Are Longer-tenured Independent Directors Less Effective Monitors? Insights from Insider Trading*

Meng Gao
Singapore Management University
Email: meng.gao.2013@pbs.smu.edu.sg

Sheng Huang
Singapore Management University
Email: shenghuang@smu.edu.sg

January 2017

* We thank Jarrad Harford, Ronald Masulis, and seminar participants in China Europe International Business School, Peking University, Singapore Management University, and Tsinghua University for their comments. All remaining errors are our own.

Are Longer-tenured Independent Directors Less Effective Monitors? Insights from Insider Trading

Abstract

We examine the effectiveness of board monitoring over independent directors' (IDs) tenure in the case of the board's oversight of insider trading. We show that the profitability of executive trades increases in IDs' tenure. Executives are more likely to trade opportunistically and during informationally more sensitive time when IDs serve longer on the board, and these trades are more profitable. The impact of IDs' tenure on executive trading is weaker in firms that have specific guidelines in place on insider trading (and thus the board has less leeway in its oversight) or where other governance mechanisms are at work. Overall, it suggests that longer-tenured IDs are less effective monitors of exploitative executive trading. Further evidence shows that longer-tenured IDs are more likely to have their independence compromised.

JEL classification: G30, G34

Keywords: independent directors, board independence, board monitoring, director tenure, inside trading

1. Introduction

Representation of independent directors on the board (board independence and its effect on the quality of board oversight) is an issue of central interest in corporate governance. The interest has been intensified following the high-profile corporate scandals involving Enron, Worldcom, and Tyco International, and the implied failure of effective board monitoring in these firms. Subsequently, the Sarbanes-Oxley Act passed in July 2002 mandates that corporate audit committees comprise entirely of independent directors. And the NYSE and Nasdaq regulation approved by the SEC in 2003 requires a majority of independent directors and fully independent nominating, compensation, and audit committees on the board. While skeptics and concerns of the reforms remain that independent directors according to regulatory definitions may not be truly independent because managers can select co-opted directors, board independence has been shown to be effective in increasing corporate transparency (e.g., Armstrong, Core, and Guay, 2014), improving corporate governance (e.g., Chen, Cheng, and Wang, 2015; Guo and Masulis, 2015), and enhancing firm value in firms where the cost of acquiring information is low (Duchin, Matsusaka, and Ozbas, 2010).

However, a noteworthy consequence of the reforms that seems to have yet received sufficient attention is the lengthening tenure of independent directors. As shown in *Figures 1* and *2*, independent directors' tenure has been increasing over time.[1] The proportion of senior independent directors (defined as those with over 10 years of tenure, the top 30 percentile during 1998-2014) among all independent directors increases substantially from 2005 (the effective year of the exchanges' new listing rules).[2] One factor driving the significant change is low turnover of independent directors, possibly due to the limited pool of talent and search costs on the director market. Firms tend to retain long-tenured independent directors to fulfill the board independence requirement because it is difficult or costly to find replacement directors.[3]

More generally, the lengthening tenure of independent directors can have significant implications on the effectiveness of board oversight. A common view in the literature on board independence is that independent directors have inferior access to information and rely mostly

[1] The median tenure of independent directors in the 2010's is 7 years, compared to 6 years in the 2000s and 5 years in the earlier years.

[2] The proportion of senior independent directors increases from 29% in 2005 to 37% in 2014. In contrast, the proportion of junior independent directors (those with less than 3 years of tenure, the bottom 30 percentile) decreases from 35% in 2005 to 24% in 2012 and only rebounds to 27% in 2014.

[3] Consistent with the low turnover of directors and firms' intention to retain directors, two thirds of S&P 500 companies explicitly disavowed tenure limits, according to the news report by Francis and Lublin (2016). Only 13 had limits on director tenure in 2015, down from two dozen in 2010.

on insiders for information, which limits their ability to monitor effectively. This is more likely to be the case when independent directors have been sitting on the board for short. Over time, independent directors can accumulate firm-specific information and knowledge (Vance, 1983), enhancing their commitment to the firm and their competence (Buchanan, 1974). This may also make them stronger monitors of management because they understand its prior behavior and decisions better than newer directors. Moreover, Jiang, Wan, and Zhao (2015) show that independent directors tend to wait till the late of their tenure and then start challenging management, and the director market rewards such monitoring behavior with more directorships in other firms at the end of their current tenure. Therefore, independent directors are likely more capable or/and more willing to monitor management and the effectiveness of board oversight is thus likely to be improved over their tenure (*Improvement view*).

Alternatively, independent directors are likely to become more personally connected and thus be cozy with management over tenure (Vafeas, 2003). Also, greater overlap and interaction with management over time can lead to more cohesiveness among independent directors and management, and the desire for more agreement and consensus may prevent independent directors from critically challenging management.[4] Therefore, the independence of independent directors is likely to be compromised and the effectiveness of board oversight can decrease over their tenure (*Compromise view*). Notably, regulators, governance advocates, and large institutions have voiced up their concern and suggested taking a skeptical view of the independence of long-tenured independent directors (see, e.g., Lublin, 2013; Vekshin, 2015; Francis and Lublin, 2016; Stein, 2016).[5] Some big money managers such as BlackRock Inc., State Street Global Advisors, and others have even voted against the reelection of some long-tenured directors (see Francis and Lublin (2016)). Outside the U.S., regulators have installed specific policies of treating long-stay directors as not independent.[6]

To summarize, the extent to which an independent board remains to be independent and, correspondingly, how the effectiveness of board oversight evolves over the tenure of independent directors, is an empirical question. Despite its great importance given the lengthening tenure of independent directors, relatively few studies have examined it and their

[4] Coles, Daniel, and Naveen (2015) term this group behaviour among directors as groupthink, and show that groupthink is negatively related to firm value in dynamic and complex industries. We expect such groupthink to exist among independent directors and management as they work as a group.

[5] According to Francis and Lublin (2016), the California Public Employees' Retirement System specifically commented that directors can be "compromised" after 12 years on a board.

[6] For instance, in France, directors lose their independent status after 12 years, while in U.K., the tenure cutoff is just nine years. Similarly, Hong Kong requires companies to re-elect directors with a separate vote after they have served nine years (Francis and Lublin, 2016).

findings are rather inconclusive (see a literature review in Section 2). Our paper intends to shed some new light on this issue. Specifically, we examine how the profitability of private trades by executives is related to the tenure of independent directors, to gauge the effectiveness of board monitoring of insider trading behavior. We find strong evidence that is consistent with monitoring deficiency by longer-tenured independent directors, and executives are more likely to exploit their informational advantages in their trading under a compromised independent board. Our focus on insider trading as a setting to examine the quality of board oversight is motivated as follows.

First, the large literature suggests that insider trading, in particular purchase, is profitable. While the profitability is due partly to managers' market-timing ability or their contrarian trading strategy (e.g., Jenter, 2005), there is rich evidence that it also reflects managers' private information (e.g., Lakonishok and Lee, 2001; Piotroski and Roulstone, 2005). Managers' informativeness can also be seen from their trading around significant corporate events.[7] The main proponent in argument for insider trading is that it allows communication of information to the market, which would result in higher stock price, higher returns from financing real investment and hence more real investment (e.g., Leland, 1992). However, empirical evidence exists that managers can also exploit their informational advantage at the cost of outside (small) investors.[8] This can have serious negative implications on firms, shareholders, and the market.[9] In particular, investors would either invest less or require higher compensation for their investment in the presence of more informed insiders who often trade to gain from their informational advantage. This leads to lower stock liquidity and higher cost of equity, which reduces firm value and shareholder wealth (Easley and O'hara. 2004).[10] In addition, prosecution of insider trading imposes great costs on firms, such as the loss of managerial time, business disruption, and negative publicity (Bettis, Coles, and Lemmon, 2000). All these highlight the

[7] See, for instance, studies on insider trading around various corporate events, including merger and acquisitions (Meulbroek, 1992; Seyhun, 1990), bankruptcy (Seyhun and Bradley, 1997), accounting frauds (Summers and Sweeney, 1998), dividend payout (John and Lang, 1991), equity offerings (Karpoff and Lee, 1991; Kahle, 2000; Clarke, Dunbar, and Kahle, 2001), earnings announcement (Ke, Huddart, and Petroni, 2003), and share repurchase activities (Lee, Mikkelson, and Partch, 1992).

[8] For examples, managers are found to exploit voluntary disclosure opportunities to maximize personal gains in private trades (Cheng and Lo, 2006; Niessner, 2015). Jagolinzer (2009) provide evidence of opportunistic behaviour in insider trading by showing that even the pre-specified trades under the 10b5-1 plans are timed to firm performance. Wu (2016) find that insider trading profitability increases following an exogenous shock that results in an increase in firm opaqueness, consistent with insiders exploiting their informational advantages.

[9] Theoretical analyses in the literature suggest that the cost of informed insider trading is likely to be greater than the benefits. See, for examples, Ausubel (1990), Manove (1989), and Khanna, Slezak, and Bradley (1994). See a literature review on insider trading controversies in Bhattacharya (2014).

[10] Studies have shown that imposing strict internal trading policies or strengthening their enforcement will reduce cost of equity (e.g., Masson and Madhavan, 1991; Easley, Hvidkjaer, and O'Hara, 2002; and Choy and Silvers, 2009).

importance of regulation and board oversight of insider trading, although focus has been mainly on the former.

Second, despite its significance in practice, less attention has been paid to assess the effectiveness of board monitoring of insider trading. Boards are expected to initiate insider trading rules and policies in the firm, review the adequacy of them to comply with all applicable laws and regulations, and more importantly, ensure the enforcement of them. This hinges on the independence of the board. On the other hand, strong board oversight is likely to deter exploitative insider trading. However, independent directors seem to face less scrutiny from shareholders in their monitoring of insider trading than in other corporate actions such as managerial turnover, financial misconduct, and executive pay polices. This in turn leads to the question about the effectiveness of board monitoring of insider trading. The literature has shown that internal governance generally plays an important role in discouraging informed insider trading (e.g., Skaife et al., 2013; Dai et al., 2016). The effectiveness of board monitoring, and in particular, how it evolves over the tenure of independent directors yet remains unexplored.

Third, the rich data on insider trading allow us to examine through their trades the informational ability of both executives and independent directors themselves (and the exploitation of it) along the tenure of independent directors. This enables us to test: (1) whether independent directors have better access to information over time, (2) whether they may utilize the improved information access to enhance their monitoring effectiveness under the *improvement view*, or alternatively, allow executives to exploit their informational advantages despite their improved information access under the *compromise view*, and (3) whether greater overlap and interaction with management over time leads to more cohesiveness in beliefs among independent directors and management by looking at their trades jointly (i.e., whether they tend to trade more consistently over time) under the *compromise view*. That is, the insider trading setting provides an ideal setting to help us test the different views on the independence of independent directors over their tenure.

We hypothesize that, under the *compromise view*, executive trading profitability increases in the tenure of independent directors, *ceteris paribus*. Executives are more likely to exploit their informational advantages for gains in private trades when independent directors have weakened monitoring incentives due to their compromised independence over tenure. Alternatively, under the *improvement view*, executive trading profitability decreases in the tenure of independent directors, *ceteris paribus*. The effectiveness of board oversight increases in the tenure of independent directors, which in turn reduces the room for executives to trade for private gains.

Our empirical investigation is based on a sample of 2530 unique S&P 1500 firms for the period of 1998-2014. We first examine the profitability of private trades by independent directors following Ravina and Sapienza (2010) who suggests that the future market-adjusted returns to the trades of independent directors captures their private information set. We find that the average profitability decreases in the independent directors' own tenure. However, a separation of the transaction types into purchase and sale reveals that the negative association between profitability and tenure is driven by sales, and independent directors are more likely to be net sellers and sell more when their tenure gets longer. It is well known that insider purchases are more likely to be information-related. We find that the profitability of purchases by independent directors strictly increases in their own tenure. It suggests that independent directors have increasing access to firm-specific information and become more informed over tenure. It is intriguing to see whether, with their better informativeness, they enhance their monitoring effectiveness of executive trades.

Interestingly, we find that the profitability of private trades by executives increases in the tenure of independent directors. This positive association holds for both purchases and sales, although it is stronger for purchases. The association seems to be concentrated in firms that are more complex and opaque where executives' informational advantages are more pronounced and more likely to be exploited for private gains. This finding is robust to a rich set of controls for firm and board characteristics as well as transaction details, which are meant to capture executives' trading motivations and factors that the literature has shown to contribute to the trading profitability. In particular, the results continue to hold when we control for inside directors' and executives own tenure. Overall, the evidence is more consistent with the *compromise view* about the independence of independent directors over tenure.

We show further evidence from a few finer tests that lends stronger support to the *compromise view*. First, we examine the nature of trades by executives and the associated profitability. We find that, when the tenure of independent directors increases, executives' trades are more likely to be "opportunistic", defined following Cohen, Malloy, and Pomorski (2012), both in terms of the number and the size of trades. Moreover, both opportunistic purchases and sales are highly profitable. Also, executives are more likely to trade outside the designated safe window specified in a firm's internal trading policy or outside a time window that is commonly regarded to be less informationally sensitive, and these trades are more profitable. The evidence suggests that executives are more likely to conduct exploitative trades with high profitability at the cost of shareholders when independent directors' tenure increases.

Second, the *compromise view* suggests that it should be those independent directors who are expected to be more effective monitors when they join the board that matters more in the tenure-profitability relation. In other words, for those independent directors whose independence or monitoring effectiveness is challengeable ex ante, we shall not expect a similarly significant change in their monitoring effectiveness along their tenure. Consistent with this, we find that the positive relation between independent directors' tenure and executive trading profitability only holds for non-co-opted, not-initially-connected, or less busy independent directors. Our finding is consistent with the literature that directors with ties to management, busy directors, and co-opted directors who are appointed after the CEO assumed office, tend to be weaker monitors (Fich and Shivdasani, 2006; Fracassi and Tate, 2012; Coles, Daniel, and Naveen, 2014).

Third, we show certain governance factors are effective in mitigating the impact of long-tenured independent directors on executive trading profitability. Specifically, for firms that adopt internal trading policies that specify clear guidelines on insider trading, the effect of independent directors' tenure is significantly weaker. It suggests that when executive trading is not bound by specific rules, boards tend to have more discretion on its regulation, which leaves room for compromised boards to be more lenient towards exploitative trading. Also, consistent with blockholders being an effective monitor, the effect of independent directors' tenure is significantly weaker in firms where blockholders sit on the board as directors. Possibly due to its alignment of incentives with shareholders on insider trading, blockholder directorship appears to an effective mechanism in countering the weakened monitoring by compromised independent directors.

Finally, we show direct evidence that independent directors are more likely to be connected with executives (and thus less likely to be independent) over their tenure, if they are not initially connected when they join the board. Following the literature, we identify their acquisition of connections through their joint membership in leisure clubs and charities. Moreover, we find that, in their own private trades, independent directors tend to trade more consistently with executives (purchase or sell contemporaneously in the same direction) over their tenure. This is consistent with more cohesiveness in beliefs among independent directors and management

possibly due to greater overlap and interactions over time, which is likely to weaken their monitoring incentives and effectiveness.[11]

To summarize, the overall evidence is consistent with the view that the independence of independent directors is likely to be compromised over their tenure, at least to some extent. Independent directors appear to have better access to information over tenure, but that does not lead to more effective oversight of executive trades. We also find evidence that the market seems to be aware of the greater informational content in executives' trades as executives are more likely to exploit their informational advantages over independent directors' tenure. Specifically, following Brochet (2010), we find that abnormal market trading volumes on the filing dates of executive trades increase in the tenure of independent directors. It is especially the case for private purchases by executives.

We conduct a few additional tests for the robustness of our finding. First, we examine how independent director turnover may affect the profitability of executive trades. We find that when a larger percentage of independent directors experience turnover or there is a larger percentage of new independent directors on board, executive trading profitability drops more significantly. Second, while independent director turnover is associated with lower executive trading profitability, the relation between independent directors' tenure and executive trading profitability also holds for firms that do not experience independent director turnover. That is, even for the same group of independent directors, executive trading profitability increases over their tenure, consistent with the *compromise view* of the independence of independent directors. Lastly, to address the potential endogeneity concern of independent directors' tenure, we utilize the exchange regulations on board independence as an exogenous shock to the tenure of an independent board for some firms that had not complied with the independence requirement before the regulations. We show that the exogenous negative change in the tenure of independent directors due to the addition of new independent directors to the board to fulfill the regulation requirement results in a decrease in profitability of executive trading.

We note that the empirical support for the *compromise view* of the independence of independent directors over tenure is confined to the setting of executives' private trades, and can be a partial equilibrium outcome. Whether and to what extent a board of long-tenured independent directors is detrimental or beneficial to the overall firm value is out of the scope of

[11] Beneish, Marshall, and Yang (2016) find that outside directors who benefit from selling stocks in a firm's financial misreporting period as the CEO does are less likely to fire the CEO. They interpret the director-CEO joint selling as a high level of alignment between them.

this paper. Firms need to balance the advisory and the monitoring role of the board (Adams and Ferreira, 2007). Theories suggest that the effectiveness of monitoring by independent directors depends on the information environment of the firm (Hermalin and Weisbach, 1998 and 2003; Raheja 2005; Harris and Raviv, 2008). Duchin, Matsusaka, and Ozbas (2010) provide empirical support that the value of board independence varies across firms. Shareholders in some firms may find it preferable to keep certain independent directors for long due to their valuable advisory services, while being aware of their jeopardized independence over their tenure. Indeed, the inconclusive findings in the literature on the effect of independent directors' tenure on other corporate decisions and firm value, to be reviewed next, are suggestive of this view.

