Board Oversight and Director Reputation: Evidence from Firms Interlocked with Backdating Investigation Targets*

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Abstract

We show that the initial announcement of a company coming under backdating investigation generates significantly negative abnormal returns to firms director-interlocked with the investigation target. The announcement returns are more negative when interlocking directors sit on the investigation target's compensation committee and less negative when interlocked companies have stronger corporate governance and better management in place. These results suggest that investors hold directors at least partially responsible for backdating, and its revelation prompts the market to discredit involved directors and downgrade the governance quality of other companies they serve. We also find that the negative reaction is not limited to interlocked companies that may have backdated options themselves, which implies that the poor judgment and lax monitoring of interlocking directors may contribute to other agency problems. Consistent with this, we find evidence of excessive CEO compensation and more aggressive earnings management at the interlocked companies.

I. Introduction

Option backdating is one of the most widespread scandals that hit corporate America in recent times.[1] According to the estimates by Heron and Lie (2008), during the period of 1996 to 2005, about 29% of option-granting firms may have backdated option grants to top executives and 19% of unscheduled at-the-money option grants to top executives may have been backdated. While managers personally benefit from backdating, shareholders suffer substantial losses when companies come under investigation for their option granting practices (Narayanan, Schipani, and Seyhun (2007), Bernile and Jarrell (2008), and Carow, Heron, Lie, and Neal (2008)). As former SEC chairman, Arthur Levitt, put it, option backdating is "ripping off shareholders in an unconscionable way". The egregious and pervasive nature of the practice raises two important questions. First, is poor corporate governance to blame, and if so, which part(s) of the corporate governance system failed shareholders? Second, do the governance mechanisms identified as culpable for backdating contribute to broader problems in corporate policy and decision making?

To address the first question, we focus on corporate boards, since one of their main responsibilities is to design and approve executive compensation. We examine whether directors should bear at least part of the blame for allowing backdating to take place on their watch. The extant literature does not provide definitive evidence on this issue. Some researchers find that the occurrence of backdating is associated with less effective boards (Bebchuk, Grinstein, and Peyer (2008) and Collins, Gong, and Li (2008)), but there is also evidence to the contrary (Gao and Mahmudi (2008)). More importantly, due to the well recognized endogeneity of board characteristics, it is difficult to draw any causality inferences based on conventional cross-sectional time-series regressions linking board structure to backdating. As Hermalin and Weisbach (1998, 2003) point out, a firm's board structure represents a bargaining outcome, and it

[1] Abnormal stock return patterns around executive option grant dates have long been documented by Yermack (1997), Aboody and Kasznik (2000) and Chauvin and Shenoy (2001). More recently, Lie (2005), Heron and Lie (2007), Narayanan and Seyhun (2005, 2008), and Collins, Gong, and Li (2005) find that the patterns are largely attributable to backdating.

is shaped by the relative positions of the CEO and the rest of the board. Boards tend to become less independent when CEOs gain stronger bargaining power. To the extent that powerful CEOs may seize the control of the pay setting process and in particular the option granting procedure, it is not clear whether boards should be blamed for option grant date irregularities.[2]

To circumvent this identification problem, we adopt an alternative approach by examining firms that share directors with companies under backdating investigation but themselves are not investigation targets. Specifically, we investigate whether a company's backdating investigation announcement generates any abnormal stock returns to its interlocked companies,[3] to which the announcement represents an exogenous event. If investors believe that backdating is an agency problem between managers and shareholders and the impaired judgment and lack of oversight on the part of directors are among the contributing factors, they will downgrade the monitoring abilities of directors at the backdating investigation target and critically reevaluate the quality of board oversight at other companies where these directors hold board seats. As a result, we expect the interlocked companies of the investigation target to experience negative stock price reactions. The alternative hypothesis is that boards should not be held responsible since they may not be aware of the practice given the control by managers over the information flow to the boards. This argument implies that we should observe little or no stock price reaction for interlocked companies as no governance reevaluation occurs. [4]

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[2] In their review of more recent board literature, Adams, Hermalin, and Weisbach (2008) reemphasize the empirical challenge presented by endogeneity in making causation statements.

[3] We define a company as "interlocked" with a backdating investigation target if it shares a director with the investigation target. This is different from other studies such as Hallock (1997), which define an interlocking relationship as one in which an executive of company A serves on the board of company B and an executive of company B serves on the board of company A.

[4] Another alternative hypothesis that does not predict negative abnormal stock returns to interlocked companies is that option backdating is part of a tax-efficient optimal design of executive compensation. Specifically, backdating enables companies to issue in-the-money options while avoiding the unfavorable tax and accounting treatments that would otherwise occur (see the *Wall Street Journal* editorial titled "Backdating to the future"). By eliminating the uncertainty over the exercise price of option grants, backdating can allow boards to focus on the size of the grants in their negotiation with executives receiving the grants (Jenkins (2006)). It is also suggested that backdating can save companies compensation expenses and enhance managerial equity incentives (Gao and Mahmudi (2008)). The problem with these arguments is that if they were true, we should not have seen the firings of and the legal actions taken against many

We start from the *Wall Street Journal*'s (WSJ) Options Scorecard, which, as of March 23, 2007, listed 138 companies that disclosed SEC or DOJ investigations into their option granting practices. We identify a sample of interlocked companies from the proxy statements filed by investigation targets immediately prior to their initial backdating-related announcements, and find that interlocked companies experience significantly negative abnormal stock returns around these announcements. This evidence suggests that investors hold directors at least partly responsible for the backdating scandal and discount their credentials as able monitors. Cross-sectional analyses of the abnormal returns yield interesting variations along several dimensions. For example, we find that the announcement returns of interlocked firms are lower as the investigation targets themselves experience more negative stock price reactions. This is consistent with the explanation that the more serious the market perceives the problem at the investigation targets, the more damage their directors' reputation as able monitors will suffer, and the greater the downward adjustment that the market will make toward the quality of board oversight at interlocked companies. We also find that interlocked companies' abnormal stock returns are more negative if interlocking directors sit on the compensation committees of investigation targets. This suggests that the market believes these directors' judgment and monitoring ability to be especially questionable given their deeper involvement with the executive pay setting process. There is also evidence that interlocked companies experience less negative abnormal returns when they have stronger corporate governance and higher-quality management in place, indicating that these factors can mitigate the negative effect of the monitoring deficiency of interlocking directors.

In the second part of the paper, we aim to gain a better understanding of the nature of investors' concerns about interlocking directors. In particular, we explore whether the abnormal returns experienced by interlocked firms are primarily driven by the market's anxiety that these

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executives for backdating. See the Perfect Payday webpage maintained by the *Wall Street Journal* for a list of these cases.

companies have also backdated options, albeit without being detected yet. This is a valid concern especially given the finding by Bizjak, Lemmon, and Whitby (2008) that director interlocks contribute to the spread of the backdating practice. Alternatively, it is also possible that being associated with a backdating firm sends a negative signal about director quality. As a result, the market may be worried that interlocking directors do not represent shareholders' interest and would sign off on other manager friendly practices as well; thereby adversely impacting non-backdating related corporate issues at interlocked companies.

