.023[a]	0.024[a]	0.023[a]	-0.014	-0.013
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.024)	(0.024)
Investment Size	0.053[a]	0.051	0.047	0.043	0.072[b]	0.073[b]	0.068[a]	0.068[a]	0.070	0.068
	(0.031)	(0.032)	(0.031)	(0.031)	(0.036)	(0.036)	(0.035)	(0.035)	(0.062)	(0.063)
Firm Experience	0.002[a]	0.003[b]	0.003[b]	0.003[b]	0.002	0.002	0.002	0.003[a]	2.176[c]	2.124[c]
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.022)	(0.021)
Firm FE	No	No	No	No	No	No	No	No	Yes	Yes
PC Industry FE	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PC Country FE	No	No	No	No	No	No	No	No	Yes	Yes
Adjusted R^2	0.018	0.0184	0.0146	0.0156	0.0929	0.091	0.0886	0.0876	0.2163	0.2177
LR Statistic	22.37	22.82	18.19	19.39	112.97	110.76	107.84	106.52	236.85	238.36

Panel A: LBO Syndication Likelihood										
Dependent Variable	indicator assigned to 1 for syndicated investments									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Probability > Chi^2	0.0043	0.0036	0.0058	0.0036	0.0001	0.0001	0.0001	0.0002	0	0
Sample Size	926	926	926	926	902	902	902	902	804	804

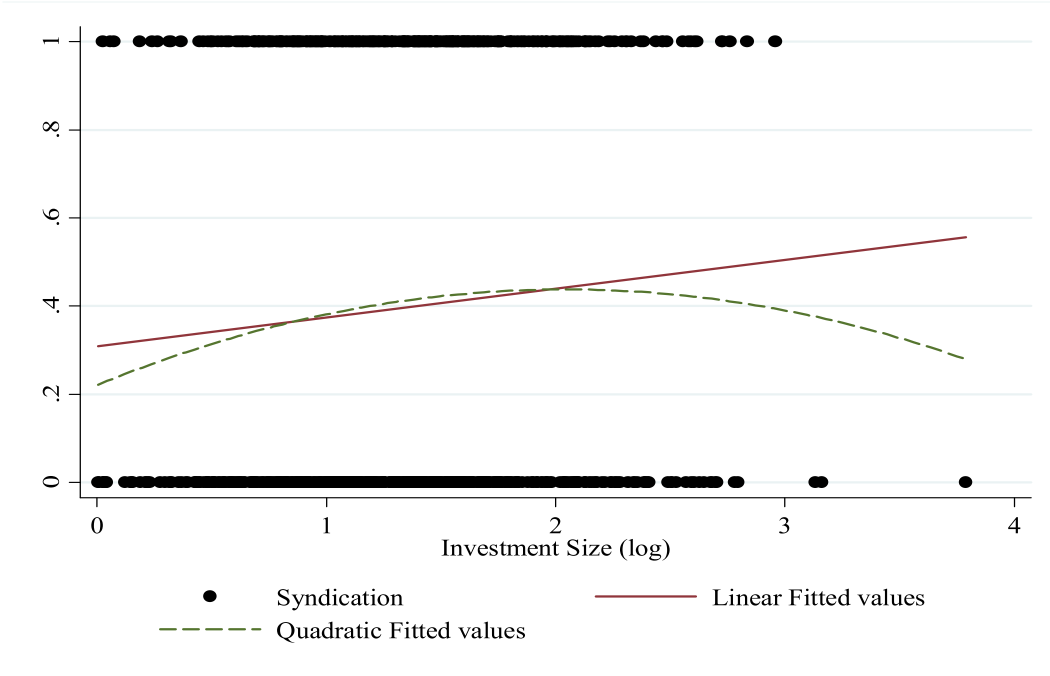
Panel B: Number of LBO Syndication Partners										
Dependent Variable	number of syndicated partners (0 for non-syndicated investments)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Team Attributes:										
Law	-0.037	-0.102			0.211	0.168			0.906	0.684
	(0.341)	(0.342)			(0.377)	(0.38)			(0.92)	(0.908)
Business	0.007	0.050			0.031	0.136			0.111	0.629
	(0.289)	(0.248)			(0.294)	(0.255)			(0.761)	(0.651)
Engineering	0.756[b]	0.673[a]			0.746[a]	0.700[a]			1.211	1.177
	(0.383)	(0.385)			(0.398)	(0.401)			(0.833)	(0.827)
Master	-0.060	-0.065	0.021	0.020	-0.161	-0.188	-0.135	-0.153	-2.393[c]	-2.489[c]
	(0.244)	(0.239)	(0.236)	(0.232)	(0.25)	(0.246)	(0.244)	(0.24)	(0.785)	(0.773)
MBA	0.284		0.296		0.324		0.338		0.802	
	(0.211)		(0.203)		(0.216)		(0.208)		(0.629)	
Harvard MBA		0.529[b]		0.566[b]		0.434[a]		0.498[b]		1.733[b]
		(0.244)		(0.235)		(0.255)		(0.245)		(0.808)
Skill Concentration			0.014	0.047			0.059	0.127		
			(0.2)	(0.174)			(0.203)	(0.179)		
Controls:										
Geographic Distance	0.076[b]	0.074[b]	0.082[b]	0.080[b]	0.072[b]	0.070[b]	0.073[b]	0.072[b]	0.006	0.000
	(0.032)	(0.032)	(0.031)	(0.031)	(0.033)	(0.033)	(0.033)	(0.033)	(0.05)	(0.05)
Investment Size	0.062	0.050	0.046	0.031	0.070	0.063	0.061	0.051	0.141	0.134
	(0.081)	(0.081)	(0.08)	(0.08)	(0.088)	(0.088)	(0.087)	(0.087)	(0.127)	(0.127)
Firm Experience	0.003	0.004	0.004	0.005	0.004	0.005	0.005	0.006	1.195[c]	1.226[c]
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.248)	(0.246)
Firm FE	No	No	No	No	No	No	No	No	Yes	Yes
PC Industry FE	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
PC Country FE	No	No	No	No	No	No	No	No	Yes	Yes
Adjusted R^2	0.0098	0.0129	0.0076	0.0115	0.0312	0.0319	0.0294	0.0311	0.1535	0.1569
Sample Size	926	926	926	926	926	926	926	926	926	926

Table 14
Robustness Checks: MBA Selection of LBO Syndication Partners

This table shows the coefficient estimates from the conditional logit model of syndication partner selection process for MBA graduates by using alternative proxies for team attributes. Each investment firm(f) at time t can choose among all other investing firms(i) in the sample with available team attributes data at time t. The dependent variable is a dummy variable equal to one for the investment firm-candidate pairs that co-invest with each other at the time when the deal is initiated. In Panel A (B The interaction terms are dummy variables that are assigned to 1 as long as the absolute values for both the investment firm and the syndicated partner exceed the median (third quartile) value among all sample firms at the time when the deal is initiated. Specification (1) is the basic model for MBA graduates in general. Specification (2) to (8) provide estimates for different subgroups. Top MBA graduates include those who are graduated from Harvard, Wharton, Stanford, Columbia, Chicago, INSEAD, or MIT business schools. Standard deviations are reported in the parentheses and the symbols [a], [b], and [c] represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

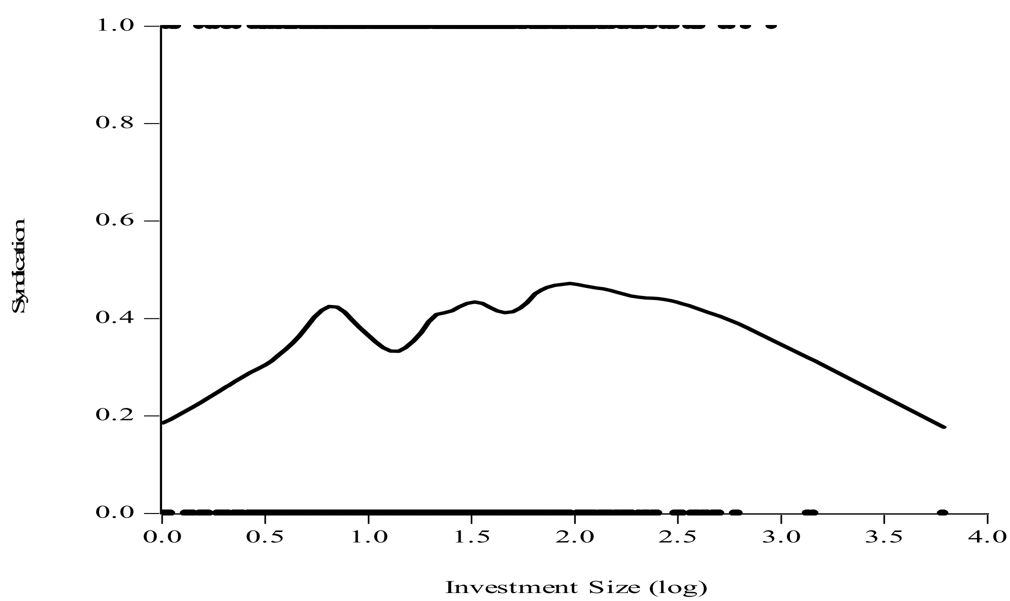
Panel A: Dummy Variable (Median)								
	(1) General MBA	(2) Top MBA	(3) Harvard MBA	(4) Wharton MBA	(5) Stanford MBA	(6) Columbia MBA	(7) Chicago MBA	(8) INSEAD MBA
MBA:								
MBA(f)*MBA(i)	2.154[c]	1.207[c]	1.304[c]	1.253[c]	1.457[c]	1.366[c]	0.289	0.809[a]
	(0.401)	(0.343)	(0.361)	(0.461)	(0.423)	(0.45)	(0.46)	(0.455)
MBA(f)*Engineer(i)	0.828[b]	0.440	0.174	1.636[c]	-0.010	0.990[b]	-0.485	0.692[a]
	(0.373)	(0.347)	(0.348)	(0.514)	(0.386)	(0.452)	(0.407)	(0.42)
MBA(f)*Law(i)	0.380	0.419	0.701[b]	-0.423	0.397	-0.482	0.144	0.193
	(0.329)	(0.317)	(0.33)	(0.435)	(0.375)	(0.403)	(0.395)	(0.38)
MBA(f)*Master(i)	0.022	-0.240	-0.197	-0.740	-0.440	0.185	0.146	-0.210
	(0.34)	(0.324)	(0.334)	(0.454)	(0.371)	(0.431)	(0.409)	(0.407)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald Chi^2	31	15.08	20.61	15.69	16.83	13.78	2.06	7.55
Probability > Chi^2	0	0.0045	0.0004	0.0035	0.0021	0.008	0.7251	0.1095
Investments	134	134	134	134	134	134	134	134
Observations	22,370	22,370	22,370	22,370	22,370	22,370	22,370	22,370

Panel B: Dummy Variable (P75)								
	(1) General MBA	(2) Top MBA	(3) Harvard MBA	(4) Wharton MBA	(5) Stanford MBA	(6) Columbia MBA	(7) Chicago MBA	(8) INSEAD MBA
MBA:								
MBA(f)*MBA(i)	0.227	1.170[c]	1.365[c]	-12.762	1.531[c]	1.369[c]	0.307	0.913[b]
	(0.545)	(0.411)	(0.4)	(4292.527)	(0.431)	(0.448)	(0.45)	(0.435)
MBA(f)*Engineer(i)	0.771	0.427	0.139	-15.666	0.822[b]	0.822[a]	0.401	0.920[b]
	(0.516)	(0.451)	(0.46)	(4879.427)	(0.411)	(0.431)	(0.439)	(0.411)
MBA(f)*Law(i)	-1.584	-0.443	0.153	-15.811	-0.135	-0.948	-0.065	-0.146
	(1.049)	(0.526)	(0.447)	(5805.353)	(0.464)	(0.651)	(0.497)	(0.532)
MBA(f)*Master(i)	-0.563	-0.704	-0.674	-17.548	-0.680	0.561	-0.307	-0.138
	(0.563)	(0.481)	(0.46)	(8557.86)	(0.46)	(0.415)	(0.437)	(0.418)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald Chi^2	5.53	11.98	15.17	0	18.94	14.99	1.74	9.61
Probability > Chi^2	0.237	0.0175	0.0044	1	0.0008	0.0047	0.7834	0.0475
Investments	134	134	134	134	134	134	134	134
Observations	22,370	22,370	22,370	22,370	22,370	22,370	22,370	22,370



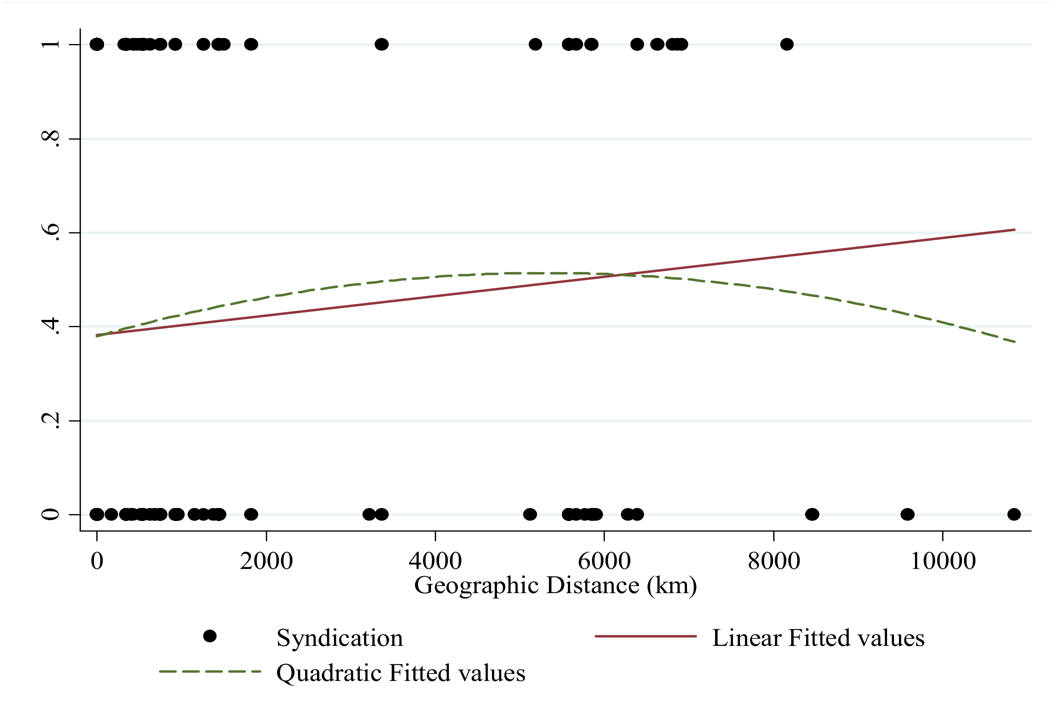
FigureA.1 Syndicated Likelihood and Investment Size

FigureA.1 shows the results of the linear estimation and the quadratic estimation of syndication likelihood on capital invested in LBO transactions (scaled by natural logarithm).



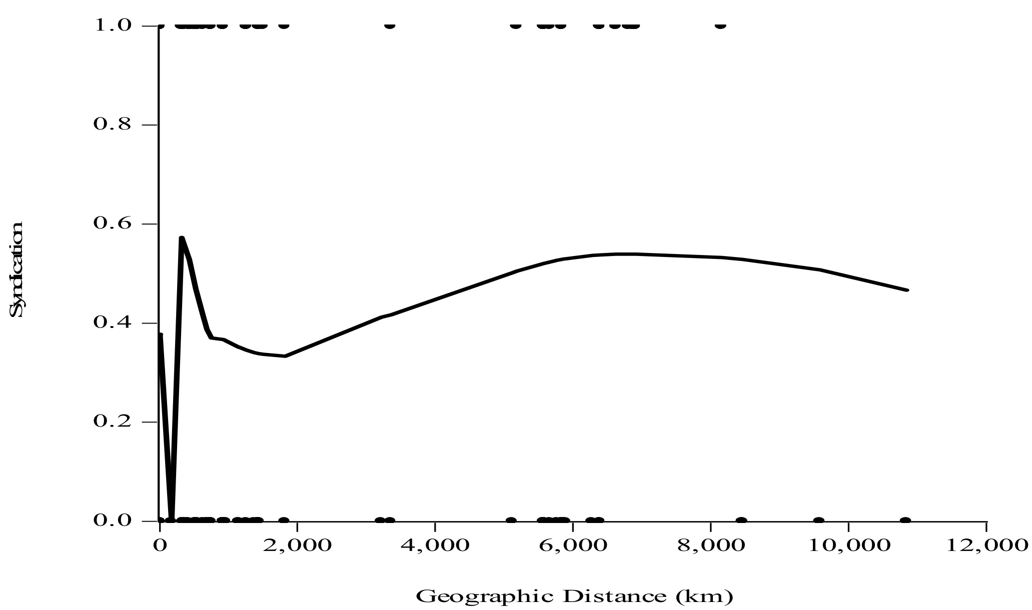
FigureA.2 Syndicated Likelihood and Investment Size

FigureA.2 shows the nearest neighbor estimation (degree=1, span=0.3) of syndication likelihood on invested in LBO transactions (scaled by natural logarithm).



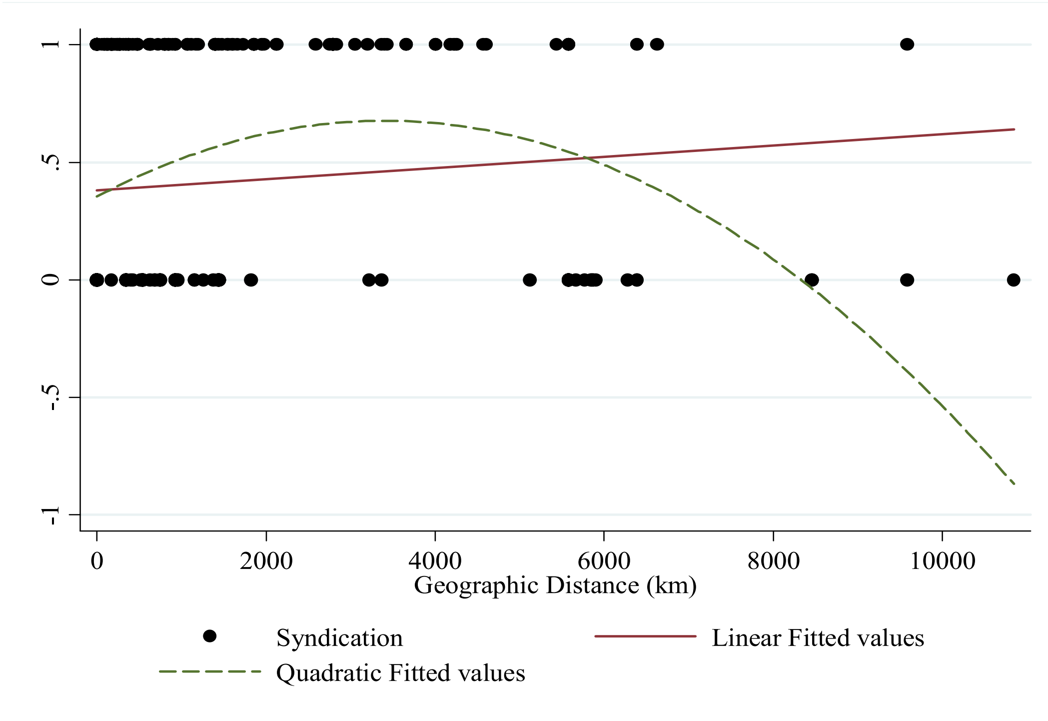
FigureA.3 Syndicated Likelihood and Geographic Distance (Sample)

FigureA.3 shows the results of the linear estimation and the quadratic estimation of syndication likelihood on geographic distance (in kilometer) between the portfolio company and its investment firm.



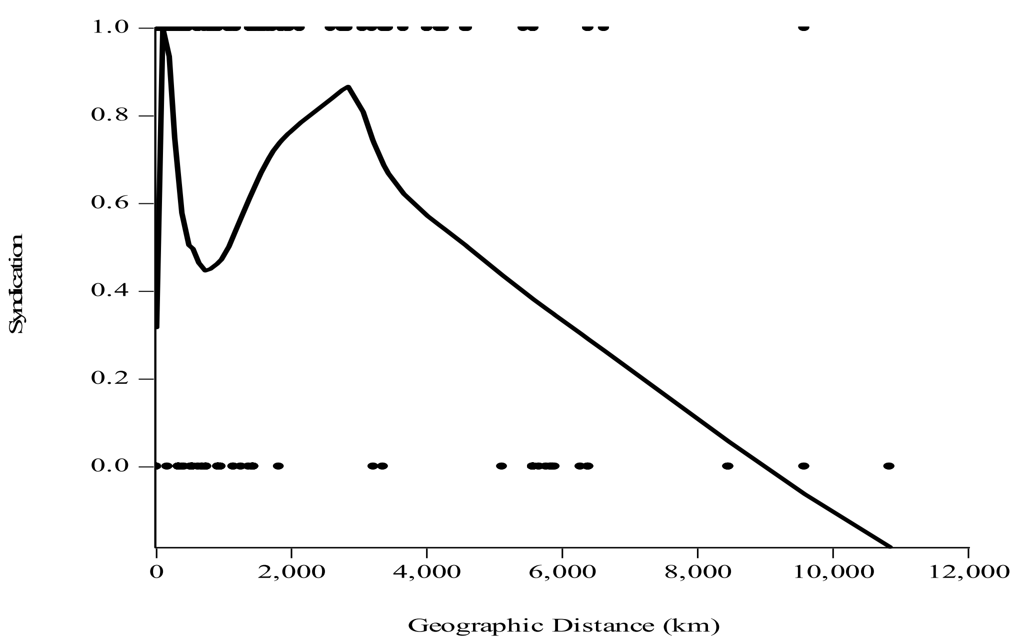
FigureA.4 Syndicated Likelihood and Geographic Distance (Sample)

FigureA.4 shows the nearest neighbor estimation (degree=1, span=0.3) of syndication likelihood on geographic difference (in kilometer) between the portfolio company and its investment firm.



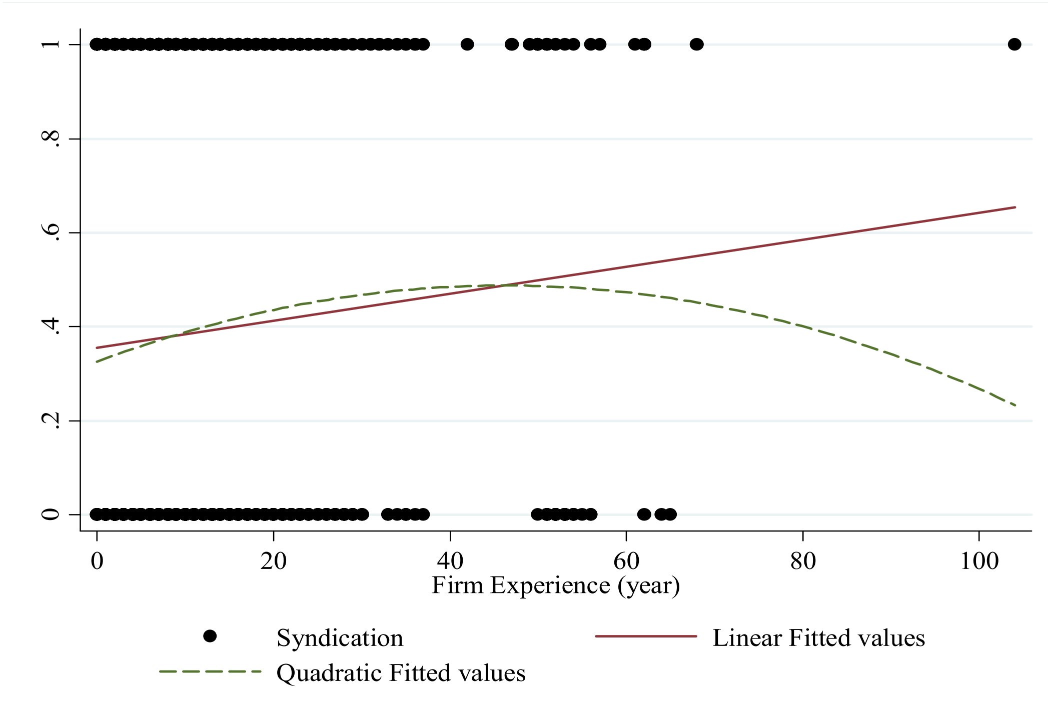
FigureA.5 Syndicated Likelihood and Geographic Distance (Team)

FigureA.5 shows the results of the linear estimation and the quadratic estimation of syndication likelihood on geographic distance (in kilometer) between the portfolio company and its investment firm(s).



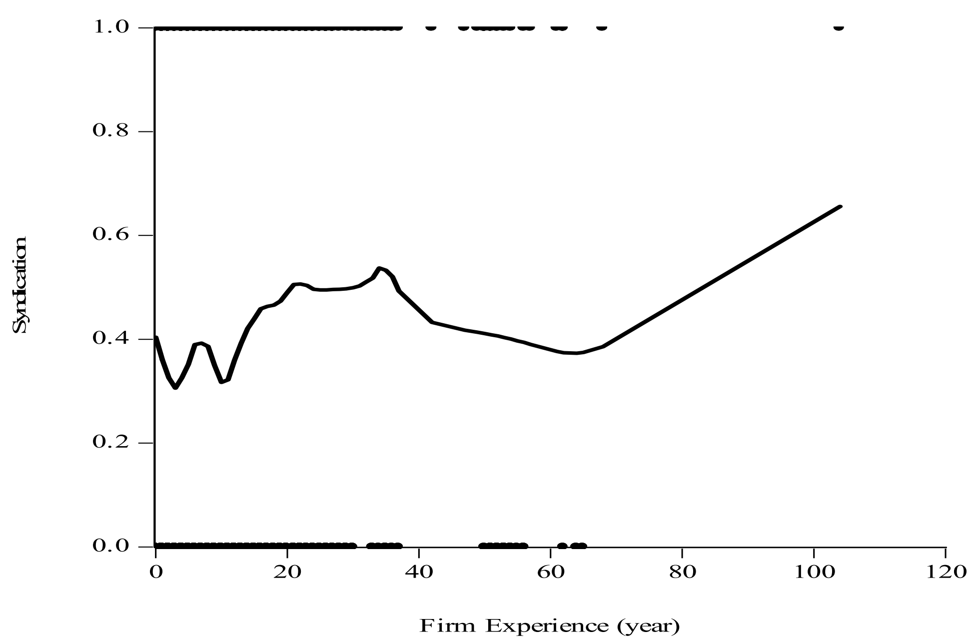
FigureA.6 Syndicated Likelihood and Geographic Distance (Team)

FigureA.6 shows the nearest neighbor estimation (degree=1, span=0.3) of syndication likelihood on geographic difference (in kilometer) between the portfolio company and its investment firm(s).



FigureA.7 Syndicated Likelihood and Firm Experience

FigureA.7 shows the results of the linear estimation and the quadratic estimation of syndication likelihood on firm experience (in year).



FigureA.8 Syndicated Likelihood and Firm Experience

FigureA.8 shows the nearest neighbor estimation (degree=1, span=0.3) of syndication likelihood on firm experience (in year).

Table A.1
Management Team on Syndication and Performance (firm-wise)

This table shows how managerial characteristics, in terms of density, differ based on syndication decision and final performance outcome. The investment team characteristics are proxied by using density variables, i.e. defined as the number of the professionals who have specific characteristics, scaled by the number of the whole investment team members within a firm. The "Skill Concentration" variable adopts the calculation similar to the Herfindahl Index, and it consists of three different skills, i.e. Law, Business, and Engineering. Low performance refers to the transactions constituting the lowest 25% performance (under the first quartile) in the sample. Similarly, high performance refers to those with the highest 25% performance (above the third quartile). Panel A and B adopt multiple as a proxy for performance, while Panel C and D adopt internal rate of return as an alternative proxy. Panel A and C show the mean test, using t-test for equality. Panel B and D show the median test, and, using Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. P-values are reported in the parentheses, and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Mean Test (Multiple)				
	Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
Non-Syndicated Investment	CFA/CPA/CA	0.1495	0.1212	-0.0282 (0.1572)
	Founder of the Firm	0.2283	0.2920	0.0637** (0.0378)
	MBA	0.4996	0.5220	0.0224 (0.4628)
	Law	0.1186	0.1361	0.0175 (0.3009)
	Business	0.7257	0.7676	0.0419** (0.0488)
	Engineering	0.0703	0.0774	0.0071 (0.5760)
	Master	0.1456	0.1737	0.0281 (0.1899)
	Harvard MBA	0.1513	0.1979	0.0466** (0.0462)
	Skill Concentration	0.6078	0.6831	0.0753** (0.0142)
	Sample Size	144	153	
Syndicated Investment	CFA/CPA/CA	0.1911	0.1276	-0.0635** (0.0253)
	Founder of the Firm	0.2023	0.2180	0.0158 (0.6643)
	MBA	0.5119	0.5128	0.0010 (0.9796)
	Law	0.1064	0.1182	0.0118 (0.5241)
	Business	0.7483	0.7530	0.0047 (0.8588)
	Engineering	0.0823	0.0893	0.0070 (0.6771)
	Master	0.1393	0.1704	0.0311 (0.1992)
	Harvard MBA	0.1774	0.2007	0.0233 (0.4780)
	Skill Concentration	0.6375	0.6356	-0.0019 (0.9607)
	Sample Size	82	81	

Panel B: Median Test (Multiple)				
	Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
Non-Syndicated Investment	CFA/CPA/CA	0.1056	0.0714	-0.0342 (0.1619)
	Founder of the Firm	0.1429	0.2	0.0571*** (0.0045)
	MBA	0.5455	0.6	0.0545 (0.4026)
	Law	0.0909	0.1111	0.0202 (0.3855)
	Business	0.75	0.7895	0.0395** (0.0323)
	Engineering	0	0	0 (0.6908)
	Master	0.1	0.1364	0.0364 (0.3995)
	Harvard MBA	0.0278	0.1429	0.1151** (0.0427)
	Skill Concentration	0.6211	0.6777	0.0566*** (0.0083)
	Sample Size	144	153	
Syndicated Investment	CFA/CPA/CA	0.1333	0.1176	-0.0157 (0.1053)
	Founder of the Firm	0.1062	0.1579	0.0517 (0.1388)
	MBA	0.5779	0.5714	-0.0065 (0.9444)
	Law	0.0833	0.1154	0.0321 (0.2575)
	Business	0.7778	0.7778	0 (0.816)
	Engineering	0.0385	0.0526	0.0141 (0.5961)
	Master	0.1091	0.12	0.0109 (0.542)
	Harvard MBA	0.125	0.1111	-0.0139 (0.8193)
	Skill Concentration	0.65	0.64	-0.01 (0.8629)
	Sample Size	82	81	

Panel C: Mean Test (Gross Internal Rate of Return)				
	Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
Non-Syndicated Investment	CFA/CPA/CA	0.1620	0.1304	-0.0315 (0.1757)
	Founder of the Firm	0.2418	0.2204	-0.0214 (0.4772)
	MBA	0.4882	0.4717	-0.0165 (0.6127)
	Law	0.1361	0.1039	-0.0322* (0.0646)

Panel C: Mean Test (Gross Internal Rate of Return)				
	Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
	Business	0.7071	0.7471	0.0400 (0.1)
	Engineering	0.0658	0.1039	0.0381*** (0.005)
	Master	0.1365	0.2117	0.0753*** (0.0013)
	Harvard MBA	0.1359	0.1772	0.0413* (0.0883)
	Skill Concentration	0.5937	0.6465	0.0528 (0.1092)
	Sample Size	133	127	
Syndicated Investment	CFA/CPA/CA	0.1437	0.1485	0.0048 (0.868)
	Founder of the Firm	0.1897	0.1723	-0.0174 (0.6211)
	MBA	0.5326	0.5256	-0.0070 (0.8741)
	Law	0.1080	0.1133	0.0053 (0.7941)
	Business	0.7602	0.7461	-0.0141 (0.6377)
	Engineering	0.1007	0.0979	-0.0028 (0.8854)
	Master	0.1658	0.1993	0.0335 (0.2694)
	Harvard MBA	0.1910	0.2206	0.0296 (0.4417)
	Skill Concentration	0.6605	0.6285	-0.0320 (0.4677)
	Sample Size	62	70	

Panel D: Median Test (Gross Internal Rate of Return)				
	Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
Non-Syndicated Investment	CFA/CPA/CA	0.125	0	-0.125 (0.196)
	Founder of the Firm	0.1667	0.1667	0 (0.8616)
	MBA	0.5	0.5385	0.0385 (0.7682)
	Law	0.0909	0.0909	0 (0.5283)
	Business	0.7143	0.8	0.0857* (0.0617)
	Engineering	0	0.0556	0.0556** (0.0101)
	Master	0.1	0.1667	0.0667*** (0.0017)
	Harvard MBA	0	0.0909	0.0909 (0.1664)
	Skill Concentration	0.5972	0.6672	0.07 (0.128)

Panel D: Median Test (Gross Internal Rate of Return)				
	Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
	Sample Size	133	127	
Syndicated Investment	CFA/CPA/CA	0.0729	0.129	0.0561 (0.4673)
	Founder of the Firm	0.1156	0.125	0.0094 (0.8268)
	MBA	0.5895	0.5885	-0.001 (0.7843)
	Law	0.0909	0.1026	0.0117 (0.2883)
	Business	0.8	0.7836	-0.0164 (0.5869)
	Engineering	0.0392	0.0871	0.0479 (0.5634)
	Master	0.1394	0.1603	0.0209 (0.5588)
	Harvard MBA	0.0955	0.1539	0.0584 (0.4026)
	Skill Concentration	0.6683	0.6556	-0.0127 (0.5968)
	Sample Size	62	70	

Table A.2
Management Team on Performance of Syndicated Investments

This table shows, for syndicated investments, how managerial characteristics, in terms of density of entire investment team, differ given the final performance. The investment team characteristics are proxied by using density variables, i.e. defined as the number of the professionals who have specific characteristics, scaled by the number of the whole investment team members across syndicated partners. Low (high) performance refers to the transactions constituting the lowest (highest) 25% performance in the sample. The set of "∂ (.)" variables refer to the differences of team characteristics before and after the syndication. Panel A and B adopt multiple as a proxy for performance, while Panel C and D adopt internal rate of return as an alternative proxy. Panel A and C show the mean test, using t-test for equality. Panel B and D show the median test, and, using Wilcoxon/Mann-Whitney (tie-adjusted) test for equality. P-values are reported in the parentheses, and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Mean Test (Multiple)			
Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
∂(CFA/CPA/CA)	-0.0075	0.0031	0.0106 (0.5397)
∂ (Founder of the Firm)	-0.0176	-0.0066	0.0110 (0.6357)
∂ (MBA)	0.0050	0.0143	0.0093 (0.6873)
∂ (Law)	-0.0121	0.0115	0.0236* (0.0563)
∂ (Business)	-0.0069	0.0146	0.0214 (0.1668)
∂ (Engineering)	0.0269	-0.0039	-0.0308*** (0.009)
∂ (Master)	0.0247	0.0033	-0.0214 (0.1611)
∂ (Harvard MBA)	0.0005	0.0031	0.0026 (0.8844)
∂ (Skill Concentration)	-0.0227	0.0098	0.0325 (0.1749)
Sample Size	82	81	

Panel B: Median Test (Multiple)			
Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
∂ (CFA/CPA/CA)	0	0	0 (0.5655)
∂ (Founder of the Firm)	0	0	0 (0.9502)
∂ (MBA)	0	0	0 (0.9329)
∂ (Law)	0	0	0 (0.8694)
∂ (Business)	0	0	0 (0.168)
∂ (Engineering)	0	0	0* (0.0815)
∂ (Master)	0	0	0 (0.2144)
∂ (Harvard MBA)	0	0	0 (0.82)
∂ (Skill Concentration)	0	0	0* (0.0950)
Sample Size	82	81	

Panel C: Mean Test (Gross Internal Rate of Return)			
Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
∂ (CFA/CPA/CA)	0.0119	0.0167	0.0048 (0.8087)
∂ (Founder of the Firm)	-0.0067	-0.0024	0.0042 (0.8466)
∂ (MBA)	-0.0087	-0.0059	0.0028 (0.9136)
∂ (Law)	-0.0098	0.0075	0.0172 (0.1735)
∂ (Business)	-0.0104	0.0011	0.0115 (0.5182)
∂ (Engineering)	0.0187	0.0006	-0.0181* (0.0899)
∂ (Master)	0.0223	-0.0109	-0.0331* (0.0533)
∂ (Harvard MBA)	-0.0075	-0.0079	-0.0005 (0.9817)
∂ (Skill Concentration)	-0.0301	-0.0086	0.0216 (0.4360)
Sample Size	62	70	

Panel C: Median Test (Gross Internal Rate of Return)			
Characteristics	Low Performance (L)	High Performance (H)	Difference (L,H)
∂ (CFA/CPA/CA)	0	0	0 (0.3721)
∂ (Founder of the Firm)	0	0	0 (0.9298)
∂ (MBA)	0	0	0 (0.6722)
∂ (Law)	0	0	0 (0.7203)
∂ (Business)	0	0	0 (0.8189)
∂ (Engineering)	0	0	0 (0.1132)
∂ (Master)	0	0	0 (0.3726)
∂ (Harvard MBA)	0	0	0 (0.438)
∂ (Skill Concentration)	0	0	0 (0.7876)
Sample Size	62	70	

Chapter 3

Backdating or Otherwise Manipulating CEO Stock Option Grants

The academic studies suggest that the practice of top executive stock option backdating was used to be widely adopted among firms. In this chapter, I study whether this option backdating practice is associated with inferior corporate governance. e.g. lax board monitoring or executive entrenchment. Moreover, I examine firm-specific characteristics that might lead to the decision and whether its rationale deviates from that of the option repricing mechanism.