2. Hypotheses Development and Delineation of Marginal Contribution

In this section, we develop two competing hypotheses about how independent director's tenure would be associated with the effectiveness of their monitoring of executive trading. Also, we discuss the contribution of our study to the literature.

2.1. Hypotheses development

It is a consensus in the literature that executives are informed in their private trades (in particular, purchases), evidenced by their ability to predict stock returns (e.g., Jaffe, 1974b; Seyhun, 1986; Rozeff and Zaman, 1988; Lin and Howe, 1990; Lakonishok and Lee, 2001; Jeng, Metrick, and Zeckhauser, 2003; Marin and Olivier, 2008). There is empirical support that managers have both market-timing ability and private information about firm operations in their private trades (e.g., Piotroski and Roulstone, 2005). The main argument in favor of insider trading is that it allows communication of information to the market and thus stock prices will fully incorporate information, leading to higher valuation and returns from financing real investment (Leland, 1992).[12]

On the other hand, investors and regulators are also concerned with executives' abuse of their informational advantages for private gains at the expense of outside investors. This is warranted by rich empirical evidence shown in the literature. For examples, Cheng and Lo (2006) find that, to maximize private gains when litigation risk is sufficiently low, executives may disclose negative news and purchase depressed shares to exploit the temporary underpricing from the news. Similarly, Niessner (2015) shows that executives are more likely to disclose

[12] Hu and Noe (2001) suggest that permitting insider trading would allow information about hidden managerial actions to be impounded into asset prices, which in turn helps shareholders make better personal portfolio-allocation decisions.

positive news prior to their private sales. Jagolinzer (2009) provide evidence of opportunistic behaviour in insider trading by showing that even the pre-specified trades under the 10b5-1 plans are timed to firm performance. Wu (2016) find that insider trading profitability increases following an exogenous shock that results in an increase in firm opaqueness, consistent with insiders exploiting their informational advantages.

The potential expropriation from insiders' informational advantage has serious negative implications on firms, shareholders, and the market. In the presence of more informed insiders, investors would either invest less or require higher compensation for their investment. This leads to lower stock liquidity and higher cost of equity, which reduces firm value and shareholder wealth (Easley and O'hara, 2004). In contrast, the literature shows that imposing strict internal trading policies or strengthening their enforcement will reduce cost of equity for firms (e.g., Masson and Madhavan, 1991; Easley, Hvidkjaer, and O'Hara, 2002; Choy and Silvers, 2009). It echoes the early theoretical work suggesting that the cost of informed insider trading is likely to be greater than its benefits (e.g., Manove, 1989; Ausubel, 1990; Khanna, Slezak, and Bradley, 1994). Therefore, it highlights the importance of regulation and board oversight of insider trading to prevent insiders' expropriative trading.

To enhance the market quality, regulators have stepped up with a series of rules and laws to govern insider trading activities.[13] At the corporate level, board of directors is the governing body of insider trading activities with General Counsel or a related officer often being delegated to be responsible for the routine implementation of governance. The board initiates insider trading rules and policies, reviews the adequacy of them to comply with all applicable laws and regulations, and more importantly, ensures the enforcement of them. Independent directors are critical in playing the governing role. However, the effectiveness of their monitoring is likely to be affected by their independence that is in turn related to their tenure.

The *Compromise view* supports the conjecture that independent directors' independence may be compromised over their tenure. Fracassi and Tate (2012) and Hwang and Kim (2009) show that outside directors who are connected with management (through social ties and networks) exhibit weaker effectiveness in monitoring management. Working together in the same firm fosters such a connection. Moreover, Katz (1982) suggests that extended tenure reduces intra-

[13] These rules and laws specify the definition of insiders (Rule 10b-5-1), enhance the disclosure of insider trading activities (Rule 10b-5; Regulation Fair Disclosure), pin down the penalty against the violators (Insider Trading Sanctions Act of 1984) and the rewards to the informants and the responsibility of top management for failure to comply with insider-trading regulation by any employee of the firm (Insider Trading and Securities Fraud Enforcement Act (ITSFEA) of 1988).

group communication and isolates groups from key information source. The change in business condition and demand for fresh idea also encourage director replacement[14]. Also, spending time together over a prolonged period creates cohesiveness among the board of directors which in turn lead to groupthink (Coles, Daniel and Naveen (2015)). Groupthink can deteriorate board monitoring to the extent that it leads directors to ignore or discourage dissenting opinions.

Note that for those directors who are seemingly independent based on the regulator's definition but are not truly independent due to their co-optedness or prior social connection with executives, their monitoring effectiveness shall not be affected by their tenure (because they are not so effective monitors anyway). That is, the compromise view shall apply only to those independent directors who are truly independent and are thus likely to be more effective monitors when they join the board. We thus have the following hypothesis:

> *Compromise hypothesis: Executive trading profitability will increase as the tenure of independent directors increases. And this relation should only hold for those independent directors who are truly independent and are likely to be more effective monitors when they join the board.*

Alternatively, the *Improvement view* suggests that as the independent directors sit on board longer and longer, they will possess more firm-specific knowledge. Since the monitoring effectiveness of independent directors require them to have sufficient information about the business model of the firm, this will hence improve their monitoring quality. Beside, director's tenure is also positively related to their experience and competence as well as their organizational commitment to the firm[15], which will also improve their monitoring quality. Jiang, Wan and Zhao (2015)'s finding implies that directors are more willing to debate and express their strong opinion when they no longer feel beholden to the managers for their appointment or have great concern about their reappointment which mostly happens during the latter period of their tenure. This will also lead to more intensive monitoring. Therefore, we have the alternative hypothesis as follows:

> *Improvement hypothesis: Executive trading profitability will decrease as the tenure of independent directors increases.*

2.2. A literature review and delineation of marginal contribution

[14] See National Association of Corporate Directors (1996).
[15] See Vance (1983), Buchanan (1974) and Salancik (1977).

Our study contributes to the literature in several ways. First, it sheds light on how board independence and its effectiveness in monitoring evolve over time, and contributes to a better understanding of the dynamic board behavior and its impact on firms. Our finding is particularly relevant given the great concern on board independence by regulators, the market, and large institutional investors. The premise of the regulatory requirement for a majority of independent directors on the board is that an independent board is conducive to greater monitoring effectiveness. This is because independent directors are less subject to potential conflict of interest, have incentives to monitor due to their reputation concerns, and are capable of monitoring due to their technical expertise in management and decision-making (Fama and Jensen, 1983).[16] Our study shows that an unintended consequence of the regulation is the lengthening tenure of independent directors, which can have negative implications on the independence of independent directors and hence the quality of board oversight. Therefore, our study calls for a more fine-tuned view of board independence and in particular, the terms of independent directors.[17] Nguyen and Nielsen (2010) show that independent directors are valuable to shareholders by documenting a negative stock price reaction to the sudden deaths of independent directors. However, consistent with the *Compromise view*, they find that stock prices react less negatively when the deceased independent directors have long tenure.

There are a few studies that have examined the relation between directors' tenure and the effectiveness of board monitoring of other corporate decisions and found mixed results. For example, some show that independent directors' tenure is positively related to the level of CEO pay (Vafeas, 2003) and the probability of a firm experiencing governance problems like major litigations, accounting restatements, and corporate scandals (Berberich and Niu, 2011). In contrast, others find that the likelihood of financial statement frauds decreases (Beasley, 1996) and dividend payout increases (Sharmar, 2011) in outside directors' tenure. Dou, Sahgal, and Zhang (2015) focus on independent directors with a substantial tenure of more than 15 years and find that firms with a higher proportion of these directors on the board have lower CEO pay, higher CEO turnover-performance sensitivity, and a lower likelihood of intentional misreporting of earnings. The contrasting results can arise from different samples, sample periods, and director characteristics covered in these studies. Our sample is comprehensive to date for all

[16] Studies showing that independent directors are better monitors include, for example, Weisbach (1988), Byrd and Hickman (1992), Brickley, Coles, and Terry (1994), Cotter, Shivdasani, and Zenner (1994), Duchin, Matsusaka, and Ozbas (2010), Chen, Cheng, and Wang (2015), and Guo and Masulis (2015).

[17] Surprisingly, the issue of director terms does not seem to have received enough attention among shareholders, especially during the early years. In a study of shareholder proxy proposals in the period of 1987-1994, Gillan and Starks (2000) find that proposals on the limitation of director terms are usually made by the so-called "gadfly" investors, but often receive low votes. But as we show, the tenure of independent director has on average increased substantially, especially following the reforms in the early 2000's.

independent directors ("grey" or affiliated directors are excluded). Moreover, our finding suggests that when independent directors face less scrutiny from shareholders in their monitoring of certain corporate activities (like insider trading here), compared to those always at the spotlight (such as managerial turnover, financial misconduct, and executive pay polices), their monitoring effectiveness is more likely to be attenuated over their tenure.

Huang (2013) finds an inverted U-shape relation between firm value and the tenure of outside directors.[18] He explains that sitting on board for long would be good for the board to play its advisory role (value-enhancing), but not necessarily so for it to play its monitoring role (value-decreasing). Thus, tenure of outside directors is not likely to be unambiguously related to firm value. However, the effectiveness of board monitoring depends on directors' access to information, which is arguably positively related to the board tenure. Moreover, he focuses on outside directors who are either independent or affiliated (or "grey") directors. Unlike him, we focus on independent directors only, who are shown in the literature to be better monitors than affiliated directors. Another advantage of our study is that we examine a governance event, which helps to isolate the effect of independent directors' tenure on their monitoring effectiveness without any confounding impact of their tenure on their advisory role.

Second, we add to the literature on board characteristics and the effectiveness of board monitoring. In addition to board independence, prior studies show that board's monitoring effectiveness is also affected by the existence of certified inside directors (Masulis and Mobbs, 2011), directors' social connections with the CEO (Fracassi and Tate, 2012), director busyness (e.g., Ferris, Jagannathan, and Pritchard, 2003; Perry and Peyer, 2005; Fich and Shivdasani, 2006; Field, Lowry, and Mkrtchyan, 2013), director co-option (directors elected after the CEO takes office) (Coles, Daniel and Naveen, 2014), director gender (Adams and Ferreira, 2009; Eckbo, Nygaard, and Thorburn, 2016), director age (Masulis, Wang, Xie, and Zhang, 2016), director reelection pressure (Fos, Li, and Tsoutsoura, 2016), board diversity (Giannetti and Zhao, 2016), and directors hired as cheerleaders (Cohen, Frazzini, and Malloy, 2012). These studies examine characteristics of directors to identify the cross-sectional variations in the effectiveness of board oversight and call into question the independence of certain directors that are defined to be independent technically. But less attention has been paid on how the effectiveness changes over the tenure of independent directors.

[18] A similar finding can also be seen from Livnat, Smith, Suslava, and Tarlie (2016).

Third, our study is also related to a burgeoning literature on individual directors' behavior while most of existing studies examine the behavior of the board as a whole. Ravina and Sapienza (2010) examine independent directors' private trades and find that they are on average informed. But they do not show how this informational ability changes over independent directors' tenure. Jiang, Wan, and Zhao (2015) find that directors are more likely to dissent in voting before the end of their term. Adams, Ragunathan, and Tumarkin (2015) provide evidence about individual directors' board committee activities and show how these would affect their informativeness. We examine independent directors' private trades over their tenure and their consistency with executives' trades. Our finding suggests that independent directors behave more cohesively with executives over tenure.

Lastly, we contribute to the vast literature on insider trading, and in particular, on the impact of corporate governance on insider trading activities. Bettis, Coles, and Lemmon (2000) suggest that internal governance plays an important role in regulating insider trading activities, notwithstanding the government and market regulations. Cziraki, Goeij, and Renneboog (2013) show that insider trading profits can be used as a kind of compensation to executives for more stringent corporate governance that executives face. Skaife, Veenman, and Wangerin (2013) find that the profitability of insider trading is significantly greater in firms displaying material weaknesses in internal control. This highlights the necessity of monitoring on insider trading.

In a related paper, Dai, Fu, Kang, and Lee (2016) construct an index of a firm's quality of internal governance, and show that firms with better internal governance are more likely to adopt internal trading policies and observe lower insider trading profitability.[19] However, they do not show which individual factors matter in the governance index for insider trading profitability. Our focus is on the tenure of independent directors, and we find that it has a significant impact on executive trading profitability. Our finding holds after controlling for most of the governance index constituents in Dai, et al. (2016), such as board size, board independence, multiple-directorship held by independent directors, CEO-Chairman duality, and institutional ownership, etc. In addition, we also control for independent directors' share ownership. We show that insider trading profitability is higher in firms with larger boards, CEO-Chairman duality, busy independent directors (with more directorship), and lower institutional ownership. More interestingly, we find that the tenure of independent directors, but not board independence, is significantly related to executive trading profitability. It suggests that it is not the board

[19] This finding only holds for insider sales but not for purchases. They explain that sales are more subjected to legal risks. We find that the impact of independent directors' tenure on executive trading profitability holds for both purchases and sales.

independence per se, but rather the true independence of independent directors, that matters for board monitoring.

3. Data and Sample Construction

The insider trading data is obtained from the Thomson Reuters insider trade files. We use the data from table1 which contains the conventional and non-derivative transactions. We exclude all transactions with low levels of reliability (cleansing records S and A). Records that are reported on forms other than Form 4 are also excluded, thus we also delete the exempt small and unregistered private transactions. And we restrict our sample to open-market purchase or sale. Moreover, we focus on the insiders trading initiated by the executives only. According to Thomson Reuters insider trading files, 32.13% of the insider trading are initiated by executives. Here, executives are defined following the classification of Thomson Reuters.

To calculate the profitability of insiders trading, we follow the method of Ravina and Sapienza (2010). We calculate the return from investing one dollar in the same way as the insider does, by either purchasing one dollar worth of the company stock when she buys, or by selling one dollar worth of the company stock when she sells. Market-adjusted buy-and-hold returns (BHARs) are calculated by subtracting the market return from the firm return, $(R_{it} - R_{mt})$ and compounding it over time. We try 30, 60, 90, and 180 calendar days as alternative holding horizons and we use value-weighted market index to proxy market returns. The results are multiplied by 100 to make the coefficients in percentage form.

We further separate the insider trading into three types based on the information it may contains following the method developed by Cohen, Malloy and Pomorski (2012). The classification is made for each year and each insider. First we require the insiders to have at least one trade in each of the three preceding years to be classified. Otherwise we categorize all his trade in this year as "unclassified". If the insiders trade in the same month for at least three consecutive years, then his trades in the same month in this year are considered as "routine" and his trades in other months of this year are considered "opportunistic". If the insider traded in past three consecutive years but no trade in same month, all his trade in this year are considered "opportunistic". Based on this classification, we find that 31.94 % of the executives' trading are "unclassified", 64.62% of them are "opportunistic" and 2.35 % of them are "routine". Generally, opportunistic trading should contain more information than routine trading while unclassified trades are more closely resemble opportunistic trades rather than routine trading according to the finding of Cohen, Malloy and Pomorski (2012). By replicating Cohen, Malloy and Pomorski

(2012), we find that opportunistic purchase transaction has very significant predictability power of future returns while the predictability of routine buy is not significant. On the other hand, opportunistic and routine sales transaction both can significantly predict future returns. But the predictability power of opportunistic sell is much greater than routine sell. Meanwhile, unclassified transaction has almost as much predictability power as opportunistic transaction.

The board data come from the IRRC. Tenure for each director is calculated as the current year minus his year of "director service since". The calculated tenure is replaced by zero if it equals to -1. The tenure is considered to be "missing" if the calculated tenure is longer than 90 years. These kinds of observations are very small and do not change the overall results. We need to consolidate the information about each director's tenure to firm specific features. Thus, we calculate independent director tenure as the mean of the tenure of all independent directors on the board for each year. Similarly, the insider director tenure is calculated as the mean of the tenure of all inside directors. We also control other board characteristics such as board size, board independence, CEO Chairman Duality dummy, number of directorships held by the independent director as well as the total percentage of firm's equity shares held by all independent directors. Board characteristics such as board size and board independence are not winsorized.

We Including a rich set of control variables not only allows us to provide further insights into the determinants of returns from insider trading, but also minimizes the omitted variable bias which may arise in the empirical analysis. Several firm characteristics are included. The scrutiny of investors is much greater in larger firms and top executives are more likely to possess valuable information in smaller firms. Therefore, firm size is controlled. MB Ratio is generally taken as a predictor of future stock returns. Firms with higher R&D intensity are perceived to be with greater information asymmetry problems. Analyst dispersion is also controlled as a proxy for information asymmetry. Loss dummy is included to control for the potential reversal of poor accounting performance. Institutional ownership ratio is included as a measurement for internal governance. Transaction-level characteristics are also included. Transaction size controls for the possible link between the importance of private information and trade size. 180 days buy-and-hold returns prior to the transactions control for insiders' contrarian behaviour. Insiders may exhibit contrarian behavior, so we expect a negative relation between the past returns and the subsequent returns. Dollar value of shares held on the day of the transactions controls for the possible link between the trading activity and ownership of the insider. Total shares traded by all insiders of the firm during ten days prior to the transaction scaled by total shares outstanding

control for either pre-emptions of a trade's information content or reinforcements of prior signals. Stock return volatilities over the last month prior to the transaction control for the information environment of the firm right before the trading. These data are obtained from various sources such as Compustat, CRSP, IBES and Thomson Reuters.