To disentangle these possibilities, we separate interlocked companies into those that appear to have backdated and those that do not based on an identification algorithm similar to those used by Lie (2005) and Heron and Lie (2007, 2008). This is possible because of a unique feature of the backdating practice compared to accounting and financial fraud; that is, backdating leaves distinct footprints in the history of grant timing in relation to stock returns, allowing a more accurate identification of perpetrators and non-perpetrators. We find significant and negative abnormal returns for both subsamples, i.e., even interlocked companies without any indication of backdating see their stock price decline around the announcements by investigation targets. This suggests that investors are worried that the ineptitude of interlocking directors as monitors may contribute to the mishandling of corporate policies other than option granting. To see whether there is any ground for such concerns, we examine the CEO compensation and the disclosure quality of interlocked companies, as both outcomes have been linked to board oversight in previous studies (see, e.g., Core, Holthausen, and Larcker (1999) and Klein (2002)). We find that in the fiscal year prior to backdating-related announcements, interlocked companies pay their CEOs significantly higher compensation and manage accounting earnings more aggressively than non-interlocked control companies matched on industry and firm characteristics, suggesting that interlocking directors from backdating investigation targets indeed contribute to more agency problems at interlocked companies.

We make three contributions to the literature with respect to option backdating and the overall corporate governance discourse. First, our unique experimental design of focusing on firms sharing directors with backdating investigation targets rather than the targets themselves allows us to avoid endogeneity concerns and provide a more definitive answer to whether board ineffectiveness contributes to the backdating scandal. Our finding of negative announcement-period abnormal stock returns to interlocked firms represents market based evidence that option backdating is an example of corporate governance failure and investors attribute it at least partially to the poor judgment and lax monitoring of directors. Our differentiation of directors based on their roles on the boards represents a departure from the traditional monolithic view of boards and helps highlight that directors sitting on the compensation committees of investigation targets are more to blame for their companies' manipulation of option grant dates.

Our paper also contributes to the literature on the valuation effect of corporate boards. Studies in this literature are hampered by the same endogeneity challenge as noted by Hermalin and Weisbach (1998, 2003), and perhaps as a result, the evidence is inconclusive (Bhagat and Black (1999) and Hermalin and Weisbach (2003)). In addition, given the dual role of monitoring and advising that boards play (Adams and Ferreira (2006)), it is difficult to interpret the valuation effect, if any, associated with boards. Our experimental design creates an exogenous shock to the perceived monitoring ability of directors, which permits us to provide director level evidence that the quality of board oversight does matter to firm value.

Second, by keying in on target directors with multiple board memberships, we show that their deficiencies in protecting shareholder interests do not just manifest in investigation targets, but appear to permeate other companies where they also hold board seats and lead to agency problems in the form of excessive CEO pay and more aggressive earnings management. Bebchuk, Grinstein, and Peyer (2008) and Collins, Gong, and Li (2008) report higher CEO pay at companies that appear to have backdated options, while our findings hold even for interlocked companies that have not displayed any signs of backdating. This suggests that these additional

agency problems are more than byproducts of option backdating, and that ineffective board oversight contributes to a wider range of issues than backdating alone.

Third, our study extends in important ways the existing literature on director reputation consequences of adverse corporate events such as financial distress (Gilson (1990)), earnings restatements (Srinivasan (2005)), and financial fraud lawsuit filings (Fich and Shivdasani (2007)). Similar to us, Fich and Shivdasani (2007) and Srinivasan (2005) find that companies interlocked through directors with sued firms and restating firms experience significantly negative abnormal stock returns upon the lawsuit or restatement announcements. Such evidence is consistent with directors suffering reputational damages, but it is also subject to alternative explanations. For example, the stock prices of interlocked companies could fall because directors of sued or restating firms are distracted by the lawsuits or restatements and hence, are unable to devote the necessary time and attention to other companies they serve.[5] However, our results suggest that the distraction based hypothesis is unlikely to be entirely responsible for the negative abnormal returns we document, since we find that interlocking directors contribute to excessive CEO pay and more aggressive earnings management even *prior to* the backdating investigation announcements.

In addition, our evidence also indicates that the reputational penalty suffered by directors is not limited to investors questioning directors' ability to handle tasks that they have failed at. Rather, it reflects the market's broader distrust of director competence in fulfilling other responsibilities and serving shareholders in general.

The remainder of the paper is organized as follows. Section II describes data sources and our sample. Section III presents our empirical analysis. Section IV concludes.

[5] Gilson (1990), Srinivasan (2005) and Fich and Shivdasani (2007) also find that directors of firms that fell into financial distress, restated earnings, or were sued for financial fraud tend to lose their directorships at other firms. This is consistent with these directors being punished by the market for directorships, but given the difficulty in differentiating between forced and voluntary director turnovers (Srinivasan (2005)), it is possible that the observed decrease in other directorships is the result of directors voluntarily cutting back their involvement with other companies either to focus on the troubled companies or to reduce their exposure to future legal liabilities if these other companies are also prone to running into trouble.

II. Sample Construction

We begin with a sample of companies that have allegedly backdated options according to the Options Scorecard kept by the *Wall Street Journal* on its Perfect Payday webpage.[6] A snapshot taken on March 23, 2007 yields 138 companies that disclosed SEC or DOJ investigations into their option granting practices. For each company, we search Lexis-Nexis for the first news report suggesting that it may have backdated options. Consistent with Bernile and Jarrell (2008), most of the initial disclosures are announcements of informal or formal SEC probes, DOJ investigations, and internal reviews launched by the companies themselves. Bernile and Jarrell also find that the initial announcements elicit most of the stock price reactions to all backdating-related news. All but two of our initial announcement dates are between January 1, 2006 and December 31, 2006.

For each investigation target, we try to locate its electronic proxy filing immediately prior to its first backdating-related announcement date. We use the information about each director's other board seats contained in the proxy statement to identify companies that have director interlocks with the investigation target. We match the names of interlocked firms with the CRSP header file to find their PERMNOs, using which we match interlocked companies with the CRSP and COMPUSTAT databases. We require that each interlocked company have financial statement information available for the fiscal year immediately prior to the first announcement date of the investigation target it is connected with and have stock return data available around that date. From the Corporate Library's Board Analyst database, we obtain the information on the positions of interlocking directors at interlocked companies and the governance structure of interlocked companies such as board characteristics and insider ownership.[7] For interlocked firms not

[6] See http://online.wsj.com/page/perfectpayday.html.
[7] We did not use the IRRC's Director Database because interlocked companies tend to be smaller than the typical company under IRRC coverage. Board Analyst, on the other hand, covers around 3,000 companies, large and small.

covered by Board Analyst, we hand-collect this information from their electronic proxy filings prior to the first announcement dates. Our final sample consists of 508 companies interlocked with 96 backdating investigation targets.[8] Table 1 presents industry distributions of backdating investigation targets and their interlocked companies based on 2-digit SIC codes. For both groups of companies, the three most represented industries are Business Services (2-digit SIC: 73), Electronic and Electric Equipment (2-digit SIC: 36), and Industrial Machinery and Equipment (2-digit SIC: 35). This overlap is expected, since firms operating in similar lines of business have similar demand for directorial talent and there is a limited pool of qualified candidates for directorships. We also notice that the distribution is more dispersed for interlocked companies. The three industries together account for close to 60% of investigation targets, but only 36% of interlocked companies. The total number of industries represented is much higher among interlocked companies (N=56) than investigation targets (N=20).