3.1 Introduction

Yermack (1997) first identifies the pattern of abnormal stock price return around executive stock option grants. More specifically, firms' stock returns are abnormally high immediately after these options are granted. Due to accounting convention and tax considerations, stock options are generally granted at the money, i.e. to set the exercise price equal to the market price[1]. It thus suggests that, other than pure luck and/or the ability to forecast stock prices, firms timing option grants or firm-related announcements is the most likely explanation, the so-called "springloading". Later, several studies (e.g. Aboody and Kasznik, 2000; Chauvin and Shenoy, 2001; Lie, 2005; Heron and Lie, 2007) further show that the stock returns are abnormally low before these option grants. Lie (2005) and Heron and Lie (2007) argue that, instead of timing grants and announcements, it is more likely that those stock options in question are actually backdated. In other words, with hindsight, the grant dates of current

[1] See Heron and Lie (2007) for detailed discussions.

options are changed to more favorable dates, i.e. with lower striking prices.

These findings, together with the comprehensive newspaper coverage (e.g. Wall Street Journal, 2005) starting from 2004, reveal this option backdating practice to the public and further draw regulators' close attention. To them, without revealed to shareholders, backdating is simply a vicious way of stealing money from the firm. More importantly, by means of resetting existing option grants to a date with a favorable price, executives are in fact rewarded for poor performance, which can be viewed as an example of managerial rent-seeking. Even worse, the anticipation of possible option backdating is detrimental to managerial incentives.

Until March 2007, there are more than 250 companies that are under internal reviews or (in)formal investigations by the SEC (U.S. Securities and Exchange Commission) and/or U.S. Department of Justice regarding the accounting of option grant dates. It thus seems that option backdating is not a practice conducted by merely a few companies with greedy executives. Heron and Lie (2009) estimate that 13.6% of all top executive (CEO) option grants between 1996 and 2005 are backdated or otherwise manipulated. For unscheduled and at the money grants, this estimate increases to 18.9%. Before the SOX (Sarbanes-Oxley Act) of 2002, this fraction is 23%, and 10% thereafter. On top of that, at the firm level, they estimate that 29.2% of firms manipulate stock options granted to their top executives. Nevertheless, even for those firms involved with option backdating, not all of their grants are backdated or otherwise manipulated. Obviously, this extensive but intermittent use of option backdating or otherwise manipulation is of great interest to both the academics as well as the regulators.

In another vein, recent research studies whether option backdating is a result of weaker corporate governance[2]. For instance, Bizjak et al. (2009) find that board interlock significantly facilitates the spread of backdating practice across firms. Other factors such as younger CEOs, higher stock volatility, and larger managerial holdings of stock and options

[2] See Bebchuk, Cohen, and Ferrell (2004) and Gompers, Ishii, and Metrick (2003) for the construction of the GIM and Entrenchment index, respectively.

all attribute to backdating likelihood. Collins el al. (2009) study the relationship between a set of governance variables and the decision to backdate. They find that weak governance, higher managerial option holding, and board interlock contribute to the backdating behavior. Having directors who receive option grants on the same day as the CEO also prompts this opportunistic behavior.

This chapter investigates the rationale behind this practice. More specifically, I examine what firm characteristics might lead to the decision to manipulate top executive stock option dates. Different from Heron and Lie (2009), Bizjak et al. (2009), and Collins et al. (2009), I take into account firm performance after manipulating options, which further allows for the comparison with option repricing mechanism. Option repricing mechanism is designed to "re-incentivize" managers by lowering the strike prices of previously granted options that are significantly out of the money. Technology, trade and service oriented firms (Chidambaran and Prabhala, 2003), along with small firms (Chance et al., 2000), conduct option repricing more. Sauer and Sautner (2008) find option repricing is common for young and fast growing firms that encounter a sharp decline in performance in the two years before repricing, and cash compensation is not reduced accordingly when repricing occurs. After repricing decision that is affected by corporate governance structure, performance improves significantly.

In contrast with option repricing mechanism as well as managerial power view, the alternative hypothesis in this chapter is that, for a cash-strapped firm with high stock price volatility, option backdating is to retain outperforming executives. To test the hypothesis, I use a sample of 6,836 stock option grants that are issued to the top executives in the Standard & Poor's (S&P) 1500 companies between 1999 and 2007. I estimate the likelihood of option manipulation based on the assumption that, in the absence of backdating or other types of option grant manipulation, the distributions of stock price returns during the month right before/after grant dates should be similar. Namely, without option manipulation, the distribution of return differences should not be significantly different from zero. Alternatively, positive abnormal return difference imply the existence of option manipulation.

I calculate abnormal returns as the difference between the stock returns of the granting firm and the ones predicted by the Fama and French three-factor model. I primarily focus on the grants whose abnormal return differences rank above the 90% decile in the sample with positive values, which I believe provides a more conservative estimate while reducing potential noises in the data[3]. In the following robustness checks, I use the positive abnormal return difference as an alternative proxy for manipulation. Moreover, I conduct additional testing for two sub-samples, i.e. the pre- and post-SOX period, and see whether (and if so, how) the passage of this Act affects the manipulation decision.

In terms of the determinants, I use the simple OLS model to estimate the manipulation likelihood. Basically, what I find is that, during the period of 1999-2007 as a whole, when smaller, younger, and better governed firms underperform in the previous year and encounter high stock volatility, the stock options granted to top executives who own more stock option components in their total compensation are more likely to be manipulated. Once controlling for the industry and year fixed effects, only the CEO option holding variable loses its influences on the option manipulation decision. The evidence thus suggests that option manipulation is not a result of weaker corporate governance, despite it can potentially be related to previous inferior market performance.

More interestingly, disparate patterns emerge between the pre- and post-SOX period. Before the passage of the 2002 SOX, firms that are smaller, younger, and better governed with higher cash holdings and stock volatility, are prone to manipulate option grant dates. Once controlling for both fixed effects, what remains is the (negative) effects of firm age only. After the 2002 SOX, firms that are smaller and better governed, with more cash at hand but having inferior performance, tend to have manipulated grants. Once controlling

[3]Heron and Lie (2009) estimate the likelihood by using the absolute difference and a dummy whether this difference is positive. Collins el al. (2009) classify a grant as backdated if the grant date stock price falls in the lowest decile of the stock price distribution over a 240-day window surrounding the option grant date. Bizjak et al. (2009) identifies grants as being backdated if the market-adjusted stock price declined at least 10% in the 20 trading days prior to the grant and increased at least 10% in the 20 trading days after the grant.

for both fixed effects, the (negative) effects of firm size, return on assets, and both the GIM index and entrenchment index, still remain. Taken together, these findings indicate that the practice of option manipulation is not a result of weaker governance or management entrenchment, regardless of the 2002 SOX. However, thereafter it is correlated with inferior performance. In the robustness checks, I use the positive abnormal return difference, and most of the results disappear.

Regarding the consequences, other than the legal ramifications, I am mainly interested in the relationship, if any, between this behavior and the subsequent firm performance, in which I use the two-step treatment-effects model to estimate because the selection process is not random. During the entire sample period, manipulating grants is positively related with performance, which suggests a favorable role involved. Similarly, I find different results in the sub-sample periods. More specifically, this positive relationship is mainly driven by the grants in post-SOX period whereas no significant relationship is found prior to the 2002 SOX. In addition, after the 2002 SOX, the firm-specific selection process of the manipulating behavior involves smaller firm size, higher dispensable cash ratio, poor previous performance, and better corporate governance. These attributes seem to resemble the option repricing mechanism to re-incentivise managers. As for the pre-SOX period, smaller and younger firms with more cash holdings, higher stock volatility, and fewer anti-takeover provisions are more likely to manipulate grant dates. Since it is not related with performance (both pre- and post-manipulation), it is not obvious what rationale might lead to option manipulation.

At the end of this chapter, I use a sub-sample of 126 firms that are under (formal or informal) investigations or internal probes regarding option backdating related accounting rule violations and/or tax evasions to test the robustness of the findings. The testing results show that, regardless of the classification methods in use, for this subset of firms, high stock volatility (and to a lesser extant, lower firm age) is the main attribute that explains this practice, which is not a result of poor corporate governance.

All in all, I find evidence that rejects the null hypothesis that option backdating or otherwise manipulation is associated with poor corporate governance, but it can be linked to inferior performance to some extent. More specifically, when taking into account both the pre- and post-performance, during the pre-SOX period, the option manipulation decision is not related with firm performance and thus not a result of poor performance. After the SOX is passed, this practice seems more of an option repricing mechanism. In addition, I do not find evidence of weak corporate governance during the selection process regardless of the sample period. In other words, option manipulation is not a result of a lax board monitoring or management entrenchment.

The main contribution of this chapter is three-fold. First of all, unlike extant studies on option backdating, it considers the firm performance both before and after the decision to backdate or otherwise manipulate top executive option grants. Moreover, unlike Collins el al. (2009), I view the option backdating or otherwise manipulation decision as a self-select treatment, instead of a random variable. Therefore, the model is more capable of better capturing the mechanisms involved in the selection process as well as the treatment effects from the act of manipulation itself. Lastly, it helps to identify firms that are more attempted to this practice, and thus might be of interest to the regulators.

The remainder of this chapter proceeds as follows: Section 2 gives a brief literature review related with backdating. Section 3 contains hypotheses to be tested. Section 4 describes the sample construction and the methodology applied. Section 5 shows the estimation and testing results. Section 6 conducts the sub-sample analysis. Section 7 summaries the findings and concludes. Section 8 displays the tables and figures.

3.2 Research on Executive Stock Option Grants

Hall and Murphy (2002) conduct a certainty-equivalent analysis to determine the cost, value, and pay-for-performance sensitivity of vested stock options owned by undiversified and risk-averse managers. They show that firm's cost of option-granting typically exceeds its value to managers. The incentives provided by options are maximized with a strike price at or near the grant-date market price when the grant is an add-on, ceteris paribus.

However, if managers receive options to compensate reduced cash income, incentives are maximized with a strike price close to zero. Thus, under this framework, some common practices, such as setting higher performance benchmarks by issuing premium options or refraining from repricing following stock price declines, are not necessarily in the interests of shareholders.

Palmon et al. (2004), by taking effort aversion into account, evaluate the common practice of at-the-money executive stock options. They simulate the firm's decisions and the manager's effort choice under various compensation schemes and identify what are optimal. They find that when abstracting from tax considerations, it is optimal to grant in-the-money options. Otherwise, issuing at-the-money options might be optimal. Both strategies hold regardless of strike price linked to market situation; in addition, issuing options with benchmarked strike prices usually dominates options without.

Bizjak et al. (2007) find that board interlock significantly facilitates the spread of backdating practice across firms. Other factors such as younger CEOs, higher stock volatility, and larger managerial holdings of stock and options all attribute to backdating likelihood. But, little evidence relates backdating to poor corporate governance. Collins el al. (2007) argue weak governance, higher managerial option holding, and board interlock contribute to backdating. Having directors who receive option grants on the same day as the CEO also increases the likelihood. Narayanan et al. (2007) discuss economic impacts of legal, governance, tax, disclosure, and incentive issues thanks to the revelation of backdating. Using a sample of firms already implicated in backdating, they find that the revelation of backdating results in a loss of 8% to shareholders, i.e. around U.S.$500 million per firm. In contrast, the potential gain from backdating (for CEOs) is estimated under U.S.$0.6 million per firm annually.

Sauer and Sautner (2008) examine the relations between option repricing, performance, and corporate governance in the Europe. They find repricing is common for young and fast growing firms that encounter a sharp decline in accounting and stock price performance in the two years before repricing, and cash compensation is not reduced accordingly when repricing occurs. After repricing decision, which is affected by corporate governance structure, performance improves significantly.

3.3 Hypotheses

In this chapter, my alternative hypothesis is that, for a cash-strapped firm that faces high stock price volatility, option backdating is one way to reward and/or retain outperforming executives. In particular, I focus on the following two null hypotheses for testing,

- H1: Option backdating (manipulation) is associated with weak corporate governance.
- H2: Option backdating (manipulation) is associated with inferior performance.

3.4 Sample and Methodology

3.4.1 Sample

Following Heron and Lie (2009), I obtain my sample of CEO stock option grants from the Thomson Financial Insider Filing database, which provides all insider transactions reported on SEC forms 3, 4, 5, and 144 in the U.S. I first restrict my sample option grants to transactions[4] that are granted or awarded to CEOs between January 1996 and November 2007[5]. I require stock returns to be available from 20 trading days before to 20 trading days after the grant date. I further eliminate duplicate grants that occur on a given grant date so that there is only one grant for a given date and company combination, i.e. firm-date observation. This leaves 26,092 firm-date observations that corresponds to 5,398 companies. In the end, I match these transactions with available corporate governance data in RiskMetrics

[4] I include transactions with derivative title as: OPTNS, EMPO, ISO, NONQ, CALL, WT, DIRO, RGHTS, and SAR. In the meantime, all the sample transactions have a cleanse indicator of R ("data verified through the cleansing process") or H ("cleansed with a very high level of confidence"), and C (A record added to nonderivative table or derivative table in order to correspond with a record on the opposing table.).

[5] In that case, a month of subsequent stock returns would be available in the 2007 Center for Research in Security Prices database.

Governance database[6], accounting data in Compustat database[7], and stock market data in CRSP database[8]. My final sample consists of 6,836 (or 6,444 with available entrenchment index data) CEO option grants across 1,303 companies among S&P 1500 companies in the U.S. during the period of 1999 and 2007.

Table 1 shows the descriptive statistics of my sample. In Panel A, the market value of slightly more than half of the firms is less than 2 billion U.S. dollars. In terms of industrial classifications, as shown in Panel B, the sample firms are concentrated in the manufacturing industry (21.18%), followed by financial industry (13.48%) and electronics industry (11.33%). When it comes to the option grants, the electronics industry has the most options being potentially manipulated (25.56%), while the manufacturing industry (18.34%) and the software industry (10.00%) follow suit, as illustrated in Panel C.

In terms of the timing of the option grants, Panel D shows that, except in 1999 and 2000, the issuance of option grants is stable over time, roughly between 10% and 14%. Moreover, consistent with the previous studies, the estimated number of manipulated options is in general higher before 2003, the year after the SOX takes effect. Particularly, in 2000, approximately 11.45% of the option grants are estimated to be manipulated, which is close to the findings in Heron and Lie (2009). Panel E shows the descriptive statistics of the variables that are adopted in the ensuing analysis.

3.4.2 Methodology for Estimating the Likelihood of Grants That Are Backdated or Otherwise Manipulated

Intuitively, when there exists no opportunistic grant timing or opportunistic timing of information flows around grants, the stock returns before and after grant dates should display similar patterns. In other words, in the absence of intentional or strategical timing, the

[6] It publishes detailed listings of up to 30 corporate governance provisions for firms in corporate takeover defenses for more than 4,000 firms since 1990.

[7] It provides annual and quarterly income statement, balance sheet, statement of cash flows, and supplemental data items on publicly held companies.

[8] It maintains a comprehensive collection of security price, return, and volume data for the NYSE, AMEX and NASDAQ stock markets, among others.

distribution of the difference between the returns for a given number of days after and before the grants should be centered around zero. Similar to Heron and Lie (2009), I use this reasoning to estimate the likelihood of grants that are backdated or manipulated.

As a matter of fact, the estimate of the abnormal stock price movements around the grant dates might be the results of various manipulative practices, such as option backdating, option springloading, and option repricing. Nevertheless, Heron and Lie (2007) argue that the majority of the abnormal returns around the declared grant dates suggest option backdating at play. In addition, the abnormal stock price patterns should vary depending on the purposes of these manipulative practices. More specifically, for option springloading, the abnormal stock returns before and after the grant dates should not be different from zero with statistical significance until the grant dates. When comparing option repricing with option backdating, the former's abnormal stock returns should sustain for a longer period with less drastic intensity because of its incentive purposes.

Following the event study approach, for the sample CEO option grants, I estimate the cumulative abnormal returns as the difference between the stock returns of the granting firm and the returns predicted by the Fama and French three-factor model. The estimation window lasts 255 days, ending 46 days before the grant date. On the other hand, the event window contains 41 days in total, starting from 20 trading days before and ending 20 trading days after the event. The reason to choose 20 trading days is because previous studies suggest that most of the abnormal returns around grants happen during the month before and after the option grants. I use the abnormal return difference before and after the grants as my estimate of the likelihood of option manipulation. In the end, I classify option grants as backdated or manipulated when their abnormal return differences rank exceeding the highest decile[9] of the sample options that have positive differences[10].

[9] Heron and Lie (2009) estimate on average 18.9% of all top executive option gratns are manipulated, with a fraction of 23% before and 10% after the 2002 SOX takes effect. Therefore, the choice of top 10% threshold provides a conservative estimate of option manipulation.

[10] By using this top 10% threshold, 21.58% of the sample firms are estimated to have manipulated their CEO stock option grants between 1999 and 2007. It thus provides a conservative estimate, compared with 29.2% between 1996 and 2005 in Heron and Lie (2009).

3.5 Empirical Results

3.5.1 Determinants of Option Manipulation

Mean-Test Analysis

Table 2 shows the testing results of univariate mean comparison analysis of CEO stock option grants[11]. On the whole, firms who have a higher propensity to manipulate their CEO option grants are smaller and younger. In addition, in the year before the grants, they tend to have more dispensable cash, lower return on assets, better governance structure, with a lower degree of managerial entrenchment. In the year of the grants, these firms are more likely to encounter higher stock volatility while their CEO have more stock option holdings relative to their total compensation.

Regression Analysis

I carry out the following OLS model to examine the relationships between some firm-specific characteristics and the option manipulation propensity,

$$Prob(MANIPULATE_{it}) = \alpha_0 + \beta_1 SIZE_{it-1} + \beta_2 AGE_{it} + \beta_3 CASHRATIO_{it-1} + \beta_4 GROWTH_{it-1} + \beta_5 PROFITABILITY_{it-1} + \beta_6 VOLATILITY_{it} + \beta_7 CEOHOLDING_{it} + \beta_8 GOVERNANCE_{it-1} + \varepsilon_{it}$$

, where MANIPULATE is a dummy variable, assigned to 1 for firm-date observations whose abnormal stock return differences rank above the top 10% of the entire sample with positive differences and 0 otherwise.

Table 3 displays the correlation matrix of the explanatory variables, and Table 4 displays the estimation results[12]. Panel A shows the estimates during the whole sample period, while Panel B presents the findings in two different sub-periods, i.e. before and after September 2002 in which the SOX is passed. The only difference in Specification (1) and (2) is that the former adopts GIM index while the latter adopts Entrenchment index to measure the

[11] I find similar testing results for median comparison anaysis (not reported).
[12] The results hold under Probit estimation (not reported).

governance level. Specification (3) and (4) further control for industry and year fixed effects for Specification (1) and (2), respectively.

When looking at the entire sample period, I find that smaller, younger, and better governed firms tend to manipulate their CEO option grants more. Not only that, when the firm underperforms in the previous year, and has higher stock price volatility this year while its CEO happen to have more stock option components relative to total compensation, the likelihood of options being manipulated is higher. Note that after controlling for the industry and year fixed effects, only the CEO option holding variable loses its influences on the propensity for option manipulation. It thus suggests that, on average, option manipulation is not a result of weaker corporate governance, but can be related to previous inferior firm performance.

More interestingly, once dividing the sample period into two with the 2002 SOX, disparate patterns emerge. Prior to the passage of the 2002 SOX, being smaller, younger, and better governed with higher cash holdings and stock volatility, is associated with a higher tendency to manipulate option grants. Once controlling for the industry and year fixed effects, only the (negative) effects of firm age remain. On the other hand, after the SOX takes effects in 2002, firms that are smaller and better governed, with more cash at hand, and facing inferior performance, tend to have manipulated grants. Once controlling for the industry and year fixed effects, the (negative) effects of firm size, return on assets, and both measures of corporate governance remain. Therefore, all taken, the evidence suggests that option manipulation is not a result of weaker governance or managerial entrenchment, regardless of the passage of the 2002 SOX, but, thereafter it is associated with inferior performance.

3.5.2 Option Manipulation and Performance

After exploring the determinants, in this section I attempt to examine the consequences that might result from option manipulation behavior. In particular, other than the legal ramifications, it is clearly that, for shareholders, what really matters is how the act might influence performance, if any, which is measured by return on assets. I use the treatment-effects model (with two-step consistent estimates) to explore the relationship. Since the decision for option manipulation is not random, the choice of treatment models that consider the selection process is more appropriate compared with other simple linear models.

Similar to the empirical strategy in the previous section, in Table 5, Panel A displays the estimates during the whole sample period, and Panel B shows the findings in two different sub-periods, i.e. before and after the 2002 SOX. In order to understand better, the numerical results are further summarized in Table 6, which provides the predicted signs for the firm-specific factors that might influence the decision for option manipulation once taking into account both the industry and year fixed effects. Without distinguishing between prior- and post-SOX period, the act of manipulating CEO option grants is positively related with performance, suggesting a favorable role involved.

However, once again intriguingly, I find different results in the two sub-sample periods. More specifically, this positive relationship is mainly driven by the grants in post-SOX period whereas no significant relationship exists prior to the SOX taking effects. Furthermore, after the 2002 SOX, the firm-specific selection process of the manipulating behavior involves smaller firm size, higher dispensable cash ratio, poor previous performance, and better corporate governance. It thus seems to reflect the option repricing mechanism that provides incentives for managers whose existing options are deep out of the money. As for the pre-SOX period, smaller and younger firms with more cash holdings, higher stock volatility and fewer anti-takeover provisions are more likely to manipulate CEO option grant dates. Because it is not directly linked to performance (both before and after the manipulation), it is not obvious to me what the considerations behind might be.

In summary, once taking into account post-performance, during the pre-SOX period, option manipulation behavior is not a result of poor performance and is independent of post-performance. After the SOX is passed, this act resembles more of the option repricing mechanism. On top of that, I do not find evidence of weaker corporate governance and/or higher management entrenchment in the selection process, regardless of the sample period under study. As a result, option manipulation does not result from a lax board monitoring or executive entrenchment.

3.5.3 Robustness Checks

As a robustness check, I relax the top 10% threshold and classify grants as manipulated as long as they have positive abnormal return differences. Table 7 and Table 8 show the estimation results for the determinants as well as the relationship between option manipulation and performance, respectively. On the whole, compared with the findings in the preceding analyses, most of the estimates are statistically insignificant, and the explanatory power of these regression models decrease dramatically. Therefore, it suggests that the choice of this 10% threshold is less of a concern about the misspecification issues.

3.6 Sub-Sample Analysis

In this section, I use a sub-sample of 126 firms, under (formal or informal) investigations or internal probes regarding option backdating related accounting rule violations and/or tax evasions[13] to further test the robustness of the previous findings. In addition, I estimate the market reaction to the press that reveals the practice of option backdating, which can be regarded as reputation risk to firms. I also examine if those firms commit other corporate frauds more in the past. In the end, I investigate possible drivers behind this reputation risk.

3.6.1 Case Study: Brocade Communications Systems

Founded in 1995, the Brocade is a data storage-networking company in San Jose, California. It provides storage switches that function as virtual traffic officers and allow for interconnection between storage devices. Gregory Reyes, who works as its CEO since mid-1998, resigns in January 2005, at the same time the company announces to restate financial statements

[13] I obtain the firm list from Wall Street Journal "Perfect Payday" report (the June 12, 2007 version), http://online.wsj.com/page/perfectpayday.html.

from 1999 to 2004 because of improper accounting for previous options granted to new or part-time employees, employees on leaves of absence or in transitory roles with the company. One of its most remarkable restatements is for fiscal 2000. During that year, Brocade actually losses $951.2 million, instead of the originally reported $67.9 million earnings. The $1 billion difference is related to its stock-based compensation and associated with income tax adjustments. After resignation, Mr. Reyes remains as consultant and director within the company for several months.

Similarly, some of Mr. Reyes' options are granted on highly favorable dates. For example, one grant is dated on October 1, 2001, at the time when its stock price reaches to the yearly lowest level; also, two other grants come at monthly stock lows. Even though Mr. Reyes does not exercise any options after the company goes public in 1999, he makes a fortune by selling at least $380 million of shares before its IPO. On May 16, 2005, Brocade discloses that the Justice Department and the SEC are investigating its option-granting practices. After two years, on May 31, 2007, Brocade agrees to settle with the SEC and pays $7 million.

Besides, since April 2006, Brocade has been under a class action lawsuit, lead by The Arkansas Public Employee Retirement System who claims a $1.9 million loss, stating that Brocade recruits employees by giving them offer letters with early, mostly inaccurate, starting dates for employment. For example, on January 6, 2000, David Smith receives an offer letter from Mr. Reyes and is employed as a vice president. His compensation consists of a base salary of $240,000 a year and 200,000 options, with the grant date of his first day of employment. However, Mr. Smith states that he does not start working full-time in Brocade until April, rather than the supposedly January starting date. Between 2000 and 2001, Mr. Smith pockets $7.4 million from the sale of his share holding.

The suit also alleges that Mr. Reyes has the authority to grant options "as a committee of one" and that he sometimes holds "ad hoc" board meetings with other executives to approve option grants. In the beginning, Mr. Reyes denies any backdating practice under his watch, but now he recognizes its existence. Nevertheless, facing criminal fraud charges and millions of dollars in fines, he still defends himself by stating that its purpose is to retain and recruit talented employees, not to defraud shareholders. The one-person stock option committee is to facilitate the hiring and retaining procedure, and is legal under the law of Delaware, where Brocade is incorporated. What's more, he argues that he does not realize its accounting implications, is not directly involved in awarding backdated options, and investors does not consider them material, either.

3.6.2 Sample

Table 9 shows the summary statistics of these 126 sub-sample firms in firm size and industry classification. The size distribution in this sub-sample is similar to that in the sample universe. However, more than half of the sub-sample firms (55.56%) are in the information technology sector (including Computer & Electronic Parts industry and Software & Technology industry), in contrast with the sample universe (18.73%)[14].

To form a reference group for testing, for each sub-sample firm, I construct a matched portfolio that consists of at most two companies by size (total assets) and industry (four-digit SIC codes) on an annual basis between 1999 and 2006.

3.6.3 Testing Results

Firm-Specific Attributes of Backdating

i. Mean-Test Analysis

First I compare corporate governance structures between the sub-sample and the market as a whole in 1998 and 2006[15]. Panel A in Table 10 provides supporting evidence that backdating firms in general have at least as good corporate governance as the market average. For instance, in 2006, except the Delay category of GIM sub-index, backdating firms have significantly stronger shareholder rights. However, note that, these differences in var-

[14] This ratio increases to 35.56% in terms of option grants in the sample.

[15] I pool all companies in the database with available data to form the market. I do not conduct year-by-year testing because corporate governance across firms is stable over time.

ious corporate governance measurements seem to shrink with time. When it comes to the comparison between the sub-sample and its peer group, Panel B in Table 10 demonstrates similar despite weaker, patterns as previous findings in market comparison. Regardless, these results show that firms under option backdating related probes do not have inferior corporate governance, and these firms are not subjected to (high) managerial entrenchment, either.

Moreover, I compare accounting performance, stock volatility, and financial constraint between the sub-sample and its peer group on an annual basis between 1998 and 2005. In Table 11, Panel A shows that there is no significant difference between both types of firms in any of these three attributes over time. Panel B shows the testing results on stock return and volatility between the sub-sample and the market that I use three different proxies, i.e. S&P Composite Index, value weighted and equally weighted NYSE/AMEX/NASDAQ Index. Generally speaking, the sub-sample firms beat the market except in 2002, and their stock prices are more volatile than the market.

ii. Regression Analysis

After separate mean-tests of several firm attributes, I conduct two sets of regression analysis[16] to test whether the rationale behind option backdating or otherwise manipulation in Section 3.5 also holds for this sub-sample of firms. Due to small sample size, I allow for three cut-off points to classify stock options that are estimated to be backdated. In Table 12, Panel A shows the number of grants that are classified as backdated. Threshold (1) and (2) refer to the criteria in which the abnormal stock return differences exceed 90% and 75% of the distribution of the entire sample (the universe of option grants). Threshold (3) relax further to classify options that are backdated as long as their abnormal return differences are positive. Note that the peer group for each sub-sample firm in the regression analysis is formed in 2005 data only in order to avoid spurious interpretations.

These two sets of regression analysis differ in how I classify stock options as backdated.

[16] The model specification is identical with the one specified in the regression analysis of Section 3.5.1.

In Panel B, I choose stock options in the sub-sample firms only, and classify those whose abnormal return differences exceed specific threshold as being backdated, as illustrated in Panel A with the red dotted square. Alternatively, in Panel C, I take into account the stock options in the peer groups. Similarly, I classify options in the sub-sample firms whose abnormal return differences exceed some threshold as being backdated. However, different from Panel B, options classified as non-backdated are options in the peer groups only whose abnormal return differences do not exceed the same threshold, as illustrated in Panel A with the blue dotted circle.

In other words, in Panel B, the estimates provides what might lead to the decision to backdate CEO stock options within the sub-sample firms, while the estimates in Panel C give a more general explanation why to backdate. Regardless of which estimation method in use, either linear probability model or binomial probit model, the only firm attributes that matter are stock volatility (+) and corporate governance (-), and firm age (-) when taking options in peer group into consideration. The evidence suggests that firms backdate their CEO stock options in order to take advantage of stock volatility. This compensation has little to do with past performance, future growth opportunity, CEO incentives, and financial constraint. Therefore, it is not obvious what the reward is for, but it is not a result of poor corporate governance. In addition, the findings in this sub-sample analysis indicate a rationale that deviates from what Section 3.5 suggests, despite some consistency.

Backdating and News Announcement

In this section, I adopt the Event Study methodology to test if the press revealing backdating practice brings negative impacts on firms. To identify the event date, I use three different sources of news release, which are Factiva[17], WSJ, and one with the earlier date between the former two. Table 13 summarizes the press announcement dates from these two sources, together with the probe order and rulings announcement dates of individual firms. The

[17] It covers various sources of information including major wire services, U.S. business publications, national and regional newspapers, and trade publications.

event window starts from 30 trading days before through 30 trading days after the event, and the estimation period is 255 days ending 45 days before the event. Using market- and market risk-adjusted return models (with both equally- and value-weighted market index), I calculate the abnormal stock returns as the difference between the realized returns and the ones predicted by model. Generally speaking, it should be more appropriate to use the last source of news release, i.e. the earlier date between Factiva and WSJ, for analysis since people use massive sources of information, which also spreads quickly nowadays. Hence, I take it as my benchmark case for the remainder of this section.