In order to mitigate the potential bias caused by omitted unobservable characteristics, we include firm fixed effects. We also include year fixed effects to control for potential time trend effects. The regressions are transaction level, and we cluster the standard error by each individual and corrected for heteroskedasticity. The results are unchanged if we cluster by each firm.

We start with firms in Thomson Reuters because this data base has data on insiders trading. To incorporate the information of board characteristics, the Thomson Reuters database need to be merged with the IRRC data. IRRC only include S&P 1500 firms. Thus there are a lot of firms in Thomson Reuters which cannot be found in IRRC. We exclude the firms not in the universe of IRRC. The sample period is from 1998 to 2014, since the data of "director service since" is only available after year 1998. Finally, our sample contains 2530 unique firms during the 17 year sample period.

As shown in *Figure 1*, the distribution of independent directors' tenure has been shifted to the right in the last few years (median tenure = 7 years) compared to 2000s (6 years) and earlier (5 years). And this shift has occurred to all four main committees of the board (nominating, compensation, governance, and audit). Interestingly, the composition of independent directors has also been undergoing a significant change since the reforms. *Figure 2* shows that the proportion of senior independent directors (defined as those with over 10 years of tenure, the top 30 percentile of all independent directors' tenure during 1998-2014) among all independent directors increases from 29% in 2005 (the effective year of the exchanges' new listing rules) to 37% in 2014. In contrast, the proportion of junior independent directors (those with less than 3 years of tenure, the bottom 30 percentile) decreases straightly from 35% in 2005 to 24% in 2012 and only rebounds to 27% in 2014. This change in the composition of independent directors is evident in all four main committees of the board. These significant changes in the tenure of independent directors are possibly due to the limited pool of talent and search costs on the director market. Firms tend to retain long-tenured independent directors to fulfill the board independence requirement because it is difficult or costly to find replacement directors.

[Table 1]

Table 1 reports summary statistics for these variables. Our sample includes S&P 1500 firms only which lead to larger mean and median of firm size and MB ratio than representative Compustat firms. 43% of the firm-year observations are associated with non-zero R&D expenditure and 13% report negative profitability. The average tenure of the insider directors is longer than the independent directors. There are more than nine directors sit on the board on average. 90% of the observations actually have an independent director majority board and 67% have CEO as the chairman of the board. Boards are relatively more concentrated on gender and ethnicity while more dispersion on age. The independent directors hold less than one outside directorship and around 1.4% of voting rights on average.

4. Main Empirical Analyses and Results

4.1 Baseline results

4.1.1 Main regression

Before the baseline regression, we check whether the independent directors would have better access to firm specific information as their tenure increase. This can be reflected in the increased profitability in their own insider purchase as shown in *table 10*. We don't observe any significant change in their trading profitability with their own tenure change.

There are several interesting evidences about how the behaviors of independent directors change along their tenure which are not reported in the table. For example, we find that long-tenured independent directors hold less outside directorship than short-tenured independent directors. Their ownership of own firms' shares increase. Their participants in board committees increase because they become more likely to sit on compensation, nomination and governance committees. However, long-tenured independent directors are actually less likely to sit on audit committee than short-tenured independent directors. Related to independent directors' insider trading activities, their number and size of insider purchase would be decreased along their own tenure. Their size of opportunistic and total trading would also be decreased given the fact that they will be granted more own firms' shares. They tend to do more routine trading instead.

[Table 2]

The baseline regression is directly related to our entrenchment hypothesis. We estimate a transaction level panel specification in which we regress the insider trading profitability for

different holding horizons on the tenure of the independent directors. Here the tenure of the independent directors is aggregated for each firm and each year as the average among all independent directors. The dependent and control variables are defined in the previous section.

Table 2 illustrates the results for the baseline regression. We can find a consistently significant positive relation between insider trading profitability and the independent directors' tenure. And the magnitude keeps increasing as the holding horizon become longer. The executives of the firms which have independent directors sit on the board for a longer time will earn more from their insiders trading. Insider directors' tenure also has positive impact on executives' insider trading profitability, but the effect is mostly not significant. We would expect these insider directors to play a much less important role in monitoring the insider trading activities of the firm. As we expect, executives in larger firms or firms with higher institutional holdings will earn less from their insider trading. This could be due to the more intensive monitoring or less severe information asymmetry among these firms. The results associated with MB ratio, Loss dummy and prior return indicates prominent contrarian strategy. Opaque information environment revealed as the higher return volatilities prior to the transaction lead to higher insider trading profitability. Other proxies for information asymmetry such as analyst dispersion or R&D dummy have no significant impact on insider trading profitability. Information environment should be considered as one of the most important determinants of insider trading profitability. However, since we have a much richer control variable set than former literatures, their effects perhaps are already captured by the firm size and institutional holdings or the return volatilities. We find that transaction size has a negative relation associated with the insider trading profitability. If the executives expect the trading to earn higher profitability, they are very likely to cut the transaction into small pieces to avoid potential scrutiny. Executives' insider trading profitability is higher if firms have larger board or CEO of the firms also hold the position of board chairman. The results confirm the finding of former literatures that the small board dominates in monitoring role and duality of CEO and board chairmen compromise the monitoring effectiveness of the board. Since market regulations and corporate internal policies are not sufficient to prevent informed insiders trading, weaker monitoring leads to higher insider trading profitability. Busy board also increases the insider trading profitability. And higher independent directors' ownership or board independence tends to decrease insider trading profitability.

We also investigate the relation between independent director tenure and the incidence of insiders trading which are measured by number of trading and trading intensity. We use Negative

binomial model instead of Possion model to test the incidence of insiders trading because of the over-dispersion problem which frequently holds in real data. The results of the count model show that the number of insider trading is smaller for firms with longer independent director tenure. Nevertheless, the relation between trading intensity and independent director tenure is insignificant. The result is still insignificant if we simply use the trading volume which is not scaled by the total shares outstanding. Furthermore, we check how the independent director tenure would affect executives' total profits. Here, total profits are calculated as the profitability multiply the transaction size for each transaction and is aggregated for each individual and each firm in each year. We find that the executives' total profits are also higher for firms with longer independent director tenure. All these three measures are for each individual and each firm in each year. So, all the transaction level characteristics cannot be included. But we further control the executives' holding at the beginning of the year[20].

4.1.2 Different types of transaction and different types of firms

Except the overall results, we also see how the independent directors' tenure affect executives' insider trading profitability for different type of transactions and for different type of firms. Some sorts of insiders trading are considered to contain more information, such as the purchase transaction and the opportunistic transactions. As shown in panel A of *table 3*, the results are stronger for sales transaction, and not so significant for purchase transaction. Although purchase transactions are usually considered more likely to be motivated by possessing some valuable information, sales transaction are actually subjected to higher probability of litigation risk (Cheng and Lo (2006)). Sales transactions are more closely scrutinized by the market and hence maybe more severely monitored by the internal governance.

[Table 3]

Panel B reports the results for the subsample test for different types of firms. Here we implement the subsample test by separating the full sample into two subsample based on different dimensions stead of using the interaction term. For the transaction type, we use the interaction terms because we would expect all other control variables to have the same impact on insider trading profitability for each type of transaction. But for the firm type, some of the control variables might have different impact for different type of firms. In panel B1 to B3, firms are separated into subsamples based on variables measuring the information transparency faced

[20] The results for the tests related to trading incidence and total profits are not reported since the results associated to trading incidence is not significant and the results about total profit is implied by the significantly increasing profitability and insignificant effect on trading volume.

by the outsiders or the independent directors: analyst dispersion, operation complexity, and R&D intensity. Complex firms and firms with higher analyst dispersion are more information asymmetric. Firms spending more on R&D usually are high-tech firms with more uncertain environment, and thus firm specific knowledge is more valuable. All measurements of information asymmetry give the same results: the pattern of increasing insider trading profitability along the increasing of independent director tenure is stronger for those opaque firms. As shown in Rogers and Stocken (2005) as well as Huddart and Ke (2007), information asymmetry tends to be one of the most important factors in explaining the abnormal return earned by informed insiders. If the information asymmetry between the insider and outsider of the firms are higher, the insiders are more likely to possess valuable private information and earn insider trading profitability. As for those transparent firms, insiders are not very likely to have great information advantage over the outsiders. Thus, the effect of board monitoring on insider trading profitability is no longer crucial.

4.2 Further evidence of weakened monitoring by long-tenured independent directors

4.2.1. Nature of insider trading

As the independent director tenure increase, not only the profitability of executives' private trading increase, the nature of the trading also changes. As shown in column (1) of table 4, firm's executives tend to do more opportunistic trading both in the sense of frequency and intensity.

Policymakers have placed various restrictions on insider trading, such as Rule 10b-5 of the Securities Exchange Act of 1934, the Insider Trading and Securities Fraud Enforcement Act, and the Stock Enforcement Remedies and Penny Stock Reform Act. Given the fact that the existing regulation and enforcement mechanisms are not sufficient in preventing informed insider trading[21], many companies have increasingly adopted internal insider trading policies. Such policies, which are mainly intended to protect a company against liabilities posed by its employees' insider trading, can be in the form of a general ban on trading or tipping on material nonpublic information, allowed trading windows, blackout periods, or pre-clearance requirements (Bettis, Coles, and Lemmon (2000); Jagolinzer, Larcker, and Taylor (2011)). There is a quote from the insider trading policy documents of General Motors. It represents the typical form of internal trading policy: "(insiders) are prohibited from engaging in any transaction

[21] Jaffe (1974a) finds no significant changes in the volume and profitability of insider trading after the most important changes in insider trading regulation. Seyhun (1992a) finds that the increased statutory sanctions in the 1980s did not have much effect on the volume and profitability of insider trading. Bris (2005) finds that insider trading enforcement increases both the incidence and the profitability of insider trading using international sample.

involving a GM security except: (i) during specified trading windows, which generally begin after the second full trading day following the release of quarterly financial results and end on the last day of the second month of each quarter …… For greater clarity, as described above, even during the trading window period, all securities transactions must be approved in advance by the Deputy General Counsel & Corporate Secretary……"

Even though literature have proven that internal trading policy can restrict informed insider trading, there is little evidence on how internal governance mechanisms, especially board monitoring, would affect the enforcement of these internal trading policies. We manually collect the information associated with firms' internal trading policies by screening the keywords from the firms' website. We consider the firm to have internal trading policies if we can find evidence that the firm has its own policies in addition to market rules to regulate insiders trading activities. Firms that have no official website, no files related to insider trading or firms with files about insider trading but do not mention or imply that they have firm-specific insider trading policies are all considered to be with no internal trading policy. Like a lot of the former studies about internal trading policy, we are unable to identify the precise adoption date for each policy. We have to assume the terms of policies are relatively stable at least during our sample period. We find 594 (22.5%) of the sample firms have adopted internal trading policy (ITP), but 360 of them just claim they have these policies and there is no evidence about the trading window or any details about the policies. Within the firms that already adopted ITP like trading window restriction, some of them further require the insiders to get approval or pre-clear by the general counsel before initiating any transaction. Besides, insider can also trade outside the safe window with the permit or approval of the general counsel. Among these 594 ITP firms, 100 (16.8%) of them have mentioned about general approval for all insiders trading and 11 (1.8%) of them accept exemption with general counsel approval. 74 firms provide effective details about their insider trading policy, e.g. the beginning day and ending day of the restriction or safe windows. Using the data of these 74 firms, we can investigate how independent directors' tenure affects the enforcement of the ITP. We convert all information about restriction window to safe window which identified the window when insiders can trade. We assume one fiscal quarter is 90 days, one month is 30 days and one week is 7 days. If the firm does not specify the ending day of the window, we just let it to be the last day of the quarter period.

[Table 4]

For the enforcement of ITP, we define the transaction to be "safe" if the insider trading is executed during the safe window following an earnings announcement. Whether the transactions

are safe or not is defined according to the detail information for each firm. Not surprisingly, insiders do not always obey the policies. 20.06% of the transactions are actually executed outside the safe window. From column (2) of *table 4*, we can find that as the independent director tenure increase, the probability that the executives do the insider trading outside the safe window required by the firm is increased.

Since only 74 of the sample firms have the specified information of the safe trading window, we try to generalize the results in the full sample. Roulstone (2003) use an indirect way to identify whether the firm has adopted internal trading policy or not. He assumes firms with 75% or more of insider trading initiated within one month after earnings announcements as those with insider trading restriction policies. One month after earnings announcements is a period of time when the information asymmetry between the insiders and the outside market are relatively lower. We can call it "transparent period". The single most common internal trading policy aims to restrict the insider trading activities to this kind of period. Based on a similar spirit, we consider the transactions happened within one month following the previous earnings release to be more transparent and we find that executives are more likely to trade outside the transparent window as independent director tenure increase. This either reflects the failure of board monitoring or merely because the insiders are getting more permission granted.

4.2.2. Independent directors who are not truly independent

From the previous section, we have already known that executives would profit more from their private trading as independent director tenure increase and this is because they can better exploit their information advantage. In the following section, we will show that this is due to the weakened monitoring form the independent directors.

If the independent director is already captured at the time he joined the board, his independence would be less likely to be compromised along his tenure. There is a rich literature on investigating the cross sectional difference in the features of independent director. Following Coles, Daniel and Naveen (2014), we define co-opted independent director as those appointed after the CEO assume office. These directors are more likely to pledge loyalty to the CEO who was involved in their initial appointment. Coles, Daniel and Naveen (2014) find that non-co-opted board independence can better explain the monitoring effectiveness rather the conventional measure of board independence. Based on similar spirit, we separate the independent director into two groups according to whether they are co-opted or not and calculate the average tenure for these two groups of independent directors respectively. The date

become CEO is obtained from Execucomp. If the independent director joined the board during the year the firm change its CEO, we consider him to be appointed by the old CEO. Thus, he is not co-opted by the new CEO. As shown in panel A of *table 5*, the effect of independent director tenure on insider trading profitability is concentrated on the non-co-opted independent directors.

[Table 5]

Second, we try to check whether the independent directors are linked with the CEO in other ways at the time he joined the board. Following Fracassi and Tate (2012), we consider three types of connection between the independent directors and the CEO: overlapping employment (past or current), education and other activities. The information about the connection between independent directors and the CEO is obtained from the Boardex database. We use CIK code to merge our sample with the Boardex database. 2110 (79.5%) of the sample firms can be directly merged with Boardex using CIK code[22]. We identify firms' CEO and independent directors from the employment file because the board summary file do not distinguish independent director. From the employment file, we can also identify the year the CEO or independent directors started to work for the firm and year they leave their position. We have compared the independent directors covered by the Boardex and IRRC for each firm and each year. In some years, Boardex include more independent directors than IRRC and in some years IRRC include more independent directors than Boardex. But the discrepancy is acceptable.

We want to specify whether the independent directors and the CEO are connected through some external connection or not at the time when the independent director is assigned to the firm. In the year when the independent director come to the board, if the independent director and the CEO have been worked together before (or if they still work together) in any firms other than the firm for which we are measuring social connection between the CEO and the board, they are considered to be connected through overlapping employment. If the independent director and the CEO graduated from the same institution or university, they are considered to be connected through education. Independent director and the CEO can also be connected through other activities such as golf club or charity membership. The independent director is defined as "connected" if he has at least one connection with the CEO in the year he comes to the board. During the year when the firms change their CEO, we will investigate whether the independent director are connected with the new CEO again. In the regression, we constrict our

[22] Boardex database has a larger coverage than IRRC, but it lack firm identifier which can be easily combined with other datasets. Therefore, we have to rely on the merged sample based on CIK code. Some of the firms are associated with multiple Boardex Company IDs, since Boardex will assign different Company IDs to the firm after the firm change its name.

sample to the firms with at least one connected independent director during the whole sample period. The results are reported in panel B of *table 5*. Similar to what we find for co-opted and non-co-opted directors, the relation between insider trading profitability and independent director tenure are only significant for those independent directors who are not connected with the CEO at the time they joined board.

There are other features of the independent directors which are not directly related to their independence but are also important to their monitoring effectiveness. Here we consider the busyness and the power of the independent directors. The independent director is considered to be busy if he or she holds more than three directorships, e.g. more than two outside directorships. Busy directors are considered to be valuable in advisory role but relatively less effective in monitoring role. From panel C of *table 5*, we find that the effect of independent director tenure is mainly driven by the not busy directors. Unlike busy directors, those who are not very busy would devote more effort on their job and the compromising of this type of independent director would have greater influence on insider trading activities. Similarly, the positive relation is concentrated on independent directors sitting on the governance committee, who are more powerful in the monitoring process of the board. And this positive relation no longer exists for independent directors with more reputation concerns as shown in panel E.

[Table 6]

There are controversies about the internal trading policies which argue that these trading policies appear to be a public relations contrivance, rather than an effective tool in reducing informed trading. And these internal policies make it more difficult for the SEC to prove insiders' reckless activities (Horowitz and Bitar (1998)). Our findings support the argument that these internal policies play an important role in affecting the abuse of nonpublic information in insider trades. In our sample, we can see that firms with or without ITP are systematically different from each other in many dimensions. Firms that adopted ITP are larger, have higher MB ratio and analyst dispersion, are more likely to do R&D investment and less likely to experience negative profit. They are more likely to be associated with larger, busier and more independent board. CEO is more likely to perform as the chairman of the board and tenure of the independent or insider directors are both more likely to be longer on average. All these difference are significant according to the simple t-test. These firms are complex and less transparent, so informed insider trading activities could be more intensive. Their board monitoring seem to be less effective reflecting in larger, busier and longer tenured board as well as the dual role of the CEO. The only exception is the board independence. These firms actually have a more independent board.