III. Empirical Results

A. Announcement returns of investigation targets and their interlocked companies

We first estimate the cumulative abnormal returns (CARs) for investigation targets over event windows (-2, 2), (-5, 5), and (-10, 10) with event day 0 being the initial announcement date. We use the CRSP value-weighted return as the market return and estimate the market model parameters over a 200-day period from event day -230 to event day -31. Panel A of Table 2 shows that investigation targets experience significantly negative CARs over all three event windows. Based on the magnitude of the CARs, event window (-10, 10) appears to be able to capture more of the announcement effects than the two shorter ones. The average CAR over this 21-day period is -4.72%, with a median of -3.94%, comparable to the initial announcement-period abnormal returns estimated by Bernile and Jarrell (2008). Given an average market

[8] We drop 12 interlocked companies that became backdating investigation targets themselves prior to the initial announcements by their interlocked investigation targets.

capitalization of about $8 billion for our investigation targets (measured on the 31th trading day prior to the initial announcement date), the average CAR translates into a loss of about $380 million in shareholder value.

We follow the same market model procedure described above to estimate the CARs of interlocked companies, and present the results in Panel B of Table 2. We find that interlocked companies experience significantly negative abnormal stock returns. The average CAR is -1.82% over event window (-10, 10), significantly different from zero at the 1% level. Given an average market capitalization of $8.9 billion for interlocked firms, this stock price decline represents a loss in shareholder value of about $160 million. These findings are consistent with the hypothesis that lax monitoring by directors is one of the contributing factors of option backdating.

For robustness, we also compute CARs by subtracting either the market returns or industry returns from the raw returns of backdating investigation targets and their interlocked companies, where we use the CRSP value-weighted returns as the market returns and the value-weighted returns of all firms with the same 2-digit SIC codes as the industry returns. Our results (untabulated) are very similar to those presented in Table 2.

Given the significant industry overlap between investigation targets and their interlocked companies as shown in Table 1, we examine whether the negative CARs of interlocked companies are primarily driven by an industry spillover effect where a company's backdating announcement causes the stock prices of its industry peers to drop. There is evidence of such effect from shareholder class action lawsuit filings (Gande and Lewis (2007)) and accounting fraud revelations (Goldman, Peyer, and Stefanescu (2008)). We divide interlocked companies into two subsamples based on whether they come from the same industry (based on 2-digit SIC codes) as their corresponding investigation targets. We find that the mean and median CARs are significant and negative for both subsamples. The magnitude of mean and median CARs of the same-industry subsample is larger than that of the different-industry subsample, but the difference is not statistically significant.

B. Cross-sectional analyses of interlocked companies' CARs

As the market reassesses the effectiveness of directors as monitors and shareholder guardians in the wake of backdating disclosures, some directors could be held more responsible than others because of the roles they play at the investigation targets. For example, compensation committee members may suffer more reputation damage due to their close involvement in the executive pay setting process. The scandal will directly call into question their ability to safeguard shareholder interests. As a result, we expect interlocked companies with these directors on board to experience greater stock price declines. In addition, the abnormal returns of interlocked companies could also be related to how much influence interlocking directors wield at interlocked companies. More prominent roles of interlocking directors at interlocked companies would lead to greater concerns about whether shareholders' best interests are being served at these companies. On the other hand, the negative effect of interlocking directors on the overall governance quality of interlocked companies could be mitigated by better shareholder-manager incentive alignment achieved through other control devices. As a result, we expect interlocked companies with stronger corporate governance in place to experience less negative abnormal returns.

We examine these possibilities by estimating OLS regressions where the dependent variable is interlocked companies' CARs over event window (-10, 10) and the independent variables are financial, governance, and director characteristics of investigation targets and interlocked companies. More specifically, we include investigation targets' CARs over event window (-10, 10) and the logarithmic transformation of their market capitalization (measured on the 31th trading day prior to the announcement date) as a proxy for firm size. We expect interlocked firms' CARs to be positively correlated with the CARs of the corresponding investigation targets, because the board oversight at interlocked companies will be discounted more when the market perceives the agency problems at investigation targets to be more serious.

Since directors of larger firms are more visible and may be considered as more able monitors, we expect them to incur a larger reputational penalty when the managers they oversee are caught backdating options. This translates into a negative coefficient for the firm size proxy.

We try to capture interlocking directors' roles at investigation targets with three dummy variables indicating whether a director is the CEO, the chairman of the board, or a compensation committee member. We expect the three dummy variables to have negative effects on interlocked companies' abnormal returns. We construct another three dummy variables to indicate whether an interlocking director is the CEO, the chairman of the board, or a compensation committee member at the interlocked company. We use these variables to measure interlocking directors' influence at interlocked companies and expect them to negatively affect interlocked companies' CARs as well.

We consider a number of governance characteristics of interlocked companies. Financial leverage provides incentives for managers to act in the best interests of shareholders and improve firm performance, since they would otherwise risk ceding control to creditors and losing their job in the event of a financial distress (Gilson (1989, 1990) and Gilson and Vetsuypens (1994)). Corporate boards tend to be more effective at monitoring managers when they have a greater percentage of independent directors (Weisbach (1988), Byrd and Hickman (1992), and Brickley, Coles, and Terry (1994)) and less effective when they are larger (Yermack (1996)) and when the CEO is also the Chairman of the board (Core, Holthausen, and Larcker (1999), Goyal and Park (2002), and Masulis, Wang, and Xie (2007)). The incentives of managers and shareholders are better aligned when managers hold a greater percentage ownership in their firms (Jensen and Meckling (1976)). To the extent that a stronger corporate governance system in place can better withstand the negative shock caused by the impaired judgment and questionable oversight of interlocking directors, we expect the CARs of interlocked companies to increase with leverage, board independence and insider ownership, and to decrease with CEO/Chairman duality and board size.