By using equally-weighted market index and market adjusted return model, I find that on date 0, there is a -2.09% abnormal return and a -7.36% cumulative abnormal return (CAR) for the sub-sample firms. In addition, the whole event window is divided into three sub-periods, i.e. pre-event, event, post-event. Fig. 1 and 2 displays the CAR pattern during the event window period. For the market adjusted return model, prior to around 20 days before the announcement, the stock prices move in line with what the theory predicts but start to decrease sharply afterwards. In particular, the CAR from Day -20 to Day -1 is around -5%, or -0.25% a day. On the announcement date, the abnormal return plummets more than 2%, which is statistically significant and making its CAR exceeding -7.5%. Since then, the stock prices gradually resume to the theoretical trend, though they never return to previous levels. In particular, the abnormal return between Day 1 and Day 30 is meagerly 0.4% by equally weighted market index (or -0.16% by value weighted market index), both statistically insignificant. On the other hand, the market return model has similar but slightly weaker results (untabled).

As a result, the first press revealing backdating practice indeed causes non-trivial damages to backdating firms. One thing interesting is the monotonic and substantial decline since 20 days before the news. To explain it, two forces, among others, might come into play. For one thing, based on other information (e.g. abnormal stock trading), investors probably anticipate the news approaching; for the other, which is more likely, insiders anticipate that happening as well. Both factors are potentially involved, and further aggravate the pattern during that period. At first glance, I suspect the second effect dominates the first one, since insiders should have better information access. But, since the abnormal return pattern almost disappears soon after the news, both effects are already priced in, and the investor effect is not necessarily dominated by the insider effect.

Backdating and Other Corporate Frauds

The last part of the empirical analyses aims to understand whether firms under investigations might in fact act not in bad faith. Following Shane et al. (2005), I collect corporate fraud information from the Accounting and Auditing Enforcement Releases (AAERs) published by the SEC. AAERs provide cases in which the SEC believes to have sufficient evidence of accounting or auditing frauds to bring a case against a firm or its executives. Namely, AAERs represent blatant violations of the Generally Accepted Accounting Principles (GAAP) standards of reporting and disclosure. Alternatively, I use the Stanford Securities Class Action Clearinghouse and find securities class action filings (SCAFs) in the U.S. between 1996 and 2007. Dyck et al. (2007) argue that the assumption that value-impacting corporate frauds follows by a security class action lawsuit filled under the 1933 Exchange Act or the 1934 Securities Act is justifiable. Hence, those filings are valid proxies for alleged corporate frauds. However, one possible problem is that using SCAFs might overestimate the actual corporate frauds; that is, some allegations are frivolous. The enactment of the Private Securities Litigation Reform Act of 1995 aims to reduce frivolous lawsuits. Since the data start from 1996, this overestimation problem is much alleviated.

Table 14 shows that the number of AAERs of each sub-sample firm ranges from 0 to as high as 10, with an average of 0.19 case per firm, and the number of SCAFs ranges from 0 to 3, with an average of 0.63 case per firm. Since AAERs capture outrageous cases of corporate wrongdoing, it can be viewed as the lower bound of the true corporate fraud level. Similarly, since SCAFs include frivolous cases, it is best viewed as the upper bound. Hence, the "confidence interval" of the true corporate frauds committed by firms should be between these two estimates. Note that I exclude backdating related cases for both AAERs and SCAFs.

To compare, I use SCAFs in order to avoid underestimation (untabled). For the peer group as a whole, the number ranges between 0 and 1, and the mean is 0.27 (the median is 0.25) case per group. The mean test shows that backdating firms seem to commit significantly more other corporate frauds. Nevertheless, the median test indicates otherwise. So, the sub-sample firms on average face more class action lawsuits than their counterparts, but not so if the influences of outliers are eliminated. Even so, I do not find conclusive evidence to reject the hypothesis that backdating firms commit more other frauds. Note that it's possible that backdating investigations might be initiated by the "track record" of corporate frauds. In other words, not only simply being large, but also having more other fraud suits would make firms easy targets.

As mentioned earlier, one way for investors to express their views on firms is through the stock market. And therefore, to some extent, stock price variation can be regarded as "public outcry". Intriguingly, I want to see if there is relationship between CAR and corporate frauds. To achieve that, firstly I use the results from the Event Study in the previous session which include individual CAR during the whole event window. Table 14 reports the outcome in three different sub-periods, i.e. CAR(-1,0), CAR(-30,0) and CAR(-30,30). Panel B shows that the correlation between the number of AAERs and any CAR measure is negative, suggesting that the higher the number of AAERs is, the higher the negative cumulative abnormal return is. Since the level of negative cumulative abnormal return represents the severeness of public outcry for firms, it can be viewed as the reputation risk facing firms. As a result, the negative correlation between the two suggests that the higher the severity of public outcry, the more likely that the shareholders, or the blockholders, might file for law suits as long as they find evidence of wrongdoings of their firms.

Taking a step further, I conduct a regression analysis to know what, if any, might explain this public outcry. Because the abnormal stock return almost disappears after the event, Table 15 shows the estimation results for two dependent variables, CAR(-1,0) and CAR(-30,0). For CAR(-1,0), in general, market-to-book ratio, ROA, and GIM index are positively associated, with different significant levels, with this CAR measure, which is negatively correlated to AAERs. So, having promising growth prospects, better profitability, and/or poor governance reduce the reputation risk, and committing other corporate frauds aggravates it. When the interaction term of GIM index*AAERs is added, the reputation risk is further reduced for firms with poor governance who also commit other corporate frauds at the same time. More, after controlling for industry effects, all the explanatory variables remain the same signs, but ROA and GIM index are not significant anymore.

When considering the whole pre-event period, a similar picture emerges. Nevertheless, now only growth opportunities and other corporate frauds matter for the reputation risk. The significance of profitability and governance disappear. More than that, another major difference is that, the magnitude for every important factor greatly increases. For both cases, replacing AAERs with SCAFs results in similar outcomes, though weaker again (untabled).

3.7 Concluding Remarks

The finding of positive abnormal stock return pattern after top executive option grants is first thought to be attributed to opportunistic timing of the grants or news. More recent studies increase the event window and discover the negative abnormal return before the grants. Heron and Lie (2007) argue that the majority of this V-shape pattern around the grants is strong evidence for option backdating practice. Since a 1998 regulatory change that required firms to expense the estimated value of repriced grants, top executive stock option repricing has been rare (e.g. Brenner et al., 2000; Chance et al., 2000; Callaghan et al., 2004, Chidambaran and Prabhala, 2003). Besides, several studies find a link between weak corporate governance and option backdating.

In this chapter, focusing on option repricing and corporate governance, I examine what firm-specific attributes might lead to the decision of CEO option backdating or otherwise grant date manipulation. More specifically, I test the alternative hypothesis that, option backdating is one way to reward outperforming executives for firms facing financial constraint and stock volatility. By using a sample of 6,836 top executive stock option grants in the S&P 1500 companies between 1999 and 2007, I find that option manipulation does not result from weak corporate governance, inconsistent with the managerial power view. In particular, firms that have a higher propensity to manipulate the grants do not have more anti-takeover provisions and higher management entrenchment levels.

When viewing this manipulating behavior as a treatment, I find that it provides a similar mechanism as option repricing, i.e. to re-incentivize managers with out-of-money options, after the passage of the 2002 SOX. Before that, it is not clear what the mechanisms are engaged in the selection process. The subset of 126 firms that are under option backdating related probes seem to conduct this practice solely to take advantage of stock price volatility, despite no evidence of poor corporate governance.

My analysis also suggests that the 2002 SOX changes how the decision of option manipulation is made. Given the evidence between the two sub-periods, this Act seems to elicit a beneficial influence on the corporate world. For future study, I will further classify options as scheduled or unscheduled. I expect that the results should be mainly driven by the unscheduled ones. Other than that, I will redo the analysis with longer event windows so that it might be able to further distinguish between different types of manipulating behavior.

3.8 Table and Figure

Table 1
Sample Statistics

This table provides summary statistics of sample firms/grants. Panel A displays the firm size distribution, in which the size is proxied by (mean) market value of sample firms between 1999 and 2007. Panel B and D display, firm-wise and grant-wise respectively, their industrial orientations in which the industrial classification is based on SIC codes as well as the classification by Chidambaran und Prabhala (2003). Panel D reports the year distribution of sample grants. Panel E shows other relevant descriptive statistics regarding the sample grants.

Panel A: Size (firm-wise)		
Market Value (US$ million)	Number of Firms	Fraction (%)
<500	189	14.50
500 – 1,000	222	17.04
1,000 – 2,000	267	20.49
2,000 – 3,000	116	8.90
3,000 – 4,000	91	6.98
4,000 – 5,000	52	3.99
5,000 – 6,000	51	3.91
6,000 - 7,000	28	2.15
7,000 – 8,000	25	1.92
8,000 – 9,000	28	2.15
9,000 – 10,000	19	1.46
10,000 – 20,000	119	9.13
20,000 – 30,000	27	2.07
30,000 – 40,000	13	1.00
> 40,000	56	4.30
Sample Size	1,303	100.00
Mean	8,100.82	
Median	1,876.49	
Maximum	460,758.90	
Minimum	15.61	
Standard Deviation	23,677.83	

Panel B: Industry (firm-wise)		
Industry	Number of Firms	Fraction (%)
Agriculture & Food	32	2.47
Mining	9	0.69
Construction	17	1.31
Oil & Petroleum	52	4.01
Small Scale Manufacturing	57	4.39
Chemicals/related manufacturing	148	11.40
Industrial Manufacturing	127	9.78
Computers & Electronic Parts	147	11.33
Printing & Publishing	21	1.62
Transportation	33	2.54
Telecommunication	23	1.77
Utilities	73	5.62
Wholesale	39	3.00
Retail	78	6.01
Services	119	9.17
Financials	175	13.48
Software & Technology	96	7.40
Biotech	52	4.01
Sample Size	1,298	100.00

Panel C: Industry (grant-wise)					
Industry	Number of Total Grants	Number of Non-Manipulated Options	Fraction (%)	Number of Manipulated Options[1]	Fraction (%)
Agriculture & Food	194	192	2.97	2	0.56
Mining	48	45	0.70	3	0.83
Construction	83	76	1.18	7	1.94
Oil & Petroleum	252	244	3.77	8	2.22
Small Scale Manufacturing	327	314	4.86	13	3.61
Chemicals/related manufacturing	893	860	13.30	33	9.17
Industrial Manufacturing	620	587	9.08	33	9.17
Computers & Electronic Parts	810	718	11.11	92	25.56
Printing & Publishing	147	146	2.26	1	0.28
Transportation	221	208	3.22	13	3.61
Telecommunication	102	96	1.49	6	1.67
Utilities	354	345	5.34	9	2.50
Wholesale	210	196	3.03	14	3.89
Retail	401	384	5.94	17	4.72
Services	571	538	8.32	33	9.17
Financials	885	860	13.30	25	6.94
Software & Technology	422	386	5.97	36	10.00
Biotech	284	269	4.16	15	4.17
Sample Size	6,824	6,464	100.00	360	100.00

Panel D: Year (grant-wise)					
Year	Number of Total Grants	Number of Non-Manipulated Options	Fraction (%)	Number of Manipulated Options	Fraction (%)
1999	501	460	7.11	41	11.36
2000	550	487	7.52	63	17.45
2001	689	604	9.33	85	23.55
2002	729	674	10.41	54	14.96
2003	908	868	13.41	40	11.08
2004	918	891	13.76	27	7.48
2005	949	932	14.40	17	4.71
2006	836	819	12.65	17	4.71
2007	756	739	11.41	17	4.71
Sample Size	6,836	6,474	100.00	361	100.00

[1] For grants whose AR(+1,+20)-AR(-20,-1) are among the top 10% of all sample grants with positive values.

Panel E: Others (grant-wise)								
	Firm Age	Dispensable Cash	M/B Ratio	Return on Assets	Stock Volatility	CEO Option Holding Ratio	GIM Index	Entrenchment Index
				Total Options				
Mean	28.21	456.39	-8.75	0.09	4.92	0.44	9.38	2.54
Standard Deviation	16.71	2,022.56	1,224.16	0.10	5.77	0.28	2.61	1.28
Median	23	62.52	4.81	0.09	3.35	0.41	9	3
Maximum	57	36,999	781.30	0.86	89.97	4.97	18	6
Minimum	2	-35,936	-101,170	-1.58	0.13	-0.28	1	0
Sample Size	6,835	6,833	6,835	6,835	6,835	6,835	6,835	6,157
				Non-Manipulated Options				
Mean	28.61	473.92	-9.59	0.09	4.86	0.43	9.43	2.56
Standard Deviation	16.72	2,074.91	1,257.83	0.10	5.67	0.28	2.60	1.28
Median	24	64.33	4.81	0.09	3.33	0.41	9	3
Maximum	57	36,999	781.30	0.86	89.97	4.97	18	6
Minimum	2	-35,936	-101,170	-1.58	0.13	-0.28	1	0
Sample Size	6,474	6,472	6,474	6,474	6,474	6,474	6,474	5,838
				Manipulated Options				
Mean	20.98	142.22	6.34	0.06	6.07	0.51	8.43	2.23
Standard Deviation	14.77	376.50	11.45	0.13	7.21	0.29	2.62	1.25
Median	14	44.96	4.67	0.07	3.73	0.51	9	2
Maximum	54	3,775	182.84	0.39	57.33	1.09	18	6
Minimum	3	-838	-45.39	-0.97	0.30	0.00	3	0
Sample Size	361	361	361	361	361	361	361	319

Table 2
Mean-Test Analysis of Manipulating CEO Stock Option Grants

This table shows the testing results of univariate mean comparison analysis of CEO stock option grants between 1999 and 2007. Option grants are assumed to be manipulated as long as the values of AR(+1,+20)-AR(-20,-1) are among the top 10% of all sample grants with positive values. Firm size has proxy of log(market value), and firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Dispensable cash ratio is defined as cash subtracted by interest expenses, scaled by total assets, and growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. Also, return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, stock volatility is the standard deviation of monthly stock prices, and CEO option holding ratio is option value (black-scholes) divided by total compensation. GIM index adopts Gompers et al. (2003), while Entrenchment index follows Bebchuk, Cohen, and Ferrell (2004). The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

	Non-Manipulated Options (N)	Manipulated Options (M)	Difference (N,M)
Firm Size (t-1)	3.482	3.149	-0.334***
			(0)
Firm Age (t)	28.610	20.983	-7.626***
			(0)
Dispensable Cash Ratio (t-1)	0.071	0.096	0.025***
			(0)
M/B Ratio (t-1)	-9.588	6.336	15.924
			(0.8099)
Return on Assets (t-1)	0.091	0.062	-0.029***
			(0)
Stock Volatility (t)	4.860	6.068	1.209***
			(0.0001)
CEO Option Holding Ratio (t)	0.435	0.510	0.075***
			(0)
GIM Index (t-1)	9.430	8.429	-1.001***
			(0)
Entrenchment Index (t-1)	2.559	2.226	-0.333***
			(0)
Firm-Date Observation	6,474	361	

Table 3
Correlation Matrix

This table reports the correlations between explanatory variables. Firm size has proxy of log(market value), and firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Dispensable cash ratio is defined as cash subtracted by interest expenses, scaled by total assets, and growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. Also, return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, stock volatility is the standard deviation of monthly stock prices, and CEO option holding ratio is option value (black-scholes) divided by total compensation. GIM index adopts Gompers et al. (2003), while Entrenchment index follows Bebchuk, Cohen, and Ferrell (2004).

	Firm Size	Firm Age	Dispensable Cash	M/B Ratio	Return on Assets	Stock Volatility	CEO Option Ratio	GIM Index	Entrenchment Index
Firm Size (t-1)	1								
Firm Age (t)	0.3206	1							
Dispensable Cash Ratio (t-1)	-0.1478	-0.2506	1						
M/B Ratio (t-1)	-0.0075	0.0169	-0.0218	1					
Return on Assets (t-1)	0.2645	0.0628	-0.0414	-0.0786	1				
Stock Volatility (t)	0.2436	0.0286	-0.0258	-0.0044	0.1413	1			
CEO Option Ratio (t)	0.1622	-0.1708	0.1513	0.0042	0.02	0.1176	1		
GIM Index (t-1)	0.0561	0.3307	-0.1618	-0.0027	0.0335	0.0023	-0.0939	1	
Entrenchment Index (t-1)	-0.1358	0.1178	-0.1084	-0.0051	0.0106	-0.0522	-0.1229	0.7191	1

Table 4
Determinants of Manipulating CEO Stock Option Grants

This table provides linear probability estimates of predictors for manipulating CEO stock option grants. The dependent variable is assigned to 1 for grants whose AR(+1,+20)-AR(-20,-1) are among the top 10% of all sample grants with positive values, and 0 otherwise. For the explanatory variables, firm size has proxy of log(market value) and firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Dispensable cash ratio is defined as cash subtracted by interest expenses, scaled by total assets, and growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. Also, return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, stock volatility is the standard deviation of monthly stock prices, and CEO option holding ratio is option value (black-scholes) divided by total compensation. GIM index adopts Gompers et al. (2003), while Entrenchment index follows Bebchuk, Cohen, and Ferrell (2004). Panel A summaries the estimation results in the entire sample period, from 1996 to 2007, while Panel B uses two periods, which is separated by the month of August 2002. Industry fixed effects adopt four-digit SIC codes. Standard deviations are reported in the parentheses and the symbols ^{a}, ^{b}, and ^{c} represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Whole Sample Estimation Results				
	(1)	(2)	(3)	(4)
Size (t-1)	-0.034^c	-0.037^c	-0.026^c	-0.028^c
	(0.004)	(0.005)	(0.006)	(0.006)
Age (t)	-0.000^c	-0.001^c	-0.000^a	-0.001^b
	(0)	(0)	(0)	(0)
Dispensable Cash Ratio (t-1)	0.020	0.020	0.012	-0.001
	(0.026)	(0.027)	(0.034)	(0.035)
Market to Book Ratio (t-1)	-0.000	-0.000	-0.000	-0.000
	(0)	(0)	(0)	(0)
Return on Assets (t-1)	-0.107^c	-0.124^c	-0.077^b	-0.097^c
	(0.028)	(0.029)	(0.035)	(0.036)
Stock Volatility (t)	0.003^c	0.003^c	0.001^b	0.001^b
	(0)	(0)	(0.001)	(0.001)
CEO Option Holding Ratio (t)	0.045^c	0.043^c	-0.008	-0.006
	(0.01)	(0.011)	(0.012)	(0.012)
GIM Index (t-1)	-0.005^c		-0.005^c	
	(0.001)		(0.001)	
Entrenchment Index (t-1)		-0.010^c		-0.006^b
		(0.002)		(0.003)
Industry FE	No	No	Yes	Yes
Year FE	No	No	Yes	Yes
R^2	0.0307	0.0321	0.1089	0.1168
Adjusted R^2	0.0296	0.0308	0.0651	0.0706
Sample Size	6,835	6,157	6,835	6,157

Panel B: Sub-Sample Estimation Results								
	Pre-SOX (01/1996-08/2002)				Post-SOX (09/2002-11/2007)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Size (t-1)	-0.037^{c}	-0.043^{c}	-0.017	-0.019	-0.025^{c}	-0.027^{c}	-0.028^{c}	-0.030^{c}
	(0.01)	(0.01)	(0.014)	(0.015)	(0.004)	(0.005)	(0.005)	(0.006)
Age (t)	-0.002^{c}	-0.002^{c}	-0.002^{c}	-0.002^{c}	-0.000	-0.000	0.000	0.000
	(0)	(0)	(0.001)	(0.001)	(0)	(0)	(0)	(0)
Dispensable Cash Ratio (t-1)	0.178^{b}	0.181^{b}	0.018	-0.008	0.084^{c}	0.082^{c}	0.041	0.023
	(0.077)	(0.08)	(0.105)	(0.109)	(0.023)	(0.024)	(0.029)	(0.031)
Market to Book Ratio (t-1)	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Return on Assets (t-1)	-0.078	-0.105	-0.060	-0.125	-0.151^{c}	-0.162^{c}	-0.117^{c}	-0.119^{c}
	(0.072)	(0.074)	(0.1)	(0.105)	(0.025)	(0.026)	(0.031)	(0.033)
Stock Volatility (t)	0.003^{c}	0.003^{c}	0.001	0.001	0.001	0.001	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
CEO Option Holding Ratio (t)	0.030	0.031	-0.050	-0.041	0.013	0.011	0.003	0.004
	(0.026)	(0.027)	(0.031)	(0.032)	(0.009)	(0.01)	(0.01)	(0.011)
GIM Index (t-1)	-0.008^{c}		-0.005		-0.003^{c}		-0.003^{b}	
	(0.002)		(0.003)		(0.001)		(0.001)	
Entrenchment Index (t-1)		-0.009^{a}		0.000		-0.008^{c}		-0.007^{c}
		(0.005)		(0.006)		(0.002)		(0.003)
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.0388	0.0379	0.1613	0.1776	0.0353	0.0393	0.1117	0.1236
Adjusted R^2	0.0354	0.0341	0.0559	0.0681	0.0336	0.0374	0.0472	0.0561
Sample Size	2,267	2,043	2,267	2,043	4,568	4,114	4,568	4,114

Table 5
Manipulating CEO Stock Option Grants and Performance

This table shows the two-stage treatment effect estimation results on how manipulating CEO stock option grants might influence performance, which is winsorized at the 1% level. The dependent variable is return on assets, a ratio of EBIT (earnings before interest and tax) to total assets. For the explanatory variables, option manipulation variable is a dummy variable, assigned to 1 for grants whose AR(+1,+20)-AR(-20,-1) are among the top 10% of all sample grants with positive values, and 0 otherwise. Firm size has proxy of log(market value), and firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Dispensable cash ratio is defined as cash subtracted by interest expenses, scaled by total assets, and growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. Moreover, stock volatility is the standard deviation of monthly stock prices, and CEO option holding ratio is option value (black-scholes) divided by total compensation. GIM index adopts Gompers et al. (2003), while Entrenchment index follows Bebchuk, Cohen, and Ferrell (2004). Panel A summaries the estimation results in the entire sample period, from 1996 to 2007, while Panel B uses two periods, which is separated by the month of August 2002. Industry fixed effects adopt four-digit SIC codes. Standard deviations are reported in the parentheses and the symbols a, b, and c represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Whole Sample Estimation Results				
	(1)	(2)	(3)	(4)
Controls:				
Size (t-1)	0.007^{c}	0.008^{c}	0.015^{c}	0.016^{c}
	(0.001)	(0.001)	(0.001)	(0.001)
Return on Assets (t-1)	0.677^{c}	0.674^{c}	0.580^{c}	0.571^{c}
	(0.007)	(0.007)	(0.008)	(0.008)
Option Manipulation	0.025	0.034^{b}	0.045^{c}	0.056^{c}
	(0.016)	(0.017)	(0.016)	(0.017)
Selection Variables:				
Size (t-1)	-0.356^{c}	-0.384^{c}	-0.356^{c}	-0.384^{c}
	(0.046)	(0.049)	(0.046)	(0.049)
Age (t)	-0.006^{c}	-0.007^{c}	-0.006^{c}	-0.007^{c}
	(0.002)	(0.002)	(0.002)	(0.002)
Dispensable Cash Ratio (t-1)	0.027	0.016	0.027	0.016
	(0.232)	(0.245)	(0.232)	(0.245)
Return on Assets (t-1)	-0.636^{c}	-0.727^{c}	-0.636^{c}	-0.727^{c}
	(0.239)	(0.251)	(0.239)	(0.251)
Stock Volatility (t)	0.023^{c}	0.023^{c}	0.023^{c}	0.023^{c}
	(0.004)	(0.004)	(0.004)	(0.004)
CEO Option Holding Ratio (t)	0.407^{c}	0.388^{c}	0.407^{c}	0.388^{c}
	(0.092)	(0.097)	(0.092)	(0.097)
GIM Index (t-1)	-0.044^{c}		-0.044^{c}	
	(0.011)		(0.011)	
Entrenchment Index (t-1)		-0.084^{c}		-0.084^{c}
		(0.023)		(0.023)
Hazard:				
Lambda	-0.017^{b}	-0.021^{c}	-0.024^{c}	-0.029^{c}
	(0.007)	(0.008)	(0.008)	(0.008)
Industry FE	No	No	Yes	Yes
Year FE	No	No	Yes	Yes
Wald Chi^2	11743.36	10464.22	14512.31	13119.77
Probability > Chi^2	0	0	0	0
Sample Size	6,823	6,146	6,823	6,146

Panel B: Sub-Sample Estimation Results								
	Pre-SOX (01/1996-08/2002)				Post-SOX (09/2002-11/2007)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Controls:								
Size (t-1)	-0.001	-0.002	0.006[c]	0.008[c]	0.014[c]	0.016[c]	0.022[c]	0.023[c]
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Return on Assets (t-1)	0.685[c]	0.675[c]	0.545[c]	0.520[c]	0.694[c]	0.695[c]	0.600[c]	0.598[c]
	(0.013)	(0.015)	(0.016)	(0.017)	(0.009)	(0.01)	(0.01)	(0.011)
Option Manipulation	-0.043[b]	-0.080[c]	-0.020	-0.033	0.168[c]	0.185[c]	0.129[c]	0.151[c]
	(0.02)	(0.023)	(0.023)	(0.026)	(0.021)	(0.022)	(0.019)	(0.02)
Selection Variables:								
Size (t-1)	-0.229[c]	-0.275[c]	-0.229[c]	-0.275[c]	-0.471[c]	-0.479[c]	-0.471[c]	-0.479[c]
	(0.06)	(0.065)	(0.06)	(0.065)	(0.079)	(0.082)	(0.079)	(0.082)
Age (t)	-0.010[c]	-0.011[c]	-0.010[c]	-0.011[c]	-0.005[a]	-0.005	-0.005[a]	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Dispensable Cash Ratio	0.768[a]	0.801[a]	0.768[a]	0.801[a]	0.674[b]	0.656[b]	0.674[b]	0.656[b]
(t-1)	(0.407)	(0.434)	(0.407)	(0.434)	(0.305)	(0.319)	(0.305)	(0.319)
Return on Assets (t-1)	-0.395	-0.517	-0.395	-0.517	-1.122[c]	-1.168[c]	-1.122[c]	-1.168[c]
	(0.402)	(0.429)	(0.402)	(0.429)	(0.316)	(0.328)	(0.316)	(0.328)
Stock Volatility (t)	0.014[c]	0.015[c]	0.014[c]	0.015[c]	0.015	0.016	0.015	0.016
	(0.004)	(0.004)	(0.004)	(0.004)	(0.01)	(0.01)	(0.01)	(0.01)
CEO Option Holding	0.164	0.178	0.164	0.178	0.163	0.124	0.163	0.124
Ratio (t)	(0.154)	(0.165)	(0.154)	(0.165)	(0.144)	(0.155)	(0.144)	(0.155)
GIM Index (t-1)	-0.043[c]		-0.043[c]		-0.038[b]		-0.038[b]	
	(0.015)		(0.015)		(0.017)		(0.017)	
Entrenchment Index (t-1)		-0.047		-0.047		-0.104[c]		-0.104[c]
		(0.031)		(0.031)		(0.036)		(0.036)
Hazard:								
Lambda	0.020[a]	0.039[c]	0.008	0.015	-0.081[c]	-0.089[c]	-0.062[c]	-0.071[c]
	(0.01)	(0.012)	(0.012)	(0.014)	(0.009)	(0.01)	(0.009)	(0.009)
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
Wald Chi^2	2764.51	2282.09	4741.38	4467.99	7162.42	6156.80	10112.01	8618.42
Probability > Chi^2	0	0	0	0	0	0	0	0
Sample Size	2,266	2,043	2,266	2,043	4,557	4,103	4,557	4,103

Table 6
Summary of Manipulating CEO Stock Option Grants and Performance

This table summaries the estimation results in Table 5. It shows the relationships between the practice of CEO stock option grant date manipulation and its predictors, as well as how the manipulation might influence performance while controlling for firm size, the previous performance, industry fixed effects, and year fixed effects.

		Return on Assets (t)		
		Whole Period	Sub-Period: Pre-SOX	Sub-Period: Post-SOX
Size (t-1)		+	+	+
Return on Assets (t-1)		+	+	+
Option Manipulation		+		+
	Selection Variables:			
	Size (t-1)	−	−	−
	Age (t)	−	−	
	Dispensable Cash Ratio (t-1)		+	+
	Return on Assets (t-1)	−		−
	Stock Volatility (t)	+	+	
	CEO Option Holding Ratio (t)	+		
	GIM Index (t-1)	−	−	−
	Entrenchment Index (t-1)	−		−

Table 7
Robustness: Determinants of Manipulating CEO Stock Option Grants

This table provides linear probability estimates of predictors for manipulating CEO stock option grants. The dependent variable is assigned to 1 for grants whose AR(+1,+20)-AR(-20,-1) are positive, and 0 otherwise. For the explanatory variables, firm size has proxy of log(market value) and firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Dispensable cash ratio is defined as cash subtracted by interest expenses, scaled by total assets, and growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. Also, return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, stock volatility is the standard deviation of monthly stock prices, and CEO option holding ratio is option value (black-scholes) divided by total compensation. GIM index adopts Gompers et al. (2003), while Entrenchment index follows Bebchuk, Cohen, and Ferrell (2004). Panel A summaries the estimation results in the entire sample period, from 1996 to 2007, while Panel B uses two periods, which is separated by the month of August 2002. Industry fixed effects adopt four-digit SIC codes. Standard deviations are reported in the parentheses and the symbols [a], [b], and [c] represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Whole Sample Estimation Results				
	(1)	(2)	(3)	(4)
Size (t-1)	-0.028[c]	-0.035[c]	-0.032[b]	-0.037[c]
	(0.01)	(0.011)	(0.013)	(0.014)
Age (t)	-0.001[b]	-0.001[b]	-0.001[b]	-0.002[c]
	(0)	(0)	(0.001)	(0.001)
Dispensable Cash Ratio (t-1)	-0.120[b]	-0.127[b]	-0.095	-0.140[a]
	(0.059)	(0.062)	(0.077)	(0.081)
Market to Book Ratio (t-1)	-0.000	-0.000	-0.000	-0.000
	(0)	(0)	(0)	(0)
Return on Assets (t-1)	0.175[c]	0.175[c]	0.238[c]	0.215[b]
	(0.064)	(0.067)	(0.08)	(0.084)
Stock Volatility (t)	-0.000	-0.001	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
CEO Option Holding Ratio (t)	0.006	-0.008	-0.035	-0.037
	(0.023)	(0.024)	(0.026)	(0.028)
GIM Index (t-1)	-0.003		-0.004	
	(0.002)		(0.003)	
Entrenchment Index (t-1)		-0.005		-0.004
		(0.005)		(0.006)
Industry FE	No	No	Yes	Yes
Year FE	No	No	Yes	Yes
R^2	0.0041	0.0048	0.0649	0.07
Adjusted R^2	0.003	0.0035	0.019	0.0214
Sample Size	6,835	6,157	6,835	6,157

Panel B: Sub-Sample Estimation Results								
	Pre-SOX (01/1996-08/2002)				Post-SOX (09/2002-11/2007)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Size (t-1)	-0.034[b]	-0.045[b]	-0.046[a]	-0.056[b]	-0.020	-0.024[a]	-0.027[a]	-0.026
	(0.016)	(0.017)	(0.024)	(0.025)	(0.013)	(0.014)	(0.016)	(0.017)
Age (t)	-0.001	-0.001[a]	-0.002	-0.002[a]	-0.001	-0.001	-0.001[a]	-0.001[a]
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Dispensable Cash Ratio (t-1)	-0.161	-0.206	-0.148	-0.249	-0.067	-0.066	-0.114	-0.152
	(0.129)	(0.137)	(0.175)	(0.187)	(0.069)	(0.072)	(0.089)	(0.094)
Market to Book Ratio (t-1)	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0)	(0)	(0.001)	(0.001)	(0)	(0)	(0)	(0)
Return on Assets (t-1)	0.372[c]	0.387[c]	0.355[b]	0.379[b]	0.082	0.076	0.156	0.133
	(0.12)	(0.126)	(0.167)	(0.18)	(0.076)	(0.08)	(0.095)	(0.1)
Stock Volatility (t)	-0.001	-0.001	0.002	0.002	-0.001	-0.001	-0.003	-0.003
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CEO Option Holding Ratio (t)	-0.015	-0.028	-0.064	-0.080	-0.002	-0.014	-0.033	-0.031
	(0.044)	(0.046)	(0.052)	(0.056)	(0.028)	(0.03)	(0.032)	(0.034)
GIM Index (t-1)	-0.005		-0.001		-0.002		-0.003	
	(0.004)		(0.005)		(0.003)		(0.004)	
Entrenchment Index (t-1)		-0.006		0.007		-0.004		-0.002
		(0.009)		(0.011)		(0.006)		(0.008)
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.0096	0.0123	0.1358	0.1421	0.0023	0.0025	0.0855	0.0916
Adjusted R^2	0.0061	0.0085	0.0272	0.0279	0.0006	0.0005	0.0191	0.0217
Sample Size	2,267	2,043	2,267	2,043	4,568	4,114	4,568	4,114

Table 8
Robustness: Manipulating CEO Stock Option Grants and Performance

This table shows the two-stage treatment effect estimation results on how manipulating CEO stock option grants might influence performance, which is winsorized at the 1% level. The dependent variable is return on assets, a ratio of EBIT (earnings before interest and tax) to total assets. For the explanatory variables, option manipulation variable is a dummy variable, assigned to 1 for grants whose AR(+1,+20)-AR(-20,-1) are positive, and 0 otherwise. Firm size has proxy of log(market value), and firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Dispensable cash ratio is defined as cash subtracted by interest expenses, scaled by total assets, and growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. Moreover, stock volatility is the standard deviation of monthly stock prices, and CEO option holding ratio is option value (black-scholes) divided by total compensation. GIM index adopts Gompers et al. (2003), while Entrenchment index follows Bebchuk, Cohen, and Ferrell (2004). Panel A summaries the estimation results in the entire sample period, from 1996 to 2007, while Panel B uses two periods, which is separated by the month of August 2002. Industry fixed effects adopt four-digit SIC codes. Standard deviations are reported in the parentheses and the symbols a, b, and c represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Whole Sample Estimation Results				
	(1)	(2)	(3)	(4)
Controls:				
Size (t-1)	0.003	0.003	0.016[c]	0.017[c]
	(0.002)	(0.002)	(0.002)	(0.002)
Return on Assets (t-1)	0.691[c]	0.684[c]	0.566[c]	0.552[c]
	(0.012)	(0.012)	(0.011)	(0.012)
Option Manipulation	-0.094[b]	-0.082[a]	0.051	0.067
	(0.043)	(0.044)	(0.04)	(0.046)
Selection Variables:				
Size (t-1)	-0.072[c]	-0.090[c]	-0.072[c]	-0.090[c]
	(0.025)	(0.027)	(0.025)	(0.027)
Age (t)	-0.002[b]	-0.002[b]	-0.002[b]	-0.002[b]
	(0.001)	(0.001)	(0.001)	(0.001)
Dispensable Cash Ratio (t-1)	-0.298[b]	-0.319[b]	-0.298[b]	-0.319[b]
	(0.149)	(0.155)	(0.149)	(0.155)
Return on Assets (t-1)	0.451[c]	0.457[c]	0.451[c]	0.457[c]
	(0.16)	(0.168)	(0.16)	(0.168)
Stock Volatility (t)	-0.001	-0.002	-0.001	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)
CEO Option Holding Ratio (t)	0.018	-0.015	0.018	-0.015
	(0.058)	(0.061)	(0.058)	(0.061)
GIM Index (t-1)	-0.008		-0.008	
	(0.006)		(0.006)	
Entrenchment Index (t-1)		-0.014		-0.014
		(0.013)		(0.013)
Hazard:				
Lambda	0.059[b]	0.052[a]	-0.032	-0.041
	(0.027)	(0.028)	(0.025)	(0.029)
Industry FE	No	No	Yes	Yes
Year FE	No	No	Yes	Yes
Wald Chi^2	6533.70	6582.94	12033.66	9743.93
Probability > Chi^2	0	0	0	0
Sample Size	6,823	6,146	6,823	6,146

Panel B: Sub-Sample Estimation Results								
	Pre-SOX (01/1996-08/2002)				Post-SOX (09/2002-11/2007)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Controls:								
Size (t-1)	0.004	0.007[a]	0.015[c]	0.020[c]	0.006[b]	0.006[a]	0.019[c]	0.020[c]
	(0.003)	(0.004)	(0.006)	(0.006)	(0.003)	(0.004)	(0.002)	(0.003)
Return on Assets (t-1)	0.657[c]	0.641[c]	0.477[c]	0.447[c]	0.681[c]	0.677[c]	0.578[c]	0.567[c]
	(0.026)	(0.03)	(0.046)	(0.048)	(0.014)	(0.016)	(0.01)	(0.012)
Option Manipulation	0.083	0.107[a]	0.180[a]	0.186[b]	-0.126[a]	-0.143	-0.000	0.045
	(0.056)	(0.06)	(0.096)	(0.095)	(0.075)	(0.097)	(0.056)	(0.071)
Selection Variables:								
Size (t-1)	-0.085[b]	-0.113[b]	-0.085[b]	-0.113[b]	-0.052	-0.063[a]	-0.052	-0.063[a]
	(0.041)	(0.044)	(0.041)	(0.044)	(0.032)	(0.034)	(0.032)	(0.034)
Age (t)	-0.003	-0.003[a]	-0.003	-0.003[a]	-0.002	-0.002	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Dispensable Cash Ratio	-0.377	-0.515	-0.377	-0.515	-0.166	-0.165	-0.166	-0.165
(t-1)	(0.328)	(0.346)	(0.328)	(0.346)	(0.173)	(0.181)	(0.173)	(0.181)
Return on Assets (t-1)	0.939[c]	0.990[c]	0.939[c]	0.990[c]	0.228	0.216	0.228	0.216
	(0.309)	(0.324)	(0.309)	(0.324)	(0.191)	(0.2)	(0.191)	(0.2)
Stock Volatility (t)	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
CEO Option Holding	-0.045	-0.071	-0.045	-0.071	-0.001	-0.029	-0.001	-0.029
Ratio (t)	(0.111)	(0.118)	(0.111)	(0.118)	(0.071)	(0.074)	(0.071)	(0.074)
GIM Index (t-1)	-0.011		-0.011		-0.005		-0.005	
	(0.01)		(0.01)		(0.008)		(0.008)	
Entrenchment Index (t-1)		-0.016		-0.016		-0.010		-0.010
		(0.022)		(0.022)		(0.016)		(0.016)
Hazard:								
Lambda	-0.052	-0.066[a]	-0.113[a]	-0.116[a]	0.079[a]	0.089	-0.000	-0.029
	(0.035)	(0.037)	(0.06)	(0.059)	(0.047)	(0.061)	(0.035)	(0.044)
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
Wald Chi^2	1821.26	1348.27	1302.68	1170.48	3626.02	2805.19	12251.79	8952.07
Probability > Chi^2	0	0	0	0	0	0	0	0
Sample Size	2,266	2,043	2,266	2,043	4,557	4,103	4,557	4,103

Table 9
Sub-Sample: Summary Statistics

This table provides summary statistics of 126 sub-sample firms under investigations related to backdating CEO stock options in the U.S. Panel A displays, in 2001 and 2006, the size distribution of sample firms, in which the market value data are retrieved from Datastream. Panel B displays their industrial orientations in which the industrial classification is based on the four-digit SIC codes as well as the classification by Chidambaran und Prabhala (2003).

Panel A: Size				
Market Value (US$ million)	2001		2006	
	Number of Firms	Fraction in %	Number of Firms	Fraction in %
< 1,000	50	40.00	44	34.92
1,000 – 2,000	21	16.80	26	20.63
2,000 – 3,000	8	6.40	7	5.56
3,000 – 4,000	9	7.20	10	7.94
4,000 – 5,000	5	4.00	4	3.17
5,000 – 6,000	5	4.00	5	3.97
6,000 - 7,000	3	2.40	3	2.38
7,000 – 8,000	4	3.20	4	3.17
8,000 – 9,000	3	2.40	3	2.38
9,000 – 10,000	3	2.40	5	3.97
> 10,000	14	11.20	15	11.90
Sample Size	125	100.00	126	100.00

Panel B: Industry		
Industry	Number of Firms	Fraction in %
Agriculture & Food	2	1.59
Mining	0	0.00
Construction	1	0.79
Oil & Petroleum	2	1.59
Small Scale Manufacturing	0	0.00
Chemicals/related manufacturing	4	3.17
Industrial Manufacturing	8	6.35
Computers & Electronic Parts	40	31.75
Printing & Publishing	0	0.00
Transportation	1	0.79
Telecommunication	7	5.56
Utilities	0	0.00
Wholesale	3	2.38
Retail	8	6.35
Services	10	7.94
Financials	4	3.17
Software & Technology	30	23.81
Biotech	6	4.76
Sample Size	126	100.00

Table 10
Sub-Sample: Backdating and Corporate Governance

This table shows whether the sub-sample backdating firms have the same corporate governance level with the market average and their peers in 1998 and 2006, respectively. Panel A displays the mean test results, using t-test for equality, between the sample and the market average, while Panel B tests for the equality between the sub-sample and its peer group. The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

Panel A: Mean Test between Sub-Sample and Market Average

		1998			2006		
		Sub-Sample (S)	Market (M)	Difference (M,S)	Sub-Sample (S)	Market (M)	Difference (M,S)
GIM Index		7.11	8.78	-1.67*** (0.0003)	8.14	9.02	-0.88*** (0.0009)
GIM Sub-Index	Delay	1.76	2.11	-0.35* (0.076)	2.49	2.46	0.04 (0.7738)
	Protection	1.89	2.09	-0.20 (0.3585)	1.83	2.04	-0.21* (0.0722)
	Voting	0.53	0.68	-0.16 (0.2352)	0.52	0.71	-0.19** (0.0217)
	Others	0.39	0.94	-0.54*** (0.0003)	0.59	0.84	-0.25*** (0.0041)
	State	1.18	1.68	-0.50 ** (0.0144)	1.29	1.72	-0.43*** (0.0017)
BCF Entrenchment Index		1.16	2.00	-0.84*** (0.0001)	1.92	2.25	-0.33** (0.0124)
Sample Size		38	1,913		93	1,896	

Panel B: Mean Test between Sub-Sample and Peer Group

		1998			2006		
		Sub-Sample (S)	Peers (P)	Difference (P,S)	Sub-Sample (S)	Peers (P)	Difference (P,S)
GIM Index		7.00	7.97	-0.97** (0.0281)	8.13	8.74	-0.61** (0.0427)
GIM Sub-Index	Delay	1.76	2.03	-0.27 (0.1728)	2.49	2.40	0.09 (0.5665)
	Protection	1.84	1.80	0.04 (0.8757)	1.84	2.07	-0.23 (0.1697)
	Voting	0.51	0.51	0.00 (1)	0.51	0.62	-0.11 (0.2718)
	Others	0.38	0.84	-0.46*** (0.002)	0.59	0.75	-0.16* (0.0584)
	State	1.14	1.36	-0.23 (0.2815)	1.29	1.60	-0.30** (0.0207)
BCF Entrenchment Index		1.16	1.74	-0.58*** (0.0056)	1.90	2.18	-0.28* (0.0811)
Sample Size		37	37		92	92	

Table 11
Sub-Sample: Backdating and Performance, Stock Volatility, and Financial Constraint

This table shows the comparison of performance, stock volatility, and cash holdings between the sub-sample backdating firms and their corresponding peer group (Panel A), as well as the market (Panel B). There are three proxies for market, S&P Composite Index (S&P), and value weighted and equally weighted NYSE/AMEX/NASDAQ Index (VWNA and EWNA, respectively). In Panel A, performance is measured by return on assets, a ratio of EBIT (earnings before interest and tax) to total assets. Cash holdings is measured by total cash subtracted by interest and related expenses. In Panel B, performance is measured by average return of stock price (index). In Panel A and B, stock volatility is measured by standard deviation of stock price (index), scaled by its mean. The symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively. P-values are reported in the parentheses.

Panel A: Mean Test between Sub-Sample and Peer Group

	Performance			Stock Volatility			Cash Holdings		
	Sub-Sample (S)	Peers (P)	Difference (P,S)	Sub-Sample (S)	Peers (P)	Difference (P,S)	Sub-Sample (S)	Peers (P)	Difference (P,S)
1998	-0.063	0.006	-0.069*	0.272	0.279	-0.007	0.184	0.150	0.034*
			(0.0854)			(0.8054)			(0.0578)
1999	0.018	-0.021	0.039	0.306	0.300	0.007	0.179	0.162	0.018
			(0.1863)			(0.8143)			(0.3996)
2000	0.043	0.058	-0.015	0.360	0.363	-0.003	0.181	0.158	0.023
			(0.4133)			(0.9165)			(0.2156)
2001	-0.042	-0.034	-0.009	0.330	0.328	0.002	0.180	0.165	0.016
			(0.7385)			(0.946)			(0.3916)
2002	-0.016	0.010	-0.026	0.364	0.346	0.018	0.174	0.154	0.021
			(0.1521)			(0.591)			(0.1675)
2003	0.033	0.044	-0.011	0.277	0.297	-0.020	0.206	0.179	0.027
			(0.3719)			(0.4935)			(0.1104)
2004	0.061	0.059	0.002	0.183	0.187	-0.004	0.155	0.153	0.002
			(0.8707)			(0.7608)			(0.89)
2005	0.071	0.069	0.002	0.142	0.169	-0.028	0.164	0.150	0.014
			(0.8668)			(0.192)			(0.3921)
Sample Size (Maximum)	120	120		106	106		121	121	

Panel B: Mean Test between Sub-Sample and Market Average						
	Performance			Stock Volatility		
	Difference (S&P,S)	Difference (VWNA,S)	Difference (EWNA,S)	Difference (S&P,S)	Difference (VWNA,S)	Difference (EWNA,S)
1998	0.020***	0.024***	0.043***	0.194***	0.195***	0.152***
	(0.0018)	(0.0002)	(0)	(0)	(0)	(0)
1999	0.091***	0.088***	0.083***	0.261***	0.249***	0.233***
	(0)	(0)	(0)	(0)	(0)	(0)
2000	0.023**	0.024***	0.024**	0.307***	0.295***	0.259***
	(0.0145)	(0.0092)	(0.0109)	(0)	(0)	(0)
2001	0.031***	0.030***	0.002	0.240***	0.237***	0.251***
	(0)	(0)	(0.7845)	(0)	(0)	(0)
2002	0.000	-0.001	-0.011**	0.245***	0.250***	0.258***
	(0.9269)	(0.8563)	(0.0118)	(0)	(0)	(0)
2003	0.047***	0.044***	0.021***	0.189***	0.176***	0.083***
	(0)	(0)	(0)	(0)	(0)	(0)
2004	0.010***	0.008**	0.002	0.151***	0.146***	0.127***
	(0.0052)	(0.0168)	(0.6448)	(0)	(0)	(0)
2005	0.006**	0.004	0.005*	0.119***	0.109***	0.101***
	(0.0414)	(0.1609)	(0.0797)	(0)	(0)	(0)
Sample Size (Maximum)	120	120	120	120	120	120

Table 12
Sub-Sample: Regression Analysis of Determinants of Option Backdating

This table provides linear probability and binomial probit estimation results of determinants of option backdating in the firms that are under backdating related investigations (Panel B), together with their peer companies matched with 2005 data (Panel C). Panel A shows the number of option grants in both firm types depending on different cut-off points, 90% and 75% of the sample distribution, and 0. In Panel B, the dependent variable is assigned to 1 for grants whose AR(+1,+20)-AR(-20,-1) exceed three these three thresholds, and 0 otherwise. In Panel C, the dependent variable is assigned to 1 for grants in backdating sample firms whose AR(+1,+20)-AR(-20,-1) exceed these three different thresholds, and 0 otherwise in peer companies. For the explanatory variables, firm size has proxy of log(market value) and firm age is the difference between the first year in which the firm has data in Compustat and the option grant year. Dispensable cash ratio is defined as cash subtracted by interest expenses, scaled by total assets, and growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. Also, return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, stock volatility is the standard deviation of monthly stock prices, and CEO option holding ratio is option value (black-scholes) divided by total compensation. GIM index adopts Gompers et al. (2003). Specification (1)-(6) use linear probability model, and Specification (7)-(12) use binomial probit model for estimation. Standard deviations are reported in the parentheses and the symbols a, b, and c represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Number of Option Grants

	Threshold (1)		Threshold (2)		Threshold (3)		Total
	>90%	≤90%	>75%	≤75%	>0	≤0	
Sub-Sample Firm	45	253	89	209	171	127	298
	Panel B						
Peer Group	42	378	111	309	203	217	420
			Panel C				
Total	87	631	200	518	374	344	

Panel B: Backdating Sub-Sample

	Linear Probability Model						Binomial Probit Model					
Dependent Variable=1, if for grants in backdating firms, AR(+1,+20)-AR(-20,-1)	(1) >90%	(2) >90%	(3) >75%	(4) >75%	(5) >0	(6) >0	(7) >90%	(8) >90%	(9) >75%	(10) >75%	(11) >0	(12) >0
Size (t-1)	-0.026	-0.022	-0.024	-0.009	-0.046	-0.030	-0.036	-0.033	-0.027	-0.012	-0.049	-0.030
	(0.04)	(0.04)	(0.052)	(0.053)	(0.056)	(0.058)	(0.039)	(0.039)	(0.053)	(0.055)	(0.057)	(0.059)
Age (t)	-0.004	-0.003	-0.005	-0.005	0.005	0.005	-0.005[a]	-0.004	-0.006	-0.005	0.005	0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)

Panel B: Backdating Sub-Sample												
	Linear Probability Model						Binomial Probit Model					
Dependent Variable=1, if for grants in backdating firms, AR(+1,+20)-AR(-20,-1)	(1) >90%	(2) >90%	(3) >75%	(4) >75%	(5) >0	(6) >0	(7) >90%	(8) >90%	(9) >75%	(10) >75%	(11) >0	(12) >0
Dispensable Cash Ratio (t-1)	0.099	0.118	0.112	0.222	-0.173	-0.117	0.085	0.110	0.097	0.226	-0.177	-0.131
	(0.161)	(0.16)	(0.208)	(0.209)	(0.225)	(0.23)	(0.148)	(0.143)	(0.208)	(0.214)	(0.229)	(0.235)
Market to Book Ratio (t-1)	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001
	(0)	(0)	(0.001)	(0.001)	(0.001)	(0.001)	(0)	(0)	(0.001)	(0.001)	(0.001)	(0.001)
Return on Assets (t-1)	0.006	-0.058	0.066	-0.004	0.178	0.128	0.038	-0.006	0.070	0.010	0.200	0.125
	(0.174)	(0.176)	(0.226)	(0.229)	(0.244)	(0.252)	(0.164)	(0.156)	(0.232)	(0.235)	(0.261)	(0.269)
Stock Volatility (t)	0.016[c]	0.013[b]	0.017[c]	0.012[a]	0.013[a]	0.008	0.013[c]	0.011[b]	0.017[c]	0.012[a]	0.015[a]	0.010
	(0.005)	(0.005)	(0.006)	(0.007)	(0.007)	(0.008)	(0.004)	(0.005)	(0.006)	(0.007)	(0.007)	(0.008)
CEO Option Holding Ratio (t)	-0.002	-0.043	-0.021	-0.069	0.058	0.018	0.004	-0.049	-0.022	-0.073	0.059	0.020
	(0.06)	(0.061)	(0.078)	(0.079)	(0.085)	(0.087)	(0.06)	(0.069)	(0.082)	(0.089)	(0.085)	(0.088)
GIM Index (t-1)	-0.024[b]	-0.026[b]	-0.017	-0.017	-0.035[b]	-0.035[b]	-0.020[b]	-0.023[b]	-0.017	-0.017	-0.037[b]	-0.038[b]
	(0.01)	(0.01)	(0.013)	(0.013)	(0.014)	(0.015)	(0.009)	(0.009)	(0.013)	(0.014)	(0.015)	(0.015)
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.0778	0.1415	0.049	0.1037	0.0475	0.0721						
Adjusted R^2	0.0523	0.0926	0.0227	0.0527	0.0211	0.0193						
LR statistic							23.01	40.42	14.31	30.31	15.14	23.53
Pseudo R^2							0.0909	0.1598	0.0394	0.0834	0.0372	0.0579
Sample Size	298	298	298	298	298	298	298	298	298	298	298	298

Panel C: Backdating Sub-Sample and Peer Group												
	Linear Probability Model						Binomial Probit Model					
Dependent Variable=1, if for grants in backdating firms, AR(+1,+20)-AR(-20,-1) (and 0 if not so for grants in matched companies)	(1) >90%	(2) >90%	(3) >75%	(4) >75%	(5) >0	(6) >0	(7) >90%	(8) >90%	(9) >75%	(10) >75%	(11) >0	(12) >0
Size (t-1)	-0.050	-0.080[b]	-0.036	-0.075	0.005	0.002	-0.049[a]	-0.081[a]	-0.035	-0.094	0.006	-0.028
	(0.031)	(0.038)	(0.043)	(0.052)	(0.05)	(0.059)	(0.027)	(0.043)	(0.043)	(0.059)	(0.051)	(0.081)
Age (t)	-0.003[a]	-0.010[c]	-0.004[b]	-0.010[c]	-0.003	-0.014[c]	-0.004[b]	-0.008[c]	-0.006[b]	-0.009[c]	-0.004	-0.016[c]
	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.004)
Dispensable Cash Ratio (t-1)	0.148	0.192	0.231	0.017	0.203	-0.159	0.112	0.034	0.212	-0.047	0.207	-0.340
	(0.115)	(0.152)	(0.155)	(0.197)	(0.193)	(0.227)	(0.093)	(0.145)	(0.151)	(0.218)	(0.198)	(0.319)
Market to Book Ratio (t-1)	0.001	0.001	0.001	0.001	-0.001	-0.000	0.002	0.005[a]	0.001	0.006	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)	(0.005)	(0.001)	(0.002)
Return on Assets (t-1)	-0.130	-0.188	0.065	-0.126	0.198	-0.101	-0.082	-0.131	0.067	-0.135	0.203	-0.192
	(0.157)	(0.194)	(0.217)	(0.257)	(0.252)	(0.286)	(0.128)	(0.204)	(0.214)	(0.297)	(0.262)	(0.424)
Stock Volatility (t)	0.015[c]	0.016[c]	0.017[c]	0.013[b]	0.014[b]	0.007	0.010[c]	0.011[b]	0.016[c]	0.013[a]	0.015[b]	0.012
	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)	(0.003)	(0.005)	(0.005)	(0.007)	(0.006)	(0.009)
CEO Option Holding Ratio (t)	0.072	0.090	0.033	0.120	0.041	0.100	0.058	0.043	0.021	0.142	0.040	0.152
	(0.054)	(0.057)	(0.074)	(0.08)	(0.084)	(0.091)	(0.046)	(0.069)	(0.075)	(0.102)	(0.086)	(0.124)
GIM Index (t-1)	-0.020[c]	-0.023[c]	-0.021[b]	-0.022[b]	-0.030[b]	-0.014	-0.015[c]	-0.016[a]	-0.020[a]	-0.018	-0.031[b]	-0.019
	(0.007)	(0.008)	(0.009)	(0.011)	(0.012)	(0.013)	(0.006)	(0.009)	(0.01)	(0.013)	(0.012)	(0.018)
Year FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.092	0.3525	0.0765	0.3491	0.0544	0.3683						
Adjusted R^2	0.0745	0.2674	0.0576	0.2575	0.0345	0.2768						
LR statistic							40.59	74.39	30.95	93.13	21.63	103.23
Pseudo R^2							0.1416	0.3236	0.0732	0.262	0.0406	0.227
Sample Size	423	423	398	398	388	388	423	293	398	320	388	330

Table 13
Sub-Sample: Summary of the Press Announcement Date

This table summarizes the earliest dates of press announcement revealing backdating practice, informal or formal probes, and rulings of sample firms from two sources, Factiva and WSJ. Companies with bold letters have replaced their CEOs and companies with grey area have their financial statements unchanged.

Company	The earliest news release date (Factiva)	The earliest news release date on WSJ report	The news release date of informal probe order	The news release date of formal probe order (SEC)	The news release date of ruling
Activision	June 19, 2006	July 28, 2006	July 28, 2006	June 7, 2007	
Affiliated Computer Services	Mar. 7, 2006	May 10, 2006	Mar. 7, 2006		
Affymetrix	July 31, 2006	Aug. 1, 2006			
Agile Software	Sep. 12, 2006	Oct. 26, 2006			
Alkermes	May 26, 2006	Aug. 10, 2006	26 May 2006		May 25, 2007 (no enforcement)
Altera	May 9, 2006	June 21, 2006	May 25, 2007		Feb. 20, 2007 (no enforcement)
American Tower	May 20, 2006	May 23, 2006	May 20, 2006		
Amkor Technology	June 12, 2006	Aug. 16, 2006	Sept. 15, 2006		
Analog Devices	Nov. 11, 2005	May 24, 2006	Nov. 11, 2005		Nov. 2005 (settled with SEC), now under US Attorney
Apollo Group	June 10, 2006	June 9, 2006	June 10, 2006		Apr. 24, 2007 (civil charges)
Apple Inc.	June 29, 2006	June 2006	Oct. 4, 2006		
Applied Micro Circuits	May 31, 2006	May 31, 2006	June 12, 2006		
Applied Signal Technology	Jan. 18, 2007	Jan. 16, 2007			
ArthroCare	Aug. 23, 2006	Aug. 23, 2006	Aug. 23, 2006		June 1, 2007 (no enforcement)
Aspen Technology	June 12, 2006	Sept. 6, 2006	June 12, 2006		
Asyst Technologies	June 14, 2006	June 7, 2006	June 7, 2006		Feb. 6, 2007 (no enforcement)
Atmel	July 25, 2006	Aug. 15, 2006	Aug. 15, 2006		
Autodesk	Aug. 18, 2006	Aug. 17, 2006	Sept. 5, 2006		
Barnes & Noble	July 12, 2006	July 12, 2006	July 21, 2006		
BEA Systems	Aug. 4, 2006	Aug. 16, 2006			
Bed, Bath & Beyond	Aug. 4, 2006	Oct. 10, 2006	Oct. 10, 2006		
Black Box	Nov. 17, 2006	Nov. 17, 2006	Nov. 17, 2006		
Blue Coat Systems	July 14, 2006	Aug. 3, 2006	Aug. 3, 2006		
Boston Communications Group	May 22, 2006	July 21, 2006	July 21, 2006		
Broadcom	May 18, 2006	May 18, 2006	June 12, 2006	Dec. 18, 2006	
Brocade Communications Systems	Nov. 11, 2005	Jan. 7, 2005	May 16, 2005		July 20, 2006 (criminal and civil charges); May 31, 2007 (Settled with SEC)
Brooks Automation	Mar. 18, 2006	Late Apr. 2006	May 12, 2006		
CA (Computer Associates)	June 29, 2006	June 29, 2006			
Cablevision	Aug. 8, 2006	Aug. 8, 2006	Aug. 16, 2006		
Caremark Rx.	May 19, 2006	May 18, 2006	May 18, 2006		
CEC Entertainment	Aug. 7, 2006	Aug. 11, 2006	Aug. 11, 2006		

Company	The earliest news release date (Factiva)	The earliest news release date on WSJ report	The news release date of informal probe order	The news release date of formal probe order (SEC)	The news release date of ruling
Ceradyne	Aug. 2, 2006	Aug. 4, 2006	Oct. 24, 2006		
Chordiant Software	Aug. 10, 2006	July 24, 2006	July 25, 2006		Feb. 14, 2007 (no enforcement)
Cirrus Logic	Oct. 25, 2006	Oct. 24, 2006	Oct. 30, 2006		
Clorox	Aug. 2, 2006	Aug. 2, 2006			
CNET Networks	May 22, 2006	May 22, 2006	May 24, 2006		
Computer Sciences	May 29, 2006	June 29, 2006	June 29, 2006		
Comverse Technology	Mar. 18, 2006	April 2006	May 4, 2006		Aug. 9, 2006 (criminal charges); Jan. 10, 2007 (settled with SEC)
Corinthian Colleges	July 12, 2006	July 12, 2006	Aug. 18, 2006		
Costco Wholesale	Oct. 13, 2006	Mar. 19, 2007	Mar. 19, 2007		
Crown Castle International	Aug. 4, 2006	Aug. 4, 2006	Aug. 4, 2006		
Cyberonics	June 8, 2006	June 8, 2006	June 9, 2006		
Dean Foods	Aug. 4, 2006	Nov. 1, 2006	Nov. 1, 2006		May 10, 2007 (no enforcement)
Delta Petroleum	May 24, 2006	May 22, 2006	June 19, 2006		
Electronic Arts	July 19, 2006	Sept. 20, 2006	Sept. 20, 2006		
Emcore	Nov. 7, 2006	Nov. 6, 2006			
Endocare	Aug. 24, 2006	Aug. 1, 2006	Aug. 1, 2006		
Engineered Support Systems	May 14, 2006	June 12, 2006	June 12, 2006		Feb. 6, 2007 (civil charges)
EPlus	Aug. 11, 2006	Aug. 11, 2006			
Equinix	June 12, 2006	June 12, 2006	June 12, 2006		Dec. 6, 2006 (termination of SEC probe); Jan. 17, 2007 (withdrawal of grand jury subpoena)
Extreme Networks	Sept. 21, 2006	Sept. 15, 2006	Sept. 15, 2006		
F5 Networks	May 22, 2006	May 22, 2006	May 22, 2006		
Forrester Research	Dec. 20, 2006	Dec. 19, 2006			
Foundry Networks	June 28, 2006	June 27, 2006	June 27, 2006		
Getty Images	Nov. 9, 2006	Nov. 9, 2006	Nov. 9, 2006		
Hansen Natural	Oct. 29, 2006	Oct. 31, 2006	Oct. 31, 2006		
HCC Insurance Holdings	Aug. 11, 2006	Nov. 17, 2006	Nov. 17, 2006		
Home Depot	June 16, 2006	June 16, 2006	June 23, 2006		
IBasis	Sept. 11, 2006	Oct. 20, 2006	Oct. 20, 2006		
Insight Enterprises	Oct. 21, 2006	Oct. 31, 2006	Oct. 31, 2006		
Integrated Silicon Solution	Aug. 4, 2006	Oct. 23, 2006			
Intuit	June 9, 2006	June 9, 2006	June 9, 2006		Oct. 30, 2006 (no enforcement)
J2 Global	Aug. 7, 2006	Aug. 11, 2006			
Jabil Circuit	Mar. 18, 2006	May 3, 2006	May 3, 2006		
Juniper Networks	May 17, 2006	May 22, 2006	May 22, 2006		
KB Home	Aug. 4, 2006	Aug. 23, 2006	Aug. 24, 2006		
Keithley	Aug. 12, 2006	Sept. 14, 2006	Sept. 14, 2006		
King Pharmaceuticals	Nov. 10, 2006	Nov. 10, 2006			
KLA-Tencor	May 22, 2006	May 22, 2006	May 22, 2006	Feb. 9, 2007	

Company	The earliest news release date (Factiva)	The earliest news release date on WSJ report	The news release date of informal probe order	The news release date of formal probe order (SEC)	The news release date of ruling
KOS Pharmaceuticals	Aug. 16, 2006	Aug. 8, 2006	July (Aug. 8, 2006)		
Linear Technology	May 22, 2006	May 24, 2006	June 15, 2006		
Macrovision	June 14, 2006	June 13, 2006	June 13, 2006		Nov. 2, 2006 (no enforcement); Feb. 13, 2007 (withdrawal of grand jury subpoena)
Marvell Technology Group	May 22, 2006	July 5. 2006	July 5, 2006		
Maxim Integrated Products	May 22, 2006	June 7, 2006	June 7, 2006		
McAfee Inc.	May 19, 2006	May 25, 2006	May 25, 2006	June 9, 2006	
Meade Instruments	May 22, 2006	May 22, 2006	June 13, 2006		
Medarex	May 24, 2006	May 24, 2006	May 24, 2006		
Mercury Interactive	Nov. 11, 2005	May 15, 2006	Nov. 11, 2005		May 31, 2007 (settled with SEC)
Michaels Stores	June 9, 2006	June 14, 2006	June 15, 2006		Sept. 7, 2006 (withdrawal of one grand jury subpoena, but received another one)
Microtune	Sept. 20, 2006	Sept. 20, 2006			
Mips Technologies	Aug. 31, 2006	Sept. 19, 2006	Sept. 19, 2006		
Molex	Aug. 3, 2006	Aug. 2, 2006	Oct. 5, 2006		
Monster Worldwide	June 12, 2006	June 12, 2006	June 12, 2006		Feb. 15, 2007 (plead guilty to criminal charges)
msystems	June 2, 2006	June 1, 2006	July 3, 2006		
Nabors Industries	Dec. 27, 2006	Dec. 27, 2006	Feb. 7, 2007		May 9, 2007 (no enforcement)
Newpark Resources	July 14, 2006	June 29, 2006			
Nvidia	June 9, 2006	Aug. 10, 2006			
Nyfix	Nov. 11, 2005	May 20, 2006	Nov. 11, 2005		
Openwave Systems	May 22, 2006	May 22, 2006	May 22, 2006		
Pediatrix	Aug. 3, 2006	Dec. 6, 2006	Dec. 6, 2006		
Pixar	Aug. 8, 2006	Nov. 9, 2006	Sept. 17, 2006		
PMC-Sierra	Aug. 14, 2006	Nov. 9, 2006	Nov. 9, 2006		
Power Integrations	Apr. 19, 2006	May 5, 2006	May 24, 2006		
Progress Software	June 21, 2006	June 19, 2006	June 27, 2006		
Quest Software	May 23, 2006	May 22, 2006	June 1, 2006		
QuickLogic	July 27, 2006	Aug. 7, 2006	Aug. 7, 2006		Mar. 23, 2007 (no enforcement)
Rambus	May 24, 2006	May 30, 2006			
Redback Networks	July 1, 2006	June 30, 2006	June 30, 2006		
Renal Care	May 22, 2006	June 2, 2006	June 2, 2006		
Research In Motion	Sept. 29, 2006	Sept. 28, 2006	Oct. 27, 2006		
Restoration Hardware	Nov. 1, 2006	Aug. 28, 2006			
RSA Security	May 20, 2006	June 13, 2006	May 20, 2006		
SafeNet	May 19, 2006	May 19, 2006	May 19, 2006		
Sanmina-SCI	June 10, 2006	June 9, 2006	June 9, 2006		
Sapient	Oct. 17, 2006	Oct. 17, 2006			

Company	The earliest news release date (Factiva)	The earliest news release date on WSJ report	The news release date of informal probe order	The news release date of formal probe order (SEC)	The news release date of ruling
Semtech	May 23, 2006	May 22, 2006	May 22, 2006		
Sepracor	May 24, 2006	June 2, 2006	June 2, 2006		
Sharper Image	Sept. 7, 2006	Sept. 7, 2006			
Sigma Designs	July 27, 2006	July 26, 2006	July 26, 2006		
Silicon Image	Oct. 29, 2006	Oct. 31, 2006	Oct. 31, 2006		
Sonus Networks	Nov. 6, 2006	Nov. 6, 2006			
Stolt-Nielsen	June 3, 2006	June 1, 2006	July 6, 2006		
Sunrise Telecom	Sept. 20, 2006	Sept. 20, 2006	Sept. 20, 2006		
Sycamore Networks	May 23, 2006	May 23, 2006		May 23, 2006	
Take-Two Interactive Software	July 10, 2006	July 10, 2006	July 10, 2006		Feb. 14, 2007 (settled with SEC)
The Cheesecake Factory	July 18, 2006	July 19, 2006	Aug. 3, 2006		
THQ	July 18, 2006	Aug. 7, 2006	Aug. 7, 2006		
Trident Microsystems	May 22, 2006	May 26, 2006	2004, June 16, 2006 (Justice)		
UnitedHealth	Mar. 18, 2006	May 11, 2006	May 11, 2006	Dec. 26, 2006	
Valeant Pharmaceuticals	Sept. 11, 2006	Sept. 11, 2006	Sept. 11, 2006		
Verint	Apr. 18, 2006	Apr. 17, 2006	July 20, 2006		
VeriSign	June 27, 2006	June 27, 2006	June 27, 2006		
Vitesse Semiconductor	Mar. 18, 2006	Apr. 19, 2006	May 18, 2006		
Witness Systems	Aug. 9, 2006	Aug. 9, 2006	Oct. 30, 2006		
Xilinx	June 7, 2006	June 23, 2006	June 23, 2006		Nov. 30, 2006 (no enforcement)
Zoran	May 23, 2006	July 3, 2006	July 3, 2006		

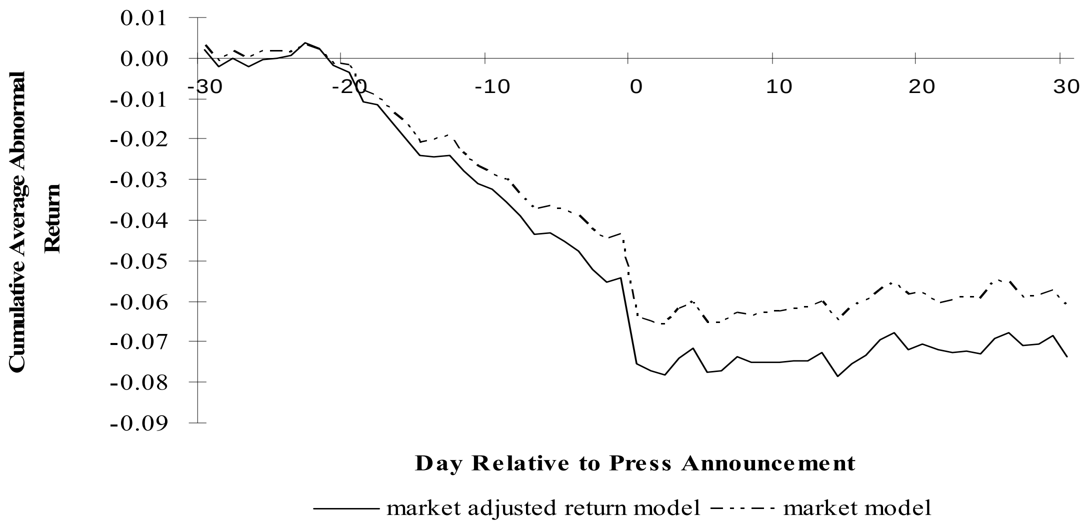


Fig. 1. Cumulative Abnormal Stock Returns Around Press Revealing Backdating Date

Figure1 displays the cumulative abnormal stock returns from 30 days before through 30 days after the earliest press release of backdating practice of the sample firms. Abnormal stock returns are estimated using the market model and market risk adjusted model, with equally-weighted market index excluding dividends, in which the estimation window lasts 255 days ending 45 days prior to the release. The release information is collected from Factiva and WSJ.

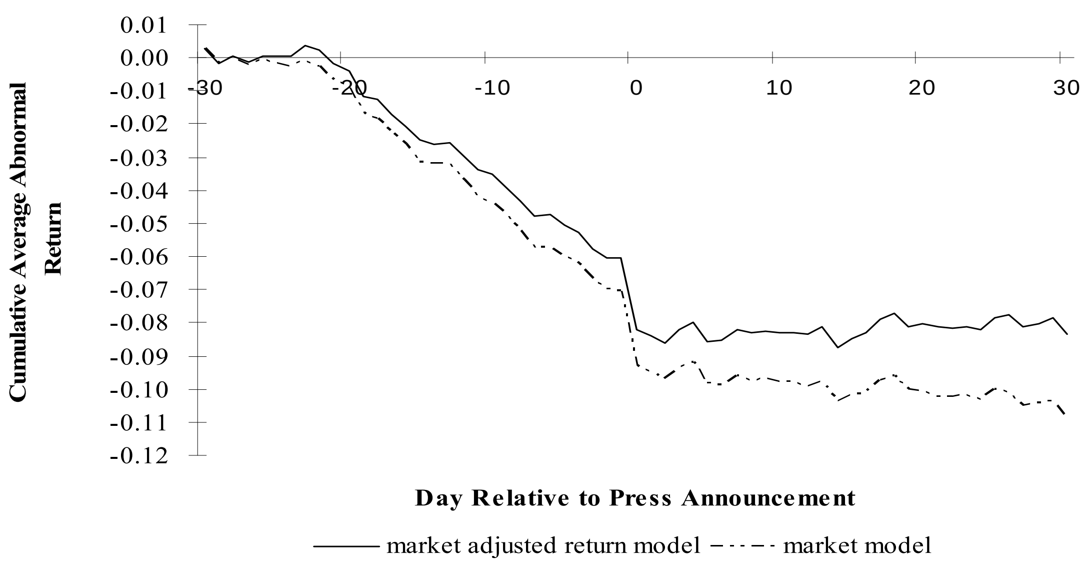


Fig. 2. Cumulative Abnormal Stock Returns Around Press Revealing Backdating Date

Figure2 displays the cumulative abnormal stock returns from 30 days before through 30 days after the earliest press release of backdating practice of the sample firms. Abnormal stock returns are estimated using the market model and market risk adjusted model, with value-weighted market index excluding dividends, in which the estimation window lasts 255 days ending 45 days prior to the release. The release information is collected from Factiva and WSJ.

Table 14
Sub-Sample: Corporate Fraud and Reputation Risk

Panel A gives a summary of number of Accounting and Auditing Enforcement Releases (AAERs) issued by the SEC, the number of Securities Class Action Filings (SCAFs) from the Stanford Securities Class Action Clearinghouse (SSCAC), and cumulative abnormal stock return (CAR) of each individual firm in the sample. In particular, for the CAR, three sub-periods are estimated by market adjusted return model with value weighted index excluding dividends. Panel B reports the correlation matrix.

Panel A: Summary

Company	# of AAERs	# of SCAFs	Cumulative Abnormal Return (%) (-1,0)	(-30, 0)	(-30,30)
Activision	0	1	3.51	-10.79	-15.37
Affiliated Computer Services	0	0	1.07	10.97	-0.94
Affymetrix	0	1	-2.52	-26.46	-31.49
Agile Software	0	1	-0.63	6.16	10.89
Alkermes	0	1	8.27	-1.17	-12.09
Altera	0	0	-3.42	-0.45	-9.65
American Tower	0	0	-13.78	-9.72	53.66
Amkor Technology	0	0	-6.80	-8.95	-14.83
Analog Devices	0	0	2.12	2.69	-1.76
Apollo Group	0	1	-1.71	-23.46	-29.79
Apple Inc.	0	1	-0.01	-6.98	3.10
Applied Micro Circuits	0	1	-4.60	-17.47	-38.69
ArthroCare	0	0	-1.88	5.86	10.00
Aspen Technology	2	2	-3.21	-30.85	-49.24
Asyst Technologies	0	0	-2.65	1.78	-13.43
Atmel	0	3	-11.32	-6.19	23.15
Autodesk	0	1	2.34	2.18	-0.14
Barnes & Noble	0	0	-1.08	-8.22	-5.98
BEA Systems	0	1	1.90	-3.68	2.55
Bed, Bath & Beyond	0	0	3.04	-7.53	-3.21
Black Box	0	1	-1.73	2.40	-1.06
Blue Coat Systems	0	1	-15.32	-6.30	10.62
Boston Communications Group	0	2	7.60	-6.81	-29.90
Broadcom	0	1	3.01	4.14	6.17
Brocade Communications Systems	0	1	-8.77	-6.69	-7.72
Brooks Automation	0	0	-0.06	-6.88	-22.88
CA (Computer Associates)	10	1	-3.07	-7.51	-1.88
Cablevision	0	0	1.93	6.00	4.64
Caremark Rx.	0	0	2.77	-15.02	-32.69
CEC Entertainment	0	0	-0.72	-8.01	-0.20
Ceradyne	0	0	-6.55	0.31	-7.97
Chordiant Software	0	1	2.36	-15.04	-14.83
Cirrus Logic	0	0	-4.91	-7.02	-2.93
Clorox	0	1	-0.51	-4.16	-5.81
CNET Networks	0	0	-2.31	-13.47	-14.68
Computer Sciences	0	0	-0.04	-1.68	-3.78
Comverse Technology	0	1	-2.53	-19.73	-23.30
Corinthian Colleges	0	2	-0.93	1.16	-8.75
Costco Wholesale	0	0	4.97	8.30	7.15
Crown Castle International	0	0	6.72	-0.46	-1.38
Cyberonics	0	1	1.84	8.24	-5.33
Dean Foods	0	0	-0.09	3.01	10.06
Delta Petroleum	0	0	0.41	-2.84	-7.17
Electronic Arts	0	1	-0.32	12.62	19.72
Emcore	0	0	-6.76	-10.18	-7.80

Panel A: Summary					
Company	# of AAERs	# of SCAFs	Cumulative Abnormal Return (%) (-1,0)	(-30, 0)	(-30,30)
Eplus	0	0	-1.90	5.34	7.51
Equinix	0	1	-7.34	-32.05	-33.22
Extreme Networks	0	1	-2.84	-10.76	-5.18
F5 Networks	0	1	0.00	-35.85	-59.52
Forrester Research	0	0	-1.73	-12.49	-18.32
Foundry Networks	0	2	-3.91	-0.42	-22.07
Getty Images	0	0	-0.79	-16.87	-23.90
Hansen Natural	0	0	-14.38	-5.76	0.30
HCC Insurance Holdings	0	0	-0.33	-21.29	-22.44
Home Depot	0	1	-1.48	-2.70	-10.57
Ibasis	0	1	-0.99	12.06	6.33
Insight Enterprises	0	1	-5.51	9.49	4.54
Integrated Silicon Solution	0	0	-3.63	0.88	1.67
Intuit	0	0	-3.94	-1.35	15.25
J2 Global	0	0	-5.01	-20.34	-19.92
Jabil Circuit	0	0	1.83	-5.07	-4.49
Juniper Networks	0	2	1.69	-8.08	-11.68
KB Home	0	0	-7.20	-16.65	9.27
Keithley	0	1	-1.98	-9.64	-3.03
King Pharmaceuticals	0	1	3.06	-7.57	-11.01
KLA-Tencor	0	0	4.84	-15.52	-17.15
KOS Pharmaceuticals	0	1	1.83	9.82	22.54
Linear Technology	0	0	-5.71	-60.13	-59.06
Macrovision	0	0	-0.11	-4.83	-5.02
Marvell Technology Group	0	1	-11.22	-18.61	-55.16
Maxim Integrated Products	0	0	-1.91	-36.89	-50.41
McAfee Inc.	3	0	-3.63	-0.69	0.10
Meade Instruments	0	0	-1.50	13.64	2.78
Medarex	0	0	-4.18	-5.43	-20.43
Mercury Interactive	0	0	-1.41	-26.59	-23.95
Michaels Stores	0	1	-2.64	6.98	-4.43
Microtune	1	2	-3.27	-1.00	-18.16
Mips Technologies	0	0	-1.97	17.75	17.69
Molex	0	1	2.92	-5.00	9.08
Monster Worldwide	1	0	6.02	-5.37	-1.14
msystems	0	0	-14.19	-3.36	-12.12
Nabors Industries	0	0	-1.75	-7.04	-12.33
Newpark Resources	0	0	-1.57	-1.31	0.21
Nvidia	2	1	0.02	-5.25	-26.33
Openwave Systems	0	2	-14.28	-12.15	-18.94
Pediatrix	0	2	2.57	-3.18	4.92
PMC-Sierra	0	0	-0.78	-45.63	-34.51
Power Integrations	0	0	4.78	0.98	-30.59
Progress Software	0	0	-1.64	-7.52	-4.91
Quest Software	0	2	-4.21	-12.50	-22.99
QuickLogic	0	1	-26.01	-41.44	-58.73
Rambus	0	1	2.66	8.96	19.15
Redback Networks	0	3	3.12	-14.50	-21.79
Research In Motion	0	0	-2.25	10.90	46.95
Restoration Hardware	0	0	0.80	-6.93	28.23
RSA Security	1	0	-6.21	-0.56	7.44
SafeNet	0	0	-23.56	-46.48	-27.04
Sanmina-SCI	0	0	-0.97	6.95	17.93
Sapient	0	0	-11.81	1.31	6.18

Panel A: Summary					
Company	# of AAERs	# of SCAFs	Cumulative Abnormal Return (%) (-1,0)	(-30, 0)	(-30,30)
Semtech	0	0	3.97	-18.72	-15.67
Sepracor	0	1	5.00	-36.60	-43.64
Sharper Image	0	1	-1.91	-17.60	-7.61
Sigma Designs	0	1	-1.34	-23.73	28.43
Silicon Image	0	3	-5.69	-7.52	2.40
Sonus Networks	0	3	2.54	-6.69	15.26
Stolt-Nielsen	0	0	-0.50	-0.51	-13.88
Sycamore Networks	0	2	3.08	15.21	11.94
Take-Two Interactive Software	3	2	-7.99	-46.02	-16.27
The Cheesecake Factory	0	0	-2.58	-7.80	13.63
THQ	0	1	-2.76	-14.35	-17.20
Trident Microsystems	0	0	-8.70	-13.77	-14.46
UnitedHealth	0	2	3.25	22.26	-31.41
Valeant Pharmaceuticals	0	0	-3.69	-1.50	-12.97
Verint	0	0	-2.43	-7.40	-9.22
VeriSign	0	1	-1.23	-29.37	-27.93
Vitesse Semiconductor	0	0	-5.96	-17.59	-13.99
Witness Systems	0	0	-6.87	-30.84	-8.33
Xilinx	0	0	0.28	-27.75	-23.10
Zoran	0	0	6.39	-3.30	-12.02
Mean	0.19	0.63	-2.14	-8.25	-8.43

Panel B: Correlation Matrix					
	# of AAERs	# of SCAFs	CAR(-1,0)	CAR(-30, 0)	CAR(-30,30)
# of AAERs	1				
# of SCAFs	0.098	1			
CAR(-1,0)	-0.039	0.033	1		
CAR(-30, 0)	-0.060	-0.006	0.319	1	
CAR(-30,30)	-0.015	-0.077	0.082	0.637	1

Table 15
Sub-Sample: Regression Analysis of Reputation Risk

This table provides OLS estimation of reputation risk, measured by the cumulative abnormal stock return during the revelation of backdating. AAERs are the Accounting and Auditing Enforcement Releases issued by the SEC, and SCAFs are the Securities Class Action Filings from the Stanford Securities Class Action Clearinghouse (SSCAC), both a proxy for corporate fraud. For explanatory variables, firm size has proxy of log(sales), growth opportunity is the market-to-book ratio defined as the market value of assets divided by the book value of total assets, i.e. the book value of assets plus the market value of common stock less the sum of book value of common equity and balance sheet deferred taxes. More, return on assets is a ratio of EBIT (earnings before interest and tax) to total assets. Panel A reports the correlations between explanatory variables, and Panel B displays the estimation results, in which some models control for industry effects coded using the first 2-digit NAICS codes. P-values are reported in the parentheses and the symbols *, **, and *** represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Correlations

	Size - log(sales)	Market to Book Ratio	Return on Assets	GIM Index	AAERs	GIM*AAERs	SCAFs	GIM*SCAFs
Size - log(sales)	1							
Market to Book Ratio	-0.145	1						
Return on Assets	0.325	-0.072	1					
GIM Index	0.073	0.048	0.030	1				
AAERs	0.082	-0.023	0.055	0.104	1			
GIM*AAERs	0.082	-0.021	0.049	0.118	0.994	1		
SCAFs	-0.121	0.035	-0.115	0.021	0.079	0.067	1	
GIM*SCAFs	-0.109	0.048	-0.124	0.155	0.098	0.094	0.970	1

Panel B: Estimation Results

Dependent Variable	CAR(-1,0)			CAR(-30,0)		
	(1)	(2)	(3)	(1)	(2)	(3)
Size - log(sales)	0.00485	0.00475	0.01115	0.01397	0.01328	0.01806
	(0.4362)	(0.4468)	(0.2382)	(0.5263)	(0.5480)	(0.5332)
Market to Book Ratio	0.00016**	0.00016**	0.00020**	0.00081***	0.00081***	0.00094***
	(0.0412)	(0.0435)	(0.0205)	(0.0035)	(0.0037)	(0.0019)
Return on Assets	0.00822**	0.00841**	0.00734	0.01095	0.01222	0.01135
	(0.0474)	(0.0443)	(0.1099)	(0.2086)	(0.1532)	(0.2610)
GIM Index	0.00420*	0.00389	0.00336	0.01109	0.00901	0.00649
	(0.0802)	(0.1057)	(0.2616)	(0.1288)	(0.1953)	(0.4517)
AAERs	-0.00504**	-0.04213***	-0.03898***	-0.01337	-0.25987***	-0.26523***
	(0.0204)	(0.0029)	(0.0064)	(0.2804)	(0)	(0.0003)
GIM Index*AAERs		0.00386***	0.00363***		0.02567***	0.02618***
		(0.0057)	(0.0072)		(0)	(0.0003)
Industry Effects	No	No	Yes	No	No	Yes
R^2	0.132	0.142	0.243	0.072	0.119	0.207
Adjusted R^2	0.085	0.086	0.046	0.021	0.061	0.001
Sample Size	98	98	98	98	98	98

Chapter 4

Small Family Firm, Agency Costs, and CEO Performance Pay

It has been discussed extensively in the literature regarding the relationship between family firm and performance. But there is little study exploring the mechanisms involved in corporate governance. This chapter aims to provide a potential link, the design or the structure of CEO compensation. More specifically, the question is, does family ownership help alleviate the traditional principal-agent problem in small corporations that have more pronounced family influences?

4.1 Introduction

In modern corporations, there exists a common organization form noted for its separation of ownership and control, which gives rise to the typical principal-agent problem due to the conflict of interest between shareholders and managers. Concentrated ownership, together with unification of ownership and management, is able to overcome the free-rider problem and provide a remedy to this agency problem (Jensen and Meckling, 1976).

Demsetz and Lehn (1985) and Shleifer and Vishny (1986) have long argued that this Berle and Means (1932) type of firms with separated ownership and control is not a comprehensive form of publicly traded corporations, which is supported by various cross-country studies (e.g. La Porta et al., 1999; Morck et al., 2000; Claessens et al., 2000; Faccio and Lang, 2002). In the U.S., while public firms are generally regarded as owned by dispersed shareholders, family ownership in fact exists in more than one-third of S&P500 firms, and families own 18 percent of shares on average (Anderson and Reeb, 2003; Villalonga and Amit, 2006).

A large amount of literature on family firms attempts to relate family firms to performance[1], and little attention has been devoted to corporate governance structures[2]. Among others, an essential mechanism is the design of top executive (CEO) compensation. To the best of my knowledge, Gomez-Mejia et al. (2003) first investigate the determinants of executive compensation in the U.S. publicly traded family firms. They show that family CEOs receive lower total income than outside CEOs, in which the difference increases with family ownership. Cai et al. (2008) use a survey of managers in Chinese private family firms and find that family firms reward higher pay (both salary and bonus) with lower performance (bonus only) sensitivity to family managers than outside managers. Bandiera et al. (2010) use survey data of Italian service sector executives and find that, compared with non-family firms, family firms pay less to their managers whose pay is less sensitive to performance.

In this chapter, I aim to examine whether family influences help mitigate the agency problem, and in particular how CEO compensation structure is shaped in family firms. However, instead of using absolute pay level as in Gomez-Mejia et al. (2003), I focus on pay-performance sensitivity[3] because it captures incentives better. Moreover, I study small firms because, in addition to their economic significance[4], family influences are more prominent and effective in small firms compared with their more established counterparts. Lastly, unlike the two-type categorization commonly adopted in the literature, I classify firms as three types. Type I is the active family-controlled firm: owned by family stake and run by family CEO. Type II is the passive family-controlled firm: owned by family stake and run by outside CEO. Type III is the non-family firm: without family stake and run by outside CEO.

[1] See Pérez-González (2006) for a review in both theory and empirics.

[2] See Wallevik (2009) for a survey in corporate governance research on family firms.

[3] Unlike Bandiera et al. (2010) who use dummy variables and index to measure sensitivity of pay to performance, I measure it by calculating the performance pay elasticity directly.

[4] According to the 2009 OECD report, Small and median-sized enterprises (SMEs) account for more than 99% of all enterprises in the European Union, and more than half of labor force in the private sector in the OECD area.

My sample construction starts with companies in the S&P600 SmallCap Index between 2001 and 2005. After filtering out the non-surviving companies during this period, there are 168 companies left, with 840 firm-year observations. To identify family firms, I manually check the proxy statements and other sources. I form a dataset on identity, ownership, tenure, and biographies of founder(s), board members, blockholders, and the top 5 managers. I classify a firm as a family firm when one of the two criteria is met: 1. founder or descendant of the founder sits on the board and/or is a blockholder; 2. at least two board members are family-related, either by blood or marriage[5]. When matched with available firm accounting and CEO compensation data, I have 785 firm-year observations. Among them, 396 (50.45%) have family influences within the firm. This is consistent with the impression that family control is more common in small firms.

I study whether agency problem is less serious in small firms, and if so, whether the existence of family influences is able to further alleviate the problem by the design of CEO compensation. Following Ang et al. (2000), I calculate two measures that indirectly evaluate the agency costs, i.e. the asset utilization ratio and the expense ratio. The former measures how effective is the management in deploying its assets; the latter measures how effective is the management in controlling its operating expenses. I find that on average the asset utilization ratio is higher in active family firms, with higher volatility though. Moreover, family firms (both active and passive) have low expense ratios compared with their non-family counterparts. It thus suggests lower agency costs in family firms, despite great variations within the group.

To measure performance sensitivity, I focus on both absolute (elasticity) and incremental values (the first order difference) of CEO pay. I hypothesize that, since pay-performance is designed to incentivize managers, the pay-performance estimates should vary across firms with different degree of owner involvement. Namely, pay-performance (elasticity) should be higher for non-family firms, followed by those in passive family firms, while the active

[5] Follow Gomez-Mejia et al. (2003), I consider father, mother, sister, brother, son, daughter, spouse, in-laws, aunt, uncle, niece, nephew, and cousin.

family firms would have the lowest values. My evidence supports this prediction. Note that this pattern is more pronounced in total compensation than in basic salary[6] component, indicating a lower use of performance pay such as stock options in family firms. For instance, in non-family firms, a 1% increase of firm value corresponds to an approximately 0.33% (0.16%) increase of total compensation (basic salary).

Ownership reduces CEO pay in general. Contingent on firm type, in terms of basic salary, ownership of outside CEO in non-family firms lowers while CEO ownership in family firms increases pay-performance elasticity. It thus implies that this conditional ownership provides a moderating effect for incentive purposes, which is not observed when it comes to total compensation. In summary, the findings suggest that family influences might reduce the need for alternative governance mechanisms to exercise control. Consequently, family ownership and performance pay seem substitutes as corporate governance mechanisms.

My study contributes to the literature on two fronts. First, I analyze how family ownership might influence the structure of CEO compensation. Furthermore, I refine the typical categorization of "family versus non-family" firms in terms of degree of involvement by family members. Indeed, the pay-performance estimates appears to differ, a result which could not be captured by the traditional family firm categorization.

The remainder of this chapter proceeds as follows: Section 2 gives a brief literature review on family firms that relates to performance, agency problems, and CEO compensation. Section 3 contains hypotheses to be tested. Section 4 describes the dataset and the sample formation used in the analyses. Section 5 shows the estimation methods and testing results. Section 6 summaries the findings and concludes. Section 7 displays the tables and figures.

[6] In this chapter, for simplicity, the basic salary includes both the cash and the bonus component.

4.2 Literature Review

4.2.1 Family Firm and Performance

The majority of the literature on family firms analyses the relationship between family ownership and firm performance. Besides, it further draws the distinction between founder CEOs and descendant CEOs, to examine whether managers who inherit their positions perform differently. On the whole, it shows that heir-controlled firms underperform their counterparts, and mixed results for founder-led family firms in general.

Theory

Family firms may be beneficial to performance for several reasons. First, family involvement provides higher nonmonetary rewards associated with firm's success that other CEOs do not share (Kandel and Lazear, 1992; Davis, Schoorman, and Donaldson, 1997). Secondly, top family managers are more likely to possess hard-to-obtain, firm-specific knowledge and higher levels of trust from key stakeholders (Donnelley, 1964) that facilitate firm-specific investments, easing cooperation and the transmission of knowledge within organizations (Barnes and Hershon, 1976), Thirdly, they might have long-term perspectives than unrelated managers (Cadbury, 2000). Last but not the least, family ownership might be able to reduce agency problems by concentrating substantial decision and cash-flow rights (Fama and Jensen, 1983; Anderson and Reeb, 2003). Alternatively, besides size limitation, the downside for family firms is due to: 1. the tensions between family and business objectives might harm the efficient allocation of management positions, executive pay, or other resources. (e.g. Christiansen, 1953; Levinson, 1971; Barnes and Hershon, 1976; Lansberg, 1983); 2. The candidates might be drawn from a limited managerial talent pool (Burkart, Panunzi and Shleifer, 2003; Pérez-González, 2006).

Regarding CEO succession decision, the models usually assume that the outside professional is better equipped than the heir. Burkart et al. (2003) present a model of succession in a firm owned and managed by its founder, who decides between hiring a professional manager or leaving management to his heir, also simultaneously on what fraction of the company to float on the stock exchange, contingent on the legal environment. They show that (active) family firms are optimal for regimes with weak legal protection of minority shareholders, while non-family firms are optimal for those with the strongest protection. Bhattacharya and Ravikumar (2005) develop a dynamic model to analyze how this tradeoff between better qualification and agency problem affects the evolution of the family firm. They find that family firms initially grow in size by accumulating capital and then, after reaching a critical size, professionalize their management.

Empirics

Morck et al. (1988b) find a significantly positive correlation between founding family management and Market-to-Book ratios for young firms, while a negative one for old firms. Irrespective of firm age, McConaughy et al. (1998) find a positive impact of founding family CEOs on M-B ratios, while Yermack (1996) find a negative correlation. More recently, Anderson and Reeb (2003) find a positive correlation between founding family ownership and firm profitability, as well as Market-to-Book ratios, conditionally on family ownership or not. Therefore, they argue that family ownership is an effective organizational structure. Villalonga and Amit (2006) show that founding families enhance value only when founders are active as executives or directors. However, dual share classes, pyramids, and voting agreements reduce such premium. The findings suggest that the agency problem resulted from the conflict between family owner and outside manager in non-family firms is more severe than that between family and non-family shareholders in founder-CEO firms.

Regarding CEO succession, Morck et al. (2000) and Villalonga and Amit (2006) find that families hurt valuations in firms managed by descendant CEOs. Bennedsen et al. (2007) adopt a unique dataset from Denmark and, by using the gender of a departing CEO's firstborn child as an instrument variable, investigate the impact of family characteristics in CEO succession decisions and the consequences of these decisions on firm performance. They find that family successions have a large negative causal impact on firm performance. Furthermore, they show that family-CEO underperformance is particularly large in fast-growing industries, industries with highly skilled labor force, and relatively large firms. Similarly, Pérez-González (2006) finds that inherited control is detrimental to firm performance. Moreover, consistent with wasteful nepotism, this underperformance is prominent in firms in which the appointed family CEOs are not graduated from "selective" universities. Hence, it suggests that inherited control destroys firm value by limiting the scope of labour market competition.

4.2.2 Family Firm and Dual Agency Problems

As mentioned in the beginning, the typical agency problem stems from the separation of ownership and control. Family ownership is able to minimize the free-rider problem that hinders effective monitoring, and to reduce the agency costs when united with management. Additionally, since family members tend to accumulate their wealth through their businesses, they are less likely to have a short time horizon in an opportunistic manner during decision making process (e.g. Anderson and Reeb, 2003; Bartholomeusz and Tanewski, 2006). Family managers can also create altruistic effects that are beneficial to stakeholders (Schulze et al., 2001).

However, there exists another type of agency problem in corporate governance, i.e. the expropriation of small shareholders in family firms. Faccio et al. (2001) argue that concentrated ownership gives rise to expropriation of minority shareholder interests in listed family firms. DeAngelo and DeAngelo (2000) and Anderson and Reeb (2003) suggest that founding family firms are more subject to issues derived from private benefit of control such as extraordinary dividend payouts, risk avoidance, excessive compensation schemes, and related party transactions. In addition, agency costs in family firms might be created through management entrenchment. For instance, several empirical studies document that founding family firms are more reluctant to maintain board independence (e.g. Anderson and Reeb, 2004; Bartholomeusz and Tanewski, 2006) .

Although, for agency costs, I have no direct measurement, several estimates have been used. Anderson et al. (2003) find a negative relationship between founding family firm ownership and agency cost of debt. They argue that family's sustained presence in the firm also creates powerful reputation effects which provide incentives for family managers to improve firm performance. Chen et al. (2007) investigate the impact of the founding family's presence on the extent of agency problems. They argue that, due to the dual agency problems, they expect the CEO turnover-performance sensitivity to be lower in family firms run by a family CEO, compared with an outsider. The reasoning is that family firms run by a professional CEO, while facing the separation of ownership and control, are under the founding family's effective monitoring of management. They find evidence supporting this conjecture, and the agency costs reflect in lower firm value after poor performance. Overall, their results indicate that, family ownership can mitigate agency problems, but not so once family members become engaged with management.

Ang et al. (2000) use data on small corporations in the U.S. to measure absolute and relative equity agency costs under different ownership and management structures. They find significantly higher agency costs when an outsider manages the firm, inversely related to the manager's stake of equity. These costs increase with the number of non-manager shareholders, and to a lesser extent, decrease with greater monitoring by banks.

4.2.3 Family Firm and CEO Compensation

To my best knowledge, there is little discussion on family stake and CEO compensation. Gomez-Mejia et al. (2003) first investigate the determinants of executive compensation in publicly traded family firms in the U.S., and they find that family CEOs of family-controlled firms receive lower total income than outside professional CEOs, in which the difference increases with family ownership concentration. Meanwhile, their pay tends to be more insulated from systematic risk, which is further moderated by the presence of institutional investors and R&D intensity. They argue that institutional investors might reduce equity-based income in order to avoid conservative decisions in an already risk-averse family business context.

More recently, Cai et al. (2008) use a detailed survey of Chinese private family firms to examine the relationship between managerial family ties and compensation. They find that family managers receive more salary and bonus, hold higher positions, and are given more decision rights and more job responsibilities than non-family managers. Alternatively, the contracts of outside managers are more performance-sensitive in bonus. Bandiera et al. (2010) build a theoretical model and examine the match between firms, managers, and incentives, with a particular focus on the difference between family and non-family firms. To test their theoretical predictions, they conduct a new survey in Italy with information on managers' risk profile as well as human capital, and on their compensation schemes, along with the firms that employ them. They find that, compared with non-family firms, family firms are more likely to offer lower and flatter compensation schemes. These firms attract less talented and more risk averse managers, who would put less effort into work and receive lower satisfaction from work. Note that since almost none of their sample managers belong to the family who owns the firm, in their paper family firms in fact refer to passive family firms in my setup.

4.3 Hypotheses

4.3.1 Agency Costs

Similar to Chen et al. (2007), I classify firms by two criteria, i.e. the identification of CEO (whether family members or not) and the family ownership.

	Family CEO	Non-Family CEO
Family Ownership	Active Family Firm (I)	Passive Family Firm (II)
No Family Ownership		Non-Family Firm (III)

Facing the conflict of interest between ownership and control, family controlled firms are less prone to agency issues. In addition, since some family influences derived from family ownership, such as effective monitoring, should also be able to provide a remedy to the agency problem, the agency costs among different types of firms are expected to be,

	Active Family (I)	Passive Family (II)	Non-Family (III)
Agency Costs	Low	Median	High

4.3.2 Pay-Performance

I postulate that, since pay-performance is one way to address the agency problem described above, i.e. to incentivize (outside) managers, the pay-performance estimates among different types of firms should be as follows,

	Active Family (I)	Passive Family (II)	Non-Family (III)
Pay-Performance	Low	Median	High

Once I consider CEO equity ownership, which should mitigate the need for incentives, the relations become the following,

	Active Family (I)	Passive Family (II)	Non-Family (III)
High Ownership	$<$ Low	$<$ Median	$<$ High
Low Ownership	Low	Median	High

4.4 Data and Sample

I form my sample by using companies in the S&P600 SmallCap Index between 2001 and 2005, the most recent period which has no major disruptive financial events. I include only companies that survive during this entire period, leaving 168 companies. To identify family firms, I manually check the proxy statements for each company, along with other sources whenever needed[7], and I create a dataset[8] which contains the following information: identity, ownership, tenure, and biographies of founder(s), board members, blockholders, and the top 5 managers, whenever available. I classify a firm as a family firm as long as

[7] Such as, Linkedin, Zoominfo, the website of the company, and etc.
[8] There are 11,228 person-firm-year observations in total.

one of the following two criteria is met: 1. founder or descendant of the founder sits on the board and/or is a blockholder; 2. at least two board members are related, either by blood or marriage[9]. Initially, I have 840 firm-year observations in which about half are identified as family firms. I match this sample with accounting data in Compustat and conduct tests on agency costs.

I use Execucomp to collect CEO compensation data. Due to some inconsistencies between these two datasets, the final sample size reduces to 785 firm-year observations[10]. Among them, 225 (28.66%) are active family-controlled firms; 171 (21.78%) are passive family-controlled firms; 389 (49.55%) are non-family firms. To supplement the data, I also use Compustat and RiskMetrics for accounting and governance data, respectively.

Using 2001 data, Table 1 provides summary statistics of my sample small family firms, whether sorted by firm types or not. Panel A and B show the size distribution in terms of market value and number of employees, respectively. Panel C and D show the firm age distribution and industry orientation of the sample firms. The majority of the sample firms have market value less than 600 million dollars (63.95%) and hire less than 3,000 employees (56.73%), despite some outliers remain in both distributions. Sorted by firm types, there seems to be more outliers in active family firms, while a flatter distribution in passive family firms and more of a normal distribution in non-family firms. The number of employees (both mean and median) is lowest in passive family firms, followed by active family firms, and highest in non-family firms. Once disregarding the outliers, I do not find significant variations in size among different firm types.

In addition, the majority of the sample firms as a whole are founded after 1960 (68.82%), and among them, 38.82% are founded after 1980, which suggests my sample firms tend to be young. Both the mean and median firm age are lowest in active family firms, followed by passive family firms, and highest in non-family firms. This pattern is consistent with the

[9]Follow Gomez-Mejia et al. (2003), I consider father, mother, sister, brother, son, daughter, spouse, in-laws, aunt, uncle, niece, nephew, and cousin.

[10]Whenever the inconsistency regarding CEO identification occurs, I use the one in Execucomp (CEOANN) and match data from my dataset.

organizational evolution of firm. As for the industry orientation, more than a third of the sample firms are in the manufacturing industry, followed by construction (16.86%), finance (15.7%), and wholesale (15.12%) industry. The distribution among firm types is similar, although non-family firms seem more likely to be in the transportation, communications, and utility industry whereas active family firms are more services oriented.

4.5 Estimation and Testing Results

4.5.1 Agency Costs

Following Ang et al. (2000), I calculate two proxies for agency costs, i.e. the asset utilization ratio and the expense ratio. The asset utilization ratio is the annual sales divided by total assets, a measure of how effectively the firm's management deploys its assets. The expense ratio is the operating expense scaled by annual sales, a measure of how effectively the firm's management controls operating costs. Table 2 shows the basic statistics of these two ratios among three types of firms. Figure 1 and 3 display the corresponding histograms, and Figure 2 and 4 display the ratios based on different industry classifications, regardless of firm types.

Looking at the asset utilization ratio, I find that on average the ratios are higher in active family firms than those in the other two types of firms, despite the higher volatility. There is no significant difference between passive family firms and non-family firms. As for the expense ratio, on average the cost management of these three types of firms are similar. However, when eliminating the effects of outliers, active family firms (passive family firms) have significantly lower expense ratios than non-family firms at 1% (5%) level, but there is no significant difference between these two types of family firms. Again, the volatility is the highest for active family firms, whereas the lowest for non-family firms. Therefore, the results suggest that agency costs are lower in family firms, despite the pattern varies more compared with their non-family counterparts[11].

[11] The tables do not report these testing results, which are available upon request.

Regardless of firm type, I find that the asset utilization ratios differ greatly among industries, in which firms in the wholesale industry have highest and those in the public administration industry have lowest ratios. On the other hand, except financial and public administration related firms, the expense ratios are similar (and lower) across industries.

4.5.2 Pay-Performance

I follow Jensen and Murphy (1990) to calculate the pay-performance estimates while further controlling for other attributes that might affect compensation. Table 3 provides summary statistics regarding the CEO compensation information, as well as the two corporate governance proxies, staggered board and GIM Index[12]. In general, the levels of basic salary are similar among three types of firms. When taking into account other elements of compensation, it seems that non-family firms award more market-based compensation to their CEOs than family firms[13]. Note that in the sample, some CEOs in the active family firms receive a tremendous amount of pay which might drive the estimation results[14].

Other than compensation components, I also find that CEOs in active family firms are older, own much more equity stake, and more experienced than their counterparts. Contrast with my expectation, active family firms have fewer anti-takeover mechanisms, along with a lower propensity to have staggered boards. It suggests that family stake might reduce the need for alternative mechanisms to exert control. On the other hand, there seems no substantial differences between passive family firms and non-family firms in terms of the factors discussed above.

[12] See Gompers, Ishii, and Metrick (2003) for the construction of the GIM Index.

[13] The OLS regression results show that there is no significant difference in CEO compensation among firm types, unlike Gomez-Mejia et al. (2003) and Bandiera et al. (2010).

[14] To address this issue, I also winsorize the compensation data, and the empirical results remain.

Regression Analysis

I estimate pay-performance coefficients, in which the pay is measured by the natural log of the absolute value (elasticity) and the incremental value (first order difference)[15], in two models described as follows,

$$Pay_{it} = \alpha_0 + \beta_1 FV_{it} + \beta_2 FV_{it} D(TypeII)_{it} + \beta_3 FV_{it} D(TypeI)_{it} + controls_{it} + \varepsilon_{it} ... Model(1)$$

where FV is the market value of the firm, and the two $D(Type.)$ refer to dummy variables assigned to one for companies classified as particular firm types. The control variables include CEO age, CEO tenure, return on assets (a ratio of earnings before interest and tax scaled by total assets), firm size (total assets), and two corporate governance proxies (GIM index and the existence of staggered board).

Because of higher agency costs in non-family firms, followed by passive and then active family firms, the pay-performance (elasticity) estimates, i.e. the betas, contingent on firm types are,

	Active Family (I)	Passive Family (II)	Non-Family (III)
Pay-Performance	$\beta_1 + \beta_3$	$\beta_1 + \beta_2$	β_1

where my conjectures are that $\beta_1 > 0$ and $\beta_3 < \beta_2 < 0$.

Once I consider CEO equity ownership that should mitigate the need for incentives, I add more interaction terms and thus Model (1) becomes,

$$Pay_{it} = \alpha_0 + \beta_1 FV_{it} + \beta_2 FV_{it} D(TypeII)_{it} + \beta_3 FV_{it} D(TypeI)_{it} + \beta_4 FV_{it} D(HO)_{it} + \beta_5 FV_{it} D(TypeII)_{it} D(HO)_{it} + \beta_6 FV_{it} D(TypeI)_{it} D(HO)_{it} + controls_{it} + \varepsilon_{it} ... Model(2)$$

where, similar to Model (1), FV is the market value of the firm. The two $D(Type.)$ are dummy variables assigned to one for companies classified as particular firm types, and

[15]Note that the first difference measurement applied to the dependent variable (pay) and the main explanatory variable of interest (firm value) only. The reason is that most of the other control variables are stable over time (or simply no variations across observations).

$D(HO)$ is a dummy variable that indicates whether the CEO ownership exceeds some threshold[16]. The control variables are the same as those in Model (1).

Contingent on ownership level, the pay-performance (elasticity) estimates among different firm type become the following,

	Active Family (I)	Passive Family (II)	Non-Family (III)
High Ownership	$\beta_1 + \beta_3 + \beta_6$	$\beta_1 + \beta_2 + \beta_5$	$\beta_1 + \beta_4$
Low Ownership	$\beta_1 + \beta_3$	$\beta_1 + \beta_2$	β_1

where my conjectures are that $\beta_1 > 0$, $\beta_3 < \beta_2 < 0$, and $\beta_i < 0, i \in \{4, 5, 6\}$.

I use the simple ordinary least square (OLS) for estimation. As shown in Table 5 and Table 6, specification (2)-(5) apply the basic Model (1)[17], while (1) does not have control variables. Specification (6) and (13) represent Model (2), in which (6)-(9) adopt the 5% cutoff and (10)-(13) use the median value as the threshold for ownership. Specification (4), (5), (8), (9), (12), and (13) further control for time and industry fixed effects.

Regarding the absolute value of CEO pay, since I take natural log of both the pay and the firm value, the set of values $(\beta_1, \beta_2, \beta_3)$ indicate the firm value elasticity of compensation[18]. In other words, these estimates measure the rate of response of compensation paid out due to a firm value change. The results in Table 5 show that, regardless of firm type, the pay-performance elasticity are higher in total compensation than in basic salary, either in terms of absolute magnitude or statistical significance. For instance, in non-family firms, a 1% increase of firm value corresponds to a roughly 0.33% (0.16%) increase of total compensation (basic salary). Contingent on firm type, I find that this pay-performance elasticity is always positive for non-family firms. Other than that, this elasticity, in particular in total compensation, is lower for active family firms than that for passive family ones.

[16] We first use 5%, the definition of a blockholder, as the cutoff point, then median as an alternative threshold.

[17] The only difference lies in the choice of corporate governance proxy.

[18] For the purpose of simplicity, hereafter I refer pay-performance elasticity to this firm value elasticity of compensation.

Considering ownership, on the whole, the evidence indicates a negative relationship between ownership and compensation. Conditional on firm type, the (family) ownership affects pay-performance elasticity in basic salary but not in total compensation. Inconsistent with my conjectures, to CEOs, having higher ownership mitigates the need for incentives only in the non-family firms while higher ownership in family firms, active or passive, reinforces the incentives. Moreover, I observe the discrepancies in elasticity among firm types only when I take into account this conditional ownership, which suggests a moderating effect on the elasticity. As for other control variables, I find that CEO age is negatively related with compensation, while CEO tenure and firm size are positively associated with CEO pay. Note that weak governance, either measured by the number of anti-takeover provisions or simply the existence of staggered board, leads to higher basic salary pay, but not total compensation.

Table 6 shows the estimation results with regard to the incremental value of CEO pay. Similar to the previous findings, regardless of firm type, the pay-performance estimates are higher in total compensation than in basic salary. For instance, in non-family firms, a 1 dollar increase of firm value corresponds to a roughly 1.55 to 2.32 (0.61 to 0.73) dollar increase of total compensation (basic salary). However, except for non-family firms, the estimates lose the statistical significance, and in general the first difference models have much lower explanatory power compared with the elasticity models. In addition, the ownership, whether contingent on firm type or not, does not influence the compensation. These findings suggest that across firms, the (incremental) performance pay is similar and independent of family influences.

Robustness

Firm Size and Firm Age

I also test whether performance pay varies among firm types through other channels such as firm size and firm age. Based on Model (2), I replace the set of $D(HO)$ variables with ones indicate whether the firm size (age) exceeds the median value. Table 7 and Table 8 show the results for pay-performance estimates in elasticity and in difference, respectively.

In terms of elasticity, firm size contingent on firm type does not matter in basic salary, despite being large passive family firms reduces the elasticity in total compensation. Old passive family firms increase the elasticity in basic salary. In terms of incremental pay, large non-family firms reduce the performance pay in total compensation, while old active family firms enhance performance pay in the basic salary.

Furthermore, to better understand the pay-performance elasticity, I run separate regressions based on firm size sorted by quartile[19]. I find that the elasticity pattern in the largest 25% of firms is inconsistent with my priors ($\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 = 0$), compared with median size firms ($\beta_1 > 0$, $\beta_2 = 0$, $\beta_3 < 0$). The smallest 25% of firms do not show discrepancies among firm types ($\beta_1 > 0$, $\beta_2 = \beta_3 = 0$). Similarly, when I group firms based on firm age by quartile, the pay in the median age firms have what I expect among firm types ($\beta_1 > 0$, $\beta_2 < 0$, $\beta_3 < 0$). This elasticity pattern in younger firms again does not vary among firm types ($\beta_1 > 0$, $\beta_2 = \beta_3 = 0$), while in very old firms, the pattern is consistent with my priors ($\beta_1 > 0$, $\beta_2 = 0$, $\beta_3 < 0$).

Firm Type

Other than the pooled models in the previous section, I also estimate the coefficients separately. As shown in Table 9 and Table 10, I use the simple OLS in specification (1)-(5), while specification (4) and (5) control for time and industry fixed effects. Specification (6) and (7) use fixed effects panel estimation. In Table 9, I look at the (natural log of) absolute level of CEO pay, and find that all three types of firms link CEO pay packages to performance. Still, as expected, there are discrepancies among different firm types. In particular, what stands out is that the pay-performance elasticity estimates in non-family firms are economically and statistically larger than those in family firms, either run by insider or outsider. For family firms, the pattern is not clear, despite the magnitude is higher in passive family firms than that in active ones. Note that the ownership reduces

[19] The results are not tabled and are available upon request.

the compensation for active family firms only.

In Table 10, I examine the incremental level of CEO pay. As a whole, in active family firms, the basic salary component, as well as the total compensation, is not sensitive to performance anymore. Alternatively, the pay-performance estimates in non-family firms are higher than those in passive family firms. Moreover, unlike Jensen and Murphy (1990), the estimates are economically higher for each type of firms. More specifically, for every dollar generated in a non-family firm, its CEO would receive approximately 1.64 to 2.09 dollars more in total compensation. Similarly, in a passive family firm, the range is between 0.96 and 1.43.

4.6 Concluding Remarks

Does the existence of family influences help alleviate the traditional principal-agent problem in small corporations? In this chapter, by using a sample of 168 small publicly-traded U.S. firms between 2001 and 2005, I measure the agency costs and further examine how the CEO compensation structure varies among different types of firms, if any. Following Ang et al. (2000), I adopt asset utilization ratio and expense ratio to indirectly measure agency costs. I find that agency costs are lower in family firms than those in non-family firms. Notwithstanding, the flatter distribution patterns in terms of both measurements, especially in active family firms, indicate that the way that family firms make use of their resources varies greatly. Still, it verifies the assumption behind my study that the principle-agent problem does exist in small firms.

My estimates for pay-performance (elasticity) are the highest in non-family firms, followed by those in passive family firms, and the lowest in the active family firms. Besides, this pattern is more pronounced in total compensation than in basic salary component. For instance, in non-family firms, a 1% increase of firm value corresponds to an approximately 0.33% (0.16%) increase of total compensation (basic salary). As a whole, the elasticity models fit more than their incremental value models. Without considering firm type, ownership reduces CEO compensation in general. Based on firm type, I observe variations regarding how CEO ownership influences pay-performance elasticity in basic salary, but not so in total compensation. Taken together, these findings suggest that family influences might reduce the need for alternative governance mechanisms to exercise control. As a result, family control and performance pay seem substitutes as corporate governance mechanisms.

My next step is to link CEO compensation, in particular the pay-performance estimates, to (post-) firm performance, and see whether different types of firms lead to heterogeneous firm performance, via CEO compensation structure and ownership, so that I could evaluate the effectiveness of different governance mechanisms at play. In addition, one caveat of this study is that the sample includes only firms that survive throughout the entire sample period of 2001-2005. I would check whether survival issues exist in order to address potential selection bias.

4.7 Table and Figure

Table 1 Sample Statistics

This table provides a summary of the sample small family firms, based on the information in 2001. The full sample consists of 172 companies in the S&P 600 SamllCap Index that survive during the whole period of 2001 to 2005. Type I firm is active family-controlled firm: i.e. controlled by family stake and run by family CEO; Type II firm is passive family-controlled firm: i.e. controlled by family stake and run by professional (outside) CEO; Type III firm is non-family firm: i.e. no family stake and run by professional (outside) CEO. Panel A and B show two size distribution, in terms of market value (U.S. million dollars) and the number of employees, of the sample firms, respectively. Panel C and D show firm age distribution and industrial orientation, based on the SIC codes, of the sample firms.

Panel A: Size (Market Value)

	Total	Type I		Type II		Type III	
	Number of Firms	Number of Firms	Fraction in %	Number of Firms	Fraction in %	Number of Firms	Fraction in %
< 100	8	6	10.91	1	2.63	1	1.33
100-200	22	5	9.09	5	13.16	12	16.00
200-300	12	3	5.45	2	5.26	7	9.33
300-400	22	7	12.73	3	7.89	12	16.00
400-500	20	4	7.27	6	15.79	10	13.33
500-600	22	6	10.91	3	7.89	13	17.33
600-700	12	3	5.45	3	7.89	6	8.00
700-800	10	4	7.27	3	7.89	3	4.00
800-900	11	3	5.45	4	10.53	4	5.33
900-1000	8	3	5.45	4	10.53	1	1.33
> 1,000	21	11	20.00	4	10.53	6	8.00
Sample Size	168	55	100.00	38	100.00	75	100.00

Panel B: Size (Number of Employees)

	Total	Type I		Type II		Type III	
	Number of Firms	Number of Firms	Fraction in %	Number of Firms	Fraction in %	Number of Firms	Fraction in %
< 500	18	6	11.11	6	16.67	6	8.00
500-1,000	23	5	9.26	9	25.00	9	12.00
1,000-2,000	30	15	27.78	6	16.67	9	12.00
2,000-3,000	22	3	5.56	4	11.11	15	20.00
3,000-4,000	16	7	12.96	1	2.78	8	10.67
4,000-5,000	10	5	9.26	2	5.56	3	4.00
5,000-6,000	9	2	3.70	1	2.78	6	8.00
6,000-7,000	7	1	1.85	2	5.56	4	5.33
7,000-8,000	5	2	3.70	0	0.00	3	4.00
8,000-9,000	2	1	1.85	0	0.00	1	1.33
9,000-10,000	4	1	1.85	1	2.78	2	2.67
> 10,000	19	6	11.11	4	11.11	9	12.00
Sample Size	165	54	100.00	36	100.00	75	100.00

Panel C: Firm Age							
	Total	Type I		Type II		Type III	
	Number of Firms	Number of Firms	Fraction in %	Number of Firms	Fraction in %	Number of Firms	Fraction in %
< 10	26	7	12.73	5	13.51	14	18.92
10-20	46	18	32.73	15	40.54	13	17.57
20-30	21	9	16.36	5	13.51	7	9.46
30-40	26	11	20.00	4	10.81	11	14.86
40-50	11	2	3.64	2	5.41	7	9.46
50-60	7	2	3.64	0	0.00	5	6.76
60-70	4	0	0.00	2	5.41	2	2.70
70-80	11	5	9.09	0	0.00	6	8.11
80-90	5	0	0.00	1	2.70	4	5.41
> 90	9	1	1.82	3	8.11	5	6.76
Sample Size	166	55	100.00	37	100.00	74	100.00

Panel D: Industry Orientation							
	Total	Type I		Type II		Type III	
	Number of Firms	Number of Firms	Fraction in %	Number of Firms	Fraction in %	Number of Firms	Fraction in %
Agriculture, Forestry, and Fishing	1	0	0.00	0	0.00	1	1.33
Mining	12	4	7.27	3	7.89	5	6.67
Construction	29	9	16.36	6	15.79	14	18.67
Manufacturing	58	17	30.91	15	39.47	26	34.67
Transportation, Communications, and Utilities	7	0	0.00	1	2.63	6	8.00
Wholesale Trade	26	10	18.18	6	15.79	10	13.33
Finance, Insurance, and Real Estate	27	9	16.36	6	15.79	12	16.00
Service Industries	7	5	9.09	1	2.63	1	1.33
Public Administration	1	1	1.82	0	0.00	0	0.00
Sample Size	168	55	100.00	38	100.00	75	100.00

Table 2 Small Family Firm and Agency Costs

This table shows the relations of different types of firms and the agency costs, proxied by two measures, the asset utilization ratio (Panel A) and the expense ratio (Panel B). The asset utilization ratio is the annual sales divided by total assets, a measure of how effectively the firm's management deploys its assets. The expense ratio is the operating expense scaled by annual sales, a measure of how effectively the firm's management controls operating costs. Type I firm is active family-controlled firm: i.e. controlled by family stake and run by family CEO; Type II firm is passive family-controlled firm: i.e. controlled by family stake and run by professional (outside) CEO; Type III firm is non-family firm: i.e. no family stake and run by professional (outside) CEO.

Panel A: Asset Utilization Ratio				
	Total	Type I	Type II	Type III
Mean	1.2021	1.2975	1.1220	1.1795
Standard Deviation	0.6913	0.8187	0.5657	0.6513
Median	1.0382	1.0596	1.0419	1.0164
Max	4.3598	4.3598	3.8895	3.8195
Min	0	0	0.0796	0.2116
Sample Size	788	232	166	390

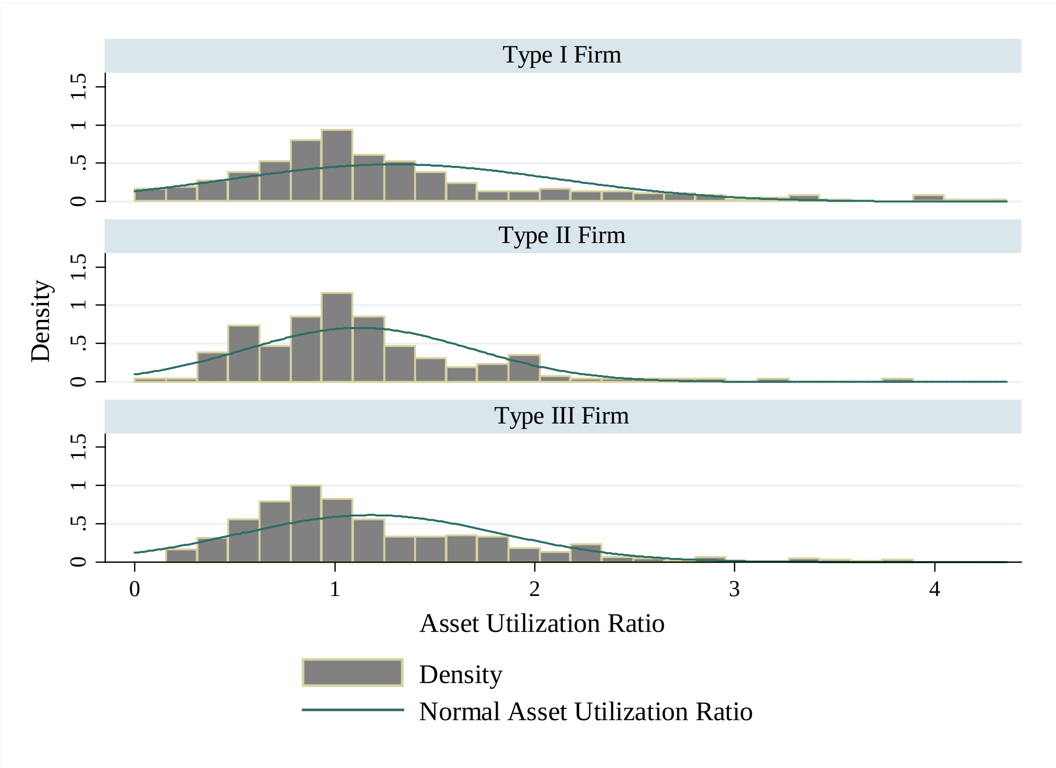


Figure1 Histogram of Asset Utilization Ratio

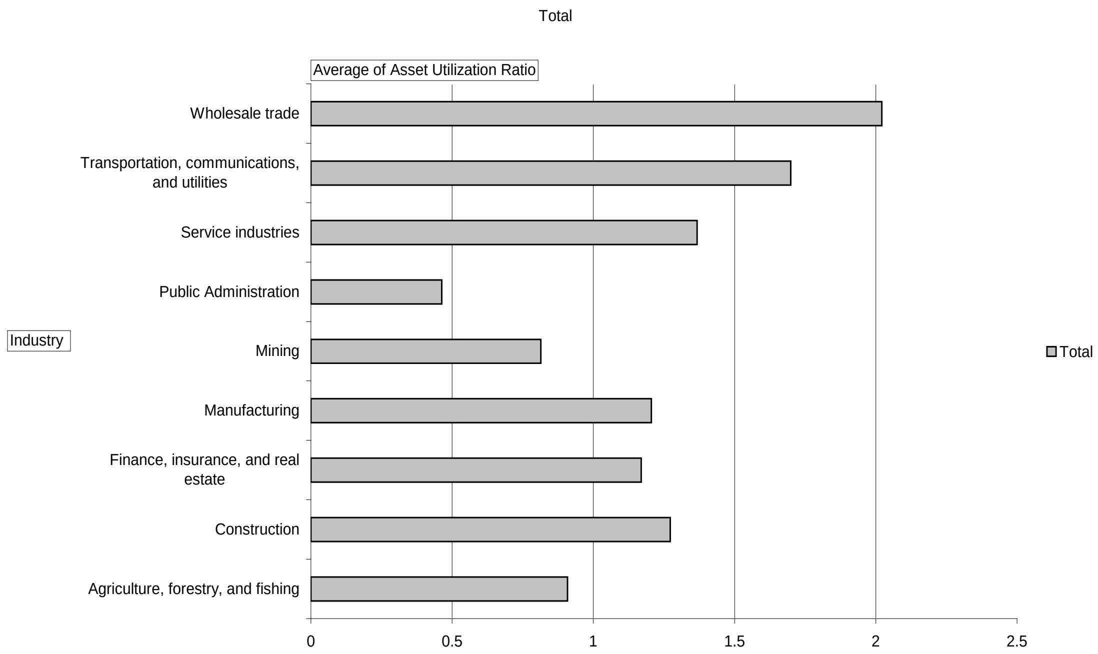


Figure2 Sales-to-Asset Ratio by One-Digit SIC

Panel B: Expense Ratio				
	Total	Type I	Type II	Type III
Mean	1.0885	1.4697	0.9666	0.9145
Standard Deviation	4.8527	8.8955	1.2065	0.2345
Median	0.8941	0.8662	0.8846	0.9033
Max	135.9874	135.9874	15.7010	3.5029
Min	0.2363	0.2363	0.4433	0.2799
Sample Size	787	231	166	390

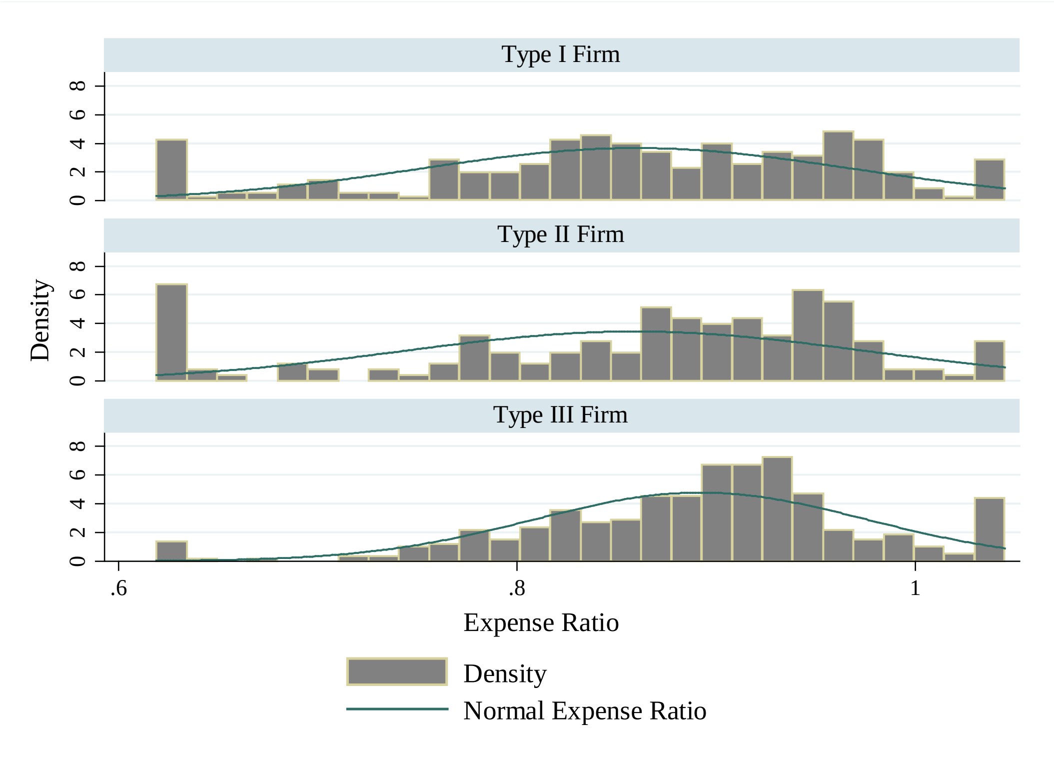


Figure3 Histogram of Expense Ratio (Winsorized at 5% Level)

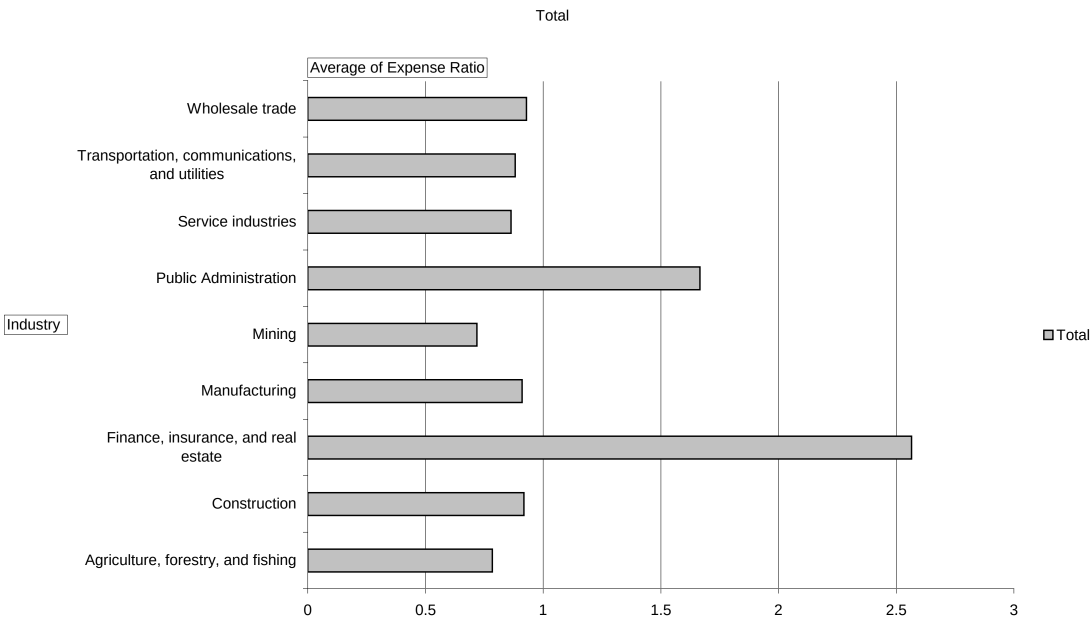


Figure4 Operating Expense-to-Sales Ratio by One-Digit SIC

Table 3 Sample Statistics: CEO Compensation and Corporate Governance

	Firm Type[1]	Salary	Bonus	Total Basic	TDC1[2]	TDC2[3]	Stockholder Equity	Market Value	CEO Age	CEO Ownership	CEO Tenure	GIM Index	Classified Board
Mean	I	536.47	679.95	1216.42	2586.18	3513.42	329.60	793.82	56.43	15.44	15.54	8.12	0.57
	II	483.96	356.36	840.32	2074.49	1933.85	348.07	781.19	52.52	1.84	4.11	9.31	0.75
	III	524.95	418.25	943.20	2543.13	2429.29	336.39	695.84	53.71	1.97	5.61	9.50	0.64
	Total	519.32	479.78	999.10	2454.39	2632.11	336.99	742.57	54.23	5.80	8.13	9.07	0.64
Standard Deviation	I	260.49	2173.33	2267.41	5035.22	8922.20	257.99	758.30	8.37	14.64	10.61	1.99	0.50
	II	178.62	413.00	526.71	1669.45	2724.30	285.21	667.36	7.15	1.76	4.01	2.39	0.43
	III	199.41	730.04	822.80	2893.45	3253.70	287.41	589.58	6.38	1.79	5.28	2.37	0.48
	Total	215.31	1291.11	1372.85	3469.49	5471.99	278.53	659.67	7.31	10.04	8.48	2.34	0.48
Median	I	500	250	755.429	1490.471	1249.743	261.415	552.7918	57	10.6	14	8	1
	II	450	262.406	727.443	1577.583	1032.915	237.613	606.839	51	1.3	3	10	1
	III	506.629	252	753	1723.685	1238.457	274.591	530.9488	54	1.54	4	10	1
	Total	500	254.303	750	1627.999	1197.883	266.929	548.6886	54	2.23	5	9	1
Maximum	I	1700	20500	21500	58981.34	94303.28	1952.109	5058.036	77	63.6	43	12	1
	II	950	2381.075	3324.075	9296.409	20230.9	1497.067	3950.856	70	12.9	21	14	1
	III	1229.167	11475.03	12475.03	32640.02	28834.72	1936.488	3717.736	69	13.1	31	17	1
	Total	1700	20500	21500	58981.34	94303.28	1952.109	5058.036	77	63.6	43	17	1
Minimum	I	0	0	205	246.014	230.823	-48.428	42.0266	40	1.5	0	3	0
	II	8.88	0	8.88	324.27	164.583	-33.9	20.0428	39	0	0	3	0
	III	0	-0.001	0	37.083	0	-1474.28	27.4528	35	0	0	3	0
	Total	0	-0.001	0	37.083	0	-1474.28	20.0428	35	0	0	3	0

[1] Type 1: Active Family-Controlled Firm; Type 2: Passive Family-Controlled Firm; Type 3: Non-Family Firm
[2] Total Compensation (Salary + Bonus + Other Annual + Restricted Stock Grants + LTIP Payouts + All Other + Value of Option Grants)
[3] Total Compensation (Salary + Bonus + Other Annual + Restricted Stock Grants + LTIP Payouts + All Other + Value of Options Exercised)

Table 4 Correlation Matrix

This table reports the correlations between explanatory variables Type I firm is active family-controlled firm: i.e. controlled by family stake and run by family CEO; Type II firm is passive family-controlled firm: i.e. controlled by family stake and run by professional (outside) CEO; Type III firm is non-family firm: i.e. no family stake and run by professional (outside) CEO. Firm Value is measured by natural log of market capitalization. Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, and firm size is measured by log(total assets).

	Firm Value	Firm Value *Dummy(Type II Firm)	Firm Value *Dummy(Type I Firm)	CEO Ownership	CEO Age	CEO Tenure	Return on Assets	Firm Size	GIM Index	Classified Board
Firm Value	1									
Firm Value *Dummy(Type II Firm)	0.1161	1								
Firm Value *Dummy(Type I Firm)	0.1456	-0.3123	1							
CEO Ownership	-0.0917	-0.2048	0.5822	1						
CEO Age	0.1118	-0.1110	0.2227	0.3326	1					
CEO Tenure	-0.0161	-0.2366	0.5170	0.6263	0.4395	1				
Return on Assets	0.4668	0.0071	0.1714	0.0723	0.0552	0.0644	1			
Firm Size	0.6531	0.0488	0.0040	-0.1141	0.1981	-0.0058	0.3317	1		
GIM Index	0.0693	0.0400	-0.2490	-0.2172	-0.0317	-0.1026	0.0704	0.1817	1	
Classified Board	0.1121	0.1026	-0.0969	-0.1314	0.0180	-0.0089	0.1800	0.1573	0.5087	1

Table 5 Pay-Performance of CEO Compensation (Elasticity)

This table shows the estimates of the pooled models that estimate how different types of firms affect the determinants of CEO compensation, in terms of the absolute level. Type I firm is active family-controlled firm: i.e. controlled by family stake and run by family CEO; Type II firm is passive family-controlled firm: i.e. controlled by family stake and run by professional (outside) CEO; Type III firm is non-family firm: i.e. no family stake and run by professional (outside) CEO. The dependent variable, CEO compensation, is scaled by the natural log. For the explanatory variables, firm value is measured by natural log of market capitalization. Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, and firm size is measured by log(total assets). Specification (1) is the basic model, while (2) and (3) include control variables. Specification (6) and (7) control for ownership that exceeds the 5% holding threshold, while (10) and (11) adopts the median threshold. Specification (4), (5), (8), (9), (12) and (13) control for time and industry fixed effects. Industry fixed effects adopt one-digit SIC codes. Panel A displays the estimates for the basic salary and bonus. Panel B shows the estimation results with regard to total compensation that includes value of option grants (TDC1). Standard deviations are reported in the parentheses and the symbols ^{a}, ^{b}, and ^{c} represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Basic Salary and Bonus													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Firm Value	0.331^{c}	0.163^{c}	0.164^{c}	0.132^{c}	0.134^{c}	0.189^{c}	0.191^{c}	0.158^{c}	0.159^{c}	0.181^{c}	0.183^{c}	0.148^{c}	0.149^{c}
	(0.024)	(0.039)	(0.039)	(0.04)	(0.04)	(0.038)	(0.038)	(0.039)	(0.039)	(0.039)	(0.039)	(0.04)	(0.04)
Firm Value *Dummy(Type II Firm)	-0.020^{b}	-0.013	-0.015	-0.014	-0.017^{a}	-0.018^{a}	-0.021^{b}	-0.020^{a}	-0.023^{b}	-0.024^{a}	-0.028^{b}	-0.027^{b}	-0.031^{b}
	(0.009)	(0.01)	(0.01)	(0.01)	(0.01)	(0.011)	(0.011)	(0.011)	(0.01)	(0.012)	(0.012)	(0.012)	(0.012)
Firm Value *Dummy(Type I Firm)	0.002	0.008	0.006	0.007	0.005	-0.028^{a}	-0.030^{a}	-0.025	-0.027^{a}	-0.048^{b}	-0.051^{b}	-0.050^{b}	-0.053^{b}
	(0.008)	(0.012)	(0.012)	(0.012)	(0.012)	(0.016)	(0.016)	(0.016)	(0.016)	(0.024)	(0.024)	(0.024)	(0.024)
CEO Ownership		-0.009^{c}	-0.008^{b}	-0.008^{b}	-0.007^{b}								
		(0.003)	(0.003)	(0.003)	(0.003)								
Firm Value *Dummy(Block Ownership)						-0.375^{c}	-0.388^{c}	-0.369^{c}	-0.383^{c}				
						(0.083)	(0.083)	(0.082)	(0.082)				
Firm Value *Dummy(Type II Firm) *Dummy(Block Ownership)						0.407^{c}	0.413^{c}	0.396^{c}	0.398^{c}				
						(0.09)	(0.09)	(0.09)	(0.09)				
Firm Value *Dummy(Type I Firm) *Dummy(Block Ownership)						0.407^{c}	0.421^{c}	0.396^{c}	0.411^{c}				
						(0.085)	(0.085)	(0.084)	(0.083)				

Panel A: Basic Salary and Bonus													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Firm Value *Dummy(High Ownership)										-0.008	-0.011	-0.012	-0.016
										(0.013)	(0.013)	(0.013)	(0.013)
Firm Value *Dummy(Type II Firm) *Dummy(High Ownership)										0.036	0.039[a]	0.040[a]	0.042[a]
										(0.024)	(0.024)	(0.023)	(0.023)
Firm Value *Dummy(Type I Firm) *Dummy(High Ownership)										0.057[b]	0.060[b]	0.062[b]	0.066[b]
										(0.027)	(0.027)	(0.027)	(0.027)
Controls:													
CEO Age		-0.007[a]	-0.007[a]	-0.007[a]	-0.007[a]	-0.008[b]	-0.008[b]	-0.008[a]	-0.008[a]	-0.009[b]	-0.009[b]	-0.008[b]	-0.008[b]
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
CEO Tenure		0.017[c]	0.016[c]	0.016[c]	0.015[c]	0.011[c]	0.011[c]	0.011[c]	0.010[c]	0.012[c]	0.012[c]	0.011[c]	0.011[c]
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Return on Assets		0.213	0.151	0.272	0.203	0.110	0.033	0.186	0.105	0.088	0.017	0.151	0.075
		(0.222)	(0.224)	(0.222)	(0.223)	(0.219)	(0.22)	(0.219)	(0.219)	(0.224)	(0.226)	(0.224)	(0.224)
Firm Size		0.687[c]	0.691[c]	0.642[c]	0.642[c]	0.683[c]	0.685[c]	0.648[c]	0.642[c]	0.714[c]	0.719[c]	0.673[c]	0.672[c]
		(0.094)	(0.093)	(0.098)	(0.097)	(0.093)	(0.092)	(0.097)	(0.095)	(0.095)	(0.094)	(0.099)	(0.097)
GIM Index		0.018		0.016		0.022[b]		0.018		0.022[a]		0.019[a]	
		(0.011)		(0.011)		(0.011)		(0.011)		(0.011)		(0.011)	
Classified Board			0.128[b]		0.139[b]		0.159[c]		0.168[c]		0.150[c]		0.162[c]
			(0.055)		(0.055)		(0.054)		(0.054)		(0.055)		(0.054)
Industry FE	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.2084	0.3552	0.3588	0.3951	0.4009	0.3779	0.384	0.4161	0.4248	0.3546	0.3594	0.3967	0.4044
Adjusted R^2	0.2054	0.3432	0.3469	0.3696	0.3755	0.3637	0.3699	0.3888	0.3979	0.3399	0.3448	0.3685	0.3765
Sample Size	780	494	494	494	494	494	494	494	494	494	494	494	494

Panel B: Total Compensation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Firm Value	0.466[c]	0.340[c]	0.339[c]	0.318[c]	0.318[c]	0.363[c]	0.362[c]	0.336[c]	0.335[c]	0.363[c]	0.362[c]	0.338[c]	0.337[c]
	(0.029)	(0.048)	(0.048)	(0.05)	(0.05)	(0.048)	(0.048)	(0.05)	(0.05)	(0.048)	(0.048)	(0.05)	(0.05)
Firm Value *Dummy(Type II Firm)	-0.024[b]	-0.018	-0.019	-0.023[a]	-0.024[a]	-0.022	-0.023[a]	-0.026[a]	-0.027[b]	-0.028[a]	-0.030[b]	-0.035[b]	-0.037[b]
	(0.011)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.015)	(0.015)	(0.015)	(0.015)
Firm Value *Dummy(Type I Firm)	-0.027[c]	-0.019	-0.022	-0.022	-0.023	-0.036[a]	-0.039[a]	-0.035[a]	-0.036[a]	-0.051[a]	-0.053[a]	-0.054[a]	-0.056[a]
	(0.01)	(0.015)	(0.014)	(0.015)	(0.014)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.029)	(0.029)
CEO Ownership		-0.012[c]	-0.012[c]	-0.011[c]	-0.011[c]								
		(0.004)	(0.004)	(0.004)	(0.004)								
Firm Value *Dummy(Block Ownership)						-0.023	-0.021	-0.033	-0.032				
						(0.06)	(0.06)	(0.06)	(0.06)				
Firm Value *Dummy(Type II Firm) *Dummy(Block Ownership)						0.043	0.039	0.040	0.034				
						(0.075)	(0.075)	(0.077)	(0.077)				
Firm Value *Dummy(Type I Firm) *Dummy(Block Ownership)						0.023	0.021	0.028	0.028				
						(0.064)	(0.064)	(0.064)	(0.064)				
Firm Value *Dummy(High Ownership)										-0.003	-0.005	-0.010	-0.012
										(0.016)	(0.016)	(0.016)	(0.016)
Firm Value *Dummy(Type II Firm) *Dummy(High Ownership)										0.029	0.032	0.037	0.039
										(0.029)	(0.029)	(0.029)	(0.029)
Firm Value *Dummy(Type I Firm) *Dummy(High Ownership)										0.021	0.020	0.026	0.027
										(0.034)	(0.034)	(0.033)	(0.033)
Controls:													
CEO Age		-0.013[c]	-0.013[c]	-0.012[b]	-0.012[b]	-0.015[c]	-0.015[c]	-0.014[c]	-0.014[c]	-0.014[c]	-0.014[c]	-0.014[c]	-0.014[c]
		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)

Panel B: Total Compensation													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
CEO Tenure		0.018[c]	0.019[c]	0.017[c]	0.017[c]	0.013[c]	0.013[c]	0.012[c]	0.012[c]	0.012[c]	0.012[c]	0.012[b]	0.011[b]
		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Return on Assets		0.218	0.216	0.244	0.229	0.143	0.132	0.190	0.167	0.100	0.088	0.132	0.107
		(0.273)	(0.276)	(0.274)	(0.276)	(0.276)	(0.279)	(0.277)	(0.279)	(0.277)	(0.28)	(0.278)	(0.28)
Firm Size		0.480[c]	0.496[c]	0.470[c]	0.477[c]	0.496[c]	0.513[c]	0.485[c]	0.492[c]	0.509[c]	0.526[c]	0.502[c]	0.508[c]
		(0.116)	(0.115)	(0.121)	(0.12)	(0.117)	(0.117)	(0.123)	(0.122)	(0.117)	(0.116)	(0.123)	(0.121)
GIM Index		0.017		0.010		0.022		0.014		0.021		0.013	
		(0.014)		(0.014)		(0.014)		(0.014)		(0.014)		(0.014)	
Classified Board			0.040		0.048		0.064		0.073		0.065		0.074
			(0.068)		(0.068)		(0.068)		(0.068)		(0.068)		(0.068)
Industry FE	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.2486	0.3462	0.3446	0.3769	0.3769	0.3343	0.3323	0.3671	0.3674	0.3359	0.334	0.3692	0.3697
Adjusted R^2	0.2456	0.334	0.3324	0.3505	0.3505	0.3191	0.3171	0.3375	0.3378	0.3207	0.3188	0.3397	0.3402
Sample Size	778	494	494	494	494	494	494	494	494	494	494	494	494

Table 6 Pay-Performance of CEO Compensation (Incremental Value)

This table shows the estimates of the pooled models that estimate how different types of firms affect the determinants of CEO compensation, in terms of the incremental value. Type I firm is active family-controlled firm: i.e. controlled by family stake and run by family CEO; Type II firm is passive family-controlled firm: i.e. controlled by family stake and run by professional (outside) CEO; Type III firm is non-family firm: i.e. no family stake and run by professional (outside) CEO. The dependent variable, CEO compensation, is scaled by the natural log. For the explanatory variables, firm value is measured by natural log of market capitalization. Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, and firm size is measured by log(total assets). Specification (1) is the basic model, while (2) and (3) include control variables. Specification (6) and (7) control for ownership that exceeds the 5% holding threshold, while (10) and (11) adopts the median threshold. Specification (4), (5), (8), (9), (12) and (13) control for time and industry fixed effects. Industry fixed effects adopt one-digit SIC codes. Panel A displays the estimates for the basic salary and bonus. Panel B shows the estimation results with regard to total compensation that includes value of option grants (TDC1). Standard deviations are reported in the parentheses and the symbols [a], [b], and [c] represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Basic Salary and Bonus													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Firm Value	0.61[c]	0.65[c]	0.65[c]	0.63[c]	0.63[c]	0.67[c]	0.67[c]	0.63[c]	0.64[c]	0.73[c]	0.72[c]	0.67[c]	0.67[c]
	(0.12)	(0.19)	(0.19)	(0.19)	(0.19)	(0.19)	(0.19)	(0.20)	(0.19)	(0.20)	(0.20)	(0.21)	(0.21)
Firm Value *Dummy(Type II Firm)	-0.11	-0.41	-0.41	-0.49	-0.50	-0.43	-0.43	-0.50[a]	-0.51[a]	-0.65[b]	-0.64[b]	-0.73[b]	-0.74[b]
	(0.21)	(0.30)	(0.30)	(0.30)	(0.30)	(0.30)	(0.30)	(0.30)	(0.30)	(0.32)	(0.32)	(0.32)	(0.32)
Firm Value *Dummy(Type I Firm)	-0.03	-0.16	-0.16	-0.23	-0.23	-0.67	-0.66	-0.67	-0.66	-0.66	-0.64	-0.85	-0.83
	(0.17)	(0.24)	(0.24)	(0.24)	(0.24)	(0.50)	(0.50)	(0.50)	(0.50)	(0.76)	(0.76)	(0.75)	(0.75)
CEO Ownership		-2.21	-1.80	-1.94	-1.58								
		(5.10)	(5.10)	(5.12)	(5.12)								
Firm Value *Dummy(Block Ownership)						-0.47	-0.51	-0.22	-0.27				
						(1.76)	(1.76)	(1.76)	(1.76)				
Firm Value *Dummy(Type II Firm) *Dummy(Block Ownership)						2.32	2.41	1.47	1.64				
						(3.13)	(3.13)	(3.30)	(3.30)				
Firm Value *Dummy(Type I Firm) *Dummy(Block Ownership)						1.03	1.06	0.71	0.75				
						(1.83)	(1.83)	(1.83)	(1.83)				
Firm Value *Dummy(High Ownership)										-0.36	-0.34	-0.25	-0.24
										(0.44)	(0.45)	(0.45)	(0.45)

Panel A: Basic Salary and Bonus													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Firm Value *Dummy(Type II Firm) *Dummy(High Ownership)										1.58^{a}	1.56^{a}	1.69^{b}	1.68^{b}
										(0.83)	(0.83)	(0.84)	(0.84)
Firm Value *Dummy(Type I Firm) *Dummy(High Ownership)										0.79	0.77	0.85	0.82
										(0.87)	(0.88)	(0.87)	(0.87)
Controls:													
CEO Age		-8.09	-8.11	-10.43	-10.54	-8.17	-8.14	-10.61^{a}	-10.64^{a}	-8.32	-8.30	-10.85^{a}	-10.92^{a}
		(6.21)	(6.21)	(6.69)	(6.39)	(6.16)	(6.15)	(6.34)	(6.33)	(6.18)	(6.18)	(6.34)	(6.33)
CEO Tenure		7.60	7.44	8.80	8.54	6.57	6.64	7.77	7.71	6.67	6.74	8.09	8.03
		(6.06)	(6.06)	(6.08)	(6.10)	(5.18)	(5.16)	(5.21)	(5.20)	(5.15)	(5.13)	(5.18)	(5.16)
Return on Assets		-259.69	-286.00	-286.98	-314.24	-285.03	-311.29	-308.42	-335.75	-262.06	-283.97	-281.24	-306.02
		(315.12)	(319.27)	(317.38)	(320.88)	(314.36)	(317.88)	(316.73)	(319.52)	(313.37)	(316.89)	(315.08)	(317.91)
Firm Size		422.10^{c}	416.91^{c}	356.35^{c}	352.74^{c}	415.35^{c}	408.97^{c}	352.33^{c}	347.31^{c}	418.63^{c}	412.62^{c}	339.93^{b}	335.93^{b}
		(125.15)	(124.42)	(132.56)	(131.57)	(124.35)	(123.45)	(132.16)	(130.99)	(124.10)	(123.15)	(131.31)	(130.11)
GIM Index		-2.16		1.63		-0.76		2.97		-1.45		2.62	
		(17.35)		(17.63)		(17.21)		(17.54)		(17.16)		(17.41)	
Classified Board			40.36		50.24		46.00		56.47		37.97		50.89
			(87.24)		(87.68)		(86.60)		(87.23)		(86.53)		(86.66)
Industry FE	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.0777	0.1037	0.1041	0.1437	0.1445	0.1075	0.1081	0.1461	0.147	0.1126	0.113	0.155	0.1557
Adjusted R^2	0.0731	0.0828	0.0833	0.1006	0.1013	0.082	0.0827	0.0982	0.0992	0.0872	0.0877	0.1077	0.1084
Sample Size	607	397	397	397	397	397	397	397	397	397	397	397	397

Panel B: Total Compensation													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Firm Value	1.62^{c}	2.23^{b}	2.32^{c}	2.00^{b}	2.09^{b}	2.22^{b}	2.32^{c}	1.98^{b}	2.08^{b}	1.75^{a}	1.86^{a}	1.55	1.66
	(0.58)	(0.88)	(0.88)	(0.93)	(0.93)	(0.89)	(0.89)	(0.94)	(0.94)	(0.96)	(0.96)	(1.01)	(1.01)
Firm Value *Dummy(Type II Firm)	-1.34	-1.51	-1.58	-1.42	-1.49	-1.52	-1.59	-1.41	-1.49	-1.31	-1.38	-1.27	-1.34
	(1.01)	(1.45)	(1.45)	(1.49)	(1.49)	(1.46)	(1.46)	(1.50)	(1.50)	(1.59)	(1.59)	(1.62)	(1.62)
Firm Value *Dummy(Type I Firm)	-2.20^{c}	-3.13^{c}	-3.22^{c}	-2.98^{b}	-3.07^{b}	-1.49	-1.56	-1.67	-1.75	0.90	0.88	1.08	1.04
	(0.82)	(1.15)	(1.15)	(1.18)	(1.18)	(2.38)	(2.38)	(2.40)	(2.41)	(3.59)	(3.60)	(3.64)	(3.64)
CEO Ownership		-7.10	-9.30	-6.90	-9.42								
		(24.55)	(24.52)	(25.09)	(25.09)								
Firm Value *Dummy(Block Ownership)						0.51	0.01	2.41	1.81				
						(8.34)	(8.35)	(8.51)	(8.52)				
Firm Value *Dummy(Type II Firm) *Dummy(Block Ownership)						-1.22	-0.99	-4.27	-4.11				
						(14.85)	(14.88)	(15.88)	(15.96)				
Firm Value *Dummy(Type I Firm) *Dummy(Block Ownership)						-2.43	-1.97	-3.92	-3.36				
						(8.68)	(8.69)	(8.84)	(8.85)				
Firm Value *Dummy(High Ownership)										2.63	2.61	2.52	2.50
										(2.11)	(2.12)	(2.17)	(2.18)
Firm Value *Dummy(Type II Firm) *Dummy(High Ownership)										-0.90	-0.97	-0.71	-0.77
										(3.94)	(3.94)	(4.06)	(4.07)
Firm Value *Dummy(Type I Firm) *Dummy(High Ownership)										-6.40	-6.48	-6.34	-6.41
										(4.15)	(4.16)	(4.20)	(4.22)
Controls:													
CEO Age		-49.18^{a}	-49.80^{a}	-55.17^{a}	-55.38^{a}	-51.12^{a}	-52.11^{a}	-57.67^{a}	-58.30^{a}	-55.45^{a}	-56.64^{a}	-61.56^{b}	-62.43^{b}
		(29.68)	(29.72)	(31.09)	(31.15)	(29.47)	(29.48)	(30.81)	(30.85)	(29.57)	(29.59)	(30.88)	(30.92)
CEO Tenure		30.53	29.78	32.30	31.51	25.97	23.73	28.13	25.62	25.95	23.66	27.98	25.41
		(28.79)	(28.87)	(29.44)	(29.57)	(25.03)	(24.97)	(25.63)	(25.59)	(24.87)	(24.82)	(25.51)	(25.48)
Return on Assets		-3047.14^{b}	-3135.55^{b}	-3136.88^{b}	-3211.53^{b}	-3034.14^{b}	-3148.73^{b}	-3143.60^{b}	-3243.49^{b}	-3011.91^{b}	-3153.79^{b}	-3104.04^{b}	-3231.04^{b}
		(1515.82)	(1534.80)	(1549.06)	(1566.92)	(1513.02)	(1529.14)	(1545.95)	(1560.55)	(1508.01)	(1523.93)	(1540.85)	(1555.57)

Panel B: Total Compensation													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Firm Size		1141.64[a]	1200.74[b]	1175.27[a]	1253.60[a]	1196.98[b]	1265.33[b]	1229.92[a]	1322.21[b]	1159.25[a]	1231.60[b]	1201.77[a]	1293.71[b]
		(593.69)	(590.91)	(642.42)	(638.80)	(590.64)	(586.87)	(640.85)	(636.16)	(589.47)	(585.34)	(638.21)	(633.26)
GIM Index		89.69		98.43		92.88		102.10		99.59		107.56	
		(84.76)		(87.41)		(84.10)		(86.91)		(83.89)		(86.47)	
Classified Board			213.88		202.65		239.42		221.48		290.61		276.45
			(417.1)		(426.94)		(415.02)		(425.65)		(414.85)		(423.87)
Industry FE	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.0151	0.0504	0.0483	0.0606	0.058	0.0519	0.0496	0.0617	0.0589	0.0575	0.0552	0.0675	0.0647
Adjusted R^2	0.0101	0.0279	0.0257	0.0124	0.0096	0.0243	0.022	0.0082	0.0052	0.0301	0.0277	0.0143	0.0113
Sample Size	599	390	390	390	390	390	390	390	390	390	390	390	390

Table 7 Robustness: Firm Size and Firm Age (Elasticity)

This table shows the estimates of the pooled models that estimate how different types of firms affect the determinants of CEO compensation, in terms of the absolute level. Type I firm is active family-controlled firm: i.e. controlled by family stake and run by family CEO; Type II firm is passive family-controlled firm: i.e. controlled by family stake and run by professional (outside) CEO; Type III firm is non-family firm: i.e. no family stake and run by professional (outside) CEO. The dependent variable, CEO compensation, is scaled by the natural log. For the explanatory variables, firm value is measured by natural log of market capitalization. Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, and firm size is measured by log(total assets). Specification (1)-(4) control for (family) firm size and specification (5) and (8) control for (family) firm age (calculated by the difference of the founding year and the sample year), both with a dummy variable that uses median value the threshold. Specification (3), (4), (7), and (8) control for time and industry fixed effects. Industry fixed effects adopt one-digit SIC codes. Panel A displays the estimates for the basic salary and bonus. Panel B shows the estimation results with regard to total compensation that includes value of option grants (TDC1). Standard deviations are reported in the parentheses and the symbols [a], [b], and [c] represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Basic Salary and Bonus								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm Value	0.153[c]	0.154[c]	0.126[c]	0.129[c]	0.174[c]	0.175[c]	0.144[c]	0.145[c]
	(0.041)	(0.04)	(0.042)	(0.042)	(0.039)	(0.039)	(0.041)	(0.04)
Firm Value *Dummy(Type II Firm)	-0.016	-0.016	-0.013	-0.015	-0.039[c]	-0.040[c]	-0.034[b]	-0.035[b]
	(0.017)	(0.017)	(0.017)	(0.017)	(0.015)	(0.015)	(0.015)	(0.015)
Firm Value *Dummy(Type I Firm)	0.016	0.013	0.019	0.016	0.002	0.001	0.004	0.004
	(0.018)	(0.017)	(0.018)	(0.017)	(0.015)	(0.015)	(0.015)	(0.015)
Firm Value *Dummy(Large Firm)	0.018	0.017	0.013	0.011				
	(0.016)	(0.016)	(0.016)	(0.016)				
Firm Value *Dummy(Type II Firm) *Dummy(Large Firm)	0.004	0.001	-0.002	-0.004				
	(0.022)	(0.022)	(0.022)	(0.021)				
Firm Value *Dummy(Type I Firm) *Dummy(Large Firm)	-0.013	-0.012	-0.019	-0.016				
	(0.02)	(0.02)	(0.02)	(0.02)				
Firm Value *Dummy(Old Firm)					-0.008	-0.006	-0.002	0.001
					(0.012)	(0.012)	(0.012)	(0.012)
Firm Value *Dummy(Type II Firm) *Dummy(Old Firm)					0.053[b]	0.050[b]	0.040[a]	0.037[a]
					(0.021)	(0.021)	(0.021)	(0.021)
Firm Value *Dummy(Type I Firm) *Dummy(Old Firm)					0.011	0.008	0.005	0.002
					(0.02)	(0.02)	(0.02)	(0.02)
Controls:								
CEO Ownership	-0.009[c]	-0.008[b]	-0.008[b]	-0.008[b]	-0.009[b]	-0.009[b]	-0.008[b]	-0.008[b]
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
CEO Age	-0.007[a]	-0.008[a]	-0.007[a]	-0.007[a]	-0.008[a]	-0.008[a]	-0.008[a]	-0.008[a]
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
CEO Tenure	0.016[c]	0.016[c]	0.015[c]	0.015[c]	0.017[c]	0.017[c]	0.016[c]	0.016[c]
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Return on Assets	0.264	0.202	0.287	0.215	0.206	0.142	0.253	0.182
	(0.229)	(0.231)	(0.228)	(0.23)	(0.222)	(0.225)	(0.222)	(0.223)
Firm Size	0.578[c]	0.590[c]	0.592[c]	0.605[c]	0.662[c]	0.665[c]	0.614[c]	0.613[c]
	(0.135)	(0.134)	(0.136)	(0.135)	(0.095)	(0.095)	(0.1)	(0.098)

Panel A: Basic Salary and Bonus								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GIM Index	0.018		0.015		0.019[a]		0.016	
	(0.011)		(0.011)		(0.011)		(0.011)	
Classified Board		0.123[b]		0.135[b]		0.126[b]		0.138[b]
		(0.055)		(0.055)		(0.055)		(0.055)
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.3575	0.3607	0.3966	0.4019	0.3646	0.3678	0.4014	0.4069
Adjusted R^2	0.3415	0.3447	0.3671	0.3726	0.3488	0.352	0.3721	0.3778
Sample Size	494	494	494	494	494	494	494	494

Panel B: Total Compensation								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm Value	0.345[c]	0.344[c]	0.328[c]	0.329[c]	0.332[c]	0.331[c]	0.309[c]	0.308[c]
	(0.049)	(0.049)	(0.051)	(0.051)	(0.048)	(0.048)	(0.05)	(0.05)
Firm Value *Dummy(Type II Firm)	0.011	0.012	0.007	0.007	-0.028	-0.028	-0.026	-0.026
	(0.021)	(0.021)	(0.021)	(0.021)	(0.018)	(0.018)	(0.018)	(0.018)
Firm Value *Dummy(Type I Firm)	-0.009	-0.011	-0.007	-0.009	-0.012	-0.014	-0.008	-0.009
	(0.021)	(0.021)	(0.021)	(0.021)	(0.018)	(0.018)	(0.019)	(0.019)
Firm Value *Dummy(Large Firm)	-0.007	-0.007	-0.015	-0.015				
	(0.02)	(0.02)	(0.02)	(0.02)				
Firm Value *Dummy(Type II Firm) *Dummy(Large Firm)	-0.047[a]	-0.050[a]	-0.048[a]	-0.049[a]				
	(0.027)	(0.027)	(0.027)	(0.027)				
Firm Value *Dummy(Type I Firm) *Dummy(Large Firm)	-0.016	-0.016	-0.022	-0.022				
	(0.024)	(0.024)	(0.024)	(0.024)				
Firm Value *Dummy(Old Firm)					-0.020	-0.018	-0.014	-0.012
					(0.014)	(0.014)	(0.015)	(0.015)
Firm Value *Dummy(Type II Firm) *Dummy(Old Firm)					0.018	0.016	0.007	0.005
					(0.026)	(0.026)	(0.026)	(0.026)
Firm Value *Dummy(Type I Firm) *Dummy(Old Firm)					-0.028	-0.030	-0.038	-0.040
					(0.024)	(0.024)	(0.025)	(0.025)
Controls:								
CEO Ownership	-0.012[c]	-0.012[c]	-0.011[c]	-0.011[c]	-0.010[b]	-0.010[b]	-0.008[b]	-0.008[b]
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
CEO Age	-0.013[c]	-0.013[c]	-0.012[b]	-0.012[b]	-0.011[b]	-0.011[b]	-0.010[b]	-0.010[b]
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
CEO Tenure	0.018[c]	0.018[c]	0.016[c]	0.016[c]	0.020[c]	0.020[c]	0.019[c]	0.018[c]
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Return on Assets	0.140	0.134	0.131	0.110	0.254	0.250	0.252	0.237
	(0.28)	(0.283)	(0.28)	(0.282)	(0.273)	(0.276)	(0.273)	(0.276)
Firm Size	0.639[c]	0.654[c]	0.689[c]	0.697[c]	0.517[c]	0.533[c]	0.508[c]	0.515[c]
	(0.165)	(0.164)	(0.168)	(0.167)	(0.117)	(0.116)	(0.123)	(0.122)
GIM Index	0.016		0.008		0.020		0.011	
	(0.014)		(0.014)		(0.014)		(0.014)	

Panel B: Total Compensation								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Classified Board		0.043		0.051		0.043		0.046
		(0.068)		(0.068)		(0.068)		(0.068)
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.3523	0.3512	0.3854	0.3857	0.3562	0.3541	0.3861	0.3859
Adjusted R^2	0.3362	0.335	0.3553	0.3556	0.3402	0.338	0.3561	0.3559
Sample Size	494	494	494	494	494	494	494	494

Table 8 Robustness: Firm Size and Firm Age (Incremental Value)

This table shows the estimates of the pooled models that estimate how different types of firms affect the determinants of CEO compensation, in terms of the incremental value. Type I firm is active family-controlled firm: i.e. controlled by family stake and run by family CEO; Type II firm is passive family-controlled firm: i.e. controlled by family stake and run by professional (outside) CEO; Type III firm is non-family firm: i.e. no family stake and run by professional (outside) CEO. The dependent variable, CEO compensation, is scaled by the natural log. For the explanatory variables, firm value is measured by natural log of market capitalization. Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, and firm size is measured by log(total assets). Specification (1)-(4) control for (family) firm size and specification (5) and (8) control for (family) firm age (calculated by the difference of the founding year and the sample year), both with a dummy variable that uses median value the threshold. Specification (3), (4), (7), and (8) control for time and industry fixed effects. Industry fixed effects adopt one-digit SIC codes. Panel A displays the estimates for the basic salary and bonus. Panel B shows the estimation results with regard to total compensation that includes value of option grants (TDC1). Standard deviations are reported in the parentheses and the symbols [a], [b], and [c] represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Basic Salary and Bonus								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm Value	0.457	0.450	0.369	0.370	0.865[c]	0.861[c]	0.839[c]	0.838[c]
	(0.492)	(0.489)	(0.493)	(0.49)	(0.252)	(0.251)	(0.256)	(0.256)
Firm Value *Dummy(Type II Firm)	-0.243	-0.234	-0.167	-0.155	-0.776[a]	-0.774[a]	-0.885[a]	-0.886[b]
	(0.709)	(0.709)	(0.711)	(0.711)	(0.451)	(0.451)	(0.45)	(0.45)
Firm Value *Dummy(Type I Firm)	-0.140	-0.152	-0.015	-0.033	-0.755[b]	-0.748[b]	-0.876[c]	-0.873[c]
	(0.717)	(0.717)	(0.73)	(0.729)	(0.316)	(0.316)	(0.319)	(0.319)
Firm Value *Dummy(Large Firm)	0.227	0.235	0.299	0.300				
	(0.527)	(0.525)	(0.527)	(0.525)				
Firm Value *Dummy(Type II Firm) *Dummy(Large Firm)	-0.187	-0.196	-0.383	-0.402				
	(0.786)	(0.785)	(0.785)	(0.785)				
Firm Value *Dummy(Type I Firm) *Dummy(Large Firm)	-0.034	-0.019	-0.248	-0.229				
	(0.762)	(0.763)	(0.774)	(0.774)				
Firm Value *Dummy(Old Firm)					-0.421	-0.418	-0.431	-0.427
					(0.343)	(0.343)	(0.343)	(0.343)
Firm Value *Dummy(Type II Firm) *Dummy(Old Firm)					0.681	0.682	0.723	0.723
					(0.598)	(0.598)	(0.594)	(0.593)
Firm Value *Dummy(Type I Firm) *Dummy(Old Firm)					1.625[c]	1.616[c]	1.741[c]	1.730[c]
					(0.491)	(0.492)	(0.493)	(0.493)
Controls:								
CEO Ownership	-2.068	-1.670	-1.794	-1.445	-4.034	-3.749	-3.508	-3.268
	(5.127)	(5.12)	(5.142)	(5.143)	(5.057)	(5.059)	(5.049)	(5.056)
CEO Age	-8.489	-8.548	-10.845[a]	-10.973[a]	-7.617	-7.614	-9.966	-10.039
	(6.276)	(6.275)	(6.457)	(6.458)	(6.134)	(6.133)	(6.291)	(6.292)
CEO Tenure	7.600	7.428	8.787	8.508	8.805	8.718	9.623	9.446
	(6.084)	(6.092)	(6.114)	(6.13)	(6.002)	(6.013)	(6.002)	(6.019)
Return on Assets	-243.942	-270.596	-268.987	-296.792	-207.587	-221.834	-230.361	-248.537
	(317.946)	(321.927)	(319.945)	(323.36)	(311.51)	(315.784)	(312.679)	(316.264)
Firm Size	418.273[c]	413.539[c]	351.554[c]	348.321[c]	403.753[c]	399.510[c]	324.920[b]	322.603[b]
	(125.929)	(125.07)	(133.583)	(132.428)	(124.326)	(123.62)	(131.655)	(130.681)
GIM Index	-1.199		2.255		-2.986		1.203	
	(17.565)		(17.831)		(17.125)		(17.346)	
Classified Board		43.540		52.433		19.383		33.344
		(87.822)		(88.225)		(86.347)		(86.421)

Panel A: Basic Salary and Bonus								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.1044	0.1049	0.1445	0.1453	0.1341	0.1342	0.1783	0.1786
Adjusted R^2	0.0764	0.077	0.0942	0.095	0.1071	0.1071	0.13	0.1303
Sample Size	397	397	397	397	397	397	397	397

Panel B: Total Compensation								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Firm Value	6.184[c]	6.392[c]	5.918[b]	6.146[b]	2.432[b]	2.508[b]	2.071	2.159[a]
	(2.323)	(2.311)	(2.369)	(2.358)	(1.207)	(1.206)	(1.256)	(1.255)
Firm Value *Dummy(Type II Firm)	-5.132	-5.198	-4.806	-4.891	-1.579	-1.678	-1.358	-1.469
	(3.421)	(3.423)	(3.491)	(3.495)	(2.191)	(2.191)	(2.235)	(2.236)
Firm Value *Dummy(Type I Firm)	-4.845	-5.061	-5.000	-5.224	-4.433[c]	-4.511[c]	-4.169[c]	-4.252[c]
	(3.442)	(3.442)	(3.527)	(3.528)	(1.519)	(1.519)	(1.565)	(1.565)
Firm Value *Dummy(Large Firm)	-4.591[a]	-4.749[a]	-4.597[a]	-4.779[a]				
	(2.486)	(2.48)	(2.531)	(2.524)				
Firm Value *Dummy(Type II Firm) *Dummy(Large Firm)	4.104	4.103	3.789	3.804				
	(3.791)	(3.795)	(3.854)	(3.861)				
Firm Value *Dummy(Type I Firm) *Dummy(Large Firm)	2.104	2.268	2.442	2.615				
	(3.649)	(3.652)	(3.738)	(3.742)				
Firm Value *Dummy(Old Firm)					-0.415	-0.394	-0.189	-0.184
					(1.644)	(1.647)	(1.678)	(1.681)
Firm Value *Dummy(Type II Firm) *Dummy(Old Firm)					0.181	0.241	-0.051	0.024
					(2.933)	(2.936)	(2.974)	(2.978)
Firm Value *Dummy(Type I Firm) *Dummy(Old Firm)					3.878	3.856	3.552	3.535
					(2.355)	(2.363)	(2.412)	(2.419)
Controls:								
CEO Ownership	-10.052	-11.944	-9.329	-11.460	-11.683	-14.146	-10.526	-13.293
	(24.557)	(24.5)	(25.089)	(25.067)	(24.639)	(24.624)	(25.147)	(25.158)
CEO Age	-42.254	-42.613	-48.519	-48.541	-48.450	-48.985	-54.454[a]	-54.574[a]
	(29.835)	(29.865)	(31.267)	(31.312)	(29.665)	(29.702)	(31.077)	(31.134)
CEO Tenure	30.432	29.743	31.447	30.663	32.469	31.928	32.854	32.279
	(28.762)	(28.836)	(29.435)	(29.563)	(28.86)	(28.951)	(29.489)	(29.632)
Return on Assets	-3335.674[b]	-3415.257[b]	-3392.708[b]	-3464.520[b]	-2905.097[a]	-2961.737[a]	-2986.914[a]	-3041.581[a]
	(1522.745)	(1540.456)	(1555.651)	(1572.19)	(1515.574)	(1535.099)	(1549.745)	(1568.022)
Firm Size	1210.389[b]	1262.049[b]	1275.330[b]	1344.129[b]	1098.989[a]	1157.417[a]	1098.986[a]	1178.167[a]
	(594.23)	(590.79)	(643.951)	(639.422)	(596.585)	(594.14)	(648.096)	(644.872)
GIM Index	73.990		82.023		85.978		97.034	
	(85.041)		(87.724)		(84.664)		(87.334)	
Classified Board		176.703		173.082		156.296		163.790
		(417.548)		(427.627)		(417.605)		(427.259)
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	No	No	Yes	Yes	No	No	Yes	Yes
R^2	0.0609	0.0595	0.0706	0.0688	0.0611	0.0589	0.0704	0.0676
Adjusted R^2	0.0311	0.0296	0.0149	0.013	0.0312	0.0289	0.0146	0.0117
Sample Size	390	390	390	390	390	390	390	390

Table 9 Robustness: Firm Type (Elasticity)

This table shows the estimates of the separate models that estimate how different types of firms affect the determinants of CEO compensation, in terms of the absolute level. Type I firm is active family-controlled firm: i.e. controlled by family stake and run by family CEO; Type II firm is passive family-controlled firm: i.e. controlled by family stake and run by professional (outside) CEO; Type III firm is non-family firm: i.e. no family stake and run by professional (outside) CEO. The dependent variable, CEO compensation, is scaled by the natural log. For the explanatory variables, firm value is measured by natural log of market capitalization. Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, and firm size is measured by log(total assets). Specification (1)-(3) use OLS estimation, while (4) and (5) control for time and industry fixed effects. Specification (6) and (7) use fixed effects panel estimation. Panel A displays the estimates for the basic salary and bonus. Panel B shows the estimation results with regard to total compensation that includes value of option grants (TDC1). Standard deviations are reported in the parentheses and the symbols ^{a}, ^{b}, and ^{c} represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Basic Salary and Bonus								
	Firm Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm Value	I	0.296^{c}	-0.263^{c}	-0.247^{c}	-0.274^{c}	-0.267^{c}	0.306^{b}	0.313^{b}
		(0.046)	(0.087)	(0.088)	(0.096)	(0.094)	(0.129)	(0.13)
	II	0.313^{c}	0.157^{a}	0.147^{a}	0.139	0.126	0.342^{c}	0.342^{c}
		(0.046)	(0.084)	(0.084)	(0.094)	(0.092)	(0.104)	(0.103)
	III	0.359^{c}	0.232^{c}	0.224^{c}	0.177^{c}	0.174^{c}	0.517^{c}	0.514^{c}
		(0.033)	(0.047)	(0.048)	(0.049)	(0.05)	(0.11)	(0.109)
CEO Ownership	I		-0.016^{c}	-0.011^{c}	-0.013^{c}	-0.009^{b}	-0.001	-0.004
			(0.004)	(0.004)	(0.004)	(0.004)	(0.016)	(0.016)
	II		0.054	0.061	0.077	0.079	-0.008	-0.008
			(0.051)	(0.051)	(0.056)	(0.056)	(0.086)	(0.085)
	III		-0.052^{a}	-0.054^{b}	-0.073^{c}	-0.075^{c}	-0.080^{a}	-0.078
			(0.026)	(0.027)	(0.026)	(0.027)	(0.047)	(0.047)
Controls:								
CEO Age	I		-0.012^{a}	-0.011^{a}	-0.014^{b}	-0.014^{b}	0.002	0.006
			(0.007)	(0.007)	(0.007)	(0.007)	(0.026)	(0.025)
	II		-0.009	-0.010	-0.007	-0.007	-0.003	-0.003
			(0.009)	(0.009)	(0.01)	(0.01)	(0.012)	(0.012)
	III		0.002	0.001	0.003	0.003	0.006	0.007
			(0.006)	(0.006)	(0.005)	(0.006)	(0.01)	(0.01)
CEO Tenure	I		0.023^{c}	0.016^{c}	0.022^{c}	0.016^{c}	-0.006	-0.006
			(0.005)	(0.005)	(0.005)	(0.005)	(0.01)	(0.01)
	II		0.023	0.022	0.012	0.012	0.086^{c}	0.086^{c}
			(0.017)	(0.017)	(0.022)	(0.022)	(0.028)	(0.028)
	III		0.018^{c}	0.017^{b}	0.017^{c}	0.016^{b}	0.009	0.010
			(0.006)	(0.007)	(0.006)	(0.006)	(0.016)	(0.016)
Return on Assets	I		4.252^{c}	3.954^{c}	3.962^{c}	3.782^{c}	1.513^{a}	1.583^{a}
			(0.7)	(0.708)	(0.863)	(0.841)	(0.823)	(0.824)
	II		-0.680^{a}	-0.629^{a}	-0.783^{b}	-0.785^{b}	0.194	0.197
			(0.361)	(0.375)	(0.369)	(0.376)	(0.689)	(0.68)
	III		0.190	0.176	0.453	0.420	0.328	0.289
			(0.292)	(0.302)	(0.284)	(0.291)	(0.699)	(0.697)
Firm Size	I		1.391^{c}	1.353^{c}	1.217^{c}	1.188^{c}	0.242	0.226
			(0.199)	(0.2)	(0.226)	(0.219)	(0.438)	(0.44)
	II		0.855^{c}	0.869^{c}	1.075^{c}	1.085^{c}	0.027	0.020
			(0.205)	(0.208)	(0.241)	(0.241)	(0.439)	(0.412)
	III		0.394^{c}	0.496^{c}	0.378^{c}	0.460^{c}	-0.138	-0.058
			(0.118)	(0.117)	(0.121)	(0.121)	(0.38)	(0.369)
GIM Index	I		-0.059^{b}		-0.028		0.050	
			(0.024)		(0.027)		(0.046)	
	II		0.027		0.019		-0.003	
			(0.025)		(0.026)		(0.062)	

Panel A: Basic Salary and Bonus								
	Firm Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	III		0.050[c]		0.047[c]		0.047	
			(0.013)		(0.013)		(0.054)	
	I			0.241[b]		0.292[c]		0.180
				(0.1)		(0.098)		(0.183)
Classified Board	II			0.011		0.083		
				(0.149)		(0.15)		
	III			0.082		0.116[a]		
				(0.07)		(0.069)		
Year		No	No	No	Yes	Yes	No	No
Industry		No	No	No	Yes	Yes	No	No
Firm		No	No	No	No	No	Yes	Yes
Adjusted R^2 / F Statistics	I	0.1519	0.4735	0.4733	0.4908	0.5198	6.15	6.09
	II	0.2126	0.332	0.3239	0.3664	0.3645	6.79	8.07
	III	0.2389	0.4109	0.3794	0.4658	0.4432	10.29	11.89
Sample Size	I	225	144	144	144	144	144	144
	II	171	101	101	101	101	101	101
	III	384	249	249	249	249	249	249

Panel B: Total Compensation								
	Firm Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm Value	I	0.414[c]	-0.077	-0.080	-0.062	-0.064	0.421[b]	0.435[b]
		(0.055)	(0.111)	(0.113)	(0.125)	(0.126)	(0.177)	(0.178)
	II	0.360[c]	0.187[b]	0.161[a]	0.127	0.109	0.295	0.296
		(0.053)	(0.086)	(0.084)	(0.091)	(0.086)	(0.198)	(0.196)
	III	0.527[c]	0.492[c]	0.486[c]	0.481[c]	0.479[c]	0.536[c]	0.535[c]
		(0.042)	(0.064)	(0.065)	(0.068)	(0.068)	(0.145)	(0.145)
CEO Ownership	I		-0.020[c]	-0.017[c]	-0.019[c]	-0.016[c]	-0.012	-0.015
			(0.005)	(0.005)	(0.005)	(0.005)	(0.022)	(0.022)
	II		0.045	0.071	0.087	0.112[b]	-0.076	-0.077
			(0.052)	(0.052)	(0.053)	(0.052)	(0.164)	(0.162)
	III		-0.007	-0.006	-0.024	-0.025	-0.041	-0.040
			(0.028)	(0.028)	(0.029)	(0.029)	(0.041)	(0.041)
Controls:								
CEO Age	I		-0.021[b]	-0.022[c]	-0.019[b]	-0.021[b]	-0.047	-0.049
			(0.008)	(0.008)	(0.009)	(0.009)	(0.036)	(0.035)
	II		-0.010	-0.011	-0.011	-0.012	0.022	0.022
			(0.009)	(0.009)	(0.009)	(0.009)	(0.023)	(0.023)
	III		-0.005	-0.006	-0.004	-0.006	0.017	0.017
			(0.007)	(0.008)	(0.007)	(0.008)	(0.013)	(0.013)
CEO Tenure	I		0.030[c]	0.026[c]	0.029[c]	0.026[c]	0.000	0.000
			(0.007)	(0.007)	(0.007)	(0.007)	(0.014)	(0.014)
	II		0.005	0.002	-0.009	-0.014	0.024	0.024
			(0.018)	(0.017)	(0.021)	(0.021)	(0.054)	(0.053)
	III		0.011	0.010	0.006	0.006	-0.008	-0.007
			(0.008)	(0.009)	(0.009)	(0.009)	(0.02)	(0.02)
Return on Assets	I		3.631[c]	3.569[c]	2.670[b]	2.685[b]	0.794	0.846
			(0.889)	(0.913)	(1.115)	(1.131)	(1.133)	(1.128)
	II		-0.147	0.167	-0.246	-0.033	0.436	0.422
			(0.373)	(0.376)	(0.354)	(0.351)	(1.315)	(1.296)
	III		-0.102	-0.116	0.080	0.041	0.341	0.327
			(0.397)	(0.402)	(0.394)	(0.396)	(0.925)	(0.92)
Firm Size	I		1.125[c]	1.117[c]	0.917[c]	0.880[c]	0.697	0.664
			(0.253)	(0.257)	(0.292)	(0.294)	(0.602)	(0.602)

	Panel B: Total Compensation							
	Firm Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	II		0.510[b]	0.600[c]	0.890[c]	0.975[c]	0.424	0.457
			(0.212)	(0.209)	(0.232)	(0.225)	(0.835)	(0.779)
	III		0.335[b]	0.403[b]	0.325[a]	0.360[b]	0.544	0.569
			(0.161)	(0.157)	(0.169)	(0.165)	(0.509)	(0.493)
GIM Index	I		-0.063[b]		-0.060[a]		0.029	
			(0.031)		(0.035)		(0.063)	
	II		0.034		0.013		0.014	
			(0.028)		(0.027)		(0.119)	
	III		0.037[b]		0.032[a]		0.015	
			(0.018)		(0.018)		(0.072)	
Classified Board	I			0.018		0.050		0.212
				(0.129)		(0.132)		(0.251)
	II			-0.345[b]		-0.297[b]		
				(0.151)		(0.141)		
	III			0.087		0.148		
				(0.093)		(0.094)		
Year		No	No	No	Yes	Yes	No	No
Industry		No	No	No	Yes	Yes	No	No
Firm		No	No	No	No	No	Yes	Yes
Adjusted R^2 / F Statistics	I	0.1996	0.4061	0.3881	0.405	0.3924	4.27	4.37
	II	0.2105	0.2143	0.2453	0.3557	0.387	1.28	1.52
	III	0.2876	0.3975	0.3897	0.4311	0.43	9.42	11.05
Sample Size	I	223	144	144	144	144	144	144
	II	168	99	99	99	99	99	99
	III	387	251	251	251	251	251	251

Table 10 Robustness: Firm Type (Incremental value)

This table shows the estimates of the separate models that estimate how different types of firms affect the determinants of CEO compensation, in terms of the incremental value. Type I firm is active family-controlled firm: i.e. controlled by family stake and run by family CEO; Type II firm is passive family-controlled firm: i.e. controlled by family stake and run by professional (outside) CEO; Type III firm is non-family firm: i.e. no family stake and run by professional (outside) CEO. The dependent variable, CEO compensation, uses the first order difference. For the explanatory variables, firm value is measured by the incremental value of market capitalization. Return on assets is a ratio of EBIT (earnings before interest and tax) to total assets, and firm size is measured by log(total assets). Specification (1)-(3) use OLS estimation, while (4) and (5) control for time and industry fixed effects. Specification (6) and (7) use fixed effects panel estimation. Panel A displays the estimates for the basic salary and bonus Panel B shows the estimation results with regard to total compensation that includes value of option grants (TDC1). Standard deviations are reported in the parentheses and the symbols ^{a}, ^{b}, and ^{c} represent statistical significance at the 0.1, 0.05, 0.01 level, respectively.

Panel A: Basic Salary and Bonus								
	Firm Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm Value	I	0.578^{c}	0.387^{a}	0.336	0.234	0.152	0.571	0.571
		(0.153)	(0.229)	(0.232)	(0.262)	(0.263)	(0.353)	(0.349)
	II	0.568^{c}	0.326^{c}	0.313^{b}	0.399^{c}	0.388^{c}	0.340^{a}	0.357^{b}
		(0.103)	(0.121)	(0.122)	(0.139)	(0.142)	(0.172)	(0.17)
	III	0.586^{c}	0.672^{c}	0.697^{c}	0.609^{c}	0.638^{c}	0.671^{b}	0.674^{b}
		(0.131)	(0.208)	(0.208)	(0.229)	(0.228)	(0.315)	(0.314)
CEO Ownership	I		-3.591	0.613	-1.496	2.898	47.815	46.231
			(7.178)	(7.337)	(7.565)	(7.733)	(80.563)	(81.197)
	II		100.762^{c}	97.399^{c}	125.370^{c}	117.405^{c}	-69.338	-71.839
			(34.537)	(34.562)	(37.792)	(38.085)	(92.12)	(91.883)
	III		-60.069	-58.095	-44.642	-41.629	-38.980	-38.903
			(38.462)	(38.688)	(40.528)	(40.497)	(82.002)	(81.68)
Controls:								
CEO Age	I		-12.785	-13.199	-18.674	-20.826	-55.538	-57.784
			(12.172)	(12.415)	(13.155)	(13.224)	(131.139)	(126.754)
	II		-5.266	-5.227	-1.658	-1.774	-2.118	-1.935
			(5.805)	(5.846)	(6.511)	(6.625)	(15.553)	(15.519)
	III		-5.724	-6.825	-5.638	-7.094	14.144	14.183
			(10.26)	(10.422)	(10.612)	(10.765)	(25.979)	(25.877)
CEO Tenure	I		13.760	8.376	14.360	9.486	-18.182	-18.600
			(9.779)	(10.086)	(9.889)	(10.184)	(55.951)	(55.961)
	II		-23.465^{b}	-22.947^{b}	-30.848^{b}	-29.185^{a}	26.076	29.607
			(11.421)	(11.469)	(15.115)	(15.319)	(32.846)	(32.55)
	III		16.129	14.971	13.338	12.363	9.496	9.876
			(12.32)	(12.436)	(12.795)	(12.78)	(40.136)	(39.962)
Return on Assets	I		837.232	597.838	736.348	778.729	2034.685	2083.471
			(1047.359)	(1075.58)	(1284.18)	(1299.631)	(2890.452)	(2905.627)
	II		-407.322^{a}	-385.563^{a}	-446.107^{a}	-447.160^{a}	333.103	549.716
			(216.804)	(224.09)	(223.75)	(230.539)	(718.611)	(677.267)
	III		-366.874	-394.902	-263.360	-312.381	1046.976	1039.801
			(513.192)	(519.209)	(524.834)	(527.473)	(1542.398)	(1536.202)
Firm Size	I		647.678^{b}	674.824^{b}	670.575^{b}	652.001^{b}	671.079	677.176
			(289.061)	(294.65)	(320.71)	(324.371)	(1736.515)	(1735.248)
	II		512.708^{c}	521.631^{c}	674.031^{c}	667.428^{c}	-384.086	-727.208
			(115.776)	(118.209)	(139.361)	(143.481)	(633.992)	(510.845)
	III		156.144	222.450	103.587	144.063	-660.021	-594.846
			(195.384)	(191.514)	(213.336)	(209.228)	(786.788)	(759.958)
GIM Index	I		-92.464^{b}		-85.958		18.304	
			(45.582)		(53.359)		(301.748)	
	II		-19.409		-24.749		-85.968	
			(16.04)		(16.344)		(93.7)	

Panel A: Basic Salary and Bonus								
	Firm Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	III		41.872		35.645		81.917	
			(25.854)		(27.024)		(241.566)	
Classified Board	I			86.024		123.578		152.241
				(191.887)		(198.947)		(936.518)
	II			-80.131		-69.845		
				(97.407)		(103.243)		
	III			77.698		128.105		
				(130.055)		(135.754)		
Year		No	No	No	Yes	Yes	No	No
Industry		No	No	No	Yes	Yes	No	No
Firm		No	No	No	No	No	Yes	Yes
Adjusted R^2 / F Statistics	I	0.073	0.1063	0.0727	0.103	0.0825	0.74	0.74
	II	0.1813	0.2925	0.2854	0.297	0.2784	1.42	1.52
	III	0.0572	0.0757	0.0651	0.0886	0.0845	1	1.15
Sample Size	I	169	112	112	112	112	112	112
	II	133	85	85	85	85	85	85
	III	313	205	205	205	205	205	205

Panel B: Total Compensation								
	Firm Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm Value	I	-0.492	0.821	0.758	0.999	0.803	2.934	2.936[a]
		(0.824)	(1.28)	(1.272)	(1.46)	(1.456)	(1.757)	(1.737)
	II	0.252	0.910	0.964[a]	1.391[b]	1.428[b]	0.081	0.379
		(0.479)	(0.566)	(0.571)	(0.667)	(0.675)	(1.127)	(1.1)
	III	1.679[c]	1.997[b]	2.086[b]	1.524	1.642[a]	1.785	1.819
		(0.565)	(0.852)	(0.854)	(0.951)	(0.948)	(1.266)	(1.267)
CEO Ownership	I		-10.554	-10.044	-26.211	-22.107	-626.072	-637.317
			(40.553)	(40.528)	(42.808)	(43.346)	(403.617)	(406.463)
	II		170.619	177.385	180.565	186.606	-1255.561[b]	-1306.242[b]
			(158.562)	(159.28)	(174.185)	(175.198)	(545.603)	(546.131)
	III		-152.988	-146.764	-131.044	-119.081	5.168	6.204
			(158.573)	(159.207)	(168)	(167.812)	(329.65)	(330.048)
Controls:								
CEO Age	I		-68.772	-72.476	-37.312	-51.198	-267.893	-281.324
			(67.886)	(67.998)	(73.515)	(73.541)	(712.617)	(686.268)
	II		-21.541	-21.387	-46.640	-45.845	-73.954	-69.787
			(27.6)	(27.767)	(30.93)	(31.158)	(94.014)	(94.35)
	III		-58.801	-64.054	-61.919	-67.911	-52.034	-51.513
			(42.122)	(42.735)	(44.007)	(44.694)	(104.436)	(104.561)
CEO Tenure	I		67.390	68.766	74.384	72.759	175.264	172.337
			(54.675)	(55.561)	(55.45)	(56.942)	(282.636)	(282.782)
	II		-39.499	-39.818	0.613	2.395	465.582[b]	497.651[b]
			(53.088)	(53.296)	(70.272)	(70.871)	(191.704)	(190.432)
	III		5.613	2.982	-1.353	-5.157	42.539	47.630
			(50.539)	(50.919)	(52.96)	(52.886)	(161.345)	(161.477)
Return on Assets	I		-20160.10[c]	-19882.41[c]	-18742.32[b]	-18038.35[b]	12064.760	12363.590
			(6232.637)	(6268.233)	(7314.996)	(7352.484)	(15251)	(15295.15)
	II		-732.436	-799.012	-764.070	-835.831	2903.523	3080.445
			(1004.844)	(1032.356)	(1037.102)	(1055.937)	(5668.093)	(5690.541)
	III		-1739.350	-1890.379	-1473.233	-1673.617	1281.539	1185.525
			(2105.755)	(2127.004)	(2173.938)	(2185.621)	(6200.441)	(6207.367)
Firm Size	I		1363.569	1356.451	1957.889	1729.299	-458.850	-414.174
			(1610.977)	(1612.074)	(1805.193)	(1814.2)	(10330.94)	(10327.87)

Panel B: Total Compensation								
	Firm Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	II		1016.684[a]	993.303[a]	932.296	907.723	-868.249	-3762.712
			(532.627)	(542.474)	(642.103)	(654.183)	(4099.015)	(3222.158)
	III		1214.941	1434.856[a]	1118.862	1277.954	-63.890	808.163
			(801.603)	(784.09)	(883.69)	(866.422)	(3162.889)	(3070.781)
GIM Index	I		-144.547		-390.845		152.752	
			(257.425)		(297.58)		(1537.177)	
	II		64.527		70.811		-685.253	
			(81.441)		(83.401)		(604.012)	
	III		152.817		143.353		1096.044	
			(106.596)		(112.407)		(971.095)	
Classified Board	I			-543.322		-898.603		1098.543
				(1054.463)		(1109.716)		(4648.804)
	II			224.041		285.654		
				(456.36)		(476.199)		
	III			402.882		527.334		
				(535.495)		(566.703)		
Year		No	No	No	Yes	Yes	No	No
Industry		No	No	No	Yes	Yes	No	No
Firm		No	No	No	No	No	Yes	Yes
Adjusted R^2 / F Statistics	I	-0.0039	0.0513	0.0509	0.0438	0.033	1.18	1.18
	II	-0.0057	0.0463	0.0412	0.0537	0.0485	1.81	1.89
	III	0.0245	0.0441	0.0369	0.0406	0.0368	0.69	0.6
Sample Size	I	166	110	110	110	110	110	110
	II	129	81	81	81	81	81	81
	III	312	204	204	204	204	204	204

Chapter 5

Conclusion

In this dissertation, three chapters examine corporate behavior that is affected by decisions made by the top management, i.e. the decisions to syndicate leveraged buyout deals (Chapter 2), to backdate or otherwise manipulate CEO stock option grant dates (Chapter 3), and the design of CEO compensation with regard to family ownership (Chapter 4).

Chapter 2 studies the considerations behind when senior managers in the private equity industry choose to syndicate the deals or not; and if yes, whom do they select to syndicate the deals with? By using a unique hand-collected dataset of 947 LBO investments, I find that investment size, geographic distance, and investor experience increase syndication likelihood. Besides, management teams with engineers and MBA graduates are prone to syndication. More specifically, Harvard MBAs tend to work with each other while Columbia MBAs are more likely to syndicate with each other as well as with engineers.

There exists a non-linear relationship between syndication and performance, probably due to different inherent nature of deals. MBA graduates seem to affect performance in non-syndicated deals, but not in syndicated ones. It thus suggests that MBAs are good at pre-deal screening, and might further explain why they would seek outside expertise when needed. Finally, the strongest syndication match that enhances value is the "Harvard MBA-and-Harvard MBA" pair. Hence, Harvard MBAs may syndicate with each other because a personal acquaintance enables a better match of skills. For other teams, syndication is likely for the purpose of diversification or future deal reciprocity.

Chapter 3 explores whether firms under option backdating probes have weak corporate governance. More specifically, different from the option repricing mechanism and the managerial power view, my alternative hypothesis is that option backdating or otherwise grant date manipulation is simply one way to reward and/or retain outperforming managers. To pin down the causality, I study the universe of the U.S. top executive stock option grants, and the sample comprises 6,836 stock option grants of the top executives in the S&P 1500 companies between 1999 and 2007. Following Heron and Lie (2009), I estimate the likelihood of option manipulation based on the assumption that, in the absence of manipulation, the abnormal stock returns during the month preceding and following the grant dates should be centered around zero.

Basically, the findings show that, inconsistent with the managerial power view, the option manipulation likelihood is not associated with weak corporate governance. If anything, this likelihood increases with superior governance proxies. It thus suggests that option manipulation behavior is not a result of lax board monitoring or managerial entrenchment. Moreover, the estimates in the post-SOX (Sarbanes-Oxley Act) period resemble the option repricing mechanism, while this act is independent of performance in the pre-SOX period. Regardless, I do not find evidence supporting one main premise of my alternative hypothesis, i.e. outperformance. Other than that, the evidence implies that the passage of the 2002 SOX alters the considerations behind this manipulating practice.

Chapter 4 investigates whether the existence of family influences helps alleviate the traditional principal-agent problem in small corporations. I construct a sample of 168 small publicly-traded U.S. firms between 2001 and 2005. The evidence shows lower agency costs in family firms, despite great variations within the group. Moreover, the pay-performance (elasticity) estimates are highest in non-family firms, followed by passive family firms, and lowest in active family firms. This pattern is more pronounced in total compensation than in basic salary and bonus component. This is consistent with family control acting as a substitute for pay performance as a corporate governance mechanism.

This dissertation presents three essays that add to the research on the influences that the top management exerts on corporate behavior. Taken together, it demonstrates discrepancies among the decisions made by managers with different educational backgrounds as well as a network effect when it comes to cooperation. Additionally, CEO stock option backdating or otherwise manipulation is not a result of inferior corporate governance, and the passage of the 2002 SOX seems to change the considerations behind. Last but not the least, small family firms have lower agency costs, and family ownership and CEO performance pay render substitution roles in corporate governance.

Chapter 6

Samenvatting (Summary in Dutch)

Dit proefschrift bestaat uit drie artikelen die bedrijfsgedrag onderzoeken dat door besluiten beïnvloed wordt van het top management. Ik bestudeer specifiek de overwegingen die betrokken zijn bij de besluiten om een syndicaat te organiseren voor invloedrijke onderhandelingen (Hoofdstuk 2), om opties te backdaten of anderzijds CEO aandeelkeuze subsidies te manipuleren (Hoofdstuk 3), samen met het ontwerp van CEO compensatie met betrekking tot het familie eigendom (Hoofdstuk 4). Bovendien relateer ik die besluiten aan de bedrijfsprestatie, die in ruil daarvoor zouden kunnen helpen om redenering achter het besluitvormingsproces te kunnen verifiëren. Daarom draagt dit proefschrift bij aan de kennis over niet alleen de rol gespeeld door het top management, maar ook de mechanismen die bij het proces betrokken zijn.

Hoofdstuk 2 bestudeert de overwegingen achter het besluit van senior managers in de private equity industrie om wel of niet een syndicaat op te zetten; en zo ja, wie selecteren zij om samen een syndicaat mee op te zetten? Door gebruik van een unieke handverzameling dataset van 947 LBO investeringen, vind ik dat de mate van investering, geografische afstand, en de ervaring van de investeerder de kans op syndicaat vorming verhogen. Opmerkelijk is dat management teams met ingenieurs en MBA gediplomeerden vaker een syndicaat vormen. Specifieker, Harvard MBA's hebben de neiging om onderling samen te werken terwijl Colombia MBA's meer geneigd zijn een syndicaat te organiseren met elkaar evenals met ingenieurs.

Er bestaat een niet-lineair verband tussen syndicatie en prestaties, waarschijnlijk wegens de verschillende essentiële aard van de onderhandelingen. MBA gediplomeerden blijken prestaties in niet-syndicaten onderhandelingen te beïnvloeden, maar niet in syndicaten onderhandelingen. Dit suggereert dat MBA's goed zijn in de voorselectie van onderhandelingen en zou verder kunnen verklaren waarom zij expertise zoeken wanneer nodig is. De sterkste syndicatievergelijking dat waarde verbetert is het "Harvard MBA-en-Harvard MBA" paar. Echter, het zou kunnen dat Harvard MBA's met elkaar syndicaten vormen omdat een persoonlijke kennis een betere gelijke van vaardigheden toelaat. Voor andere teams, is syndicatie waarschijnlijk voor diversificatie of toekomstige overeenkomstenwederkerigheid.

Hoofdstuk 3 onderzoekt of firma's die onderzocht worden op het backdaten van opties zwakke corporate governance hebben. Specifieker, verschillend van het optie repricing mechanisme en de bestuursmacht visie is mijn alternatieve hypothese dat option backdating of anders de manipulatie van de toelagedatum eenvoudig een methode is om goede managers te belonen en binnen het bedrijf te houden. De steekproef omvat 6836 optie toelagen van de hoogste stafmedewerkers in S&P 1500 bedrijven tussen 1999 en 2007. Volgend op Heron en Lie (2009) schat ik de waarschijnlijkheid van optie manipulatie gebaseerd op de aanname dat zonder manipulatie de abnormale aandelen rendementen gedurende de maand voor en na de toezegging data zich rond nul zouden moeten centreren.

Inconsequent met de bestuursmachtmening, vind ik dat de waarschijnlijkheid van de optiemanipulatie niet gerelateerd is met zwak collectief bestuur. Dit suggereert dat het gedrag van de optiemanipulatie geen resultaat van losse raad controle of bestuursverschansing is. Voorts lijkt de ramingen tijdens de post-SOX periode op het optie repricing mechanisme, terwijl deze handeling van prestaties tijdens de periode pre-SOX onafhankelijk is. Hoe dan ook, vind ik geen bewijsmateriaal die één belangrijke premisse van mijn alternatieve hypothese steunt, outperformance. Buiten dat, impliceert het bewijsmateriaal dat de passage van 2002 SOX de overwegingen achter deze manipulerende praktijk verandert.

Hoofdstuk 4 onderzoekt of het bestaan van de hulp van familie invloeden het traditionele principal-agent probleem in kleine bedrijven vermindert. Ik construeer een steekproef van 168 kleine openbaarhandel gedreven firma's van de U.S. tussen 2001 en 2005. Het bewijsmateriaal toont lagere agentschapkosten in familiefirma's, ondanks grote variaties binnenin de groep. Voorts zijn de loonprestatie (elasticiteit) schattingen het hoogst in niet-familie firma's, gevolgd door passieve familiefirma's en het laagst in actieve familiefirma's. Dit patroon wordt meer uitgesproken in totale compensatie dan in basissalaris en bonuscomponent. Dit is verenigbaar met familiecontrole handelend als vervanging van loonsprestaties als collectief bestuurmechanisme.

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