This is partially contradictory to the finding of Dai, Fu, Kang and Lee (2016) who shows that firms with better internal governance are more likely to adopt voluntary restriction policies measured by a complicated index[23].

Besides, we still have no idea whether firms adopt internal trading policy or not would impact the effect of independent directors' tenure on executives' insider trading profitability. If we separate the sample into two subgroups based on whether firms adopt ITP or not, we would see that the relation between the insider trading profitability and the independent director tenure are almost the same in the two subsamples, except that it is slightly stronger for firms without internal trading policy. In *table 6*, we use the interaction term to capture the effect of ITP on the relation between insider trading profitability and the independent director tenure. Here, we do not include the ITP dummy because it is absorbed by the firm fixed effect. As shown in table 6, adopting internal trading policy attenuates the effect of independent director tenure. Insider trading activities is a sort of grey area which is easier for the independent directors to turn a blind eye to the executives who have a closer relation to them. If there exist explicit rules, the indulgence would be much more difficult since the independent directors have their own career concerns.

A portion of these ITP firms also require general counsel prior to the transaction. According to Jagolinzer, Larcker and Taylor (2011)[24], general counsel play a much more important role in mitigating informed trading by corporate insiders than merely the restriction policies. The percentage of firms that is with explicit evidence of general counsel approval in our sample is very small. The result shows that general counsel approval has no additional effect on the relation between the insider trading profitability and the independent director tenure given the existence of internal trading policy.

There exists at least another governance factor that can help counter the weakened monitoring form independent director as their tenure extended: the presence of outside block-holder on board. This type of block-holder is more aligned with the interest of shareholders and also has great power to influence board decisions. As shown in *table 6*, the positive relation between executives' insider trading profitability and independent director tenure becomes weaker

[23] They use standardized values of six individual governance variables to obtain their main composite internal governance score: the percentage of outside directors on the board, the percentage of outside directors in the compensation committee, CEO pay-performance sensitivity, an indicator for firms in which any non-executive directors receive stock or options as a part of their compensation, the percentage of ownership held by institutional investors, the percentage of shares held by the top five independent, long-term, and dedicated/quasi-indexer institutional investors as defined in Chen et al. (2007).

[24] They find over 80% of the ITP firms also adopt GC approval. But in our sample, this percentage is much lower.

for firms adopted internal trading policies or with at least one outside block-holder sitting on board. Independent director with a legal background can also be perform like a vigilante, hence reduce the positive relation between the executive insider trading profitability and the independent director tenure.

[Table 7]

The information contained in executives' insider trading increases along the tenure of independent director. To investigate how stock market would capture this relation, we test how does the abnormal trading volume triggered by the filing of insider trading change as independent director tenure increase. We use the following regression to estimate the abnormal trading volume. In this regression, the dependent variable is the trading volume for each firm in each trading day scaled as a percentage of total shares outstanding for firm. The amount of trading volume initiated by the top management of the firm is removed from this amount. Filing date is the date when SEC received the file of insider trading. Generally, transaction date is earlier than the date the insider signed the file and signature date is earlier than the date SEC received the file. Thus, the SEC date is considered more relevant to the public availability of the insider trading information.

$$\text{Log (volume)}_t = \alpha_1 \text{Filling date} + \beta_1 \text{Log (volume)}_{t-1} + \beta_2 \text{Log (volume)}_{t-2} + \beta_3 \text{Log(market volume)} + \beta_4 \text{Monday} + \beta_5 \text{Tuesday} + \beta_6 \text{Wednesday} + \beta_7 \text{Thursday} + \beta_8 \text{Holiday} + \beta_9 \text{Earning announcement} + \beta_{10} \text{Dividend announcement} \quad (1)$$

The coefficient of the variable "file date" is explained as the abnormal trading associated with the filing of insider trading. We estimate a separate coefficient of variable "Filing date" for each firm-SEC filing date and use it as the dependent variable in table 7. As shown in *table 7*, market reaction to insider purchase become stronger as independent director tenure increase.

4.2.3. Direct evidence of compromised independence of independent directors

In this section, we will provide direct evidence illustrating how the independence of independent directors is compromised along their own tenure.

First, we want to see whether independent director's connection with the CEO has been strengthened as their tenure increase. We will only focus on their connections through other activities such as leisure club or charity membership. The education background is stable because most directors have received their degrees (including MBA) long before they joined the board. Overlapping employment is the most important source of connection between independent

directors and the CEO, but it is not suitable for our investigation. On one hand, the employment is determined by the employer to a great extent instead of the independent director or the CEO themselves. On the other hand, tenure is highly correlated with the age and people may reduce their employment as they become older. Besides, independent director and CEO might also try to reduce their overlapping position to avoid being accused as collusion.

[Table 8]

To see whether independent director's connection with the CEO through other activities increase after they joined the board, we need to identify the start year of each connection. Unfortunately, there are a lot of missing data about the starting year for the connection through other activities. We focus on the director-CEO connections which has the non-missing starting year information only. Since over 97.31% of the independent directors in the sample and their CEO have zero (34.67%) or only one (62.64%) connection through other activities, Logit model would be more suitable instead of count model. We are not going to test whether the number of social connections increases or not. Rather, we check whether the director are more likely to socially connected with the CEO as they sit on board longer and longer. In the Logit model, dependent variable equals to one if there exist at least one connection through other activities between the dependent variable and his firm's CEO. The results are reported in *table 8*. In column 1 and 2, we include a dummy variable "After" which equals to one after the director and the CEO are connected through the investigated firm: either after the director come to the board or the CEO come to the firm. The result shows that the independent director and the firm's CEO are more likely to have social connections after they are bonded together through the position in the firm. In column 3 and 4, we break the independent director's entire tenure into for periods: early period which is from year zero to year one, the first middle period which is from year two to year three, the second middle period from year four to year five and the late period is from year six thereafter. Penalized maximum likelihood estimation is used to deal with the rare event problem. Based on the results, we can see that the social connections between the independent directors and the CEO are significantly strengthened as they sit on the board longer and longer. And this result is actually driven by the directors sit on the board for more than 3 years or even longer. We control for firm, board and individual characteristics in the regression. Some of them also have significant impact on the probability of social connection between the independent directors and the CEO. Older directors are more likely to be connected with the CEO while the effect of gender and nationality is insignificant. Directors in larger firms or firms with larger or more independent board are less likely to be connected with the CEO.

Interestingly, board diversity increases the probability that the independent directors and the CEO are socially connected and the effect is very strong for age and ethnicity diversities.

Next, we want to investigate how the trading behaviors of the independent directors change as they sit on the board longer and longer. We test the likelihood of collusive trading between independent directors and other firm's executives. First, we calculate the total shares of sale transaction and purchase transaction initiated by the non-director executives respectively for each firm during each fiscal quarter. We require the executives not to be directors of the firm so that it does not include the trading of insider directors. Then we calculate the net shares traded by executives for each firm during each fiscal quarter which equals to the total purchased shares minus the total sale shares. Next, we calculate the net shares traded by the independent directors. Trading is defined as "conflicting" if the director trades in opposite direction with the executives of the firm in this month. Trading is defined as "silent" if the director trades but the executives of the firm do not trade in this month, or the director does not trade but the executives of the firm trade in this month. Trading is defined as "consistent" if the director trades in the same direction with the executives of the firm in this month. The three types of trading are defined for each director of each firm during each fiscal quarter. Consistent trading takes up 49.58% of the full sample. For the rest of the transaction, 89.08% of them are silent trading. Conflicting trading only takes up 5.51% of the full sample. The consistency is categorized into three levels in an ascending order: conflicting, silent and consistent. Here we use ordered Logit model to test the trading consistency. We report both the coefficient and the marginal effect in the following table. We can only interpret the sign of the coefficients. A positive sign means the variable is with better consistency. A negative sign means the variable is with worse consistency. The marginal effect is reported for different level of consistency. It can be interpreted in the way that if the control variable increases by one unit or if the dummy equals to one, then the transaction is how much less or more likely to be in each level of consistency. The marginal effects sum up to zero for each variable among all categories.

[Table 9]

Table 9 reports the result for the simple ordered Logit regression. The intercept parameters are significantly different from each other, so the three categories should not be combined. The independent directors become more and more likely to do consistent trading and less and less likely to do conflict and silent trading as their tenure increases. The main results will not change if we use alternative measure of consistency level which the estimation window is no longer each month but are each quarter and each half year respectively. When the window extends to half a

year, the likelihood of silent trading decreased a lot. And distinguishing conflict trading and silent trading is not as meaningful as when we use monthly or quarterly window, since cut1 constant is not significant any more.

Beneish, Marshall and Yang (2016) use the collusive trading between outside directors and firm's CEO as a new proxy for their independence. They find this new dimension to the assessment of board independence can explain the board monitoring effectiveness to a great extent. Consistent to them, we see the increasing collusive trading between independent directors and firm's other executives along their tenure as evidences of their compromising in independence. A potential explanation for independent director to be more generous in monitoring insider trading might be that they also want to trade themselves. According to unreported results, we find that the independent director's ownership of the firm shares increase with their tenure. similar to the case for firm's managers, greater equity ownership not only increases the ability of the directors to influence firm decision, but also provides them with more flexible to trade. On the other hand, independent directors might have more incentive to protect their own investment in the firm. Acharya and Johnson (2010) predict that a greater number of insiders lead to more insider trading since the probability of be detected is reduced. As the independent directors sit on board longer, they become more likely to be considered as "insider". This hence increases the overall insider trading profitability.

The unreported results also show that the independent directors are less likely to sit on audit committee as their tenure becomes longer. In this sense, they are even not necessarily to possess more firm-specific knowledge. According to Ravina and Sapienza (2010), the independent directors sitting on audit committee are those obtain relatively more valuable information about the firm reflecting in their higher insider trading profitability. And the position in audit committee is the only committee position that matters compared to nomination, compensation and governance committee. There is no significant effect of tenure on independent directors' probability of attend less than 75% of the board meeting. On one hand, this measure of board meeting attendance is too rough to capture any useful information. On the other hand, working harder does not mean boards work better (Vafeas (1999)). These simple fact about independent behavior related to their tenure are substantial challenges to the learning story about the independent director tenure rather than simply hypothetical less effective communication argument.

5. Robustness Checks and Discussions

5.1 Robustness with more controls for board characteristics

We further add board diversity measures, classified board dummy and interlocking dummy to see whether these will add explanations to insider trading profitability. Unlike Huang (2013), we do not include the tenure diversity which equals to the standard deviation of independent directors' tenure because this item is highly correlated with average independent directors' tenure. We do not find any significant effect from these variables and controlling all these board characteristics leads to multicollinearity[25]. We restrict our sample to post-SOX period only, and we find the results still hold. We also try to include the squared term of independent director tenure to capture its potential non-linear relation with insider trading profitability. The coefficient of the quadratic term is not significant and including this variable does not change the effect of other variables. The entrenchment hypothesis seems to dominate the learning hypothesis. As robustness test, we use alternative measures of the independent director tenure. First, we use the median among all independent director tenure which reflects a central tendency as measure of the aggregate independent director tenure. Also, we use the tenure of the most senior independent director, e.g. the longest tenure among all independent directors. Then, we restrict to a group of independent directors who continuously serve the board, e.g. their tenure extend to at least five year (or ten years). We excluded those independent directors who merely sit on board for a very short period of time and calculate the average tenure only among those loyal independent directors. Finally, we define senior independent directors as those with tenure longer than the sample median among all independent directors in our sample firm during our sample period. And we calculate the percentage of senior independent directors for each firm in each year as a proxy for independent director tenure. Not surprisingly, these alternative measures of independent director tenure are highly correlated and they all capture the same positive significant relation between insider trading profitability and independent director tenure.

5.2 Turnover of independent directors

Change in the composition of board construction also can lead to the change in the independent director tenure, for example, when the old independent directors leave the board or the new independent directors come to board. We use two measurements to proxy these situations. One is the percentage of independent director's turnover which reflects how much portion of the independent directors was on the board last year but leave this year. To identify

[25] We do not report the results for including all these board characteristics. After further controlling board gender diversity, age diversity, ethnicity diversity, classified board dummy and interlocking dummy, CEO-Chairman dummy and analyst dispersion are omitted. But the coefficient associated with independent director tenure is still positive significant.

the director's turnover, we require the firm to have at least two consecutive years of board information. The other is the percentage of new independent director come to board. It is necessary to check whether the results are mainly driven by the change in board composition or due to the time effect of the same bunch of independent director sitting on the board. This investigation is made by interacting the independent director tenure and an indicator variable identifying whether there is any changes in board construction or not.

[Table 11]

The results are reported in *table 11*. If a larger portion of independent directors leave board this year, the insider trading profitability will become lower. Likewise, in the years with a greater portion of new independent directors come to the board, the insider trading profitability also would be lower. Notably, incumbent independent director leaving the board not necessarily cause the average tenure to be decreased. More importantly, even if there is no change in the composition of independent directors, the executives' insider trading profitability will still increase as the independent directors sit on board longer and longer. And the isolated time effect is greater than the general results across all holding horizons.

5.3 Endogeneity of independent directors' tenure

We believe that endogeneity is less of a concern in our study. Regardless, we cannot rule out that endogeneity could be driving our results unless we have a clean instrument or natural experiment. Accordingly, we take a difference-in-difference approach to eliminate these concerns about the endogeneity of board construction. We use the regulation changes brought up by the Sarbanes-Oxley Act (SOX) as a natural experiment. The SOX was first unveiled in 17 Jan 2002 and it became law in 30 July 2002. Shortly thereafter, the NYSE and NASDAQ proposed new exchange listing rules. The proposals were approved in late 2003 and they went into effect in 2004 and 2005. Different papers have different opinion in choosing the key events associated with the passage of SOX and new exchange listing requirements, but most of them agree that market should be fully aware of this event by 25 July 2002 when the congress passed the SOX and 2005 is considered the first year of full compliance. To construct the treatment and control groups, we focus on the firms that are not compliant to the SOX and the exchanges' rules about the majority independent director on board in year 2001 and we further require these firms to be listed on NYSE or NASDAQ at least from 2001 to 2005. These 228 firms are forced to increase their board independence in order to comply with the new regulations. 86.4% of them choose to incorporate new independent directors. We further require the composition of independent

directors do not change in pre-period or post-period respectively. Thus, all changes happen during the transition period. Firms are supposed to comply with the new rules by the end of year 2004, so we compare firms' average independent director tenure in year 2001 and 2005. We find that 43.86% of the firms' average independent director tenure has been decreased. Considering four years have passed, these firms are very likely to have independent directors with relative longer tenure before the change. Meanwhile, the average independent director tenure does not decrease for 56.14% of the firms. They are very likely to have independent directors with relative shorter tenure. Treatment is a dummy variable equals to one for those noncompliant firms whose average independent director tenure decreased after compliance. The control group is the noncompliant firms whose average independent director tenure does not decreased after compliance. We do the propensity score matching to construct the control group by controlling for stock volatility, MB ratio, size, E-index, Dual class dummy, CEO-chairman dummy, inside and linked vote, non-employment block-holder dummy, CEO-founder dummy, CEO age and CEO tenure in the score matching process. We do the radius matching with the radius equal to 0.15, but using radius of 0.1 and 0.2 give us the same resulted sample. Also we require the matched pairs to be in the same Fama French 48 industry. Post is a dummy variable equals to one after year 2005.

[Table 12]

The choice of incorporating new independent directors is forced by the new regulations and hence the decrease of the independent director tenure is not an endogenous decision of the firm. The treatment and control firms are both S&P 1500 firms and do not comply with the new regulations before the event. These firms are very similar in many aspects of firm characteristics, let alone after the matching process. The difference-in-difference test also eliminate other confounding effect of the SOX and the exchanges' rules such as the increase in board independence, improvement in financial transparence and rules associated with insider trading activities. The result in *table 12* shows that the executives' insider trading profitability drops after the exogenous decrease in independent director tenure.

6. Conclusion

We find that executives tend to profit more from their private trades as independent directors' tenure increases. In firms with longer-tenured independent directors, executives are more likely to conduct opportunistic trades, trade outside the designated safe window of insider trading, or trade during informationally more sensitive time. Our finding suggests that the

independence of independent directors is likely to be compromised and thus the effectiveness of board monitoring of insider trading weakens over independent directors' tenure. As a result, executives can better exploit their informational advantages for private gains through trades. As further evidence that is consistent with the compromised independence of independent directors over tenure being the leading explanation, the profitability-tenure association does not hold for those directors who are defined to be independent but are not truly independent when they join the board. We also show that independent directors are more likely to get socially connected with executives, if they are initially not, and their own private trades become more consistent with executives' trades over their tenure.

While our finding suggests weakened board oversight of insider trading over the tenure of independent directors, we do not imply or advocate that a board with more newly incorporated independent directors is always preferred. As indicated by Adams and Ferreira (2007), the advisory and monitoring role of the board of directors are sometimes in conflict with each other. Some firms may find it more beneficial for independent directors to stay with the board for longer to better serve their advisory role. But the downside of a long-tenured independent board is that its monitoring effectiveness can be compromised. Our finding in the context of insider trading is consistent with the downside impact, but it does not speak to the overall value implication of a long-tenured independent board.