To capture the industry spillover effect mentioned earlier, we construct a dummy variable indicating whether an interlocked firm and its corresponding investigation target operate in the same industry based on two-digit SIC codes. We also control for whether interlocked companies share the same auditor, outside counsel, or compensation consultant with investigation targets, since they may experience more negative stock price reactions if investors believe that these players also contribute to the backdating scandal. We create a same-auditor dummy based on Compustat item 149. There is no readily available information on a company's outside counsel and compensation consultant. Bizjak, Lemmon, and Whitby (2008) argue that outside counsels or compensation consultants tend to cluster by geographic location, industry, and firm size in terms of their clientele. We follow Bizjak, Lemmon, and Whitby to create a same-state dummy based on whether interlocked firms and backdating investigation targets are headquartered in the same state. Finally, we control for interlocked companies' financial characteristics such as size, returns on assets (ROA), and Tobin's Q. We measure firm size by the logarithmic transformation of market capitalization calculated on the 31th trading day prior to the announcement date. ROA, Tobin's Q, and leverage are measured at the fiscal year end immediately prior to the announcement date. ROA is defined as net income (item 172) divided by the book value of total assets (item 6). We calculate Tobin's Q as the ratio of a firm's market value of total assets to its book value of total assets, where the market value of assets is computed as the book value of assets minus the book value of common equity (item 60) plus the market value of common equity (item 25 × item 199). Leverage is defined as a firm's book value of long-term debt (item 9) and short-term debt (item 34) divided by its market value of total assets.

Table 3 presents the summary statistics for all independent variables. We find that 6.5%, 5.1%, and 42.5% of interlocking directors are CEOs, Chairmen of the Board, and compensation committee members at investigation targets, and 2.6%, 7.1%, and 53.3% of them are in those three positions at interlocked companies. For the average (median) interlocked company, the market capitalization is about $8.9 billion ($1.5 billion), the ROA is 0.4% (4.3%), the Tobin's Q

is about 2.25 (1.75), the leverage is about 13.1% (8.4%), the board has 9 (9) directors, with 72.8% (75%) of them being independent, and insiders' percentage ownership is 13.8% (6%). At 57.7% of interlocked companies, the CEO is also the chairman of the board.

We present the coefficient estimates from our regression analysis in column (1) of Table 4. In parentheses are robust *t*-statistics based on standard errors adjusted for heteroskedasticity (White (1980)) and clustering at the level of investigation targets (Peterson (2007)). We find that consistent with our prediction, investigation targets' CARs have a positive coefficient of 0.101 with a *t*-statistics of 2.20, significant at the 5% level. This indicates that for every 1% decline in shareholder value at an investigation target, its interlocked companies will lose about 0.1% of their market capitalization. As hypothesized earlier, the size of investigation targets has a significantly negative effect on interlocked companies' CARs.

The dummy variable indicating whether interlocking directors sit on the compensation committee of investigation targets has a negative coefficient that is significant at the 5% level. This evidence suggests that investors believe directors directly involved in the executive pay setting process at investigation targets are more to blame for the grant date manipulations and thus their credentials as effective monitors suffer greater damage.

We find that the coefficient estimate of the same-auditor dummy is insignificant, while the same-state dummy has a negative and significant coefficient. Therefore, it appears that investors hold outside counsels and compensation consultants but not auditors responsible for the backdating practice. This is consistent with the deeper involvement of outside counsels and compensation consultants in the option grant date determination process.

Among the governance variables, insider ownership has a positive coefficient, significant at the 5% level. The coefficient estimates of leverage, board independence, and board size, albeit insignificant, are of the expected sign. These results support our conjecture that interlocked companies with stronger governance in place indeed experience less negative abnormal returns. We also find that ROA has a significantly positive effect on CARs. This is consistent with the

notion that better performance is indicative of higher-quality managers, who are less likely to engage in self-serving behavior at the expense of shareholders.[9]

Since monitoring is an especially important function performed by independent directors, we re-estimate the regression of column (1) while focusing on interlocking directors who are independent directors at investigation targets, and present the results in column (2). Most of the variables that have significant coefficients in column (1) continue to do so in column (2). Moreover, board independence becomes significantly positively related to CARs at the 10% level and board size becomes significantly negatively related to CARs at the 5% level.

C. Subsample regression analyses of interlocked firms' CARs

Our evidence so far suggests that the probe announcements by investigation targets prompt the market to question the judgment and monitoring ability of the directors at these companies. This in turn leads investors to downgrade the governance quality of companies director-interlocked with investigation targets and causes their stock prices to drop. Two questions naturally follow. First, are the negative abnormal stock returns of interlocked companies mainly driven by investors' concern that these companies may have also engaged in option backdating, given that director interlocks have been shown to contribute to the spread of the practice (Bizjak, Lemmon, and Whitby (2008))? Alternatively, do the negative abnormal returns reflect broader shareholder concerns about corporate policies and decisions beyond option backdating? Second, are these shareholder concerns founded? In other words, do interlocked companies display symptoms of agency problems that may justify the market's anxiety about the effectiveness of their governance structure?

We approach these two questions by dividing interlocked firms into two groups. The first group consists of firms with no signs of having backdated options, while the second group

[9] Morck, Shleifer, and Vishny (1990) and Masulis, Wang, and Xie (2007) use operating performance as a proxy for management quality and find that better managers make more profitable acquisitions for their shareholders.

consists of firms that may have engaged in backdating themselves but are not currently under investigation. If stock price reactions of interlocked companies are primarily driven by the market's concern about their own option granting practice, we would expect the negative CARs to largely concentrate in firms with at least some signs of backdating.

To investigate this conjecture, we extract information on the option grants made by all interlocked firms between 1996 and 2005 from the Thomson Financial Insider Filing database. Following Heron and Lie (2007, 2008), Bebchuk, Grinstein, and Peyer (2008), and Narayanan and Seyhun (2008), we retain records with transaction code 'A' (Grant or award transaction pursuant to Rule 16b-3(c)), and cleanse indicators 'R' (Data verified through the cleansing process), 'H' (Cleansed with a very high level of confidence), or 'C' (A record added to non-derivative table or derivative table in order to correspond with a record on the opposing table). We retain observations with derivative type 'CALL'/'OPTNS' (options), 'NONQ' (non-qualified options), 'EMPO' (employee options), 'ISO' (incentive stock option), or 'DIRO'/'DIREO' (director options). After we eliminate multiple grants made by the same firm on the same day and remove scheduled grants, i.e., grants awarded on the same day (plus and minus one day) each year (Heron and Lie (2007, 2008)), we obtain 8,002 unique non-scheduled grant dates.