There has been an intense interest on board structure and behavior and their relevance for shareholder value. The explicit rules and regulations for a majority independent board aside, there are also public and institutional pressures for a more devoted board. The National Association of Corporate Directors, the Council of Institutional Investors, and Institutional Shareholder Services (2012), have all recommended various limitations on the number of boards on which directors serve. When the supply of independent directors dwindles, firms might find it more difficult to have new independent directors, which results in incumbent independent directors serving longer than optimal. Our finding implies that one need take the tenure of independent director into consideration in assessing the effectiveness of board independence.

Reference

Acharya, V. V., & Johnson, T. C. (2010). More insiders, more insider trading: Evidence from private-equity buyouts. Journal of Financial Economics,98(3), 500-523.

Adams, R. B., & Ferreira, D. (2007). A theory of friendly boards. The Journal of Finance, 62(1), 217-250.

Adams, R. B., Ragunathan, V., & Tumarkin, R. (2015). Death by Committee? An Analysis of Delegation in Corporate Boards. Working paper.

Armstrong, C. S., Core, J. E., & Guay, W. R. (2014). Do independent directors cause improvements in firm transparency? Journal of Financial Economics, 113(3), 383-403.

Ausubel, L. M. (1990). Insider trading in a rational expectations economy. The American Economic Review, 1022-1041.

Beneish, M. D., Marshall, C. D., & Yang, J. (2016). Explaining CEO retention in misreporting firms. Journal of Financial Economics, forthcoming.

Bettis, J. C., Coles, J. L., & Lemmon, M. L. (2000). Corporate policies restricting trading by insiders. Journal of Financial Economics, 57(2), 191-220.

Bhattacharya, U. (2014). Insider Trading Controversies: A Literature Review. In Lo, A. and R. Merton (ed.) Annual Reviews of Financial Economics 6, 385-403.

Bris, A. (2005). Do insider trading laws work?. European Financial Management, 11(3), 267-312.

Brochet, F. (2010). Information content of insider trades before and after the Sarbanes-Oxley Act. The Accounting Review, 85(2), 419-446.

Buchanan, B. (1974). Building organizational commitment: The socialization of managers in work organizations. Administrative science quarterly, 533-546.

Chen, X., Cheng, Q., & Wang, X. (2015). Does increased board independence reduce earnings management? Evidence from recent regulatory reforms. Review of Accounting Studies, 20(2), 899-933.

Cheng, Q., & Lo, K. (2006). Insider trading and voluntary disclosures.Journal of accounting research, 44(5), 815-848.

Choy, H. L., & Silvers, R. N. (2009). The Effect of Firm-Imposed Insider Trading Restrictions on Cost of Equity Capital. Available at SSRN 1325387.

Clarke, J., Dunbar, C., Kahl, K., 2001. Long-run performance and insider trading in completed and canceled seasoned equity offerings. Journal of Financial and Quantitative Analysis 36, 415–430.

Cohen, L., Frazzini, A. & Malloy, C. (2012). Hiring cheerleaders: Board appointments of "independent" directors. Management Science 58(6), 1039-1058.

Cohen, L., Malloy, C., & Pomorski, L. (2012). Decoding inside information. The Journal of Finance, 67(3), 1009-1043.

Coles, J. L., Daniel, D. N., & Naveen, L. (2015). Director overlap: Groupthink versus teamwork. University of Utah, Working Paper.

Coles, J. L., Daniel, N. D., & Naveen, L. (2014). Co-opted boards. Review of Financial Studies, 27(6), 1751-1796.

Cziraki, P., De Goeij, P., & Renneboog, L. (2013). Corporate governance rules and insider trading profits. Review of Finance, rft001.

Dai, L., Fu, R., Kang, J. K., & Lee, I. (2016).Corporate Governance and the Profitability of Insider Trading. Journal of Corporate Finance, Forthcoming

Duchin, R., Matsusaka, J. G., & Ozbas, O. (2010). When are outside directors effective?. Journal of financial economics, 96(2), 195-214.

Easley, D., & O'hara, M. (2004). Information and the cost of capital. The journal of finance, 59(4), 1553-1583.

Easley, D., Hvidkjaer, S., & O'hara, M. (2002). Is information risk a determinant of asset returns?. The journal of finance, 57(5), 2185-2221.

Eckbo, B. E., Nygaard, K., & Thorburn, K. S. (2016). Does gender-balancing the board reduce firm value?. Tuck School of Business Working Paper, (2746786).

Fich, E. M., & Shivdasani, A. (2006). Are busy boards effective monitors?.The Journal of finance, 61(2), 689-724.

Field, L., Lowry, M., & Mkrtchyan, A. (2013). Are busy boards detrimental?.Journal of Financial Economics, 109(1), 63-82.

Fos, V., Li, K., & Tsoutsoura, M. (2016). Do Director Elections Matter?.Available at SSRN 2609815.

Fracassi, C., & Tate, G. (2012). External networking and internal firm governance. The Journal of Finance, 67(1), 153-194.

Francis, T., J.S. Lublin. 2016. Big investors question corporate board tenures. The Wall Street Journal, March 23, 2016.

Giannetti, M., & Zhao, M. (2015). Board Diversity and Firm Performance Volatility. Available at SSRN 2700058.

Guo, L., & Masulis, R. W. (2015). Board structure and monitoring: New evidence from CEO turnovers. Review of Financial Studies, 28(10), 2770-2811.

Harris, M., & A. Raviv. (2008). A theory of board control and size. Review of Financial Studies 21, 1797–1832.

Hermalin, B. E., & M. S. Weisbach. (1998). Endogenously chosen boards of directors and their monitoring of the CEO. American Economic Review 88, 96–118.

Hermalin, B. E., & M. S. Weisbach. (2003). Boards of directors as an endogenously determined institution: A survey of the economic literature. Economic Policy Review (Federal Reserve Board of New York) (April) 7–26.

Horowitz, R. A., & Bitar, K. Y. (1998). Minimizing the risk of insider trading liability. Client Alert, July, 1(3).

Hu, J., and T. H. Noe. (2001). "Insider Trading and Managerial Incentives." Journal of Banking and Finance 25, 681–716.

Huang, S. (2013). Zombie boards: Board tenure and firm performance. Available at SSRN 2302917.

Huddart, S. J., & Ke, B. (2007). Information asymmetry and cross-sectional variation in insider trading. Contemporary Accounting Research, 24(1), 195-232.

Hwang, B. H., & Kim, S. (2009). It pays to have friends. Journal of financial economics, 93(1), 138-158.

Jaffe, J. F. (1974a). The effect of regulation changes on insider trading. The Bell Journal of Economics and Management Science, 93-121.

Jaffe, J. F. (1974b). Special information and insider trading. Journal of Business 47, 410–428.

Jagolinzer, A. D. (2009). SEC Rule 10b5-1 and insiders' strategic trade. Management Science, 55(2), 224-239.

Jagolinzer, A. D., Larcker, D. F., & Taylor, D. J. (2011). Corporate governance and the information content of insider trades. Journal of Accounting Research, 49(5), 1249-1274.

Jeng, L., Metrick, A., Zeckhauser, R., 2003. Estimating the returns to insider trading: a performance-evaluation perspective. Review of Economics and Statistics 85, 453–471.

Jenter, D. (2005). Market timing and managerial portfolio decisions. The Journal of Finance, 60(4), 1903-1949.

Jiang, W., Wan, H., & Zhao, S. (2015). Reputation concerns of independent directors: Evidence from individual director voting. Review of Financial Studies, hhv125.

John, K., & Lang, L. H. (1991). Insider trading around dividend announcements: theory and evidence. The Journal of Finance, 46(4), 1361-1389.

Kahle, K. (2000). Insider trading and the long-run performance of new security issues. Journal of Corporate Finance 6, 25–53.

Karpoff, J. M., & Lee, D. (1991). Insider trading before new issue announcements. Financial Management, 18-26.

Katz, R. (1982). The effects of group longevity on project communication and performance. Administrative science quarterly, 81-104.

Ke, B., Huddart, S., Petroni, K. 2003. What insiders know about future earnings and how they use it: evidence from insider trades? Journal of Accounting and Economics 35, 315–346.

Khanna, N., Slezak, S. L., & Bradley, M. (1994). Insider trading, outside search, and resource allocation: why firms and society may disagree on insider trading restrictions. Review of Financial Studies, 7(3), 575-608.

Lakonishok, J., & Lee, I. (2001). Are insider trades informative? Review of financial studies, 14(1), 79-111.

Lee, D. S., Mikkelson, W. H., & Partch, M. M. (1992). Managers' trading around stock repurchases. The Journal of Finance, 47(5), 1947-1962.

Leland, Hayne, 1992, Insider trading, should it be prohibited?, Journal of Political Economy 100, 859–887.

Lin, J., Howe, J., 1990. Insider trading in the OTC market. Journal of Finance 45, 1273–1284.

Lublin, J. S. 2013. The 40-Year Club: America's Longest-Serving Directors. The Wall Street Journal, July 16, 2013.

Manove, M. (1989). The harm from insider trading and informed speculation. The Quarterly Journal of Economics, 823-845.

Marin, J., Olivier, J., 2008. The dog that did not bark: insider trading and crashes. Journal of Finance 63, 2429–2476.

Masson, R. T., & Madhavan, A. (1991). Insider Trading and the Value of the Firm. The Journal of Industrial Economics, 333-353.

Masulis, R. W., & Mobbs, S. (2011). Are all inside directors the same? Evidence from the external directorship market. The Journal of Finance,66(3), 823-872.

Meulbroek, L. K. (1992). An empirical analysis of illegal insider trading. The Journal of Finance, 47(5), 1661-1699.

Niessner, M., 2015. Strategic disclosure timing and insider trading. Unpublished working paper, Yale University.

Piotroski, J., Roulstone, D., 2005. Do insider trades reflect both contrarian beliefs and superior knowledge about future cash flow realizations? Journal of Accounting and Economics 39, 55–81.

Raheja, C. G. (2005). Determinants of board size and composition: A theory of corporate boards. Journal of Financial and Quantitative Analysis 40, 283–306.

Ravina, E., & Sapienza, P. (2010). What do independent directors know? Evidence from their trading. Review of Financial Studies, 23(3), 962-1003.

Rogers, J. L., & Stocken, P. C. (2005). Credibility of management forecasts.The Accounting Review, 80(4), 1233-1260.

Roulstone, D. T. (2003). The relation between insider-trading restrictions and executive compensation. Journal of Accounting Research, 41(3), 525-551.

Seyhun, H. N., 1986. Insiders' profits, costs of trading, and market efficiency. Journal of Financial Economics 61, 189–212.

Seyhun, H. N. (1990). Overreaction or fundamentals: Some lessons from insiders' response to the market crash of 1987. The Journal of Finance 45(5), 1363-1388.

Seyhun, H. N. (1992). Effectiveness of the Insider-Trading Sanctions. Journal of Law & Economics 35 (1), 149-182.

Seyhun, H. N., & Bradley, M. (1997). Corporate Bankruptcy and Insider Trading. The Journal of Business, 70(2), 189-216.

Skaife, H. A., Veenman, D., & Wangerin, D. (2013). Internal control over financial reporting and managerial rent extraction: Evidence from the profitability of insider trading. Journal of Accounting and Economics, 55(1), 91-110.

Stein, M.L. 2016. Investors question independence of long-stay directors. The Wall Street Journal, February 23, 2016.

Summers, S. L., & Sweeney, J. T. (1998). Fraudulently misstated financial statements and insider trading: An empirical analysis. Accounting Review, 131-146.

Vafeas, N. (1999). Board meeting frequency and firm performance. Journal of financial economics, 53(1), 113-142.

Vafeas, N. (2003). Length of board tenure and outside director independence.Journal of Business Finance & Accounting, 30(7 - 8), 1043-1064.

Vance, S. C. (1983). Corporate leadership: Boards, directors, and strategy. McGraw-Hill Companies.

Vekshin, A. 2015. Calpers pushes boards to clear room for the young and ethnic. Bloomberg Politics, November 12, 2015.

Wu, W., 2016. Information asymmetry and insider trading. Unpublished working paper, Texas A&M University.

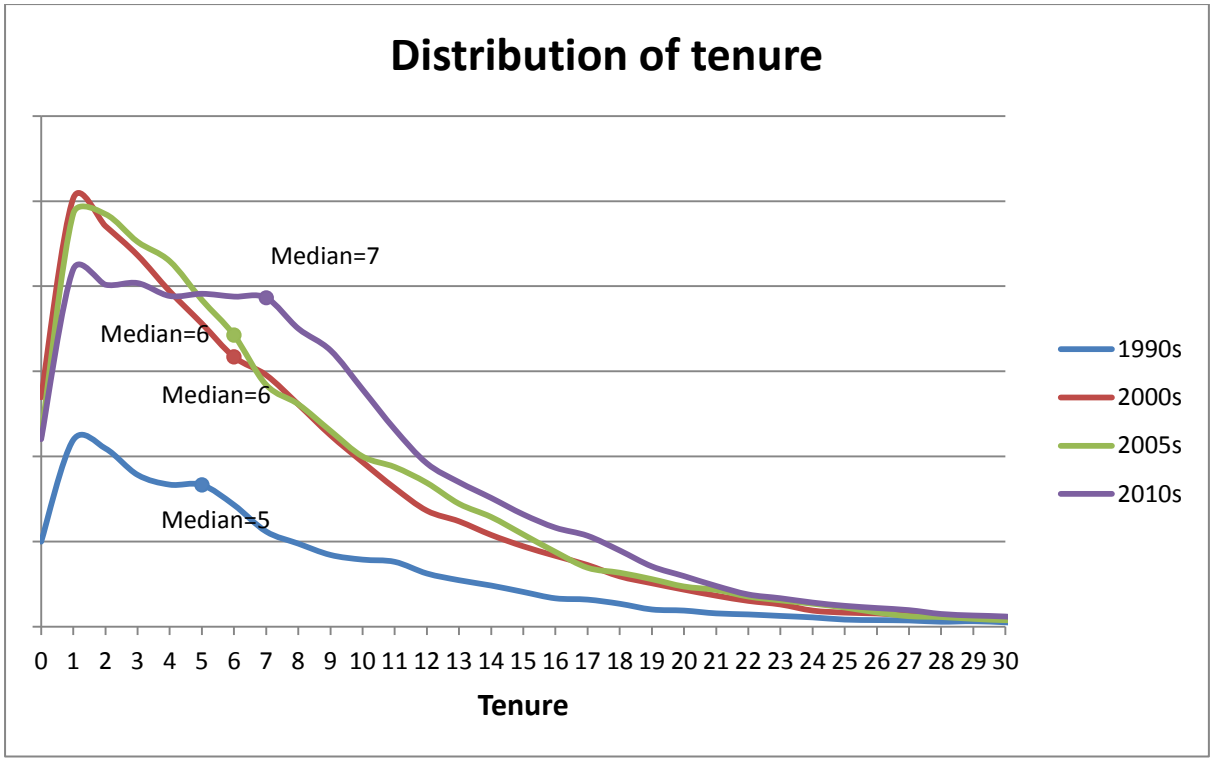

Figure 1: Distribution of tenure for different time period

This figure plots the distribution of tenure for all independent directors of the sample firms for four different time period. 1990s include year 1998 and 1999. During this period, the median tenure of all independent directors is 5 years. 2000s include year 2000 to 2004. 2005s include year 2005 to 2009. During these two periods, the median tenure of all independent directors are both 6 years. 2010s include year 2010 to 2014. During this period, the median tenure of all independent directors becomes 7 years.

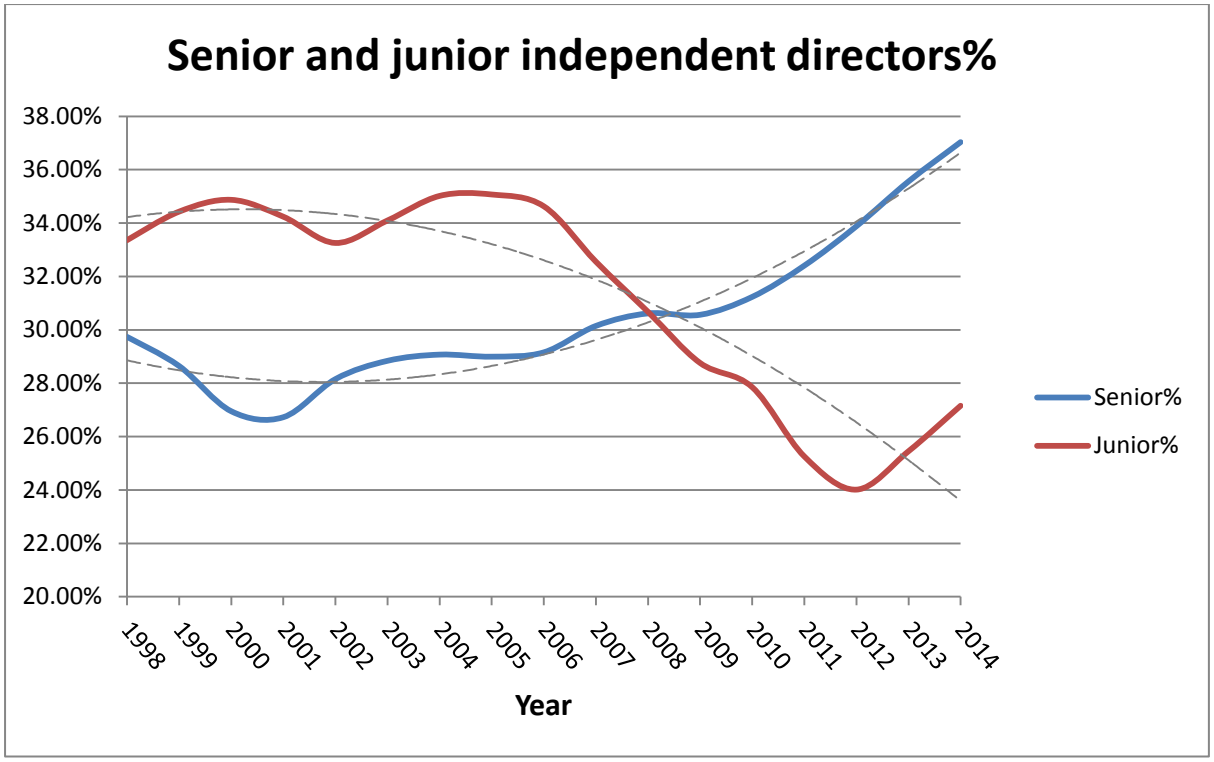

Figure 2: Percentage of senior and junior independent directors over time

Among all independent directors in all sample firms during the whole sample period, the top 30 percentile of the tenure is 10 years and bottom 30 percentile equals to 3 years. Senior independent director are defined as those whose tenure is longer than 10 years. And junior independent director are defined as those whose tenure is shorter than 3 years. This figure shows how the percentages of senior and junior independent directors change over time respectively.

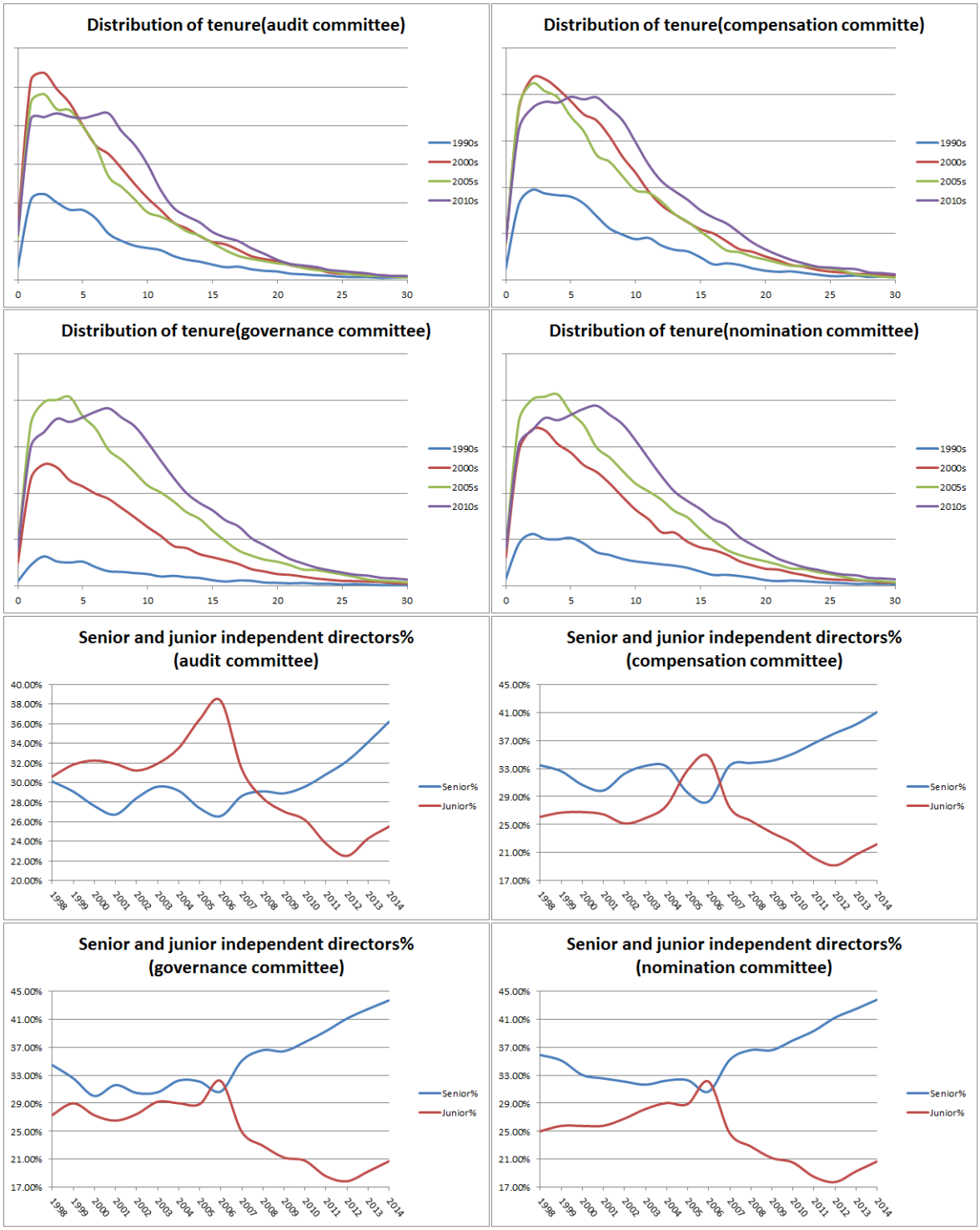

Figure 3: Distribution of tenure and Percentage of senior or junior independent directors for different board committees

The definitions are the same as in figure 1 and figure 2. The lines are plotted for the independent directors sitting on four different board committees respectively. The SOX and associated exchange rule changes have slightly different policies among these four committees.

Table 1: Summary Statistics: sample period 1998 to 2014

Size is the log value of market capitalization. MB ratio is the market-to-book ratio. R&D is a dummy variable equals to one if the firm reports non-zero R&D expense. Loss is a dummy variable equals to one if the firm's net income before extraordinary during the most recent fiscal year is strictly negative. Institutional Ownership Ratio is the percentage of shares holding by the institutional investors. This data is quarterly reported, so we combine it with our sample data for each quarter. Analyst dispersion equals to the standard deviation of EPS forecast divided by the absolute value of average forecast. Independent director tenure is the average tenure of all independent directors for the firm for each year. Inside director tenure is the average tenure of all insider directors for the firm for each year. Independent director age is the average age of all independent directors for the firm for each year. Co-opted independent director is co-opted independent directors as a fraction of the total board. Directors are considered to be "co-opted" if they joined board after the CEO assumes office. Board size is the number of director on the board for each firm in each year. Board independence is the percentage of independent directors on the board for each firm in each year. Multi-directorship is the average number of outside directorship held by the independent directors. Independent director ownership is the total percentage of firm's equity shares held by all independent directors. CEO-Chairman is a dummy variable equals to one if the CEO is also the chairman of the board.

Variables	#Obs	Mean	Median	P10	P25	P75	P90	Stan. Dev.
Size	18,881	7.71	7.601	5.885	6.657	8.747	9.858	1.501
MB Ratio	18,881	1.972	1.516	1.012	1.147	2.224	3.365	1.589
R&D dummy	18,894	0.436	0	0	0	1	1	0.496
Loss	18,894	0.134	0	0	0	0	1	0.341
Institutional ownership ratio	18,825	0.721	0.74	0.451	0.599	0.858	0.949	0.213
Analyst dispersion	18,026	0.799	0.296	0.0328	0.115	0.747	1.619	6.381
Board size	18,894	9.466	9	6	8	11	13	2.691
Board independence	18,894	0.717	0.75	0.5	0.625	0.857	0.9	0.164
CEO-Chairman	18,894	0.679	1	0	0	1	1	0.467
Multi-directorship	18,871	0.919	0.833	0.125	0.4	1.333	1.778	0.657
Independent director ownership (%)	18,881	1.393	0.346	0.039	0.119	0.894	2.361	4.437
Independent director age	18,893	60.54	60.81	55.1	58	63.38	65.56	4.264
Co-opted independent director	17,157	0.37	0.333	0	0.143	0.571	0.75	0.26
Independent director tenure	18,865	7.667	7.3	3.571	5.25	9.571	12	3.517
Insider director tenure	18,812	9.957	8	2	4	14	21	7.613
Busy ID tenure	18,894	5.102	4.5	0	0	8	11.5	4.962
No-busy ID tenure	18,894	7.686	7.2	3	5	9.857	12.8	3.999
Co-opted ID tenure	18,894	3.133	2.4	0	0.5	4.75	7.4	3.192

No-co-opted ID tenure	18,894	8.728	9	0	0	13	17.6	7.303
Connected ID tenure	14,922	3.987	0	0	0	6.900	12.70	6.017
Non-connected ID tenure	14,922	7.645	7.267	3.417	5.133	9.667	12.27	3.645
Governance ID tenure	18,894	6.408	6.4	0	0	9.833	13.25	5.372
No-governance ID tenure	18,894	6.529	6	1.5	3.75	8.75	11.75	4.191
Profession ID tenure	18,871	4.718	2.667	0	0	8	13	5.86
Non-profession ID tenure	18,871	7.605	7.143	3.333	5	9.571	12.25	3.777

Table 2: How independent directors' tenure affect executives' insider trading profitability

Dependent variable is the Market-adjusted buy-and-hold returns for different holding horizons. Independent director tenure is the average tenure of all independent directors for the firm for each year. Inside director tenure is the average tenure of all insider directors for the firm for each year. Size is the log value of market capitalization. MB ratio is the market-to-book ratio. R&D is a dummy variable equals to one if the firm reports non-zero R&D expense. Loss is a dummy variable equals to one if the firm's net income before extraordinary during the most recent fiscal year is strictly negative. Institutional Ownership Ratio is the percentage of shares holding by the institutional investors. This data is quarterly reported, so we combine it with our sample data for each quarter. Analyst dispersion equals to the standard deviation of EPS forecast divided by the absolute value of average forecast. Transaction size equals to the number of shares exchanged in the transaction scaled by the total number of shares outstanding. Prior return is the Market-adjusted buy-and-hold returns for 180 days prior to the trading. A negative sign is added to the prior return for sales transactions. Recent trade equals to the sum of absolute numbers of shares traded by all insiders of the firm during ten days prior to the transaction date and it is scaled by the total number of shares outstanding of the firm. Return volatility is the standard deviation of daily market adjusted returns of the stock measured over the last month prior to the transaction. Independent director age is the average age of all independent directors for the firm for each year. Co-opted independent director is co-opted independent directors as a fraction of the total board. Directors are considered to be "co-opted" if they joined board after the CEO assumes office. Board size is the number of director on the board for each firm in each year. Board independence is the percentage of independent directors on the board for each firm in each year. Multi-directorship is the average number of outside directorship held by the independent directors. Independent director ownership is the total percentage of firm's equity shares held by all independent directors. CEO-Chairman is a dummy variable equals to one if the CEO is also the chairman of the board. Firm and year fixed effect are included and the standard error is clustered by director-level and corrected for heterogeneity.

Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Independent director tenure	**0.0381****	**0.1155*****	**0.1511*****	**0.3193*****
	(0.0185)	**(0.0293)**	**(0.0397)**	**(0.0664)**
Inside director tenure	0.0183*	0.0290*	0.0260	0.0420
	(0.0097)	(0.0168)	(0.0224)	(0.0401)
Size	-1.0513***	-2.1332***	-3.1528***	-5.2290***
	(0.1354)	(0.2009)	(0.2574)	(0.4527)
MB ratio	-0.5664***	-1.0390***	-1.4014***	-2.0715***
	(0.0546)	(0.0910)	(0.1228)	(0.2233)
R&D dummy	0.1774	0.3607	-0.4390	-0.6185
	(0.3305)	(0.5248)	(0.6519)	(1.0300)
Loss	1.0429***	1.7041***	2.0847***	3.4221***
	(0.1681)	(0.2801)	(0.3915)	(0.6715)
Institutional Ownership Ratio	-1.9096***	-3.6482***	-4.9372***	-8.9839***
	(0.4035)	(0.6610)	(0.8913)	(1.4799)
Dispersion	-0.0050	0.0020	0.0091	0.0098
	(0.0070)	(0.0117)	(0.0163)	(0.0184)
Transaction size	-0.5469***	-0.7524***	-0.5444**	-0.5443
	(0.1740)	(0.2352)	(0.2744)	(0.4257)
Prior return	-0.0113***	-0.0236***	-0.0392***	-0.0550***
	(0.0024)	(0.0036)	(0.0046)	(0.0069)
Recent trade	0.0164	0.0368	0.2041	0.1180
	(0.0511)	(0.1091)	(0.1511)	(0.1715)
Return volatility	20.2152***	27.9846***	16.0751**	20.1042
	(4.0609)	(6.1221)	(7.6559)	(12.5555)
Independent director age	-0.0542***	-0.0946***	-0.0752*	-0.2109***
	(0.0197)	(0.0317)	(0.0450)	(0.0744)
Co-opted independent directors %	0.2920	0.0100	-0.2742	0.5628
	(0.2011)	(0.3349)	(0.4291)	(0.7112)
Board size	0.1010***	0.2959***	0.4573***	0.8110***
	(0.0247)	(0.0403)	(0.0545)	(0.0967)

Board independence	-0.9715**	-1.3009**	-1.1566	-1.9722
	(0.4112)	(0.6568)	(0.8868)	(1.4055)
Multi-directorship	0.1189	0.4952***	0.1885	0.9200***
	(0.0898)	(0.1411)	(0.1840)	(0.2925)
Independent director ownership	-0.0153	-0.0553***	-0.1278***	-0.1619***
	(0.0112)	(0.0201)	(0.0296)	(0.0496)
CEO-Chairman	0.1954*	0.3886**	0.5371**	0.5980*
	(0.1081)	(0.1658)	(0.2114)	(0.3431)
Observations	211,188	211,176	211,163	211,059
R-squared	0.0804	0.1064	0.1281	0.1687
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 3: How independent directors' tenure affects executives' insider trading profitability: subsample results

Dependent variable is the Market-adjusted buy-and-hold returns for different holding horizons. Independent director tenure is the average tenure of all independent directors for the firm for each year. Control variables are the same as in table 2, including Insider director tenure, Size, MB ratio, R&D dummy, Loss dummy, Institutional Ownership Ratio, Analyst dispersion, Transaction size, Prior return, Recent trade, Return volatility, Independent director age, Co-opted independent directors, Board size, Board independence, Multi-directorship, independent director ownership and CEO-Chairman dummy. In panel A, transactions are separated into purchase and sale. In panel B1-B3, firms are separated into subsamples based on some variables measure the information transparency faced by the outside investors. Analyst dispersion equals to the standard deviation of EPS forecast divided by the absolute value of average forecast. Operation complexity is measured by the factor score obtained from Principle component analysis (PCA) of four factors: log value of market capitalization, log value of firm age, log value of number of business segment and log value of number of geographical segments. Some firms report segment information multiple times in each year. We only retained the latest record. Firms spending more on R&D usually are high-tech firms with more firm specific knowledge which are not easily obtained by the outsiders. If the firm's R&D expenditure is missing, we replace it by zero. For these three measures, we calculate the sample median for each year among all firms and the firm is considered to have high dispersion, to be complex firm or to have high R&D expenditure if the measures are larger than the sample median. Otherwise it is considered to be in the "low" or "simple" group.

Panel A: Purchase or sales transaction

	Purchase				Sales			
Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Independent director tenure	-0.0572	-0.1226	-0.1913	-0.2463	0.0706***	0.1559***	0.2098***	0.3972***
	(0.0771)	(0.1107)	(0.1433)	(0.2137)	(0.0190)	(0.0308)	(0.0417)	(0.0715)

Panel B1: Analyst dispersion high or low

	High dispersion				Low dispersion			
Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Independent director tenure	0.0282	0.1234***	0.1773***	0.4239***	0.0170	0.0831*	0.1392**	0.2944***
	(0.0277)	(0.0455)	(0.0610)	(0.0951)	(0.0285)	(0.0462)	(0.0631)	(0.1062)

Panel B2: Complex or simple firm

	Complex				Simple			
Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Independent director tenure	0.0326	0.1517***	0.2058***	0.3535***	0.0370	0.1204**	0.1110*	0.2708***
	(0.0254)	(0.0396)	(0.0574)	(0.1019)	(0.0314)	(0.0491)	(0.0632)	(0.1038)

Panel B3: R&D expenditure high or low

	High R&D				Low R&D			
Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Independent director tenure	0.0712**	0.1610***	0.1567**	0.3407***	-0.0054	0.0430	0.1071**	0.2756***
	(0.0277)	(0.0444)	(0.0618)	(0.1051)	(0.0233)	(0.0366)	(0.0475)	(0.0757)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 4: Nature of insider trading over independent director tenure

In column (1), we identify whether the insider trading is information-driven or not following the method developed by Cohen, Malloy and Pomorski (2012). The classification is made for each year and each insider. If the insiders trade in the same month for at least three consecutive years, then his trades in the same month in this year is considered as "routine" and his trades in other month of this year is considered "opportunistic". If the insider traded in past three consecutive years but no trade in same month, all his trade in this year are considered "opportunistic". We calculate the percentage of the number of opportunistic trading which equals to the number of opportunistic trading divided by the total number of all insider trading for each firm in each year and the percentage of the volume of opportunistic trading which equals to the total trading volume of opportunistic trading divided by the total trading volume of all insider trading for each firm in each year. And we test whether firms' executives tend to do more opportunistic trading as independent director tenure increase. These are firm-year level tests, and control variables include Insider director tenure, Size, MB ratio, R&D dummy, Loss dummy, Institutional Ownership Ratio, Analyst dispersion, Independent director age, Co-opted independent directors, Board size, Board independence, Multi-directorship, independent director ownership and CEO-Chairman dummy. In column (2), we use the subsample of the firms which the specified information, e.g. the beginning and ending day of the safe trading window is available. The dependent variable is a dummy variable equals to one if the transaction happens outside the safe window and zero otherwise. Independent director tenure is the average tenure of all independent directors for the firm for each year. Since only 74 of the sample firms have the specified information of the safe trading window, we try to generalize the results in column (3). The dependent variable is a dummy variable equals to one if the transaction is executed outside the transparent window which is defined as one month following the previous earning announcement. The tests reported in column (2) and (3) are all transaction-level tests, and control variables are the same as in table 2, including Insider director tenure, Size, MB ratio, R&D dummy, Loss dummy, Institutional Ownership Ratio, Analyst dispersion, Transaction size, Prior return, Holding, Recent trade, Return volatility, Independent director age, Co-opted independent directors, Board size, Board independence, Multi-directorship, independent director ownership and CEO-Chairman dummy.