We then merge each grant date observation to the CRSP daily stock files and compute market-adjusted returns for the pre- and post-grant periods following Heron and Lie (2007, 2008) and Narayanan and Seyhun (2008). We mark a grant date as suspicious for backdating if a firm experiences a market-adjusted return of worse than -10% during the 30 trading days prior to the grant date and a market-adjusted return of better than 10% during the 30 trading days following the grant date. A firm is classified as a backdater if at least one of its grant dates is flagged as suspicious.[10] Of the 508 interlocked firms, 204 have suspicious grant dates while 304 do not show any signs of option backdating. The proportion of firms identified as backdaters is higher in our

[10] In unreported analyses, we use the backdating identification method proposed by Bizjak, Lemmon, and Whitby (2008), and obtain qualitatively identical results.

sample than reported for a comprehensive random sample by Heron and Lie (2008). There are two possible reasons. First, Bizjak, Lemmon, and Whitby (2008) show that firms interlocked with backdating companies are more likely to engage in the practice themselves. All of our sample firms are interlocked with companies under backdating investigation. Therefore, it is not surprising that compared to a random sample, a greater percentage of them may have backdated options. Second, our criteria for a firm to qualify as a backdater are less stringent than those used by other studies. As a result, we may have over identified some firms as backdaters. This actually serves our purpose since we need to assure that our non-backdater sample is conservative, while previous studies face a similar constraint for the backdater sample.

In Panels C and D of Table 1, we report the announcement-period abnormal returns for the two subsamples of interlocked companies separately. We find that both groups experience significantly negative abnormal returns. The mean and median CARs over event window (-10, 10) are -2.16% and -2.12% for the subsample with signs of backdating and -1.59% and -0.52% for the subsample without signs of backdating, all significant at the 5% level or better. This evidence suggests that the option granting practice of interlocked companies does not appear to be the only issue that concerns investors and drives negative abnormal returns. Investors seem to believe that directors who fail to detect and prevent the backdating practice at investigation targets may have allowed and continue to allow other forms of managerial rent extraction and self-serving behavior to slip through their surveillance. We investigate this possibility by examining two corporate policies under the purview of a firm's board of directors: executive compensation and financial disclosure quality.

D. Analysis of CEO compensation of interlocked companies

Executive compensation is among the central issues in the current debate over the effects of weak corporate governance, and exorbitant CEO pay packages have been widely regarded as a major form of private benefits and a symbol of bad governance. Excessive CEO compensation is

also a direct way of shifting wealth from shareholders to managers, much like option backdating viewed from an agency lens. We examine whether interlocking directors contribute to overly generous CEO pay packages by comparing the level of CEO compensation between interlocked companies and comparable companies without director interlocks with investigation targets.

From the Board Analyst database, we are able to obtain CEO compensation data for the pre-announcement fiscal year for 419 of the 508 interlocked companies.[11] For each interlocked company, we select from Board Analyst a control company with the same 2-digit SIC code, the closest market capitalization at the end of the pre-announcement fiscal year, and no signs of backdating. Our final sample consists of 419 interlocked companies and 419 control firms.

The mean (median) CEO total compensation, including salary, bonus, restricted stock awards, option grants, long-term incentive payouts, and other payments, is $6.56 million ($3.34 million) for interlocked companies and $4.80 million ($2.85 million) for control firms. The t-statistic (z-statistic) from the difference-in-mean (median) test is 3.42 (2.00), suggesting that CEOs at interlocked firms are paid significantly more than their counterparts at control firms.

We also estimate OLS regressions where the dependent variable is the level of CEO total compensation as in Aggarwal and Samwick (1999), Core, Holthausen, and Larcker (1999), and Bertrand and Mullainathan (1999). The key explanatory variable is a dummy variable equal to one for interlocked companies and zero for control firms. We control for a wide array of determinants of CEO compensation, such as firm size, leverage, Tobin's Q, operating performance, stock return performance, and firm risk. We measure a firm's operating performance by its ROA (item 172/item 6) in a fiscal year, and its stock performance by its market-adjusted abnormal stock return during the fiscal year. We use the standard deviation of monthly stock returns during the past five years as a proxy for firm risk. We also include governance variables such as CEO/Chair duality, board independence, board size, and percentage

[11] Compared to ExecuComp, which consists mostly of companies in the S&P 1500, Board Analyst has a more comprehensive coverage of firms of various sizes.

stock ownership of insiders. We present the regression results in Table 5. In column (1), we estimate the CEO compensation regression using the full sample of interlocked companies and their control firms. We find that the interlocked-firm dummy has a significantly positive coefficient of 1.253, indicating that ceteris paribus, CEOs of interlocked companies are paid about $1.253 million more. We also find that CEO compensation is higher at larger, riskier firms with more growth opportunities proxied by Tobin's Q, and at firms where the CEO is also the chairman of the board, all in line with the evidence in prior studies (Core, Holthausen, and Larcker (1999) and Fahlenbrach (2004)). Consistent with its disciplinary role, leverage has a significant and negative effect on CEO compensation. In column (2) and (3), we separate the full sample into firms with signs of backdating and those without, and re-estimate the CEO compensation regression in both subsamples. We find that the interlocked-firm dummy has a significant and positive coefficient in both regressions. The evidence of higher CEO compensation at interlocked companies without any signs of backdating suggests that excessive CEO pay is an agency problem independent of option backdating.

E. Analysis of earnings management by interlocked companies

Earnings management represents another manifestation of agency problems between managers and shareholders. Managers with significant stock and stock option holdings are more likely to manipulate earnings to boost market valuations and benefit themselves by selling shares or exercising options at a high stock price (Cheng and Warfield (2005), Bergstresser and Philippon (2006), and Burns and Kedia (2006)), while the stocks of firms that manage their earnings aggressively end up losing more value in the long run (Chan, Chan, Jegadeesh, and Lakonishok (2006)). Through earnings management, managers can also reduce the transparency of corporate financial disclosures and conceal their consumption of private benefits (Warfield, Wild, and Wild (1995) and Fan and Wong (2002)). Klein (2002) shows that more independent directors on boards and audit committees curb the level of earnings management. We examine

whether the lax monitoring by interlocking directors from backdating investigation targets results in more earnings management.

Earnings have a cash flow component and an accrual component, with the latter easier to manipulate than the former. Not all accruals represent earnings management, however, since some accruals arise from normal business transactions and operational needs. Given that they are largely out of managers' control, they are considered as non-discretionary accruals (NDA). Discretionary accruals (DA), the difference between total accruals (TA) and non-discretionary accruals, are subject to the influence of managerial judgment and manipulation, and therefore, have been used as a proxy for earning management by a large number of studies (see, e.g., DeAngelo (1986), Klein (2002), Ashbaugh, LaFond, and Mayhew (2003), Francis, LaFond, Olsson, and Schipper (2005), and Bergstresser and Philippon (2006)). We follow the prior literature and estimate discretionary accruals using a modified version of the Jones (1991) model (Dechow, Sloan, and Sweeney (1995)). The model is specified as follows.

$$TA_{it}/A_{it-1} = \beta_1 \times (1/A_{it-1}) + \beta_2 \times [(\Delta SALES_{it} - \Delta REC_{it})/A_{it-1}] + \beta_3 \times (PPE_{it}/A_{it-1}) + e_{it},$$

where TA_{it} is firm i's total accruals in year t, A_{it-1} is the book value of total assets (Compustat item 6) at the beginning of year t, $\Delta SALES_{it}$ is the change in sales (item 12) during year t, ΔREC_{it} is the change in account receivable (item 2) during year t, and PPE_{it} is the book value of property, plant, and equipment (item 7) in year t.

$$TA_{it} = \Delta\text{item 4} - \Delta\text{item 1} - \Delta\text{item 5} + \Delta\text{item 34} - \text{item 14},$$

where Δitem 4 is the change in current assets during year t, Δitem 1 is the change in cash and cash equivalents during year t, Δitem 5 is the change in current liabilities during year t, Δitem 34 is the change in short-term debt during year t, and item 14 is the depreciation and amortization expense during year t. We estimate the modified Jones model cross-sectionally using all Compustat firms for each year and 2-digit SIC industry cohort that has at least 10 observations. Discretionary accruals are simply the residuals from the regressions.

We follow the same procedure as in the CEO compensation analysis to select a control firm for each interlocked company in the pre-announcement fiscal year, except that we now match on 2-digit SIC industry and the closest contemporaneous return on assets (ROA) computed as the ratio of net income (item 172) over the book value of total assets (item 6). We choose performance as a matching criterion because performance can be correlated with the discretionary accruals estimated from the variants of the Jones model (Kothari, Leone, and Wasley (2005)). In the end, we obtain a sample of 392 interlocked companies and 392 industry and performance matched control firms.

Unlike studies examining firms' earning management behavior prior to specific corporate events such as securities offerings (Teoh, Welch, and Wong (1998a, b), Rangan (1998), and Shivakumar (2000)) and M&A activities (Erickson and Wang (1999)), we are interested in the magnitude but not the sign of discretionary accruals, as both positive and negative values would indicate earning managements. Therefore, we follow Klein (2002) and Bergstresser and Philippon (2006) to use the absolute value of estimated discretionary accruals as the dependent variable in our earnings management analysis. We find that the mean and median absolute discretionary accruals are 0.074 and 0.045 for interlocked companies, and 0.059 and 0.044 for their control firms. The means are significantly different at the 1% level while the medians are different at the 10% level based on a one-sided test.

We also estimate OLS regressions of the absolute discretionary accruals. The key explanatory variable is a dummy variable that equals one for interlocked companies. Other explanatory variables include firms' financial and governance characteristics that prior literature has shown to be related to earnings management. Specifically, we control for firm size, ROA, Tobin's Q, leverage, asset growth rate, and external financing activities. Asset growth rate is the percentage growth rate of the book value of total assets (item 6) during a fiscal year. External financing activities are the net proceeds from equity and debt financing scaled by the book value of total assets. Net proceeds from equity financing are equal to the sale of common and preferred

stock (item 108) less repurchase of common and preferred stock (item 115) less dividend payments (item 127). Net proceeds from debt financing are equal to the issuance of long-term debt (item 111) less the reduction in long-term debt (item 114) less the net changes in current debt (item 301). We also control for insider ownership and board attributes such as board size, board independence, and CEO/Chairman duality and expect discretionary accruals to decrease with insider ownership and board independence and increase with board size and CEO/chairman duality.

The results in column (1) of Table 6 are based on the full sample of 784 observations. We find that the interlocked-firm dummy has a significant and positive coefficient, suggesting that lax monitoring by interlocking directors indeed leads to more aggressive earnings management by managers. We also find that absolute discretionary accruals are significantly lower at larger companies and higher at companies with faster asset growth, both in line with the evidence in Yu (2008). In addition, firms with larger boards are more aggressive in managing earnings, consistent with Yermack (1996)'s argument that larger boards are less effective in monitoring.

We also separate the entire sample into firms with signs of backdating and firms without signs of backdating, and re-estimate the discretional accrual regression in both subsamples. Results in columns (2) and (3) show that interlocked companies exhibit significantly more earnings management through accruals, even when they show no signs of backdating. These results echo our findings from the CEO compensation analysis. Together, they suggest that shareholders of interlocked companies have legitimate reasons to worry that interlocking directors could have adverse effects on more areas of corporate policies than just option granting.

Our findings of excessive CEO pay and more aggressive earnings management at interlocked companies can also help us address a potential alternative explanation for the negative CARs of interlocked companies. Specifically, the negative stock price reactions experienced by interlocked companies could be driven by the market's concern that the backdating probe at the investigation targets may distract interlocking directors from tending to the affairs of interlocked

companies with same energy and focus they would otherwise do. This alternative hypothesis, however, cannot explain why we uncover evidence of excessive CEO pay and aggressive earnings management at interlocked companies in the fiscal year *prior to* the backdating disclosure of investigation targets. Therefore, it is unlikely to be responsible for our announcement returns results.

It is important to note that excessive CEO compensation and aggressive earnings management are not directly driving the negative CARs of interlocked companies, since both symptoms are observable to the market prior to the initial backdating announcements by investigation targets. But there are many managerial actions and corporate activities that are not readily observable to investors or are not as easy to decipher because of information asymmetry (Holmstrom (1979)). Recognizing the potential for moral hazard presented by such situations, investors form an ex ante estimate of the probability and severity of manager-shareholder conflict of interests based on such observables as business environment, current and past corporate policies, and the incentive and control devices in place. The announcements by backdating investigation targets raise the market's estimate of unobservable agency problems at interlocked companies, thereby driving down their stock prices.

IV. Conclusion

We provide insights into the contributing factors of the backdating scandal by examining the stock price reactions experienced by firms that have director interlocks with companies under backdating investigation but themselves are not investigation targets. Our evidence suggests that investors hold directors at least partially responsible for allowing backdating to take place. Specifically, we find that a company's backdating investigation announcement generates significant and negative abnormal stock returns to companies with which it has a director-interlocking relationship. The abnormal returns are more negative when interlocking directors sit on the compensation committee of the backdating investigation target, and less negative when the

interlocked companies have stronger corporate governance and higher-quality management in place. These findings indicate that the backdating announcement prompts investors to question the judgment and monitoring ability of directors of the investigation target and especially those directly involved in the executive pay setting process. The damaged reputation of these directors leads the market to critically reassess the governance quality of other companies where they hold board seats.

We also find that the negative abnormal returns we uncover do not concentrate in interlocked companies that may have backdated options themselves; even interlocked companies with no signs of option backdating experience declines in market value. This suggests that the poor judgment and lax monitoring of interlocking directors may contribute to other agency problems in addition to option backdating. Consistent with this notion, we find that regardless of whether they display any signs of backdating, interlocked companies tend to award their CEOs overly generous compensation and they also manage their earnings more aggressively compared to carefully selected control companies.

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Table 1. Industry distributions of backdating investigation targets and their interlocked companies

The sample consists of 96 backdating investigation targets and 508 interlocked companies that have the necessary stock return, financial statement, and corporate governance information available from CRSP, COMPUSTAT and the Board Analyst databases. Investigation targets are obtained from the Option Scorecard kept by the Wall Street Journal. Companies interlocked with investigation targets are identified through proxy statements.

2-digit SIC code	Industry description	Investigation targets		Interlocked firms	
		No. of obs.	Percentage	No. of obs.	Percentage
12	Coal mining			2	0.39
13	Oil and gas extraction			6	1.18
15	General building contractors	1	1.04	4	0.79
16	Heavy construction			1	0.20
20	Food and kindred products	1	1.04	12	2.36
22	Textile mill products			1	0.20
23	Apparels & other textile products			2	0.39
24	Lumber and wood products			1	0.20
25	Furniture and fixtures			3	0.59
26	Paper and allied products			5	0.98
27	Printing and publishing	1	1.04	6	1.18
28	Chemicals and allied products	6	6.25	43	8.46
29	Petroleum and coal products			2	0.39
30	Rubber & plastic products			2	0.39
31	Leather and leather products			2	0.39
32	Stone, clay, and glass products	1	1.04	1	0.20
33	Primary metal industries			2	0.39
34	Fabricated metal products			3	0.59
35	Industrial machinery & equipment	10	10.42	42	8.27
36	Electronic & electric equipment	20	20.83	62	12.20
37	Transportation equipment			4	0.79
38	Instruments & related products	5	5.21	27	5.31
39	Miscellaneous manufacturing industries			3	0.59
42	Trucking and warehousing			1	0.20
44	Water transportation			3	0.59
45	Transportation by air			3	0.59
46	Pipelines, except natural gas			1	0.20
47	Transportation services			3	0.59
48	Communications	4	4.17	24	4.72
49	Electric, gas & sanitary services			15	2.95
50	Wholesale—durable	2	2.08	7	1.38
51	Wholesale—non-durable			3	0.59
52	Building materials & garden supplies	1	1.04	1	0.20
53	General merchandise stores			4	0.79
54	Food Stores			3	0.59
55	Automotive dealers & service stations			1	0.20
56	Apparels and accessory stores	2	2.08	4	0.79
57	Furniture and homefurnishings stores	2	2.08	4	0.79
58	Eating and drinking places	2	2.08	8	1.57
59	Miscellaneous retail	4	4.17	8	1.57

60	Depository institutions			9	1.77
61	Nondepository institutions			7	1.38
62	Security and Commodity brokers			13	2.56
63	Insurance carriers	2	2.08	12	2.36
64	Insurance agents, brokers & service			3	0.59
65	Real estate			1	0.20
67	Holding & other investment offices	3	3.13	13	2.56
72	Personal services			3	0.59
73	Business services	27	28.13	81	15.94
78	Motion pictures			3	0.59
79	Amusement & recreation services			6	1.18
80	Health services	1	1.04	10	1.97
82	Educational services	1	1.04	4	0.79
83	Social services			1	0.20
87	Engineering & management services			11	2.17
99	Nonclassifiable			2	0.39
Total		96	100.00	508	100.00

Table 2. Announcement-period abnormal returns of investigation targets and interlocked companies

Panel A presents the cumulative abnormal returns (CARs) experienced by 96 backdating investigation targets over three alternative event windows surrounding their initial backdating related announcements. Panel B presents the CARs experienced by 508 interlocked companies upon the initial announcements by investigation targets. Panels C and D present the CARs for the subsample of interlocked companies with and without signs of backdating. [a], [b], and [c] stand for statistical significance at the 1%, 5%, and 10% level, respectively.

Variable	No. of obs.	Mean	Median	Standard deviation
Panel A: CARs of investigation targets				
(-10, +10)	96	-4.72% [a]	-3.94% [a]	13.22%
(-5,+5)	96	-3.79% [a]	-2.14% [a]	10.12%
(-2,+2)	96	-3.43% [a]	-3.01% [a]	6.67%
Panel B: CARs of interlocked companies				
(-10, +10)	508	-1.82% [a]	-1.10% [a]	10.85%
(-5,+5)	508	-1.02% [a]	-0.22% [b]	8.03%
(-2,+2)	508	-0.58% [b]	-0.35% [b]	5.30%
Panel C: CARs of interlocked companies with signs of backdating				
(-10, +10)	204	-2.16% [a]	-2.12% [b]	12.51%
(-5,+5)	204	-0.96%	-0.50%	9.45%
(-2,+2)	204	-0.66% [c]	-0.95% [c]	5.78%
Panel C: CARs of interlocked companies without signs of backdating				
(-10, +10)	304	-1.59% [a]	-0.52% [b]	9.60%
(-5,+5)	304	-1.06% [a]	-0.12% [c]	6.93%
(-2,+2)	304	-0.53% [c]	-0.05%	4.97%

Table 3. Summary statistics of director, financial, and governance related variables

Panel A is based on a sample of 96 backdating investigation targets. Panel B, C, and D are based on a sample of 508 interlocked companies. *Director is CEO*, *Director is COB*, and *Director on compensation committee* are dummy variables indicating whether an interlocking director is the CEO, the Chairman of the board, or a compensation committee member at a backdating investigation target or an interlocked company. Market capitalization is measured on the 31th trading day prior to the initial announcements of investigation targets. ROA is defined as net income (item 172) divided by the book value of total assets (item 6). Tobin's Q is the ratio of a firm's market value of total assets over its book value of total assets, where the market value of assets is computed as the book value of assets minus the book value of common equity (item 60) plus the market value of common equity (item 25 × item 199). Leverage is defined as a firm's book value of long-term debt (item 9) and short-term debt (item 34) divided by its market value of total assets. Board size is the number of directors on a board. CEO/Chairman duality is a dummy variable equal to one for firms where the CEO is also the chairman of the board. Board independence is the percentage of independent directors on a board. Insider ownership is the percentage ownership in a firm by the firm's insiders, i.e., officers and directors.

Variable	Mean	Median	Standard Deviation
Panel A: Director positions at investigation targets			
Director is CEO	0.065	0	0.247
Director is Chairman of the Board (COB)	0.051	0	0.221
Director on compensation committee	0.425	0	0.495
Panel B: Director position at interlocked companies			
Director is CEO	0.026	0	0.158
Director is Chairman of the Board (COB)	0.071	0	0.257
Director on compensation committee	0.533	1	0.499
Panel C: Interlocked company financial variables			
Market capitalization (in millions $)	8915	1501	25221
ROA	0.004	0.043	0.215
Tobin's Q	2.252	1.754	1.498
Leverage	0.131	0.084	0.157
Panel D: Interlocked company governance variables			
Board size	9	9	2.494
CEO/Chairman duality	0.577	1	0.495
Board independence	0.728	0.750	0.144
Insider ownership	0.138	0.060	0.195

Table 4. Regression analysis of the CARs of interlocked companies

The table presents the coefficient estimates from regressions of the CARs of interlocked companies over the event window (-10, +10). Results in column (1) are based on the entire sample of 508 interlocked companies, while those in column (2) are based on the subsample of 425 interlocked companies where the involved interlocking directors serve as independent directors at the investigation targets. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White (1980)) and clustering at the level of investigation targets (Petersen (2007)). [a], [b], and [c] stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Full sample analysis	(2) Subsample analysis
Investigation target characteristics		
Investigation target CAR(-10, +10)	0.101 [b]	0.114 [a]
	(2.20)	*(2.63)*
Log(market capitalization)	-0.005 [c]	-0.004 [c]
	(-1.93)	*(-1.76)*
Director position at investigation targets		
Director is CEO	0.013	
	(0.65)	
Director is COB	-0.002	-0.077
	(-0.07)	*(-1.49)*
Director on compensation committee	-0.021 [b]	-0.018 [c]
	(-2.02)	*(-1.79)*
Director position at interlocked companies		
Director is CEO	-0.026	0.001
	(-0.90)	*(0.03)*
Director is COB	0.034	-0.008
	(1.14)	*(-0.44)*
Director on compensation committee	-0.002	-0.007
	(-0.18)	*(-0.76)*
Interlocked company characteristics		
Same industry as investigation target	-0.010	-0.026 [c]
	(-0.63)	*(-1.66)*
Same state as investigation target	-0.021 [b]	-0.014
	(-2.32)	*(-1.53)*
Same auditor as investigation target	0.011	0.007
	(1.24)	*(0.73)*
Log(market capitalization)	0.010 [a]	0.009 [a]
	(2.60)	*(2.63)*
ROA	0.079 [a]	0.077 [a]
	(3.85)	*(5.07)*
Tobin's q	-0.002	-0.005
	(-0.43)	*(-1.08)*
Leverage	0.046	0.018
	(1.38)	*(0.60)*
Log(board size)	-0.023	-0.048 [b]
	(-1.09)	*(-2.16)*
CEO/Chairman duality	0.005	0.012
	(0.50)	*(1.11)*
Board independence	0.038	0.052 [c]
	(1.41)	*(1.84)*
Insider ownership	0.059 [b]	0.061 [a]
	(2.39)	*(2.93)*
Number of Obs.	508	425
Adjusted R^2	7.52%	9.56%

Table 5.
Regression analysis of CEO compensation of interlocked companies and their control companies

The table presents coefficient estimates from regressions of CEO total compensation ($ million), which is equal to the sum of salary, bonus, restricted stock awards, option grants, long-term incentive payouts, and other payments. Results in column (1) are based on the full sample of 419 interlocked companies and 419 industry and size matched non-interlocked control companies. Results in column (2) are based on the subsample of firms with signs of backdating, while those in column (3) are based on the subsample without signs of backdating. Interlocked firm is a dummy variable equal to one for interlocked companies and zero for control firms. One-year abnormal stock return is a firm's market-adjusted abnormal stock return during a fiscal year. Stock return volatility is the standard deviation of monthly stock returns during past five years. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White (1980)). [a], [b], and [c] stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Whole sample	(2) Firms with signs of backdating	(3) Firms without signs of backdating
Interlocked firm	1.253 [a]	1.272 [c]	1.174 [b]
	(3.15)	*(1.87)*	*(2.55)*
Log(market capitalization)	2.830 [a]	2.863 [a]	2.817 [a]
	(13.92)	*(7.77)*	*(11.43)*
ROA	0.853	0.281	1.660
	(0.57)	*(0.12)*	*(0.94)*
Tobin's q	0.347 [a]	0.403 [b]	0.252
	(2.74)	*(1.94)*	*(1.63)*
Leverage	-3.052 [c]	-3.946	-2.364
	(-1.76)	*(-1.34)*	*(-1.05)*
One-year abnormal stock return	-0.242	0.002	-0.139
	(-1.00)	*(0.00)*	*(-0.68)*
Stock return volatility	64.117 [b]	62.268	62.000
	(2.08)	*(1.50)*	*(1.49)*
Log(board size)	-0.465	0.806	-0.968
	(-0.53)	*(0.56)*	*(-0.92)*
CEO/Chairman duality	1.161 [a]	1.914 [a]	0.784
	(3.06)	*(3.05)*	*(1.54)*
Board independence	-0.712	2.349	-2.360
	(-0.49)	*(0.93)*	*(-1.27)*
Insider ownership	0.400	-0.648	1.183
	(0.22)	*(-0.53)*	*(0.42)*
Number of Obs.	838	306	532
Adjusted R^2	40.98%	38.31%	42.77%

Table 6.
Regression analysis of earnings management by interlocked companies and their control companies

The table presents coefficient estimates from regressions of earning management by interlocked companies and their control companies. The dependent variable is the absolute value of discretionary accruals estimated from the modified Jones (1991) model. The Jones model is estimated cross sectionally using all Compustat firms for each year and 2-digt SIC industry cohort with at least 10 observations. Results in column (1) are based on the full sample of 392 interlocked companies and 391 industry and ROA matched non-interlocked control companies. Results in column (2) are based on the subsample of firms with signs of backdating, while those in column (3) are based on the subsample without signs of backdating. Interlocked firm is a dummy variable equal to one for interlocked companies and zero for control firms. Asset growth rate is the percentage growth rate of the book value of total assets (data6) during a fiscal year. External financing activities are the net proceeds from equity and debt financing scaled by the book value of total assets. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White (1980)). [a], [b], and [c] stand for statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Whole sample	(2) Firms with signs of backdating	(3) Firms without signs of backdating
Interlocked firm	0.016 [a]	0.016 [b]	0.012 [c]
	(3.00)	*(2.05)*	*(1.76)*
Log(market capitalization)	-0.009 [a]	-0.011 [a]	-0.006 [c]
	(-3.18)	*(-3.00)*	*(-1.94)*
ROA	-0.018	-0.027	-0.073
	(-1.05)	*(-1.50)*	*(-1.58)*
Tobin's q	0.004	0.004	0.006 [b]
	(1.34)	*(1.28)*	*(2.17)*
Leverage	0.029	0.095 [b]	-0.003
	(1.10)	*(2.14)*	*(-0.11)*
Asset growth rate	0.063 [a]	0.112 [a]	0.017
	(3.64)	*(6.10)*	*(1.26)*
External financing activities	-0.096	-0.247	0.101 [c]
	(-0.76)	*(-1.57)*	*(1.93)*
Log(board size)	0.024 [c]	0.004	0.030 [c]
	(1.84)	*(0.22)*	*(1.82)*
CEO/Chairman duality	-0.003	0.003	-0.004
	(-0.49)	*(0.31)*	*(-0.51)*
Board independence	-0.007	-0.015	0.001
	(-0.38)	*(-0.50)*	*(0.05)*
Insider ownership	-0.027	-0.056 [c]	-0.016
	(-1.58)	*(-1.81)*	*(-0.85)*
Number of Obs.	784	346	438
Adjusted R^2	10.43%	26.52%	3.11%