	(1)		(2)		(3)	
	Opportunistic	Opportunistic	Trade outside safe window		Trade outside transparent window	
Variables	Number%	Volume%	OLS	Logit	OLS	Logit
Independent director tenure	**0.0086*** **	**0.0102*** **	**0.0118** **	**0.1043*** **	**0.0028*** **	**0.0133*** **
	(0.0021)	**(0.0022)**	**(0.0054)**	**(0.0212)**	**(0.0010)**	**(0.0033)**
Inside director tenure	0.0037***	0.0037***	-0.0012	-0.0136	0.0006	0.0028*
	(0.0010)	(0.0010)	(0.0022)	(0.0100)	(0.0005)	(0.0015)
Size	0.0590***	0.0604***	-0.0486	-0.5894***	-0.0270***	-0.1189***
	(0.0090)	(0.0093)	(0.0370)	(0.0862)	(0.0045)	(0.0142)
MB ratio	0.0102***	0.0102***	0.0301*	0.2545***	-0.0017	-0.0102**
	(0.0032)	(0.0034)	(0.0175)	(0.0372)	(0.0011)	(0.0042)
R&D dummy	0.0400	0.0317	-0.0136	-10.1310	-0.0134	-0.0688
	(0.0493)	(0.0511)	(0.0847)	(402.8850)	(0.0151)	(0.0607)
Loss	-0.0548***	-0.0501***	0.0116	-0.0713	0.0373***	0.1868***
	(0.0114)	(0.0120)	(0.0541)	(0.1087)	(0.0072)	(0.0238)
Institutional Ownership Ratio	-0.0102	-0.0310	-0.2591**	-2.4621***	-0.0380**	-0.2286***
	(0.0297)	(0.0303)	(0.1134)	(0.3882)	(0.0149)	(0.0589)

Dispersion	-0.0005	-0.0005	0.0203	0.0690**	0.0005***	0.0024***
	(0.0004)	(0.0004)	(0.0157)	(0.0298)	(0.0001)	(0.0008)
Transaction size			-0.0040	0.0070	-0.0291**	-0.2114***
			(0.0384)	(0.4996)	(0.0116)	(0.0602)
Prior return			-0.0003	-0.0036**	0.0003***	0.0012***
			(0.0007)	(0.0016)	(0.0001)	(0.0003)
Recent trade			-0.1798**	-5.9358***	-0.0167***	-0.1590***
			(0.0699)	(0.5497)	(0.0039)	(0.0275)
Return volatility			-2.8717***	-23.1978***	-10.3231***	-68.8735***
			(1.0818)	(3.0468)	(0.2862)	(0.6882)
Independent director age	-0.0036	-0.0045*	0.0003	-0.0290	-0.0032***	-0.0167***
	(0.0023)	(0.0024)	(0.0074)	(0.0211)	(0.0012)	(0.0036)
Co-opted independent directors %	0.0658***	0.0729***	0.0513	0.9080***	0.0234**	0.1364***
	(0.0229)	(0.0243)	(0.0571)	(0.2296)	(0.0108)	(0.0379)
Board size	0.0047	0.0051	-0.0007	0.0124	0.0001	-0.0062
	(0.0030)	(0.0033)	(0.0068)	(0.0207)	(0.0014)	(0.0048)
Board independence	-0.0721	-0.0610	-0.0316	-0.4235	-0.0221	-0.0996
	(0.0448)	(0.0477)	(0.1180)	(0.4433)	(0.0209)	(0.0715)
Multi-directorship	-0.0270***	-0.0257**	0.0285	0.3154***	0.0090**	0.0373**
	(0.0096)	(0.0100)	(0.0289)	(0.0873)	(0.0045)	(0.0152)
Independent director ownership	-0.0018*	-0.0027**	0.0002	-0.0090	0.0003	0.0011
	(0.0010)	(0.0011)	(0.0047)	(0.0240)	(0.0007)	(0.0022)
CEO-Chairman	0.0049	0.0112	0.0290	0.1523**	0.0011	0.0164
	(0.0111)	(0.0114)	(0.0208)	(0.0743)	(0.0051)	(0.0178)
Observations	16,039	16,039	20,844	20,016	210,280	208,386
R-squared	0.3832	0.3725	0.2416		0.1613	
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Relation driven by independent directors who are expected to play a major role in monitoring

Dependent variable is the Market-adjusted buy-and-hold returns for different holding horizons. Control variables are the same as in table 2, including Insider director tenure, Size, MB ratio, R&D dummy, Loss dummy, Institutional Ownership Ratio, Analyst dispersion, Transaction size, Prior return, Holding, Recent trade, Return volatility, Independent director age, Co-opted independent directors, Board size, Board independence, Multi-directorship, independent director ownership and CEO-Chairman dummy. In panel A, independent directors are separate into two types: co-opted or non-co-opted. They are considered to be "co-opted" if they joined board after the CEO assume office, in other words, they are assigned by the CEO. In panel B, independent directors are separate into two types: connected with the CEO or not. This is defined at the time when the independent directors join the board or when firms change the CEO, e.g. when directors and CEO are connected through the investigated firm for the first time. The independent directors are considered to be connected with the CEO either they graduate from the same school, have overlapping employment other than the investigated firm or share positions in other organizations such as leisure clubs or charities. In panel C, independent directors are separate into two types: busy or not busy. They are considered to be "busy" if the independent director holds altogether more than three directorships. In panel D, independent directors are separated into two groups based on whether they also sit on governance committee. Directors on governance committee usually are in charge of recruiting new board members, training and education of the Board related to governance roles and responsibilities, assessment/evaluation of the Board, monitoring of governance structures and processes, and Board meetings/sessions evaluation. In panel E, independent directors are separated into two groups based on whether they have a professional career such as doctor, academic or politician. This type of independent directors are considered to have more reputation concerns, and thus not easily to compromised. Beside, firms incorporate these directors mainly for their advisory role. We calculate the average tenure of different type of independent directors respectively and include the tenures for different types of independent directors in the regression together to investigate their heterogeneous effect on executives' trading profitability.

Panel A: Whether the independent directors are co-opted or not				
Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Co-opted independent director tenure	-0.0131	-0.0196	0.0021	0.0129
	(0.0216)	(0.0324)	(0.0408)	(0.0694)
Non-co-opted independent director tenure	0.0198***	0.0439***	0.0649***	0.0966***
	(0.0067)	(0.0107)	(0.0140)	(0.0231)
Panel B: Whether the independent directors are socially connected with the CEO or not				
Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Connected independent director tenure	0.0016	0.0077	0.0184	-0.0037
	(0.0083)	(0.0130)	(0.0171)	(0.0298)
Non-connected independent director tenure	0.0121	0.0714***	0.0943**	0.1690***
	(0.0166)	(0.0265)	(0.0371)	(0.0569)
Panel C: Whether the independent directors are busy or not				
Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Busy independent director tenure	0.0152*	0.0277*	0.0184	0.0280
	(0.0085)	(0.0145)	(0.0196)	(0.0308)
Not busy independent director tenure	0.0291**	0.0867***	0.1267***	0.2478***
	(0.0134)	(0.0210)	(0.0278)	(0.0459)
Panel D: Whether the independent directors sit on governance committee or not				
Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)

Governance committee ID tenure	0.0231***	0.0333**	0.0343*	0.0616**
	(0.0086)	(0.0141)	(0.0184)	(0.0302)
Non- governance committee ID tenure	0.0031	0.0226	0.0077	0.0258
	(0.0111)	(0.0175)	(0.0236)	(0.0374)

Panel E: Whether the ID has a profession background (Doctor, academic or politician)

Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Profession independent director tenure	-0.0028	-0.0099	-0.0343*	-0.0092
	(0.0086)	(0.0143)	(0.0208)	(0.0424)
Non-profession independent director tenure	0.0406***	0.1161***	0.1670***	0.2768***
	(0.0154)	(0.0263)	(0.0340)	(0.0539)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 6: Factors that help counter the weakened monitoring by independent directors

Dependent variable is the Market-adjusted buy-and-hold returns for different holding horizons. Independent director tenure is the average tenure of all independent directors for the firm for each year. Control variables are the same as in table 2, including Insider director tenure, Size, MB ratio, R&D dummy, Loss dummy, Institutional Ownership Ratio, Analyst dispersion, Transaction size, Prior return, Holding, Recent trade, Return volatility, Independent director age, Co-opted independent directors, Board size, Board independence, Multi-directorship, independent director ownership and CEO-Chairman dummy. ITP is a dummy variable equals to one if the firms have adopted internal trading policies. Outside block-holder is a dummy variable equals to one if there is at least one outside block-holder sitting on the board for the firm in this year. Outside block-holder is a non-employee who has over 1% of firm voting power. This definition is following Guo and Masulis (2015). Presence of independent director is a dummy variable equals to one if there is at least one independent director with a legal background sitting on the board for the firm in this year. On one hand, firms may want to hire these types of IDs because they are more concerned about their firm governance, or more sensitive to legal issues. On the other hand, if there is block-holder or IDs with legal background sitting on board, the others will be more careful about their exploitation behavior.

Panel A: Internal trading policies Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Independent director tenure	0.0595***	0.1456***	0.1595***	0.3115***
	(0.0218)	(0.0345)	(0.0456)	(0.0743)
Independent director tenure × ITP	-0.0617**	-0.0869**	-0.0243	0.0223
	(0.0260)	(0.0393)	(0.0504)	(0.0836)
Panel B: Outside Block-holder on Board Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Independent director tenure	0.0521***	0.1359***	0.1689***	0.3496***
	(0.0194)	(0.0310)	(0.0418)	(0.0692)
Independent director tenure × Outside Block-holder	-0.0394***	-0.0573***	-0.0498*	-0.0852**
	(0.0118)	(0.0196)	(0.0257)	(0.0409)
Panel C: Independent director with legal background on board Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Independent director tenure	0.0443**	0.1235***	0.1615***	0.3457***
	(0.0186)	(0.0294)	(0.0399)	(0.0660)
Independent director tenure × Presence of legal ID	-0.0307**	-0.0393	-0.0513	-0.1309**
	(0.0149)	(0.0240)	(0.0315)	(0.0563)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 7: Abnormal trading volume and independent director tenure

The following regression is used to estimate abnormal trading volume triggered by the file of insider purchase or sales:

$$\begin{aligned}\text{Log (volume)}_t = {} & \alpha_1 \text{Filling date} + \beta_1 \text{Log (volume)}_{t-1} + \beta_2 \text{Log (volume)}_{t-2} + \beta_3 \text{Log(market volume)} \\ & + \beta_4 \text{Monday} + \beta_5 \text{Tuesday} + \beta_6 \text{Wednesday} + \beta_7 \text{Thursday} + \beta_8 \text{Holiday}_t + \beta_9 \text{Holiday}_{t-1} \\ & + \beta_9 \text{Earning announcement} + \beta_{10} \text{Dividend announcement}\end{aligned}$$

Dependent variable is the log value of the trading volume for each firm in each trading day. The amount of trading volume initiated by the top management of the firm is removed where top management refers to firm's CEO, CFO, COO, board chairman and president. Here, the trading volume is scaled as a percentage of total shares outstanding for firm. Here, we consider insider sales and purchase separately. For an insider purchase, the amount of trading volume excludes the total shares purchased by the top management team. Similarly, for an insider sales file, the amount of trading volume excludes the total shares sold by the top management team. Filing date is the variable of interest. It is the date when SEC received the file of insider trading. Generally, transaction date is earlier than the date the insider signed the file and signature date is earlier than the date SEC received the file. The SEC date is considered more relevant to the public availability of the insider trading information. Brochet (2014) explain the coefficient of this variable as the abnormal trading associated with the insider trading. The lag one period and two period of the log value of the trading volume is included as control variables. Market volume is the total trading volume as a percentage of total shares outstanding for all firms listed on the same exchange for each firm on that day. Monday, Tuesday, Wednesday and Thursday are dummy variables equals to one for the specific weekday. Holiday is a dummy variable equals to one for days preceding three-day holiday weekends and the Friday following Thanksgiving. Dividend announcement and earning announcement are dummy variables equals to one for the announcement date. The control variables are following former literature about abnormal trading volume (Meulbroek (1992); Yermack (1997); Heron and Lie (2007)). Filing equals to one on the insider filing date and the following one to four trading days. For each firm-filing date, we estimate a separate coefficient of "Filing", using a regression based on 50 days before and after the event day. Each regression produces an α_1 specific to a Form 4 filing, which is used as a measure of abnormal trading volume. The following table presents the summary statistics of the estimated abnormal trading volume (in percentage).

	All executive trading		Purchase or Sales	
Variables	(1)	(2)	(1)	(2)
Independent director tenure	0.0046	-0.0062		
	(0.0569)	(0.0689)		
Independent director tenure × Purchase			**0.3115*** **	**0.3272*** **
			(0.0765)	**(0.0839)**
Independent director tenure × sale			-0.0408	-0.0497
			(0.0580)	(0.0705)
Inside director tenure	-0.0467*	-0.0257	-0.0436	-0.0257
	(0.0266)	(0.0338)	(0.0267)	(0.0336)
Report lag	0.0030	0.0041	0.0026	0.0035
	(0.0028)	(0.0031)	(0.0028)	(0.0032)
Recent trade	-0.0849	-0.1665	-0.0696	-0.1524
	(0.2491)	(0.2843)	(0.2504)	(0.2854)
Transaction size	-0.0606	0.1197	-0.0176	0.1750
	(0.3179)	(0.4493)	(0.3258)	(0.4647)
Size	-0.4775	-0.5019	-0.2476	-0.2583
	(0.3353)	(0.3408)	(0.3353)	(0.3415)
MB ratio	-0.0216	-0.0472	-0.0175	-0.0462
	(0.1351)	(0.1431)	(0.1355)	(0.1431)
R&D dummy	1.2353	1.5506	1.4001	1.7289
	(1.0039)	(1.1164)	(0.9840)	(1.1081)
Loss	1.0020*	0.9395	0.7621	0.6967
	(0.5603)	(0.5823)	(0.5571)	(0.5815)
Institutional Ownership Ratio		-0.3431		-0.0671
		(1.2624)		(1.2879)

Dispersion		0.0276***		0.0277***
		(0.0068)		(0.0069)
Independent director age		-0.0721		-0.0714
		(0.0790)		(0.0790)
Co-opted independent director %		-0.3455		-0.2350
		(0.8182)		(0.8207)
Board size		0.0305		0.0123
		(0.1095)		(0.1099)
Board independence		0.2925		0.0351
		(1.5136)		(1.5141)
Multi-directorship		0.2745		0.2733
		(0.3267)		(0.3270)
Independent director ownership		0.0172		0.0196
		(0.0446)		(0.0448)
CEO-Chairman		-0.0233		-0.0058
		(0.3548)		(0.3559)
Observations	245,377	215,018	245,377	215,018
R-squared	0.0516	0.0472	0.0523	0.0480
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 8: Probability of getting socially connected between independent directors and the CEO

Dependent variable is a binary variable equals to one if the independent director and the CEO are connected through positions in other organizations such as leisure clubs or charities. This connection is examined every year and we focus on the connections that the starting years are available. Penalized maximum likelihood estimation is used to deal with the rare event problem. After is a dummy variable equals to one after the director and the CEO are connected through the investigated firm: either after the director come to the board or the CEO come to the firm. We cut the tenure into four periods: early period is from year zero to year one, the first middle period is from year two to year three, the second middle period if from year four to year five and the late period is from year six thereafter. The results are robust if we change the cutoffs. Male is a dummy variable equals to one if the director is a male. Age is the director's age. Nationality is a dummy variable equals to one if the director is from US. Size is the log value of market capitalization. MB ratio is the market-to-book ratio. Board size is the number of director on the board for each firm in each year. Board independence is the percentage of independent directors on the board for each firm in each year. CEO-Chairman is a dummy variable equals to one if the CEO is also the chairman of the board. The three diversities are measured by Blau Index as $1 - \sum p^2$. For Gender diversity, p is the percentage of female directors and male directors respectively. For Age diversity, p is the percentage of directors' age belonging to 1920, 1930, 1940, 1950 and 1960 cohorts respectively. For Ethnicity diversity, p is the percentage of directors belonging to Caucasian, Indian, Asian, Hispanic, Black/African-American and others respectively. Busy board is a dummy variable equals to one if majority of the independent directors hold more than three directorships. Block-holder on board is a dummy variable equals to one if there exist at least one director on board who holds more than 1% of the firm's common shares outstanding.

Variables	Coefficient	Odd ratio	Coefficient	Odd ratio
After	**0.228*** **	**1.257*** **		
	(0.0458)	**(0.0575)**		
Tenure (0, 1]			**0.232** **	**1.261** **
			(0.100)	**(0.126)**
Tenure [2,3]			**0.321*** **	**1.379*** **
			(0.0729)	**(0.101)**
Tenure [4,5]			**0.227*** **	**1.255*** **
			(0.0764)	**(0.0959)**
Tenure [6, after)			**0.203*** **	**1.225*** **
			(0.0506)	**(0.0620)**
Male	0.0753	1.078	0.0740	1.077
	(0.0607)	(0.0654)	(0.0607)	(0.0653)
Age	0.0217***	1.022***	0.0223***	1.023***
	(0.00247)	(0.00253)	(0.00253)	(0.00259)
Nationality	0.407***	1.503***	0.409***	1.506***
	(0.0493)	(0.0741)	(0.0493)	(0.0743)
Size	-0.0435***	0.957***	-0.0441***	0.957***
	(0.0167)	(0.0160)	(0.0167)	(0.0160)
MB Ratio	-0.0402**	0.961**	-0.0398**	0.961**
	(0.0195)	(0.0188)	(0.0195)	(0.0188)
Board size	0.102***	1.108***	0.102***	1.108***
	(0.00640)	(0.00708)	(0.00640)	(0.00708)
Board independence	-1.131***	0.323***	-1.128***	0.324***
	(0.156)	(0.0505)	(0.156)	(0.0506)
CEO-chairman	0.192***	1.212***	0.192***	1.212***
	(0.0503)	(0.0610)	(0.0503)	(0.0610)
Gender diversity	0.797***	2.219***	0.798***	2.221***
	(0.172)	(0.382)	(0.172)	(0.383)
Age diversity	-0.0363	0.964	-0.0358	0.965
	(0.188)	(0.182)	(0.189)	(0.182)
Ethnicity diversity	0.625***	1.869***	0.625***	1.869***

	(0.118)	(0.221)	(0.118)	(0.221)
Busy board	-0.0345	0.966	-0.0350	0.966
	(0.0707)	(0.0683)	(0.0707)	(0.0683)
Block-holder on board	-0.434***	0.648***	-0.433***	0.648***
	(0.0589)	(0.0381)	(0.0589)	(0.0382)
Year FE	Yes	Yes	Yes	Yes
Observations	240,156	240,156	240,156	240,156

Table 9: Independent director's trading consistency with other executives of the firm

We measure the trading consistency between each individual and all the other insiders in our sample as a total during each earnings report period. The reporting quarter observations are deleted if both this individual and all the other insiders do not trade that quarter. We exclude firm-years report earnings announcement more than four times during the corresponding fiscal year (less than 2% of the sample). The total purchase shares and sales shares are aggregated for each individual in each firm during each reporting quarter. And the net share is calculated as purchase shares minus sales shares. Trading is considered to be "consistent" if the net shares traded by this individual and all the other insiders are in the same direction. Trading is considered to be "conflict" if the net shares traded by this individual and all the other insiders are in the opposite directions. Trading is considered to be "silent" if this individual trade and all the other insiders do not trade, or this individual do not trade while the others trade. Dependent variable is the level of consistency in an ascending order: conflicting, silent and consistent. We encode the consistency by 1, 2 and 3. Tenure and Age are the tenure and the age of each independent director. Female is a dummy variable indicating whether the independent director is a female. Ownership is the total shares of the firm owned by this director scaled by total firm shares outstanding. Number of committee membership is the total number of committee the director sits in. Attend <75% meeting is a dummy variable equal to one if the director attends less than 75% of the board meeting this year. Outside boards is the number of other directorship the director holds in this year. Other control variables include Size, MB ratio, R&D dummy, Loss dummy, Institutional Ownership Ratio, Analyst dispersion, Board size, Board independence, CEO-Chairman dummy, and CEO tenure.

Variables	Consistency Coefficient	Conflict Marginal effect	Silent Marginal effect	Consistent Marginal effect
Tenure	**0.0522*** **	**-0.0009*** **	**-0.0024*** **	**0.0033*** **
	(0.0020)	**(0.0000)**	**(0.0001)**	**(0.0001)**
Female	0.0527*	-0.0009*	-0.0025*	0.0034*
	(0.0312)	(0.0005)	(0.0015)	(0.0020)
Ownership	0.0441***	-0.0008***	-0.0020***	0.0028***
	(0.0084)	(0.0001)	(0.0004)	(0.0005)
Age	0.0080***	-0.0001***	-0.0004***	0.0005***
	(0.0019)	(0.0000)	(0.0001)	(0.0001)
Number of committee membership	0.0297***	-0.0005***	-0.0014***	0.0019***
	(0.0113)	(0.0002)	(0.0005)	(0.0007)
Attend <75% meeting	-0.1638**	0.0031**	0.0066***	-0.0097**
	(0.0709)	(0.0014)	(0.0025)	(0.0039)
Outside Public Boards	-0.0536***	0.0009***	0.0025***	-0.0034***
	(0.0098)	(0.0002)	(0.0005)	(0.0006)
Size (quarter)	0.0007	-0.0000	-0.0000	0.0000
	(0.0159)	(0.0003)	(0.0007)	(0.0010)
MB ratio (quarter)	0.1030***	-0.0018***	-0.0047***	0.0065***
	(0.0142)	(0.0003)	(0.0007)	(0.0009)
R&D dummy (quarter)	0.1935***	-0.0033***	-0.0094***	0.0127***
	(0.0376)	(0.0006)	(0.0019)	(0.0025)
Loss (quarter)	-0.0742*	0.0013*	0.0032*	-0.0046*
	(0.0420)	(0.0008)	(0.0017)	(0.0025)
Institutional Ownership Ratio (quarter)	0.7553***	-0.0132***	-0.0347***	0.0479***
	(0.1397)	(0.0025)	(0.0065)	(0.0089)
Dispersion	-0.0009	0.0000	0.0000	-0.0001
	(0.0011)	(0.0000)	(0.0000)	(0.0001)
Stock volatility (quarter)	1.4878***	-0.0261***	-0.0683***	0.0944***
	(0.3229)	(0.0057)	(0.0148)	(0.0204)
Board size	-0.0507***	0.0009***	0.0023***	-0.0032***
	(0.0119)	(0.0002)	(0.0005)	(0.0007)
Board independence	-0.3617**	0.0063**	0.0166**	-0.0230**
	(0.1486)	(0.0026)	(0.0069)	(0.0094)
CEO-Chairman	-0.0753**	0.0013**	0.0035**	-0.0048**

	(0.0355)	(0.0006)	(0.0017)	(0.0023)
CEO tenure	0.0357*	-0.0006*	-0.0016*	0.0023*
	(0.0210)	(0.0004)	(0.0010)	(0.0013)
Cut1 constant	-3.1013***			
	(0.2448)			
Cut2 constant	3.5220***			
	(0.2446)			
Year FE	Yes	Yes	Yes	Yes
Observations	273,974	273,974	273,974	273,974

Table 10: How independent director's insider trading profitability change with their own tenure

Dependent variable is the Market-adjusted buy-and-hold returns for different holding horizons. Tenure and Age are the tenure and the age of each independent director. Female is a dummy variable indicating whether the independent director is a female. Ownership is the total shares of the firm owned by this director scaled by total firm shares outstanding. Number of committee membership is the total number of committee the director sits in. Attend <75% meeting is a dummy variable equal to one if the director attends less than 75% of the board meeting this year. Outside boards is the number of other directorship the director holds in this year. Other control variables include Size, MB ratio, R&D dummy, Loss dummy, Institutional Ownership Ratio, Analyst dispersion, Board size, Board independence, CEO-Chairman dummy, Recent trade, Return volatility, Transaction size, and Prior return. Their definitions are the same as in table 2. Firm and year fixed effect are included and the standard error is clustered by director-level and corrected for heterogeneity.

	Purchase				Sales			
Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Tenure	**0.0237**	**0.0247**	**0.0096**	**0.0503**	**0.0061**	**0.0083**	**0.0147**	**0.0071**
	(0.0147)	**(0.0224)**	**(0.0275)**	**(0.0394)**	**(0.0084)**	**(0.0131)**	**(0.0166)**	**(0.0248)**
Age	0.0121	0.0139	0.0171	-0.0344	-0.0133*	-0.0172	-0.0277*	-0.0299
	(0.0122)	(0.0185)	(0.0224)	(0.0348)	(0.0080)	(0.0124)	(0.0156)	(0.0244)
Ownership	0.1058	-0.2154	-0.2950	-0.0687	0.0542	0.0425	0.0685	0.0457
	(0.1009)	(0.1698)	(0.1910)	(0.2392)	(0.0495)	(0.1145)	(0.1585)	(0.3104)
Female	-0.0942	-0.2002	-0.3649	-0.6900	0.2130	0.2625	-0.1058	0.0268
	(0.2232)	(0.3393)	(0.4257)	(0.6092)	(0.1408)	(0.2233)	(0.2751)	(0.3674)
Outside Public Boards	0.0423	0.0442	-0.1251	-0.1196	-0.0431	-0.0940	0.0466	0.1383
	(0.0832)	(0.1257)	(0.1516)	(0.2119)	(0.0542)	(0.0855)	(0.1047)	(0.1571)
Attend <75% meeting	-1.0294	-0.8690	-1.4068	-3.1718	-0.7005	-1.2986	-0.4326	0.3705
	(0.8666)	(1.4094)	(1.5239)	(2.2905)	(0.7018)	(1.1195)	(1.3293)	(1.7432)
Number of committee membership	0.0333	-0.0188	-0.0396	0.0404	0.0993**	0.0592	-0.0249	0.0047
	(0.0816)	(0.1246)	(0.1542)	(0.2220)	(0.0506)	(0.0852)	(0.1102)	(0.1692)
Recent trade	0.2351	-0.0959	0.3304	-0.0170	-0.2019	-0.3189	-0.5743**	-0.4356
	(0.4516)	(0.5334)	(0.7718)	(0.7446)	(0.1433)	(0.2590)	(0.2767)	(0.3072)
Return volatility	44.7008***	97.1653***	100.5923***	134.7259***	-15.8747*	-41.0659***	-65.8495***	-91.3168***
	(8.9621)	(13.5374)	(17.0092)	(23.1229)	(8.9242)	(12.9744)	(16.4860)	(20.6689)
Transaction size	0.8301**	0.8871	1.1475	-0.1197	-0.2512	0.0355	0.0333	0.3479
	(0.4209)	(0.6122)	(0.9351)	(0.9729)	(0.2152)	(0.2875)	(0.2938)	(0.4750)
Prior return	-3.5530***	-6.2472***	-10.0399***	-14.7614***	-2.0072***	-4.4196***	-7.2443***	-12.8385***
	(0.4384)	(0.7724)	(0.9305)	(1.3451)	(0.4467)	(0.6738)	(0.8743)	(1.1304)
Size	1.3116***	3.0224***	4.6504***	6.1243***	-1.3001***	-2.3018***	-2.9409***	-4.0580***
	(0.3050)	(0.4739)	(0.5831)	(0.9189)	(0.2015)	(0.3371)	(0.4532)	(0.7321)
MB ratio	1.1376***	2.0663***	2.5845***	5.2889***	-0.4994***	-1.2045***	-1.6611***	-2.9400***

	(0.1625)	(0.2365)	(0.3098)	(0.5651)	(0.0923)	(0.1509)	(0.1971)	(0.3675)
R&D dummy	-0.4336	-1.0468	-1.8597	6.4211**	0.1631	-0.6633	-1.6946	-1.3778
	(0.9117)	(1.3712)	(1.5926)	(2.5889)	(0.4750)	(0.9183)	(1.0989)	(1.7701)
Loss	-0.3985	-1.5093**	-2.4294***	-4.2139***	0.9360***	2.8685***	3.5836***	6.5560***
	(0.4008)	(0.6916)	(0.8060)	(1.2012)	(0.3163)	(0.5172)	(0.7182)	(1.2002)
Institutional Ownership Ratio	1.9734**	0.6893	3.7821**	4.9566*	-1.9108***	-3.0698**	-4.7454***	-6.1513***
	(0.9986)	(1.6543)	(1.9035)	(2.9301)	(0.6967)	(1.2266)	(1.6584)	(2.0502)
Dispersion	0.0015	-0.0032	0.0104	-0.0269	0.0264**	0.0153	0.0031	0.0066
	(0.0116)	(0.0191)	(0.0482)	(0.0297)	(0.0104)	(0.0190)	(0.0173)	(0.0266)
Board size	-0.0982	-0.2507***	-0.2350**	-0.4390***	0.0714	0.1887**	0.3922***	0.9106***
	(0.0646)	(0.0907)	(0.1128)	(0.1665)	(0.0480)	(0.0813)	(0.0999)	(0.1439)
Board independence	-0.7679	0.4929	1.4204	0.7867	-2.0205**	-3.4299**	-2.6732	-4.6217
	(1.0685)	(1.6521)	(2.0870)	(3.1470)	(0.8914)	(1.4205)	(1.8793)	(2.8900)
CEO-Chairman	0.3001	-0.2493	-1.5592***	-1.6578**	0.2872*	0.5042*	0.8949**	0.9871*
	(0.2985)	(0.4316)	(0.5090)	(0.8272)	(0.1714)	(0.2853)	(0.3689)	(0.5931)
Observations	20,072	20,072	20,072	20,064	40,152	40,136	40,128	40,085
R-squared	0.2243	0.2500	0.2895	0.3637	0.1516	0.1957	0.2273	0.3027
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 11: Change in independent director composition and isolated time effect

Dependent variable is the Market-adjusted buy-and-hold returns for different holding horizons. Percentage of independent director turnover represents the percentage of independent directors that were on the board last year but are not on the board this year. Percentage of new independent director measures the percentage of independent directors attend the board for the first year. Change is a dummy variable equals to one if the firm change its composition of independent directors last year. No-change is a dummy variable equals to one if the firm does not change its composition of independent directors last year. Control variables are the same as in table 2, including Insider director tenure, Size, MB ratio, R&D dummy, Loss dummy, Institutional Ownership Ratio, Analyst dispersion, Transaction size, Prior return, Recent trade, Return volatility, Independent director age, Co-opted independent directors, Board size, Board independence, Multi-directorship, independent director ownership and CEO-Chairman dummy.

Panel A: Percentage of independent director turnover Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Percentage of independent director turnover	-0.1616 (0.2654)	-0.6468 (0.4248)	-1.3421** (0.5719)	-1.7631* (0.9305)
Panel B: Percentage of new independent directors Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Percentage of new independent director	0.4864 (0.3611)	-0.4218 (0.5848)	-2.8009*** (0.7844)	-3.1365*** (1.2163)
Panel C: Time effect of the board tenure Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Independent director tenure × Change	0.0377* (0.0203)	0.1134*** (0.0314)	0.1323*** (0.0420)	0.2617*** (0.0704)
Independent director tenure × No-change	**0.0392** (0.0190)**	**0.1076*** (0.0297)**	**0.1443*** (0.0409)**	**0.3050*** (0.0691)**
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Table 12: Exogenous decrease in independent director tenure

Dependent variable is the Market-adjusted buy-and-hold returns for different holding horizons. Control variables are the same as table 2, including Insider director tenure, Size, MB ratio, R&D dummy, Loss dummy, Institutional Ownership Ratio, Analyst dispersion, Transaction size, Prior return, Holding, Recent trade, Return volatility, Independent director age, Co-opted independent directors, Board size, Board independence, Multi-directorship, independent director ownership and CEO-Chairman dummy. To construct the treatment and control groups, we focus on the firms that are not compliant to the SOX and the exchanges' rules about the majority independent director on board in year 2001 and we further require these firms to be listed on NYSE or NASDAQ at least from 2001 to 2005. Treatment is a dummy variable equals to one for those noncompliant firms whose average independent director tenure decreased after compliance. The control group is the noncompliant firms whose average independent director tenure does not decreased after compliance. We further require that the composition of independent director of both the treatment and control firms do not change during the pre-period and the post-period respectively. Then, we match the treatment group and control group by controlling for stock volatility, MB ratio, size, E-index, Dual class dummy, CEO-chairman dummy, inside and linked vote, non-employment block-holder dummy, CEO-founder dummy, CEO age and CEO tenure in the score matching process. We do the radius matching with the radius equal to 0.15. But using radius of 0.1 and 0.2 give us the same resulted sample. Also we require the matched pairs to be in the same Fama French 48 industry. Post is a dummy variable equals to one after year 2005. Treatment variable and post variable are absorbed by the firm fixed effect and the year fixed effect.

Variables	R(t+30)	R(t+60)	R(t+90)	R(t+180)
Treatment × post	-2.0586**	-2.1997*	-3.9041**	-2.7450
	(0.8272)	(1.2683)	(1.6762)	(2.6394)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes