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AND
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KU LEUVEN

DETERMINANTS AND CONSEQUENCES OF DIRECTOR OPPORTUNISTIC INSIDER TRADING

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by

Sander De Groote

Daar de proefschriften in de reeks van de Faculteit Economie en Bedrijfswetenschappen het persoonlijk werk zijn van hun auteurs, zijn alleen deze laatsten daarvoor verantwoordelijk.

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Conferences

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General Introduction

Insider trading, the trading of a public company's stock by corporate insiders with access to nonpublic information, has always been a controversial issue and receives much attention from legislators, regulators, academics and the general public. To limit exploitation of outside investors and ensure a level playing field in the stock market, American legislators have been active in limiting the ability of insiders to engage in profitable insider trading behavior. Insider trading restrictions have been in place since the first regulations enacted in the 1934 Securities Exchange Act. Within the legal framework, insiders are allowed to purchase and sell stock as long as they are not in possession of material nonpublic information. In addition, insiders can be forced to return any profits realized from round trip transactions that take place within 180 calendar days and have to report each transaction to the SEC[1]. It is these legal, publicly disclosed transactions that are the subject of this dissertation.

The desirability of insider trading behavior by corporate insiders is a fiercely debated issue in the literature. Starting with Manne (1966) some scholars have argued that through their trading behavior, insiders release private information to the market which increases market efficiency (McGee, 2008). Furthermore, McGee (2008) argues that insider trading behavior can hardly be considered unethical and illegal given that there are no individuals or groups suffering any negative consequences from this behavior. However, even though insider trading might increase market efficiency by reducing information asymmetries, such trading can be costly for directors and the firm itself. Ample evidence indicates that insider trading is associated with higher cost of capital (e.g., Lambert, Leuz, and Verrecchia 2007), lower market liquidity (Bhattacharya and Daouk 2002; Fishe and Robe 2004), and increased litigation risk in cases of insider selling prior to bad news

[1] Since the reforms implemented in the Sarbanes Oxley Act insiders have to use form 4 to report their transactions to the SEC within 2 business days after they take place.

disclosures (Jones and Weingram 1996; Johnson et al. 2007; Billings and Cedergren 2015).

In addition to its impact on firm liquidity and litigation risk information based, opportunistic insider trading has developed a very negative reputation. It is associated with a general perception that insiders exploit uninformed stakeholders for personal financial gains (Cui et al. 2015) and hence those engaging in it are portrayed by the press as devoid of all ethical principles. The practice is deemed "wholly bad" by regulators and economists opposing insider trading rely on ethical arguments to reject insider trading claiming "it's just not right" (McGee, 2007; Engelen and Van Liedekerke, 2007). Individual firms thus have ample incentives to manage the opportunistic insider trading behavior of their insiders. Consistent with this, Bettis et al. (2000) and Jagolinzer et al. (2011) provide evidence of firms' monitoring and restriction of insider trades by specifying blackout periods or requiring approval from the general council.

This thesis contributes to both the literature investigating factors associated with (reduced) insider trading behavior, and the debate on the impact of insider trading behavior on the firm. The first chapter investigates the association between equity compensation for insiders and their likelihood to engage in opportunistic trading behavior. The second chapter focuses on firm ex post disciplinary actions following opportunistic insider trading by their directors, and investigates whether opportunistic insider trading by directors is positively associated with their likelihood of replacement. Finally, the last chapter focuses on the possible adverse relation between opportunistic insider trading behavior by audit committee members and the quality of their oversight of the financial reporting process.

Research Objectives and Contributions

As a means of overcoming the fundamental agency problem between outside investors and directors, firms award their directors equity incentives to align their interests with those of outside shareholders (Jensen 1993). However, the effectiveness of this form of

compensation as a monitoring tool is disputed. One major concern regarding equity compensation is the ease with which directors can unload and re-acquire equity. Bebchuk and Fried (2005) therefore question the potential of equity compensation as a tool to align interests between directors and outsiders because of directors' ability to earn profits from insider trading. Although research investigating the effects of director equity compensation is plentiful, earlier research has associated it with better company performance, greater investment opportunities, a higher price-to-book ratio and increased board oversight (Perry 2000; Bebchuk and Fried 2003; Yermack 2004; Ryan and Wiggins 2004; Fich and Shivdasani 2005; Linn and Park 2005; Conyon 2006; Sengupta and Zhang 2015), there is little research investigating director trading in their company's stock. The first chapter of this dissertation investigates the association between directors equity compensation and their likelihood of opportunistic insider trading behavior. It argues that the strength of the social environment where the directors operate is an important moderating factor when evaluating the impact of equity compensation on director behavior. When the local social norms are strong deviant behavior is punished more severely, potentially increasing the interest alignment effect of equity compensation. However, when awarding equity compensation in an environment with weak norms firms could just be giving insiders the tools to engage in opportunistic trading behavior. The first chapter adds to the discussion on the effectiveness of equity compensation in aligning shareholder-management interests by providing evidence that the social environment of the firm needs to be taken into account when analyzing the effects of equity compensation. Secondly, the first chapter contributes to the literature relating insider trading to compensation by documenting that when norms are loose, providing directors with equity compensation can lead to increased agency problems.

In their attempts to limit insider trading behavior many firms implement ex ante voluntary insider trading policies, such as defining blackout periods or requiring approval from the general council (Bettis

et al. 2000; Jagolinzer et al. 2011; Lee, Lemmon, Li, and Sequeira 2014). Next to these ex ante measures, firms might also impose ex post disciplinary actions following opportunistic insider trading by their directors. The second chapter in this dissertation focuses on this relation and investigates whether firms are more likely to replace board members who engage in opportunistic insider trading behavior and whether this applies equally to all board members. Unlike earlier research investigating board member turnover following major, firm-level adverse events, this chapter looks at turnover following individual director undesirable behavior. As such, it is the first study to shed light on potential labor market consequences of director opportunistic insider trading by documenting the effect on their board turnover rates.

Finally, the third chapter takes another look at the factors influencing the effectiveness of the audit committee. Earlier research in this field focuses on relatively static audit committee characteristics like independence and expertise (Abbott and Parker 2000;Chen and Zhou 2007; Cassell et al. 2012), and the economic incentives of equity compensation awarded by the firm (Archambeault, DeZoort and Hermanson 2008; Cullinan, Du, and Wright 2008; Magilke, Mayhew and Pike 2009; Keune and Johnstone 2015). The third chapter adds to this body of research by focusing on opportunistic insider trading behavior by audit committee members and its association with oversight quality. As opposed to earlier research, this factor is a dynamic representation of the behavior of audit committee members, providing insight into their character and motivation. As such, the third chapter contributes to the literature on audit committee effectiveness by showing that audit committees do not always act in the best interest of shareholders but might take advantage of their positon and engage in opportunistic trading. Additionally, this chapter shows that audit committee members are not only willing to take advantage of their superior access to information (Ravina and Sapienza, 2010; Duellman et al., 2018), but that this behavior is also associated with overall audit committee effectiveness.

Chapter I

The Relation Between Opportunistic Insider Trading, Equity Compensation And Social Capital

Abstract

In this paper I analyze the nature of the relation between equity compensation and director opportunistic insider trading behavior. I exploit the variation in the social capital across US counties to investigate when additional equity compensation provides directors with the necessary tools to engage in opportunistic behavior. Using a sample of 16,811 firm-insider-day observations spread over 1,834 unique directors and 320 firms from 2005 through 2014, I find that increased equity compensation increases (reduces) director likelihood of opportunistic behavior when local social capital is low (high). This paper contributes to the discussion on the effectiveness of equity compensation as a tool to align interests. Its findings should be of interest to compensation committees, outside investors and regulators.

1. Introduction

In this paper I study the relation between director equity compensation and their inclination to trade opportunistically. As a means of overcoming the fundamental agency problem between outside investors and directors, firms award their directors equity incentives to align their interests with those of outside shareholders (Jensen 1993). However, the effectiveness of this form of compensation as a monitoring tool is disputed. One major concern regarding equity compensation is the ease with which directors can unload and re-acquire equity. Bebchuk and Fried (2005) therefore question the potential of equity compensation as a tool to align interests between directors and outsiders because of directors' ability to earn profits from insider trading. While some earlier studies argue that in some settings, profitable insider trading might serve as an implicit form of compensation (Roulstone 2003; Dennis and Xu 2013), it also causes significant agency conflict (Bebchuk and Fried 2005; Dennis and Xu 2013). and exposes the firm to reputational and economic costs (Bhattacharya and Daouk 2002; Fishe and Robe 2004; Cui, Jo and Li 2015; De Groote, Bruynseels and Gaeremynck 2018). In this paper I investigate the association between equity compensation and director opportunistic insider trading. Providing equity compensation is a much-used monitoring mechanism to align interests between shareholders and corporate directors (Jensen 1983) and awarding more generous compensation packages can allow the firm to attract higher talent directors (Hope, Lu and Saiy 2018). However, providing directors with equity also gives them the tools to engage in potentially harmful insider trading behavior (Bebchuk and Fried 2006). While neither argument clearly dominates the other, I argue that the strength of the local social capital can influence whether equity compensation aligns directors with outside shareholders, or whether it provides opportunities to trade.

Social capital is often defined as the trust in the local society and the strength of local norms (Coleman 1994; Portes 1998; Spagnolo 1999; Jha and Chen 2015). I propose that the strength of local norms, measured as the amount of social capital in the US county where a firm is headquartered, can have an impact on what directors do with their equity compensation. Regions with higher social capital are typically characterized by high mutual trust, a community-centric attitude and a culture that cultivates cooperation. In such

a culture, people rely one each other in a continuous repetition of games, leading to the development of a code of conduct that encourages actors to honor obligations and develop mutual trust (Fukuyama 1997; Jha and Chen 2015; Jha 2017). When social capital is stronger, deviations from the social norm are more costly (Coleman 1994; Portes 1998) and the desire to conform to group expectations increases (Hilary and Huang 2013, Jha and Chen 2015). This change in cost of insider trading will impact directors' reaction to receiving equity compensation. Whereas directors in low social capital areas can utilize their equity relatively easily for opportunistic insider trading behavior, this will not be the case in high social capital areas. I test this idea by exploiting the variation in social capital at the county level in the United States. Using the zip code of the firm's headquarters, I gather data for variables proxying for the county-level social capital for each firm-year. I then conduct regressions to estimate the association between equity compensation and opportunistic insider trading behavior and control for the moderating impact of social capital.

I use the methodology of Cohen et al. (2012) to identify director "opportunistic" or information-driven insider trading in a sample of 16,811 firm-insider-day observations spread over 1,834 unique directors and 320 firms from 2005 through 2014. Using a specification that controls for director-year fixed effects to absorb any impact of director level social capital, I find that when not controlling for local social capital, director equity compensation does not influence their likelihood of engaging in opportunistic insider trading. However, when I separate the effect of equity compensation based on local social capital, the association between director equity compensation and the likelihood of their transaction being opportunistic is positive and significant in areas with relatively little social capital. This indicates that when local norms are weak providing directors with equity gives them the tools to engage in opportunistic insider trading behavior. On the other hand, in areas with relatively high amounts of social capital the association between director equity compensation and the likelihood of their transaction being opportunistic is negative and significant.

By exploring this relation I contribute to the literature in various ways. I add to the discussion on the effectiveness of equity compensation in aligning shareholder-management interests by providing evidence that the social

environment of the firm needs to be taken into account. This is of interest to the compensation committee of the board of directors as it allows them to better understand the implications of proposed compensation packages. Secondly, I contribute to the literature relating insider trading to compensation by documenting that when norms are loose, providing directors with equity compensation can lead to increased agency problems.

The rest of this paper is structured as follows. Section 2 review the existing literature and develops hypotheses. The research design and sample are described in section 3. Section 4 describes our analyses of opportunistic insider trading. Finally, I summarize the results and come to a conclusion in section 5.

2. Previous literature and hypothesis development

To mitigate agency conflicts resulting from the separation between ownership and control, the board of directors exerts monitoring on firm management (Fama and Jensen 1983). Agency theory predicts that a firm's compensation policy can tie an agent's incentives and expected utility to the principal's objectives (Jensen and Murphy 1990). Awarding high director compensation can also potentially allow the board to attract more talented and diligent directors (Hope et al. 2018). Equity compensation, in particular, is proposed as an effective way to make independent directors appreciate how their decisions affect shareholder wealth (Jensen 1993). Increased director equity compensation has been associated with better performance, greater investment opportunities, a higher price-to-book ratio and increased board oversight (Perry 2000; Bebchuk and Fried 2003; Yermack 2004; Ryan and Wiggins 2004; Fich and Shivdasani 2005; Linn and Park 2005; Conyon 2006; Dalton, Hitt and Certo 2007; Feng, Ghosh, and Sirmans 2007; Cordeiro, Veliyath, and Romal 2007; Sengupta and Zhang 2015; Hope et al. 2018).

Increased (equity) compensation, however, does not always translate into better director performance. Research suggests directors' independence decreases as their wealth associated with the firm increases (Bebchuk and Fried 2004; Dalton 2005). Bebchuk and Fried (2005) raises another concern associated with equity compensation, directors' mostly unrestricted ability to unload and reload shares in their own firm. This ability to engage in insider trading might provide directors with an incentive to manipulate the

information environment of the firm to enable profitable unloading and reloading of shares.

Corporate insiders' trades in their own company's equity are scrutinized by all parties in the stock market every day (Cohen et al. 2012). Over the years, this phenomena has also attracted intense research interest, allowing for the development of a wide literature on the topic. Insider trading based on access to superior information has long been established (Jaffe 1974; Seyhun 1986 1992 1998; Bettis, Vickrey and Vickrey 1997) and seems to persist over time (Ravina and Sapienza 2010; Cziraki et al. 2013). While some prior literature argues that insider trading helps to increase market efficiency (Manne 1966) and can be a part of optimal contracting (Roulstone 2003, Dennis and Xu 2013), insider trading behavior is also perceived to be an exploitation of outside investors (Cui et al. 2015). Research has documented negative market level effects of insider trading. In particular, insider trading has been associated with decreases in market depth and liquidity (Fishe and Robe 2004) and increases in firm cost of capital (Bhattacharya and Daouk 2002). Furthermore, there are also likely to be reputational concerns associated with insider trading, especially if the insider trading behavior is perceived as opportunistic or information-driven (De Groote, Bruynseels and Gaeremynck 2019). Indeed, profitable, opportunistic insider trading is perceived as inherently unfair, as corporate insiders use their information advantage for personal financial gains (Cui et al. 2015) and therefore leads to negative public sentiment, publicity and reputational losses if discovered (Bettis et al. 2000). Cohen et al. (2012) developed a methodology to isolate information-driven or opportunistic trades from routine trades. They go on to show that opportunistic insider trades have a much higher chance of being investigated by the SEC, compared to routine insider trades. Firms will thus have ample incentives to keep directors from opportunistically trading on their private information. Consistent with this, Bettis et al. (2000) and Jagolinzer et al. (2011) provide evidence of firms' monitoring and restriction of insider trades by specifying blackout periods or requiring approval from the general council.

Providing directors with equity compensation can influence director behavior in multiple ways. On the one hand, alignment of director and shareholder goals, which I expect to result in less opportunistic insider trading. As opportunistic insider trading behavior is costly to the firm and

shareholders, increased equity compensation might incentivize directors to engage in less opportunistic behavior. On the other hand, however, increased equity compensation might also create the opportunity to engage in more opportunistic trading. Providing directors with the needed shares to trade might shift director focus towards private rent extraction through opportunistic trading behavior.

Given the conflicting arguments above, the association between equity compensation and opportunistic insider trading remains an empirical question. Therefore, I present our hypothesis in the null form.

***H_1**: "There is no relation between director equity compensation and their opportunistic insider trading"*

The concept of social capital is increasingly popular in a wide range of disciplines such as economics, political science and management and has found its way into accounting research (Adler and Kwon 2002). Throughout its development in the literature social capital has been defined in a number of different ways, yet the predominant intuition behind the concept is that it is a set of norms that facilitate cooperation. Another interpretation of social capital, particularly in the management literature, is to view it as a set of networks from which benefits are derived (Payne et al. 2011; Jha and Chen 2015). I follow Woolcock (2001) and include both interpretations to define social capital as the set of norms and networks that facilitate collective action.

In regions with higher social capital, greater trust is fostered over time, and a culture is created that cultivates cooperation. In such a culture, people rely one each other in a continuous repetition of games, leading to the development of a code of conduct that encourages actors to honor obligations and develop mutual trust (Fukuyama 1997; Jha and Chen 2015). This strong culture and network sustains this code of conduct through the punishment of deviant behavior and encouragement of good behavior, making people feel like they need to behave in a certain way (Coleman 1994; Portes 1998; Spagnolo 1999). Earlier research has shown that social capital is negatively related to crime (Buonanno et al. 2009) and opportunistic behavior (La Porta et al. 1997) for individual agents. At the firm level, social capital has been found to limit tax avoidance (Hasan et al. 2016) and improve financial reporting quality and readability (Jha 2018). Its impact on the firm is taken

into account by the auditor, who charges lower fees in higher social capital areas (Jha and Chen 2015).

In addition to its effect on firm level outcomes, I expect social capital to also moderate the relation between equity compensation and opportunistic insider trading, allowing for differentiation between the interest alignment and private benefit extraction incentives generated by equity compensation. Human beings develop a set of norms and ideals for their own behavior based on what they perceive in their surroundings and deviations from these norms come with the cost of sense of guilt (Cialdini et al. 1991; Akerlof 2007). The social norms in directors' surroundings also enforce themselves not only because deviations are costly (Coleman 1994; Portes 1998), but also because of the desire to conform to group expectations (Hilary and Huang 2013, Jha and Chen 2015). In regions with more dense social capital, directors will thus be more inclined to conform to the expectations of shareholders and abnormally high equity compensation is likely to further align their interests. In low social capital environments, however, increases in equity compensation are likely to lead to less alignment between directors and shareholders and potentially even provide directors with the tools to engage in opportunistic transactions by increasing their shareholding. I thus formulate the following set of hypotheses:

***H_{2a}**: "Director equity compensation will increase the likelihood of opportunistic insider trading in low social capital regions"*

***H_{2b}**: "Director equity compensation will reduce the likelihood of opportunistic insider trading in high social capital regions"*

3. Sample and Variables

This study analyses trades placed by non-executive directors in S&P 1500 companies. I obtain data on these transactions, directors and firms from a number of separate databases. I obtain insider trading information from Thompson Reuters Insiders Data Feed from Form 4 filings. This data set includes insider trading data on directors, officers, and large stockholders with holdings greater than 10% of a firm's stock for firms listed on NYSE, AMEX, or NASDAQ. The initial sample period spans from January 2002 till March 2014. Given the research setting, I only retain trades placed by board members

and exclude option related trades to focus on open market transactions. Furthermore, while the initial period spans from January 2002 till March 2014, the usable range is limited to trades from January 2005 onwards because the identification of opportunistic insider trading behavior requires a preceding three year window (Cohen et al. 2012). I sum all transactions per firm-insider-day.

I obtain director information from the Boardex database from Management Diagnostics Limited. Boardex provides detailed biographical information on board members and senior executives providing a broad spectrum of individual characteristics. I start with director-firm-fiscal year observations in Boardex between 2002 and 2014[2] and combine these with social capital information from the Northeast Regional Center for Rural Development[3]. My initial sample consists of 37,293 firm-insider-day observations that are classifiable as routine or opportunistic and have compensation and social capital information. I include firm accounting information from Compustat which results in the loss of another 7,956 observations that cannot be linked. Finally, I exclude another 12,526 observations that have missing information resulting in a final sample of 16,811 usable firm-insider-day transaction observations spread over 1,834 unique directors and 320 firms.

Insider-firm- transaction days with compensation and social capital information	37,293
Observations without compustat counterpart	(7,956)
Observations with additional missing information	(12,526)
Total sample	16,811

Table 1: Sample Selection

3.1. Opportunistic Trading

I construct our measure of opportunistic trading (*Opportunistic Transaction*$_{i,j,d}$) following the methodology developed by Cohen at al. (2012). This classification is widely used in recent research to link opportunistic,

[2] Pre 2009, compensation data is available for individuals with roles at companies at companies in either S&P 500, S&P MID CAP 400, or S&P SMALL CAP 600. Post 2009, compensation data is available only for individuals with roles at companies in the S&P 500

[3] Data is available at:http://aese.psu.edu/nercrd/community/social-capital-resources/social-capital-variables-for-1997-2005-and-2009 (accessed on 23/11/2016).

information-driven trading to abnormal returns (Cohen et al. 2012; Khan and Lu 2013), SEC investigations (Cohen et al. 2012), strategic timing of earnings news (Michaely, Rubin, and Vedrashko 2016), or news warnings in the face of impending earnings disappointment (Billings and Cedergren 2015).

The Cohen et al. (2012) classification scheme relies on diversification and liquidity trades being more predictable and regular in their timing, while information based transactions are more irregular as they are placed when information arrives. To be able to identify the pattern in individual directors' transactions I use their preceding three year transaction history. I require each individual to have at least one transaction in the focal firm in each of the three preceding years in order to be classified. Each directors' trades are then marked as either routine when they are placed following a discernable pattern (i.e., when the director places at least one trade in the month of the focal transaction in each of the three preceding years). All other transactions that meet the requirements to be classified are classified as opportunistic (i.e. when the trade occur in a month where the same director has not traded in each of the three preceding years). This allows for individual directors to have both opportunistic and routine transactions in each fiscal years enabling me to get more granular insights into directors trading behavior.

3.2. Test Variables

I are interested in how director equity compensation influences directors' likelihood to engage in opportunistic transactions (H1) and how this relationship is moderated by the strength of the social capital in their environment (H2). To test H1, I estimate the association between the likelihood that a transaction is opportunistic ($Opportunistic\ Transaction_{i,j,d}$) and director equity compensation ($Equity_{i,j,t}$). To test H2 I add an interactions between $Equity_{i,j,t}$ and social capital ($Low\ Social\ Capital_{j,t}$) to estimate the moderating effect of the strength of local norms on the association between equity compensation and the likelihood a transaction is opportunistic.

I measure $Equity_{i,j,t}$ as the ratio of total equity linked compensation to total compensation for the individual director and include an additional measure for total compensation ($Total\ Comp_{i,j,t}$). This allows for the estimation of the impact of equity compensation such that it is comparable across directors and boards. Following H1 I do not formulate a directional prediction for the

association between the relative amount of equity compensation and the likelihood of opportunistic transactions by directors.

To measure social capital I follow the approach of Rupasingha et al. (2006) and construct a county level social capital index based on two social norms measures and two social networks measures. To proxy for social norms Rupasingha et al. (2006) propose voter turnout in presidential elections and national census response rate, where higher values represent higher social capital. For social networks, on the other hand, they propose the number of NGO's, and the number of civic and social organizations registered within a county normalized by its population, higher values represent a denser social network and thus higher social capital. I then utilize principal component analysis to construct the index of social capital for the years 1997 2005 and 2009. Following earlier literature I then linearly interpolate the data to fill in the years 1998 to 2004 and 2006 to 2008, and extrapolate the data to cover the years 2010-2013 (Hilary and Hui 2009; Jha and Chen 2015; Hasan et al. 2016)[45].The social capital index and the underlying data are available at the Northeast Regional Center for Rural Development[6].

After constructing the social capital index for all counties in the US, I construct a population-level indicator variable classifying counties as either low or high social capital counties. I classify a county as having low social capital when its social capital is below the mean for that year (*Low Social Capital*$_{j,t}$). I then impose a social capital classification on each firm where insider transactions occur, based on the county in which the firm is headquartered. Following $H2_a$ and $H2_b$ I expect the effect of *Equity*$_{i,j,t}$ to be mediated by our social capital variable, where I expect equity compensation to increase the likelihood of opportunistic behavior in low social capital areas and decrease the likelihood of opportunistic behavior in high social capital areas.

[4] Social Capital is very stick over time (Rupasingha et al. 2006; Jha and Chen 2015) remaining quite stable throughout the sample period. Correlations between the social capital index in 1997 and 2005, and 2005 and 2009 are 0.9378 and 0.9316 respectively. The correlation between the social capital index in 1997 and 2009 is 0.8822.

[5] Restricting the sample to years for which social capital is available severely reduces sample size. Coefficient estimates remain similar for the restricted sample, but due to the lower power the estimates become insignificant.

[6] Data is available at:http://aese.psu.edu/nercrd/community/social-capital-resources/social-capital-variables-for-1997-2005-and-2009 (accessed on 23/11/2016).

3.3. Control Variables

Next to the test variables I also introduce director, firm and board control variables which are reported in Table 2. On the director level I control for director shareholding ($Shareholding_{i,j,d}$) which is measured as the total amount of shares held by director *i* in firm *j* at the start of transaction day *d* scaled by total shares outstanding at the beginning of the fiscal year and trading activity ($Trades_{i,j,t}$) which is measured as the amount of trades placed by director *i* in firm *j* over the past 4 fiscal years. As I classify trades based on the three preceding years of transactions I expect a higher number of transactions to reduce the likelihood of a single transaction to be classified as opportunistic. Based on Cohen et al. (2012) I include $Board\ Tenure_{i,j,t}$ to control for the amount of time director *i* has spent on the board of firm *j* at the end of fiscal year *t*, I expect directors to gain more access to information throughout their tenure enabling them to engage in more opportunistic, information based trades. In addition I control for the director membership of one or more of the important board committees ($AC\ Member_{i,j,t}$; $RC\ Member_{i,j,t}$; $NC\ Member_{i,j,t}$). Directors that serve on certain board committees have access to more valuable information and build up more human capital in the firm (Ravina and Sapienza 2010; Yermack 2004) allowing them to engage in more opportunistic behavior. I control for membership of the audit committee($AC\ Member_{i,j,t}$), the compensation committee($CC\ Member_{i,j,t}$) and the nominating committee($NC\ Member_{i,j,t}$).

On the firm level I control for size ($Size_{j,t}$), performance ($ROA_{j,t}$, $Stock\ Returns_{j,t}$), leverage ($Debt/Assets_{j,t}$) and status ($Firm\ Status_{j,t}$). I expect directors at bigger and more reputable firms to be monitored more, limiting their opportunistic trading. I include the natural logarithm of total assets ($Size_{j,t}$) to control for size (Cohen et al. 2012) and an indicator measuring one if the firm is either an S&P 500 firm or is listed on the Fortune Most Admired Companies list and zero otherwise ($Firm\ Status_{j,t}$) to control for firm reputation. To further control for external monitoring I include firm leverage ($Debt/Assets_{j,t}$) which I expect to limit opportunistic trading (Jensen,1986; Ghosh,2007). $ROA_{j,t}$, which is measured as EBITDA over total assets, and $Stock\ Returns_{j,t}$,which is measured as the stock performance of the firm over the previous three years, are included to control for past firm performance (Cohen et al. 2012).

I also expect opportunistic trading by directors to be influenced by the governance environment of the firm, to control for this I include CEO power (*CEO Chair*$_{j,t}$ and *CEO Founder*$_{j,t}$), board independence and busyness (*Board Independence*$_{j,t}$ and *Board Busyness*$_{j,t}$) as well as board size(*Board Size*$_{j,t}$). *CEO Chair*$_{j,t}$ is an indicator variable that equals one when the CEO is the chairman of the board or both and zero otherwise, while *CEO Founder*$_{j,t}$ equals one when the CEO is also the founder of the firm. *Board Independence*$_{j,t}$ measures the ratio of independent board members to total board size, and is expected to negatively influence opportunistic behavior. *Board Busyness*$_{j,t}$ - measures the ratio of independent directors with three or more outside board positions to the total number of independent directors. *Board Size*$_{j,t}$ controls for the total number of directors on the board. In addition I include an indicator that measures one when firm *j* is classified as a low governance firm for fiscal year *j (Low Governance*$_{j,t}$ *)*[7].

Variable	Definition
Opportunistic Transaction$_{i,j,d}$	Indicator variable that equals 1 if the trade is classified as opportunistic and 0 if it is classified as routine.
Equity$_{i,j,t}$	Ratio of equity and equity linked compensation received to total compensation received.
Total Comp$_{i,j,t}$	Natural logarithm of 1 + total compensation provided by Boardex (1000 US Dollars).
Low Social Capital$_{j,t}$	Indicator variable that equals 1 if the firm' headquarters is located in a county that has social capital at or below the mean of all counties for that year.
Shareholding$_{i,j,d}$	Total shares held by the insider before the current transaction scaled by total shares outstanding.
Trades$_{i,j,t}$	Natural log of the total amount of trades placed in the firm by the insider over the past four years.
Board Tenure$_{i,j,t}$	Number of years the director has spent on the board of the firm.

[7] I classify firms as low governance when they have 2 or fewer of the following characteristics: (a) Above median board independence, (b) Below median board busyness, (c) CEO is not the chairperson, (d) CEO is not the founder, and (e) Firm is a member of S&P 500 or on the Fortune Most Admired Companies list.

AC Member$_{i,j,t}$	Indicator variable measuring one if the insider is a member of the audit committee of the focal board.
RC Member$_{i,j,t}$	Indicator variable measuring one if the insider is a member of the remuneration committee of the focal board.
NC Member$_{i,j,t}$	Indicator variable measuring one if the insider is a member of the nominating committee of the focal board.
Size$_{j,t}$	Natural log of total assets outstanding at the beginning of the fiscal year.
ROA$_{j,t-1}$	The earnings before interest, taxes, depreciation, and amortization (EBITDA), divided by the firm's total assets measured over the previous fiscal year.
Stock Returns$_{j,t-1}$	The holding period stock return for the past three years, equal to the ratio of the price at the end of year t-1 to the end of year t-4, adjusted for dividends and splits, minus 1.
Debt/Assets$_{j,t-1}$	The ratio of debt to total assets measured over the previous fiscal year.
Firm Status$_{j,t}$	An indicator variable that equals 1 if the firm is either a S&P 500 firm or listed Fortune's annual listing of "most admired companies" or both and 0 otherwise.
CEO Chair$_{j,t}$	Indicator variable measuring 1 when the current CEO is also the chairman of the board and zero otherwise.
CEO Founder$_{j,t}$	Indicator variable measuring 1 when the current CEO is also the founder of the firm and zero otherwise.
Board Busyness$_{j,t}$	Ratio of independent directors with three or more public board engagements to total independent directors in the board.
Board Independence$_{j,t}$	Ratio of independent directors to total directors in the board.
Board Size$_{j,t}$	Total amount of directors in the board.
Low Governance$_{j,t}$	Indicator variable measuring 1 when firms have 4 or more of the following characteristics: (a) Below median board independence, (b) above median board

	busyness, (c) CEO is chairperson, (d) CEO is founder, (e) Low status firm, and (f) below median debt/assets ratio and zero otherwise.

Table 2: Variable Definitions

3.4. Model Design

I estimate the relation between the likelihood of transactions being opportunistic, director compensation, and the strength of social capital using a linear probability model. This design choice allows for an easier interpretation of our coefficients of interest (Woolridge 2002; Chyz and Gaerntner 2018). To control for potential omitted variables and to ensure I estimate the differential impact of compensation for each director engagement and environment, I estimate all our models with director-year fixed effects. To avoid issues with multicollinearity and make results easier to interpret I use the standardized value of all continuous variables[8]. This leads to the following models:

$$Pr(Opportunistic\ Transaction_{i,j,d}) = F\ (\beta_0 + \beta_1\ Equity_{i,j,t} + \beta_2\ Total\ Comp_{i,j,t} + \beta_3\ Low\ Social\ Capital_{j,t} + \sum \beta\ \text{Director Controls} + \sum \beta\ \text{Firm Controls} + \sum \beta\ \text{Board Controls} + \sum \beta\ \text{Director Year Fixed effects} + \varepsilon_{i,j,d})\ (1)$$

$$Pr(Opportunistic\ Transaction_{i,j,d}) = F\ (\beta_0 + \beta_1\ Equity_{i,j,t} + \beta_2\ Total\ Comp_{i,j,t} + \beta_3\ Low\ Social\ Capital_{j,t} + \beta 4\ Low\ Social\ Capital_{j,t} * Equity_{i,j,t} + \sum \beta\ \text{Director Controls} + \sum \beta\ \text{Firm Controls} + \sum \beta\ \text{Board Controls} + \sum \beta\ \text{Director Year Fixed effects} + \varepsilon_{i,j,d})\ (2)$$

4. Empirical Results

4.1. Univariate Analysis

Table 3 presents descriptive statistics for all variables used[9]. Panel A Provides information on the frequency of opportunistic transactions. About 56.6% of all insider-firm-trading days are classified as opportunistic

[8] I standardize after winsorizing at the 1st and 99th percentile.
[9] I report non-standardized variables for all continuous variables, but use standardized values in the estimations.

indicating that opportunistic insider trading behavior is pervasive. Compared to the results found by Cohen et al. (2012) I find a higher rate of opportunistic transactions (56.6% in our study compared to 45% in the Cohen et al (2012) study), which is not surprising as I classify transactions on a trade basis using a rolling window. This indicates opportunistic insider trading is not a trivial issue within our sample.

Panel B provides an overview of the test variables used. In general directors get compensated quite well, with an average total compensation of $268,000, 37.0% of which is cash compensation. In spite of winsorizing, average director compensation is still sensitive to outliers, as median compensation is only about $205.000. Directors seem to trade more actively in firms with their headquarters in low social capital areas, as 77.5% of transactions are placed in these firms.

Panels C reports descriptive statistics on the controls used in our analyses. Directors in our sample are quite active traders, with an average of 33 transactions over the last 4 years. This is not unexpected given that all directors in our sample need to be active traders over the 4 year measurement period to be included in our sample. The average director has a 0.13% stake in their firm and 80% serve on at least one board committee. Directors in our sample have served in their role for about 12.5 years on average. Firms are on average quite large and profitable, with over 20 billion USD in assets and an average return on assets of 15,5%. The average CEO combines their role with that of chairman of the board (58.5%) but boards are fairly independent (83.0%) and most independent directors are not busy (14.6%). 13.7% of the transactions in our sample stem from a firm operating in a low governance environment.

	N	mean	sd	p25	p50	p75
Panel A: Dependent Variables						
Opportunistic Transaction$_{i,j,d}$	16811	0.566	0.496	0.000	1.000	1.000
Panel B: Test Variables						
Total Comp$_{i,j,t}$	16811	5.325	0.604	5.017	5.323	5.587
Total Comp$_{i,j,t}$ (in 1000's US Dollar)	16811	268.00	496.00	151.00	205.00	267.00
Equity$_{i,j,t}$	16811	0.630	0.214	0.500	0.610	0.780
Low Social Capital$_{j,t}$	16811	0.775	0.417	1.000	1.000	1.000
Panel C: Controls						
Shareholding$_{i,j,d}$	16811	0.001	0.007	0.000	0.000	0.000
Trades$_{i,j,t}$	16811	2.978	0.948	2.303	2.944	3.555
Trades$_{i,j,t}$ (raw value)	16811	32.707	44.672	10.000	19.000	35.000
Board Tenure$_{i,j,t}$	16811	12.446	8.503	6.200	9.900	15.900
AC Member$_{i,j,t}$	16811	0.409	0.492	0.000	0.000	1.000
RC Member$_{i,j,t}$	16811	0.422	0.494	0.000	0.000	1.000
NC Member$_{i,j,t}$	16811	0.393	0.488	0.000	0.000	1.000
Firm Status$_{j,t}$	16811	0.317	0.465	0.000	0.000	1.000
Debt/Assets$_{j,t-1}$	16811	0.231	0.159	0.121	0.213	0.306
ROA$_{j,t-1}$	16811	0.155	0.080	0.106	0.148	0.200
Stock Returns$_{j,t-1}$	16811	0.501	1.107	-0.080	0.229	0.716
Size$_{j,t}$	16811	9.069	1.283	8.189	8.930	9.966
Board Size$_{j,t}$	16811	10.951	2.205	10.000	11.000	12.000
Board Independence$_{j,t}$	16811	0.830	0.088	0.778	0.846	0.900
Board Busyness$_{j,t}$	16811	0.146	0.136	0.000	0.125	0.222
CEO Chair$_{j,t}$	16811	0.586	0.493	0.000	1.000	1.000
CEO Founder$_{j,t}$	16811	0.016	0.125	0.000	0.000	0.000
Low Governance$_{j,t}$	16811	0.137	0.344	0.000	0.000	0.000

Table 3: Descriptive Statistics

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.0000										

1. *Opportunistic Transaction$_{i,j,d}$*											
2. *Total Comp$_{i,j,t}$*	**0.0177** (0.0217)	**1.0000**									
3. *Equity$_{i,j,t}$*	0.0110 (0.1551)	**0.3403** (0.0000)	**1.0000**								
4. *Low Social Capital$_{j,t}$*	**0.0478** (0.0000)	**0.0492** (0.0000)	-0.0082 (0.2890)	**1.0000**							
5. *Shareholding$_{i,j,d}$*	**0.0610** (0.0000)	**0.0314** (0.0000)	**-0.0362** (0.0000)	**0.0265** (0.0006)	**1.0000**						
6. *Trades$_{i,j,t}$*	-0.0108 (0.1601)	**0.0731** (0.0000)	0.0077 (0.3162)	-0.0084 (0.2741)	**0.2173** (0.0000)	**1.0000**					
7. *Board Tenure$_{i,j,t}$*	**0.0915** (0.0000)	**0.1023** (0.0000)	**-0.0875** (0.0000)	**0.0768** (0.0000)	**0.2893** (0.0000)	**0.4492** (0.0000)	**1.0000**				
8. *AC Member$_{i,j,t}$*	-0.0122 (0.1135)	**-0.0467** (0.0000)	**-0.0325** (0.0000)	0.0052 (0.5006)	**-0.0882** (0.0000)	**-0.1765** (0.0000)	**-0.1863** (0.0000)	**1.0000**			
9. A*C Member$_{i,j,t}$*	**-0.0441** (0.0000)	**-0.0257** (0.0009)	**0.0375** (0.0000)	**0.0344** (0.0000)	**-0.1027** (0.0000)	**-0.1819** (0.0000)	**-0.1065** (0.0000)	**-0.2110** (0.0000)	**1.0000**		
10. *NC Member$_{i,j,t}$*	-0.0037 (0.6321)	0.0148 (0.0549)	**0.0770** (0.0000)	**0.0646** (0.0000)	**-0.0907** (0.0000)	**-0.1105** (0.0000)	**-0.0741** (0.0000)	**-0.0283** (0.0002)	**0.1149** (0.0000)	**1.0000**	
11. *Firm Status$_{j,t}$*	**-0.0662** (0.0000)	**0.0304** (0.0001)	**0.0214** (0.0056)	-0.0091 (0.2360)	-0.0151 (0.0506)	**-0.1433** (0.0000)	**-0.1202** (0.0000)	-0.0086 (0.2667)	**0.0977** (0.0000)	**0.0335** (0.0000)	**1.0000**
12. *Debt/Assets$_{j,t-1}$*	**-0.0316** (0.0000)	**0.0742** (0.0000)	**0.0950** (0.0000)	**0.1528** (0.0000)	**-0.0352** (0.0000)	**0.0405** (0.0000)	**-0.0655** (0.0000)	**0.0176** (0.0225)	**0.0596** (0.0000)	**0.0500** (0.0000)	**-0.0303** (0.0001)
13. *ROA$_{j,t-1}$*	**-0.0258** (0.0008)	**-0.0248** (0.0013)	0.0003 (0.9682)	0.0079 (0.3034)	**0.0212** (0.0060)	**0.0391** (0.0000)	**-0.0577** (0.0000)	**0.0222** (0.0039)	**0.0502** (0.0000)	**0.0326** (0.0000)	**0.0397** (0.0000)
14. *Stock Returns$_{j,t-1}$*	**0.0434** (0.0000)	0.0069 (0.3725)	**0.0238** (0.0020)	**-0.0985** (0.0000)	**-0.0549** (0.0000)	**-0.0812** (0.0000)	**-0.1664** (0.0000)	**0.0389** (0.0000)	0.0021 (0.7899)	**0.0362** (0.0000)	**-0.0184** (0.0170)
15. *Size$_{j,t}$*	**-0.0441** (0.0000)	**0.1949** (0.0000)	0.0035 (0.6508)	-0.0001 (0.9933)	**0.0192** (0.0128)	**0.0361** (0.0000)	**0.0915** (0.0000)	**-0.0811** (0.0000)	**-0.0692** (0.0000)	**-0.0743** (0.0000)	**0.1915** (0.0000)
16. *Board Size$_{j,t}$*	**-0.0364** (0.0000)	**-0.0779** (0.0000)	**-0.1724** (0.0000)	0.0072 (0.3479)	**-0.0157** (0.0411)	**0.0480** (0.0000)	**0.0699** (0.0000)	**-0.1183** (0.0000)	**-0.0997** (0.0000)	**-0.1197** (0.0000)	**0.0334** (0.0000)
17. *Board Independence$_{j,t}$*	**-0.0637** (0.0000)	**0.0911** (0.0000)	**0.1016** (0.0000)	**-0.0561** (0.0000)	**-0.0481** (0.0000)	**-0.1738** (0.0000)	**-0.1461** (0.0000)	**-0.0198** (0.0101)	**0.0456** (0.0000)	**0.0358** (0.0000)	**0.1447** (0.0000)
18. *Board Busyness$_{j,t}$*	-0.0099 (0.1987)	**0.0502** (0.0000)	**0.0500** (0.0000)	**0.0341** (0.0000)	-0.0106 (0.1679)	0.0058 (0.4539)	**0.0269** (0.0005)	**-0.0349** (0.0000)	**-0.0157** (0.0420)	**-0.0390** (0.0000)	**0.2406** (0.0000)
19. *CEO Chair$_{j,t}$*	**-0.0592** (0.0000)	**-0.0562** (0.0000)	**0.0477** (0.0000)	**-0.0685** (0.0000)	**-0.1119** (0.0000)	**-0.1431** (0.0000)	**-0.1532** (0.0000)	**0.0600** (0.0000)	**0.0880** (0.0000)	**0.1081** (0.0000)	**0.1368** (0.0000)
20. *CEO Founder$_{j,t}$*	**0.0421** (0.0000)	**0.0487** (0.0000)	**0.0383** (0.0000)	0.0114 (0.1393)	**-0.0153** (0.0471)	**-0.0449** (0.0000)	**-0.0408** (0.0000)	**0.0396** (0.0000)	0.0128 (0.0979)	-0.0058 (0.4559)	**-0.0160** (0.0385)
21. *Low Governance$_{j,t}$*	0.0073 (0.3435)	**-0.0304** (0.0001)	-0.0005 (0.9508)	**-0.0484** (0.0000)	-0.0088 (0.2513)	**-0.0461** (0.0000)	**-0.0461** (0.0000)	**0.0452** (0.0000)	0.0067 (0.3832)	**0.0255** (0.0010)	**-0.2095** (0.0000)

Table 4: Correlation Table

12.	13.	14.	15.	16.	17.	18.	19.	20.	21.

12. *Debt/Assets*$_{j,t-1}$	**1.0000**									
13. *ROA*$_{j,t-1}$	**0.0795** (0.0000)	**1.0000**								
14. *Stock Returns*$_{j,t-1}$	**-0.1483** (0.0000)	**0.2167** (0.0000)	**1.0000**							
15. *Size*$_{j,t}$	**-0.0786** (0.0000)	**-0.3166** (0.0000)	**-0.2465** (0.0000)	**1.0000**						
16. *Board Size*$_{j,t}$	**-0.0253** (0.0010)	**-0.0882** (0.0000)	**-0.2126** (0.0000)	**0.4009** (0.0000)	**1.0000**					
17. *Board Independence*$_{j,t}$	**0.0389** (0.0000)	**-0.0847** (0.0000)	**-0.0296** (0.0001)	**0.0733** (0.0000)	**-0.1207** (0.0000)	**1.0000**				
18. *Board Busyness*$_{j,t}$	**0.0296** (0.0001)	**-0.0388** (0.0000)	**-0.0359** (0.0000)	**0.2381** (0.0000)	**0.0981** (0.0000)	**0.0869** (0.0000)	**1.0000**			
19. *CEO Chair*$_{j,t}$	**-0.0267** (0.0005)	**0.1478** (0.0000)	**0.0565** (0.0000)	**-0.0267** (0.0005)	**-0.0780** (0.0000)	**0.2290** (0.0000)	**0.1230** (0.0000)	**1.0000**		
20. *CEO Founder*$_{j,t}$	**0.0158** (0.0405)	**0.0211** (0.0062)	**0.0623** (0.0000)	**0.0331** (0.0000)	**-0.0612** (0.0000)	**-0.0560** (0.0000)	0.0049 (0.5223)	**0.0904** (0.0000)	**1.0000**	
21. *Low Governance*$_{j,t}$	**-0.1886** (0.0000)	-0.0090 (0.2420)	**0.0651** (0.0000)	**0.0350** (0.0000)	**0.0235** (0.0023)	**-0.2293** (0.0000)	**0.0994** (0.0000)	**0.2763** (0.0000)	**0.2260** (0.0000)	**1.0000**

Table 4: Correlation Table (continued)

Table 4 presents the correlation structure for all variables used. In support of H1 I find no significant correlation between equity compensation and the likelihood of opportunism. However, both total compensation (corr= 0.0177; p-value=0.0217) and low social capital (corr=0.0478; p-value= 0.000) seem to have a positive and significant correlation with the likelihood of opportunistic trading. Correlations between controls are modest, yet in some models multicollinearity can become an issue. To avoid this influencing our estimates I work with standardized values for all continuous variables. In all analysis VIF's remain well below the threshold, with a maximum value of 6.41.

4.1. Compensation composition and opportunism

Table 5 presents results showing that, consistent with hypothesis 1, the likelihood of opportunistic trading is not significantly related to the relative level of equity compensation (coeff=0.0309; p-value=0.292) directors receive. It seems neither the interest alignment nor the insider trading opportunity effect dominates in the general sample. However, I do find that there is a negative, marginally significant negative association between the total compensation directors receive and the likelihood of a their transactions being negative (coeff=-0.1171; p-value=0.081). I also find no significant association between the likelihood of opportunistic trading by directors and the level of social capital in of the firm in which they are trading in (coeff=0.0370; p-value=0.485).

Related to the control variables I find that at the director level, our controls do not seem to pick up on much variance. Contrary to our expectations, neither the amount of trades placed over the classification window not the holdings of individual directors are significantly associated with the likelihood of their transactions being opportunistic. Directors trade less opportunistically when firm accounting performance is higher (coeff=-0.1182; p-value=0027). Contrary to expectations, monitoring by external debtholders does not significantly reduce the likelihood of an insider to be trading opportunistically (coeff=-0.0360; p-value=0.343). Compared to their lower status engagements, directors are less likely to trade opportunistically in high status engagements (coeff=-0.2031; p-value=0.035) and when boards are more independent (coeff=-0.1223; p-value=0.006). Directors are also significantly less likely to be trading opportunistically in boards that are bigger (coeff=-0.0902; p-value=0.035) and in boards where more directors hold three or more public board seats (coeff=-0.0678; p-value=0.008).

	Expected Sign	(1)
$Total\ Comp_{i,j,t}$	+/-	-0.1171* (0.0671)
$Equity_{i,j,t}$	+/-	0.0309 (0.0293)
$Low\ Social\ Capital_{j,t}$	+	0.0370 (0.0529)
$Shareholding_{i,j,d}$	-	0.0402 (0.0338)
$Trades_{i,j,t}$	-	0.0601 (0.0385)
$Board\ Tenure_{i,j,t}$	+	-0.0361 (0.0414)
$AC\ Member_{i,j,t}$	+	0.0332 (0.0631)
$AC\ Member_{i,j,t}$	+	0.0142 (0.0519)
$NC\ Member_{i,j,t}$	+	0.0124 (0.0529)
$Firm\ Status_{j,t}$	-	-0.2031** (0.0963)
$Debt/Assets_{j,t-1}$	-	-0.0360 (0.0379)
$ROA_{j,t-1}$	+	-0.1182** (0.0533)

Stock Returns$_{j,t-1}$	+	0.0429 (0.0346)
Size$_{j,t}$	-	0.0704 (0.0511)
Board Size$_{j,t}$	+/-	-0.0903** (0.0429)
Board Independence$_{j,t}$	-	-0.1223*** (0.0446)
Board Busyness$_{j,t}$	+	-0.0678*** (0.0254)
CEO Chair$_{j,t}$	+	-0.0632 (0.0618)
CEO Founder$_{j,t}$	+	0.0446 (0.2648)
Low Governance$_{j,t}$	+	0.0234 (0.1290)
Constant		0.7495*** (0.1209)
Director*Year fixed effects		yes
Observations		16811
Adjusted R^2		.00611

Table 5: Opportunistic trading and equity compensation

*,**,*** indicates significance at the 10%, 5% and 1% levels (two tailed). Numbers in parentheses are robust T-statistics. For variable definitions please refer to Table 2.

Table 6 presents the multivariate results regarding the differential impact of equity compensation for low and high social capital areas. Column (1) presents regression results for model (2). I find that directors' insider transactions are significantly more likely to be opportunistically timed when the firm has its headquarters in an area with low social capital (coeff=0.1266; p-value=0.029). In addition, when controlling for the interaction with social capital, directors overall trade significantly less opportunistic in engagements there they receive a higher proportion of their compensation in the form of equity (coeff=-0.1400; p-value=0.020). However, the interaction between the equity component of director compensation and low social capital is positive and strongly significant (coeff=0.2341; p-value=0.000), suggesting that directors in low social capital areas use the equity they gain from compensation to engage in opportunistic transactions. In column (2), I estimate the impact of $Equity_{i,j,t}$ separately for the low and high social capital group, allowing for an easier interpretation of the overall effect of equity on

the likelihood of transactions being opportunistic[10]. The results in column (2) show that the effect of equity compensation on the likelihood of opportunistic trading is actually reversed for directors trading in low vs. high social capital areas. Directors with engagements in both social capital areas will on average trade more (less) opportunistically when receiving a higher fraction of equity compensation in their low (high) social capital engagements ($Equity_{i,j,t}$ when *Low Social Capital* $_{j,t}$: coeff=0.0941; p-value=0.003; $Equity_{i,j,t}$ when *High Social Capital* $_{j,t}$: coeff=-0.1400, p-value=0.020)[11]. Control variables are in line with the results in table 5. Taken together, the evidence in table 6 provides strong support for hypothesis 2a and 2b, finding that the impact of equity compensation on director behavior hinges on the strength of social captial in the environment of the firm.

	Expected Sign	(1)	(2)
$Total\ Comp_{i,j,t}$	+/-	0.0119	
		(0.1157)	
$Equity_{i,j,t}$	-	-0.1400**	
		(0.0601)	
$Low\ Social\ Capital_{j,t}$ * $Total\ Comp_{i,j,t}$	+/-	-0.1227	
		(0.1399)	
$Low\ Social\ Capital_{j,t}$ * $Equity_{i,j,t}$	+	0.2341***	
		(0.0669)	
$Total\ Comp_{i,j,t}$ When $Low\ Social\ Capital_{j,t}$=1	+/-		0.0119
			(0.1157)
$Total\ Comp_{i,j,t}$ When $Low\ Social\ Capital_{j,t}$=0	+/-		-0.1108
			(0.0763)
$Equity_{i,j,t}$ When $Low\ Social\ Capital_{j,t}$=1	+		-0.1400**
			(0.0601)
$Equity_{i,j,t}$ When $Low\ Social\ Capital_{j,t}$=0	-		0.0941***
			(0.0317)
$Low\ Social\ Capital_{j,t}$	+	0.1266**	0.1266**
		(0.0578)	(0.0578)
$Shareholding_{i,j,d}$	-	0.0400	0.0400
		(0.0338)	(0.0338)
$Trades_{i,j,t}$	-	0.0482	0.0482
		(0.0388)	(0.0388)
$Board\ Tenure_{i,j,t}$	+	-0.0119	-0.0119
		(0.0422)	(0.0422)
$AC\ Member_{i,j,t}$	+	-0.0081	-0.0081

[10] In a column (1), I estimate $\beta_1{}^t\ Equity_{i,j,t} + \beta_2{}^t\ Low\ Social\ Capital_{j,t} + \beta_3{}^t\ Equity_{i,j,t} * Low\ Social\ Capital_{j,t}$. The analysis in column (2) provides a separate coefficient of $Equity_{i,j,t}$ for both groups identified by *Low Social Capital* $_{j,t}$ such that $\beta_1 = \beta_1{}^t$ and $\beta_2 = \beta_1{}^t + \beta_3{}^t$. This approach allows for a direct test of the effect of $Equity_{i,j,t}$ for both groups (Christensen, Hail, and Leuz 2013; De Groote et al. 2019).

[11] Compensation composition does not differ significantly between high and low social capital areas (p-value= 0.2890).

		(0.0628)	(0.0628)
AC $Member_{i,j,t}$	+	0.0100	0.0100
		(0.0521)	(0.0521)
$NC\ Member_{i,j,t}$	+	0.0190	0.0190
		(0.0513)	(0.0513)
$Firm\ Status_{j,t}$	-	-0.1549	-0.1549
		(0.0951)	(0.0951)
$Debt/Assets_{j,t-1}$	-	-0.0517	-0.0517
		(0.0364)	(0.0364)
$ROA_{j,t-1}$	+	-0.1332**	-0.1332**
		(0.0520)	(0.0520)
$Stock\ Returns_{j,t-1}$	+	0.0478	0.0478
		(0.0324)	(0.0324)
$Size_{j,t}$	-	0.0906*	0.0906*
		(0.0521)	(0.0521)
$Board\ Size_{j,t}$	+/-	-0.0775*	-0.0775*
		(0.0419)	(0.0419)
$Board\ Independence_{j,t}$	-	-0.1232***	-0.1232***
		(0.0436)	(0.0436)
$Board\ Busyness_{j,t}$	+	-0.0636**	-0.0636**
		(0.0255)	(0.0255)
$CEO\ Chair_{j,t}$	+	-0.0903	-0.0903
		(0.0622)	(0.0622)
$CEO\ Founder_{j,t}$	+	0.0227	0.0227
		(0.2630)	(0.2630)
$Low\ Governance_{j,t}$	+	0.0368	0.0368
		(0.1264)	(0.1264)
Constant		0.6841***	0.6841***
		(0.1166)	(0.1166)
Director*Year fixed effects		yes	yes
Observations		16811	16811
Adjusted R^2		.00798	.00798

Table 6: Opportunistic trading and equity compensation for high and low social capital areas

*,**,*** indicates significance at the 10%, 5% and 1% levels (two tailed). Numbers in parentheses are robust T-statistics. For variable definitions please refer to Table 2.

4.2. Moderating impact of governance in low social capital areas

The main results in table 6 show that awarding directors with a higher proportion of equity compensation in low social capital areas is associated with a strong increase in the likelihood of their transactions being opportunistic. In this section I explore whether the quality of firms' governance affects this relationship. Prior research studying the impact of firm governance on insider trading behavior finds that when governance quality is

low, profitability of trades is higher (Ravina and Sapienza 2010, Dai et al. 2016), as well as the likelihood of opportunistic behavior (Cohen et al. 2012). In this section, I investigate how high-quality firm governance can help mitigate concerns surrounding the potentially adverse effect of equity compensation in areas with less strict norms. To this end, I focus on trades taking place in low social capital areas only and adjust model (2) to now include an interaction with *Low Governance*$_{j,t}$, singling out the impact of equity compensation on opportunism for directors in low social capital environments. Because I only take observations from low social capital environments into account our indicator for social capital is no longer present in the model, all other variables remain.

Table 7 describes the results from this regression, column (1) describes the results using a traditional interaction analysis while column (2) displays the total effect of equity compensation on the likelihood of trades being opportunistic for low and high governance firms. I find that an increase in the proportion of equity compensation does not influence the likelihood of trades being opportunistic for all directors at conventional levels (coeff=0.0542, p-value=0.206). The strengths of the local governance environment does not seem to have a significant association with the likelihood of transactions being opportunistic either (coeff=0.1015, p-value=0.532), nor does it mediate the association between the equity component of compensation and the likelihood of transactions being opportunistic (coeff=0.2629, p-value=0.187). Column (2) shows that the total effect of equity compensation on the likelihood of opportunistic trading in a weak governance environment is not significant at conventional levels (*Equity*$_{i,j,t}$ when *Low Governance*$_{j,t}$, coeff=0.3171, p-value=0.110).

	Expected Sign	(1)	(2)
Total Comp$_{i,j,t}$	+/-	-0.0964 (0.0767)	-0.0964 (0.0767)
Equity$_{i,j,t}$	+/-	0.0542 (0.0428)	
Low Governance$_{j,t}$ * *Equity*$_{i,j,t}$	+	0.2629 (0.1993)	
Equity$_{i,j,t}$ When *Low Governance*$_{j,t}$ =1	+		0.0542 (0.0428)

$Equity_{i,j,t}$ When $Low\ Governance_{j,t}$ =0	+/-		0.3171
			(0.1983)
$Low\ Governance_{j,t}$	+	0.1015	0.1015
		(0.1623)	(0.1623)
$Shareholding_{i,j,d}$	-	0.0479	0.0479
		(0.0340)	(0.0340)
$Trades_{i,j,t}$	-	0.0570	0.0570
		(0.0572)	(0.0572)
$Board\ Tenure_{i,j,t}$	+	-0.0243	-0.0243
		(0.0710)	(0.0710)
$AC\ Member_{i,j,t}$	+	0.0161	0.0161
		(0.0910)	(0.0910)
$AC\ Member_{i,j,t}$	+	0.0255	0.0255
		(0.0685)	(0.0685)
$NC\ Member_{i,j,t}$	+	0.0417	0.0417
		(0.0727)	(0.0727)
$Firm\ Status_{j,t}$	-	-0.1310	-0.1310
		(0.1153)	(0.1153)
$Debt/Assets_{j,t-1}$	-	-0.0788	-0.0788
		(0.0521)	(0.0521)
$ROA_{j,t-1}$	+	-0.2048***	-0.2048***
		(0.0779)	(0.0779)
$Stock\ Returns_{j,t-1}$	+	0.0040	0.0040
		(0.0385)	(0.0385)
$Size_{j,t}$	-	0.0771	0.0771
		(0.0774)	(0.0774)
$Board\ Size_{j,t}$	+/-	-0.0711	-0.0711
		(0.0557)	(0.0557)
$Board\ Independence_{j,t}$	-	-0.1031	-0.1031
		(0.0662)	(0.0662)
$Board\ Busyness_{j,t}$	+	-0.0981***	-0.0981***
		(0.0367)	(0.0367)
$CEO\ Chair_{j,t}$	+	-0.2605***	-0.2605***
		(0.0897)	(0.0897)
$CEO\ Founder_{j,t}$	+	-0.2283	-0.2283
		(0.3687)	(0.3687)
Constant		0.9236***	0.9236***
		(0.1382)	(0.1382)

Director*Year fixed effects	yes	yes
Observations	13033	13033
Adjusted R^2	.00643	.00643

Table 7: Opportunistic trading and equity compensation for high and low governance in low social capital areas

*,**,*** indicates significance at the 10%, 5% and 1% levels (two tailed). Numbers in parentheses are robust T-statistics. For variable definitions please refer to Table 2.

5. Conclusion

Reducing agency conflict in the board of directors is of importance to both shareholders and firms. Compensation has been a key element used to align the interests of board members and shareholders, yet its effectiveness is not clear. Increasing (equity) compensation for directors has been shown to increase board independence, yet it also provides directors with the means to engage in opportunistic insider trading (Bebchuk and Fried 2003, 2005; Ryan and Wiggins 2004). In this paper I investigate under which circumstances equity compensation creates an opportunity for opportunistic behavior as opposed to aligning interests between inside and outside shareholders.

Providing directors with equity compensation is proposed as an effective way to align firm insiders with the interests of outside shareholders (Jensen 1993). It has been associated with increased board effectiveness and better board performance (Yermack 2004; Ryan and Wiggins 2004; Fich and Shivdasani 2005; Linn and Park 2005; Conyon 2006; Dalton, Hitt and Certo 2007; Sengupta and Zhang 2015). However, Bebchuk and Fried (2005) raise the concern that the effectiveness of equity compensation is undermined by directors' ability to easily unload and reload equity stakes. Through their superior access to information equity compensation can enable directors to engage in profitable, opportunistic insider trading by providing them with the necessary equity to trade. I investigate whether equity compensation influences opportunistic behavior and in which context it does so. Using a specification that controls for director-year fixed effects I study a sample of 16,811 firm-insider-day observations spread over 1,834 unique directors and 320 firms from 2005 through 2014. I adapt the methodology of Cohen et al. (2012) to identify "opportunistic" or information-driven insider trade and find that awarding equity compensation can increase (decrease) the likelihood of transactions being opportunistic in settings with relatively low (high) amounts

of social capital. This indicates that when the local norms are loose, providing directors with equity gives them the opportunity to engage in opportunistic behavior. When norm are strong, on the other hand, additional equity compensation aligns the behavior of directors with the interests of outside shareholders.

The results in this study contribute in two ways. Firstly, I show that when evaluating the effectiveness of equity compensation the strength of local social capital can play a pivotal role. Increased equity compensation has opposite effects on director behavior depending on the strength of local social captial. Taking social capital into account can materially change research results. Secondly, I provide evidence that in settings with loose norms providing equity compensation to directors increases agency problems, while equity compensation can decrease agency issues in environments with strict norms. I hope that these findings can help inform the debate on the effectiveness of equity compensation as a means to reward and motivate independent directors.

Chapter II

Are all directors created equal? Evidence from director replacement following opportunistic insider trading[12]

Abstract

In this paper, we examine how opportunistic insider trading among board directors affects their chances of being replaced in the board. We predict that director opportunistic insider trading behavior is positively associated with their likelihood of being removed from the board, but that certain types of directors are likely to be treated more leniently. Using a sample of 11,515 directors in 2,390 firms from 2005 to 2014, we indeed find that opportunistic trading by individual directors is associated with an increased rate of replacement for some directors, but not all. Directors who are especially valuable to the board or costly to replace seem to be able to insulate themselves from an increased likelihood of turnover. Interestingly, public scrutiny seems to offset this differential treatment of directors engaging in opportunistic insider trading, as we only observe the above-mentioned differences in disciplinary turnover in less visible firms. Our findings are robust to various alternative explanations and specifications. Understanding market labor consequences of individual director insider trading should be of interest to directors as well as companies and regulators.

12 This chapter is co-authored with Liesbeth Bruynseels and Ann Gaeremynck.

1. Introduction

Prior research provides consistent evidence that company insiders profit from buying and selling their company's stock (e.g., Jaffe 1974; Seyhun 1986; Lakonishok and Lee 2001; Cohen, Malloy, and Pomorski 2012; Dai, Parwada, and Zhang 2015). Although insider trading can be considered an efficient vehicle to achieve market efficiency (Piotroski and Roulstone 2005), opportunistic or informed insider trading is perceived as inherently unfair, (e.g., Seyhun 1986; Bettis, Coles, and Lemmon 2000; Jagolinzer, Larcker, and Taylor 2011; Gao, Lisic, and Zhang 2014; Cui, Jo, and Li 2015; Hillier, Korczak, and Korczak 2015; Billings and Cedergren, 2015). As a result, U.S. policymakers impose various restrictions on insider trading[13] and many firms implement ex ante voluntary insider trading policies, such as defining blackout periods or requiring approval from the general council (Bettis et al. 2000; Jagolinzer et al. 2011; Lee, Lemmon, Li, and Sequeira 2014). In this study, we focus on firm ex post disciplinary actions following opportunistic insider trading by their directors, and investigate whether opportunistic insider trading by directors is positively associated with their likelihood of replacement. Importantly, we also investigate whether certain types of directors (i.e., those that are costly to replace or have high value to the board) are able to insulate themselves from an increased likelihood of turnover following opportunistic trading and whether the likelihood of succeeding in this endeavor is dependent on firm visibility.

Given the public disapproval of opportunistic insider trading, firms might be exposed to negative publicity and reputation loss (Cui et al. 2015), and experience a negative effect on firm value caused by increasing cost of capital and decreasing market liquidity (Bhattacharya and Daouk 2002; Fishe and Robe 2004), as well as increased legal risk (Johnson, Nelson, and Pritchard 2007; Billings and Cedergren 2015). as a consequence, we expect firms to try to distance themselves from directors who engage in this behavior by increasing their rate of replacement in the board[14]. However, as the decision to replace a director likely involves a careful cost-benefit analysis, we do not expect the same outcome for all types of directors nor firms. To explore this,

[13] These regulatory initiatives include 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.
[14] Firms can achieve replacement either through directly dismissing a director or not nominating the director for renewal of their mandate. Throughout this paper we do not distinguish between these two channels of replacement.

we investigate differences in turnover following opportunistic insider trading for directors who fulfill a key position in the firm and examine whether decisions to replace opportunistic directors differ for highly visible and less visible firms.

We analyze a sample of 11,515 directors in 2,390 firms from 2005 until 2014. Using the methodology of Cohen et al. (2012) to identify "opportunistic" or information-driven insider trades, we find that opportunistic insider selling behavior is positively associated with director likelihood of replacement. However, firms do not treat all directors equally when responding to opportunistic insider selling. We find evidence that executive directors, directors in key board positions (i.e., board chairperson or chairperson of the compensation, nomination, or audit committee), and directors who are in high demand (e.g., financial experts) are not subject to a higher likelihood of turnover following opportunistic insider selling. However, these director characteristics do not insulate directors from turnover in all firms. Larger, more visible firms potentially face higher reputation costs and experience a higher risk of litigation, which increases the likelihood of adverse consequences resulting from opportunistic insider selling. Consistent with this, our findings show that highly visible firms are less likely to differentiate among directors when deciding on the replacement of directors engaging in opportunistic insider selling. Together, these findings suggest that the decision to replace a potentially unethical director results from careful weighing of benefits and costs, including the directors' role in the board, the cost of their replacement, and potential damage inflicted by their insider trading behavior. Note that our results are not likely explained by directors anticipating their replacement as we find that they are concentrated in younger directors and directors with shorter tenure. Moreover, given that our findings hold after the inclusion of firm or firm-year fixed effects, it is unlikely that firm culture or other firm level effects explain our results.

We contribute to the literature in various ways. To the best of our knowledge, this is one of the first studies to relate individual director behavior to the likelihood of subsequent turnover. Previous studies on director turnover mainly focused on firm-level events like restatements (Srinivasan 2005) or enforcement actions for financial misrepresentation (Karpoff, Lee, and Martin 2008). Our study extends this line of research by showing that directors

engaging in opportunistic insider trading behavior are more likely to be removed from their position. Second, we are the first to relate director insider trading to labor market consequences by documenting the effects of individual directors' decisions on their turnover rates. Furthermore, we provide empirical evidence that the consequences of this counter-normative behavior are not equal for all directors but critically depend on the roles that directors assume on the board and the support that they receive from the CEO. This study also extends the literature on the consequences of insider trading, which to date has focused on effects at the financial market or firm level, such as increased likelihood of firm litigation (e.g., Billings and Cedergren 2015) or increased cost of capital (e.g., Bhattacharya and Daouk 2002). We are the first to explore the association between insider trading behavior of individual directors and their chances of subsequent renewal of their board position. As such, we adopt a broader perspective than Niehaus and Roth (1999), who examine the relationship between CEO insider trading before securities class actions and their likelihood of being replaced. They adopt a quite narrow focus by only considering CEO turnover and restricting their sample to 54 firms who settled securities class actions. In contrast, we study the relationship between information driven insider selling and turnover consequences in a more general setting and for all members of the board. Compared to Niehaus and Roth (1999) our findings show that firms respond proactively to information-based insider selling, whereas they provide evidence of that insider trading aggravating the consequences of securities litigation.

The rest of the paper is structured as follows. Section 2 reviews related literature and develops our hypotheses. The research design and sample selection are discussed in section 3, and section 4 discusses the analyses. Finally, we summarize the results and conclude in section 5.

2. Background and hypothesis development

2.1. Background on Insider Trading and Director Turnover

The desirability of insider trading behavior by corporate insiders is a fiercely debated issue in the literature. Starting with Manne (1966) some scholars have argued that through their trading behavior, insiders release private information to the market which increases market efficiency (McGee, 2008). Furthermore, McGee (2008) argues that insider trading behavior can hardly be considered unethical and illegal given that there are no individuals

or groups suffering any negative consequences from this behavior. However, even though insider trading might increase market efficiency by reducing information asymmetries, such trading can be costly for directors and the firm itself. Ample evidence indicates that opportunistic insider trading is associated with higher cost of capital (e.g., Lambert, Leuz, and Verrecchia 2007), lower market liquidity (Bhattacharya and Daouk 2002; Fishe and Robe 2004), and increased litigation risk in cases of insider selling prior to bad news disclosures (Jones and Weingram 1996; Johnson et al. 2007; Billings and Cedergren 2015). To avoid these negative consequences, firms generally ex-ante restrict insider trading by specifying blackout periods or requiring approval from the general council (Bettis et al. 2000; Jagolinzer et al. 2011; Dai, Fu, Kang, and Lee 2016). Ex-post disciplinary action, such as not renewing the board mandate of a director engaging in opportunistic insider trading, also is an option.

Current literature on director turnover mainly focuses on the association between director replacement and board ineffectiveness, which includes restatements (Srinivasan 2005; Arthaud-Day, Certo, Dalton, and Dalton 2006), fraud (Fich and Shivdasani 2007), SEC investigations (Karpoff et al. 2008), option backdating (Ertimur, Ferri, and Maber 2012), and disclosures of material weaknesses in internal control (Johnston, Li, and Rupley 2011). Few studies link individual director behavior or characteristics to the likelihood of turnover. Yermack (2004) identifies several important factors that influence turnover, including socio-demographic director characteristics, director ownership, and board role. Karpoff et al. (2008) and Brochet and Srinivasan (2014) show that being named personally in a fraud investigation leads to a significant increase in the director turnover rate at the named firm. More recently, Kachelmeier, Rasmussen, and Schmidt (2016) show that the visibility of audit committee member ineffectiveness influences their chances of reelection at the board level.

2.2. Director turnover following opportunistic insider trades

Our study extends this line of research by looking at the association between director insider trading and the likelihood of director turnover, adding individual director behavior to the equation. We rely on institutional theory to formulate predictions regarding director turnover following opportunistic insider trading. Prior research explains director turnover from an agency

theoretic perspective, focusing on the consequences of board (under)performance (e.g., Srinivasan 2005; Arthaud-Day et al. 2006; Fich and Shivdasani 2007; Johnston et al. 2011; Ertimur et al. 2012). Institutional theory adopts a much broader perspective by recognizing that firms ultimately seek legitimacy within social and cultural systems (Suchman 1995). In this respect, Ashforth and Gibbs (1990, 182). state that firms need to "*foster the belief among constituents that the organization's activities and ends are congruent with their expectations"*. To safeguard their perceived legitimacy, firms adhere to the "*system of norms, values, beliefs*" of the institutional environment in which they operate (Suchman 1995, 557).

Public perception of wrongdoing likely affects decisions to undertake remedial actions. As stated by Kachelmeier et al. (2016, 213), "*an institutional-theoretic perspective suggests that the threat from ineffective governance is not so much what is bad, but what looks bad.*" Given that the public associates profitable insider trading with greed, unfairness, and insider exploitation of uninformed stakeholders (Gao et al. 2014; Cui et al. 2015), we argue that firm directors' disclosure of opportunistically timed transactions through SEC Form 4[15] poses a significant threat to the public perception of a firm's legitimacy. Therefore, we expect firms to respond to this threat by distancing themselves from directors who violate societal norms and expectations (Suchman 1995; Arthaud-Day et al. 2006), such as by not renewing their board mandate or by implementing disciplinary turnover. As such, the firm signals that it values proper conduct and does not tolerate counter-normative behavior among its directors (Cowen and Marcel 2011). This expectation results in the first hypothesis:

H_1: *Directors' opportunistic insider trading behavior is positively associated with the likelihood of turnover from their firms' board.*

Replacing a potentially unethical director is beneficial in terms of addressing legitimacy concerns. However, this decision also can be costly. Outside directors are invited to be members of the board because they bring important resources to the firm, such as access to external parties or human

[15] In accordance with section 16 of the Securities and Exchange act of 1934, all insiders (directors, officers, or owners of more than 10 percent of a class of equity securities registered under Section 12) must publicly disclose their ownership in such security. Insiders file their initial ownership through Form 3, which they subsequently update through Form 4. Following the 2002 Sarbanes Oxley Act, insiders must file their Form 4 disclosures through the EDGAR system within two business days following a transaction.

capital (i.e., experience and expertise) and because they oversee corporate governance issues. Prior studies (e.g., Yermack 2004; Chidambaran, Liu, and Prabhala 2015; Renneboog and Zhao 2018) indeed show that key outside board members, such as committee members, committee chairs, and lead directors, are less likely to be replaced compared to directors without a key position due to higher firm costs[16]. Likewise, the company's inside directors, which typically include the company's top executives, such as the CEO, CFO and COO are costly to replace. As noted by Agrawal et al. (1999), incumbent top management generally holds their position because they have a comparative advantage in managing the company and profound knowledge of the business. As a consequence, we argue that the value of these key directors and the influence they have in the corporate governance process might potentially insulate them from disciplinary turnover (Yermack 2004).

Summarizing this line of reasoning, we thus expect that directors with key positions on the board, either due to their specific expertise, board role or function within the firm, are shielded from disciplinary turnover following opportunistic insider trading. Therefore, we posit the following hypothesis:

H_2: *The association between insider trading and the likelihood of director turnover is less pronounced for valuable directors than for less-valuable directors.*

The trade-off between the cost of retention and the cost of replacement is not only likely to be influenced by the characteristics of the individual director engaging in opportunistic trading, but also by the characteristics of the company. More specifically, we expect company visibility and investor scrutiny to play an important role in the company's decision to undertake remedial actions. The underlying reason is that the costs of director counter-normative behavior to the firm increase as this behavior becomes more visible. Although director trades are disclosed through SEC Form 4 and hence publicly available, outside investors do not always pay attention to these (less visible) disclosures (Rogers et al. 2016). Market

[16] The value of specific outside directors (and hence the cost of replacing them) is likely to be influenced by external factors that affect the demand for certain types of directors. For example, Linck et al. (2009) show that SOX's specific requirements regarding directors with financial backgrounds has led to a substantial increase in demand for financial experts. Recently, Alam et al. (2015) show how this increase in demand for financial experts, coupled with local director supply constraints, has forced certain firms to settle for suboptimal solutions in terms of the financial experts appointed to the board.

responses are often triggered by dissemination of insider trading news by a prominent media outlet such as Dow Jones (e.g. Dai et al 2015; Rogers et al. 2016). Important to note here is that firm size is an important determinant of media coverage of insider trading news (Dai et al. 2015), which makes this type of director behavior especially cumbersome for large companies. Indeed, not only are insider trades potentially damaging to board image, they also increase the risk of litigation (Badertscher et al. 2011; Agrawal and Cooper 2015; Dai et al, 2015). Especially larger firms which already experience a higher risk of litigation risk (Kim and Skinner, 2012) should thus be more responsive to insiders' trading behavior.

Our third hypothesis focusses on the likelihood that highly valuable directors are able to insulate themselves from negative consequences when engaging in opportunistic insider trading behavior and the potentially moderating effect of firm visibility. While the costs associated with replacing a valuable director might outweigh the benefits for smaller, less visible firms with little reputation at stake or less investor scrutiny or media coverage, larger firms cannot afford to grant their insiders leniency when engaging in opportunistic insider trading behavior. Compared to smaller firms, large firms are more visible to investors (Hollander, Pronk and Roelofsen, 2009), have higher press coverage (Miller 2006; Fang and Peress, 2009; Dai et al, 2015), and more reputation at stake (Fama and Jensen, 1983; Adams and Ferreira, 2008), which substantially increases the costs of keeping opportunistically trading directors in place. To avoid costly litigation and reputational damages, larger, we expect larger, more visible firms to respond to director insider trading behavior regardless of their value to the board. This argument leads to the third hypothesis:

H_3: *For large firms, the difference between valuable and non-valuable director turnover following opportunistic insider trading becomes less pronounced.*

3. Research Design

3.1. Data and Sample

Because we investigate the association between director opportunistic insider trading and the likelihood of turnover in a firm's board of directors,

we need director trading data and data regarding individual director and firm characteristics. To create our trading dataset, we rely on the Thompson Reuters Insiders Data Feed from Form 4 filings. This dataset includes insider trading data on directors, officers, and large stockholders with holdings greater than 10 percent of a firm's stock, for firms listed on NYSE, AMEX, or NASDAQ. The initial sample period spans from January 2002 to March 2014. Given the research setting, we focus on trades actively placed by board members and exclude purchases or sales through exercising options. Although the initial period spans from January 2002 to March 2014, the usable range is limited to trades from January 2005 onwards, because identifying opportunistic insider trading behavior requires a preceding three-year window (Cohen et al. 2012). We match this sample to individual director characteristics and board-level information from BoardEx, firm-level financial information from Compustat and Audit Analytics, and stock performance indicators from CRSP. The initial

sample thus comprises 61,600 firm-director-calendar years that appear in all five databases. After excluding 23,334 observations with missing values, the final sample comprises 49,703 unique firm-director years, with data from 2,390 individual firms and 11,515 directors. Table 1 summarizes the sample selection.

Total Firm-Director-Calendar Years overlapping in all databases from 2005 until 2014	53,344
Less Firm-Director-Fiscal Years without all required information	-3,641
Total usable Firm-Director-Fiscal Years	49,703

Table 1: Sample Selection

3.2. Dependent Variable

In all analyses, the dependent variable is the likelihood of director turnover. The main variable of analysis ($TURNOVER3YR_{i,j,t}$) equals one if director *i* leaves the board of firm *j* within three years starting year *t* and zero otherwise. As noted, in almost all previous board turnover literature, it is rare

for directors to be "fired" (Yermack 2004; Srinivasan 2005; Arthaud-Day et al. 2006; Cowen and Marcel 2011; Marcel and Cowen 2014). Instead, when a board decides to replace a board member, it refrains from nominating that board member for reelection. Because staggered boards, where directors serve three-year terms, remain prevalent amongst companies, using a one-year measurement window means that not every director has come up for reelection. We therefore employ a three-year window to measure director turnover and ensure that all directors face reelection at least once over the course of the measurement, following previous literature (Srinivasan 2005). In addition, to analyze the short term impact of insider trading behavior we include an alternative specification of the main dependent variable measured over a one year window (TURNOVER1YRi,j,t).

3.3. Test Variables

3.3.1.Insider Trading

Our main variable of interest is opportunistic director insider trading behavior using the individual trade-level classification scheme of Cohen et al.(2012) to identify opportunistic sales. This classification scheme is widely used in recent research to link opportunistic, information-driven trading to abnormal returns (Cohen et al. 2012; Khan and Lu 2013), SEC investigations (Cohen et al. 2012), strategic timing of earnings news (Michaely, Rubin, and Vedrashko 2016), or news warnings in the face of impending earnings disappointment (Billings and Cedergren 2015).

Cohen et al. (2012) classify individual directors' transactions as routine when they follow a discernable pattern (i.e., when transactions occur in the same month each year). Trades placed outside of this pattern are classified as opportunistic. As such, insiders can have both opportunistic and routine trades within the same year. This approach creates a nuanced measurement of opportunistic behavior that weighs the severity of insiders' opportunism.

When classifying insider trades, we do not differentiate between sales and purchases to generate an insiders trading pattern. However, as purchases generally convey positive information about the firm's future (Lakonishok and Lee 2001) we do not expect them to impact director's likelihood of replacement. Insider sales, on the other hand send a different signal to the market. Sales by insiders could be driven by negative firm prospects, director

liquidity needs, or portfolio diversification (Fidrmuc, Goergen, and Renneboog 2006). Insider sales that are classified as opportunistic contain much more information about negative future firm prospects compared to routine transactions (Cohen et al 2012). Furthermore, recent research by Dai et al. (2016) shows that firms attach more importance to restricting insider selling than insider purchasing. They explain this finding by pointing out that insider selling is more prone than insider purchases to SEC investigation and litigation (e.g., Cheng and Lo 2006; Brochet and Srinivasan 2014; Billings and Cedergren 2015; Dai et al. 2015, 2016). Because insider sales are more likely to signal firm failures than successes, allowing insiders to generate abnormal profits from informed insider selling is not considered good company governance (Dai et al. 2016). Therefore, we construct our test variable, $OPP\ SALE_{i,j,t}$, which is a continuous variable between 0 and 1 that measures the ratio of total share volume sold opportunistically to total share volume sold by director *i* at firm *j* for fiscal year *t*[17].

3.3.2.Director Board Value

The first proxy for directors' value is whether they are an executive in the firm ($EXECUTIVE_{i,j,t}$). Our second proxy for director value is whether they fulfill key positions in the board ($KEY\ DIRECTOR_{i,j,t}$). Based on Yermack (2004) and Chidambaran et al. (2015), we define key director positions as the chairperson of the board, the lead director, or the chairperson of the audit, compensation, or nomination committee. The third proxy we use for director board value is whether the director is an accounting expert ($ACFE_{i,j,t}$). Since the enactment of the Sarbanes Oxley Act, accounting financial experts have been in high demand on boards (Linck, Netter, and Yang 2009; Bonner and Erkens 2013; Alam, Chen, Ciccotello, and Ryan 2015). They are difficult to replace due to local director supply constraints (Alam et al. 2015), which further increases the value of financial experts. Therefore, we include the indicator variable $ACFE_{i,j,t.}$, equaling one if a director's biographic information in the BoardEx database includes terms reflecting accounting or auditing expertise, such as certified public accountant, auditor, controller,

[17] We assign a value of 0 for $OPP\ SALE_{i,j,t}$ when directors only have purchase transactions in a given year. Results are similar if we use total shares traded as an alternative scale instead.
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treasurer, accountant, or chief financial officer (e.g., Cohen et al. 2014; Bonner and Erkens 2012) or if their biographic information indicates that they are or have been employed at one of the 25 current and historical audit firms listed in Compustat (Badolato, Donelson, and Ege 2014).

3.3.3.Firm Visibility

Outside investors only have limited time and resources to gather information (Hirschleifer and Teoh 2003) and tend to rely on a limited number of sources of information (Blankespoor, Miller and White 2014). Information intermediaries (such as the press) are an important source of information and their coverage is essential in reducing information asymmetries surrounding the firm (Bushee et al. 2010). Dai et al (2015) indeed find that increased press coverage reduces insiders' trading profitability and increases litigation risk following trading. To proxy for firm visibility and press coverage we base our measure on the market value of equity at the start of the $TURNOVER_{i,j,t}$ window. Consistent with Blankespoor et al (2014) we define highly visible firms as firms that are in the top quartile of market value at the beginning of their fiscal year ($VISIBLE_{j,t}$)[18].

3.4. Control Variables

Table 2 reports the director, board, and firm control variables. Based on previous literature (Srinivasan 2005; Yermack 2004; Karpoff et al. 2008), we add the following director characteristics: $COMMITTEE\ MEMBER_{i,j,t}$, $TIME\ TO\ RET_{i,j,t}$, $BOARD\ TENURE_{i,j,t}$, and $BOARD\ POSITIONS_{i,j,t}$. $COMMITTEE\ MEMBER_{i,j,t}$ is an indicator variable that equals one if a director is a member of the audit, compensation, or nomination committee. $TIME\ TO\ RET_{i,j,t}$ and $BOARD\ TENURE_{i,j,t}$ capture the years until the director reaches the age of retirement and the time that the director has already spent on the board of directors. $BOARD\ POSITIONS_{i,j,t}$ measures the current number of board positions that the director has on boards of quoted companies (Srinivasan 2005).

Board and firm control variables supplement these director control variables. First, a board where multiple directors engage in opportunistic insider trading should be more tolerant towards this behavior, compared to

[18] Due to data constraints we do not have access to firm press coverage. Dai et al (2015) do show that firms with high market values receive much higher press coverage following insider trading behavior.

boards where opportunistic trading is uncommon. To account for this effect, we control for *BOARD OPPORTUNISM*$_{j,t}$, which measures the relative opportunism on the board and is defined as the average total opportunistic transactions scaled by total trades placed by all non-executive board directors except the director under investigation. Furthermore, we control for *POWER CEO*$_{j,t}$, *BOARD SIZE*$_{j,t}$, *%INDEPENDENT*$_{j,t}$, *%BUSY*$_{j,t}$, *FIRM SIZE*$_{j,t}$, *ROA*$_{j,t}$, and *Tobins Q*$_{j,t}$, and *PERFORMANCE*$_{j,t}$ (Hermalin and Weisbach 1998; Gilson 1990; Farrell and Whidbee 2000; Yermack 2004; Ferris, Jagannathan, and Pritchard 2003; Srinivasan 2005; Fich and Shivdasani 2007; Karpoff et al. 2008). *FIRM SIZE*$_{j,t}$ is the natural logarithm of the market value of equity[19] at the beginning of the measurement window for *TURNOVER*$_{i,j,t}$. *PERFORMANCE*$_{j,t}$ is the difference between the CRSP value-weighted index return and the firm's stock return, both measured over the same time as *TURNOVER*$_{i,j,t}$ and in accordance with Yermack (2004). We also include the average *ROA*$_{j,t}$, and *Tobins Q*$_{j,t}$ measured over the same time window as *TURNOVER*$_{i,j,t}$ for comparability to previous literature. *POWER CEO*$_{j,t}$, *BOARD SIZE*$_{j,t}$, *%BUSY*$_{j,t}$ and *%INDEPENDENT*$_{j,t}$ account for the influence of corporate governance quality on director turnover.

[19] Results are identical when the natural logarithm of total assets at the beginning of the turnover window are used.

Panel A: Dependent Variable	
$TURNOVER3YR_{i,j,t}$	Indicator variable that equals 1 if director *i* leaves the board of company *j* over the period from *t* to *t*+3 and 0 otherwise.
$TURNOVER3YR_{i,j,t}$	Indicator variable that equals 1 if director *i* leaves the board of company *j* in year *t*.
Panel B: Test Variables	
$OPP\ SALE_{i,j,t}$	The ratio of share volume purchased opportunistically to total share volume traded by director *i* at company *j* in year *t*.
Panel C: Director Characteristics	
$EXECUTIVE_{i,j,t}$	Indicator variable that equals 1 if director *i* is classified as a executive director and 0 otherwise.
$KEY\ DIRECTOR_{i,j,t}$	Indicator variable that equals 1 if director *i* fulfills a key position (i.e. chairman of the board, lead director or chairman of either the audit, nomination or compensation committee) at the board of company *j* in year *t*.
$ACFE_{i,j,t}$	Indicator variable that equals 1 if director *i* is classified as a financial expert and 0 otherwise.
$TIED\ DIRECTOR_{i,j,t}$	Indicator variable that equals 1 if director *i* shares social connections with the CEO of company *j* in year *t*, and 0 otherwise.
$BOARD\ TENURE_{i,j,t}$	Number of years director *i* has spent on the board of company *j* at year *t*.
$COMMITTEE\ MEMBER_{i,j,t}$	Indicator variable that equals 1 if director *i* is a member of the audit, nomination or compensation committee of company *j* in year *t*, and 0 otherwise.
$TIME\ TO\ RET_{i,j,t}$	Number of years until director *i* reaches the legal retirement age of 65.
$BOARD\ POSITIONS_{i,j,t}$	Total number of current board positions held by director *i* in listed firms at year *t*.
Panel D: Firm Characteristics	
$VISIBLE_{j,t}$	An indicator variable that equals 1 if the market capitalization of the firm is in the top quartile of its industry for year *t*.
$POWERCEO_{j,t}$	An indicator variable that equals 1 if the CEO of company *j* at year *t* is either founder of the company or the chairman of the board, and 0 otherwise.
$BOARD\ SIZE_{j,t}$	Number of directors on the board of company *j* at year *t*.
$\%INDEPENDENT_{j,t}$	Ratio of independent directors to total directors in the board of company *j* at year *t*.

$\%BUSY_{j,t}$	Ratio of directors with three or more directorships to total directors in the board of company *j* at year *t*.
$BOARD\ OPPORTUNISM_{j,t}$	Ratio of directors in the board of company *j* at year *t* that are classified as opportunistic directors (excluding the focal director).
$FIRM\ SIZE_{j,t}$	The market value of equity (in billion US$) company *j* at the beginning of year *t* .
$RESTATEMENT_{j,t}$	Indicator variable that equals *1* if company *j* announces a restatement in year *t*, and 0 otherwise.
$ADVERSE\ RESTATEMENT_{j,t}$	Indicator variable that equals *1* if company *j* announces an income decreasing restatement in year *t*, and 0 otherwise.
$ROA_{j,t}$	The return on assets of company *j* measured over the same period as Turnover.
$TOBIN'S\ Q_{j,t}$	Tobin's Q of company j measured over the same period as Turnover.
$PERFORMANCE_{j,t}$	Firm's stock return minus the CRSP value weighted index of company *j* measured over the same period as Turnover..

Table 2: Variable Definitions

3.5. Model Design

To test our three hypotheses, we develop three different models and estimate linear probability models (LPM) wherein the likelihood of turnover for director *i* in firm *j* for fiscal year *t* (*TURNOVER)* measured on the short *(TURNOVER1YR*$_{i,j,t}$) and the long term (*TURNOVER3YR*$_{i,j,t}$) is the dependent variable. This design choice allows for an easier interpretation of our coefficients of interest (Woolridge 2002; Chyz and Gaerntner 2018)[20]. *OPP SALE*$_{i,j,t}$ is the test variable, and control variables are as previously discussed. Given Hypothesis 1, we expect positive coefficients for both β_1, measuring the association between opportunistic selling behavior and the likelihood of director turnover.

$$Pr(TURNOVER) = \beta_0 + \beta_1\ OPP\ SALE_{i,j,t} + \beta_2\ EXECUTIVE_{i,j,t} + \beta_3\ KEY\ DIRECTOR_{i,j,t} + \beta_4\ ACFE_{i,j,t} + \sum \beta_l\ Control\ variables + \sum \beta_k\ Fixed\ effects + \varepsilon_{i,j,t} \quad (1)$$

[20] Using either logit or probit models to estimate our regressions does not alter the results.

For parsimony, table 2 provides detailed variable definitions. Models include year and two-digit SIC code industry fixed effects with standard errors corrected for clustering at the director level.

To test Hypothesis 2, we expand model (1) to estimate the association between opportunistic insider selling and director likelihood of replacement, conditional upon the director being more valuable to the board. For all proxies of director value ($EXECUTIVE_{i,j,t}$, $KEY\ DIRECTOR_{i,j,t}$, and $ACFE_{i,j,t}$,), this conditional estimation strategy results in two coefficient estimates for the effect of $OPP\ SALE_{i,j,t}$ on director turnover. The coefficient of $OPP\ SALE_{i,j,t}$ *when valuable = 0* (where valuable is measured by $EXECUTIVE_{i,j,t}$, $KEY\ DIRECTOR_{i,j,t}$ or $ACFE_{i,j,t}$) captures the impact of opportunistic insider selling on director turnover for directors who are not key nor members of the company's top management, and the coefficient of $OPP\ SALE_{i,j,t}$ *when valuable* = 1 captures the impact of opportunistic insider selling on director turnover for directors with high value to the board. This approach is equivalent to a traditional interaction analysis.[21] However, it allows for a direct comparison of the effect of opportunism on director turnover for directors that are more versus less valuable to the board, which makes the results much easier to interpret compared to a traditional interaction model. The effect of opportunism for each group is reported directly, instead of the incremental effects when estimating main and interaction effects (Christensen, Hail, and Leuz 2013).

$$Pr(TURNOVER) = \beta_0 + \beta_1\ OPP\ SALE_{i,j,t}\ when\ valuable = 0 + \beta_2\ OPP\ SALE_{i,j,t}\ when\ valuable = 1 + \beta_3\ EXECUTIVE_{i,j,t} + \beta_3\ KEY\ DIRECTOR_{i,j,t} + \beta_4\ ACFE_{i,j,t} + \sum \beta_l\ Control\ variables + \sum \beta_k\ Fixed\ effects + \varepsilon_{i,j,t} \quad (2)$$

To test Hypothesis 3, we expand upon model (2) in the same way as in the previous analysis, estimating the association between opportunistic insider selling and directors' likelihood of turnover conditional upon insiders having increased value to the board ($EXECUTIVE_{i,j,t}$, $KEY\ DIRECTOR_{i,j,t}$, and $ACFE_{i,j,t}$,) in highly visible boards ($VISIBLE_{j,t}$). We thus estimate four

[21] In a traditional interaction analysis, we would estimate the following when using $EXECUTIVE_{i,j,t}$ as a proxy for *valuable:* $\beta_1{}^t\ OPP\ SALE_{i,j,t} + \beta_2{}^t\ EXECUTIVE_{i,j,t} + \beta_3{}^t\ OPP\ SALE_{i,j,t}$ * $EXECUTIVE_{i,j,t}$. Our analysis provides a separate coefficient of $OPP\ SALE_{i,j,t}$ for both groups identified by $EXECUTIVE_{i,j,t}$, such that $\beta_1 = \beta_1{}^t$ and $\beta_2 = \beta_1{}^t + \beta_3{}^t$. This approach allows for a direct test of the effect of $OPP\ SALE_{i,j,t}$ for both groups.

separate coefficients for the effect of opportunism on director turnover. The coefficient of $OPP\ SALE_{i,j,t}$ *when valuable=0 and VISIBLE* $_{j,t} = 0$ captures the impact of opportunistic insider selling on director turnover for directors not classified as valuable in less visible firms, while $OPP\ SALE_{i,j,t}$ *when valuable=0 and VISIBLE* $_{j,t} = 1$ captures the impact of opportunistic insider selling on director turnover for directors not classified as valuable in highly visible firms. Likewise, the coefficient of $OPP\ SALE_{i,j,t}$ *when valuable=1 and VISIBLE* $_{j,t} = 0$ captures the impact of opportunistic insider selling on director turnover for highly valuable directors in less visible firms, while $OPP\ SALE_{i,j,t}$ *when valuable=1 and* $VISIBLE_{j,t} = 1$ captures the impact of opportunistic insider selling on director turnover for highly valuable directors in highly visible firms. In all models, we expect coefficient β_1, β_2 and β_4 to be positive and significant while we expect β_3 to be insignificant.

$$Pr(TURNOVER_{i,j,t}) = \beta_0 + \beta_1\ OPP\ SALE_{i,j,t}\ when\ valuable=0\ and\ VISIBLE_{j,t} = 0 + \beta_2\ OPP\ SALE_{i,j,t}\ when\ valuable=0\ and\ VISIBLE_{j,t} = 1 + \beta_3\ OPP\ SALE_{i,j,t}\ when\ valuable=1\ and\ VISIBLE_{j,t} = 0 + \beta_4\ OPP\ SALE_{i,j,t}\ when\ valuable=1\ and\ VISIBLE_{j,t} = 1 + \beta_5\ EXECUTIVE_{i,j,t} + \beta_6\ KEY\ DIRECTOR_{i,j,t} + \beta_7\ ACFE_{i,j,t} + \sum \beta_l\ Control\ variables + \sum \beta_k\ Fixed\ effects + \varepsilon_{i,j,t} \quad (3)$$

4. Director Turnover and Opportunism

4.1. Descriptive Statistics

Table 3 describes the summary statistics for all variables. All variables are winsorized at the top and bottom 1-percent levels. Panel A provides information on director turnover rate. In line with previous research (Yermack 2004; Asthana and Balsam 2010), 20.9 (7.0) percent of all directors are replaced from the board within three (one) years, suggesting an expected board tenure of about 14 years. Panel B of Table 3 provides descriptive information of $OPP\ SALE_{i,j,t}$. and shows that insiders on average sell about 35.0 percent of shares opportunistically [22].

[22]Cohen et al. (2012) suggest two methods to distinguish between opportunistic and routine trades, one at the trader level and one at the trade level, and show that both measures are equally effective. Although they do not provide descriptive statistics for their individual trade-level classification, at the trader level they classify 45.2 percent of all traders as opportunistic. When we apply the trader-level classification scheme, we also find that 43.9 percent of insiders in our sample classify as opportunists, which is very similar to the percentage reported by Cohen et al. (2012).

Panel C presents descriptive statistics on proxies used to measure director value, as well as firm visibility. The sample contains 45. percent key board members (i.e., lead directors, chairpersons of the board, or chairperson of key committees) and 26.8 percent financial experts and 22.7 percent executives. We find that 34.1 percent of observations come from firms ranked in the highest quartile of market value of equity.

Panel D details the control variables used. Related to the director characteristics, the average board tenure was approximately 11.24 years, and the average director was 6 years from retirement. The average number of board positions held was 1.66, and 65.2 percent fulfilled roles on at least one board committee. Turning our attention to firm characteristics we find that boards in our sample are large (mean of 9.8 board members), consist mainly of independent board members[23] (78.3 percent, on average) along with busy directors (7.3 percent). Furthermore, 52.7 percent of sample firms have a "high power" CEO who is the founder or chairperson of the board. Although opportunistic trading is common in our sample, on average only 29.6 percent of share volume traded by members of the board was opportunistically traded. Finally, descriptive statistics related to the other firm characteristics show that, on average, sample firms had a market value of equity of 5.382 billion US$, an average ROA of 6.5 (6.7) percent over three (one) years, an average Tobin's Q of 1.660(1.662) over three (one) years, and they outperformed the market by 10.5 (2.9) percent over three (one) years.

	N	mean	sd	min	p25	p50	p75	max
Panel A: Dependent Variable								
$TURNOVER3YR_{i,j,t}$	49,703	0.209	0.406	0.000	0.000	0.000	0.000	1.000
$TURNOVER1YR_{i,j,t}$	49,703	0.070	0.256	0.000	0.000	0.000	0.000	1.000
Panel B: Test Variables								
$OPP\ SALE_{i,j,t}$	49,703	0.350	0.462	0.000	0.000	0.000	1.000	1.000
Panel C: Director-level Variables								
$EXECUTIVE_{i,j,t}$	49,703	0.227	0.419	0.000	0.000	0.000	0.000	1.000
$KEY\ DIRECTOR_{i,j,t}$	49,703	0.450	0.498	0.000	0.000	0.000	1.000	1.000
$ACFE_{i,j,t}$	49,703	0.268	0.443	0.000	0.000	0.000	1.000	1.000
$BOARD\ TENURE_{i,j,t}$	49,703	11.244	7.099	0.200	5.800	9.400	14.900	29.900
$COMMITTEE\ MEMBER_{i,j,t}$	49,703	0.652	0.476	0.000	0.000	1.000	1.000	1.000
$TIME\ TO\ RET_{i,j,t}$	49,703	6.152	7.943	-10.500	0.500	5.500	11.500	28.100
$BOARD\ POSITIONS_{i,j,t}$	49,703	1.661	0.982	1.000	1.000	1.000	2.000	5.000

[23] Non-independent directors are those not classified as independent by Boardex amongst others blockholders, general counsel, officers, and non-independent board chairpersons.

Panel D: Firm-level Variables								
$VISIBLE_{j,t}$	49,703	0.341	0.474	0.000	0.000	0.000	1.000	1.000
$POWERCEO_{j,t}$	49,703	0.527	0.499	0.000	0.000	1.000	1.000	1.000
$BOARD\ SIZE_{j,t}$	49,703	9.767	2.537	5.000	8.000	9.000	11.000	16.000
$\%INDEPENDENT_{j,t}$	49,703	0.783	0.116	0.375	0.714	0.800	0.882	0.923
$\%BUSY_{j,t}$	49,703	0.073	0.100	0.000	0.000	0.000	0.125	0.375
$BOARD\ OPPORTUNISM_{j,t}$	49,703	0.296	0.223	0.000	0.125	0.250	0.449	0.833
$FIRM\ SIZE_{j,t}$	49,703	5.382	11.391	0.013	0.374	1.257	3.937	62.036
$RESTATEMENT_{j,t}$	49,703	0.062	0.242	0.000	0.000	0.000	0.000	1.000
$ROA3YR_{j,t}$	49,703	0.065	0.099	-0.594	0.023	0.064	0.111	0.267
$ROA1YR_{j,t}$	49,703	0.067	0.110	-0.664	0.023	0.066	0.117	0.287
$TOBIN'S\ Q3YR_{j,t}$	49,703	1.660	0.947	0.830	1.059	1.332	1.847	6.198
$TOBIN'S\ Q1YR_{j,t}$	49,703	1.662	1.010	0.782	1.051	1.306	1.852	7.043
$PERFORMANCE3YR_{j,t}$	49,703	0.105	0.644	-1.365	-0.256	0.047	0.390	2.560
$PERFORMANCE1YR_{j,t}$	49,703	0.029	0.355	-0.684	-0.188	-0.012	0.189	1.351

TABLE 3: Descriptive Statistics

Table 4 summarizes correlations between all variables in our regression models. Correlation coefficients presented in bold are statistically significant at the 5 percent level. Consistent with H1, opportunistically selling shares ($OPP\ SALE_{i,j,t}$) correlates positively with the likelihood of being replaced ($Pr(TURNOVER_{i,j,t})$), both on the 1 and 3 year measurement window. Correlations between control variables are limited, as none exceed an absolute value of 0.42. Variance inflation factors, however, indicate some multicollinearity between $BOARD\ SIZE_{j,t}$ and $\%INDEPENDENT_{j,t}$.[24] We standardize both variables and report coefficients for these standardized regressors in all tables. This procedure reduces our maximal variance inflation factor to 6.70 for $COMMITTEE\ MEMBER_{i,j,t}$. However, inferences are identical for models using standardized and non-standardized variables.[25]

[24] $BOARD\ SIZE_{j,t}$ variance inflation factor = 28.27; $\%INDEPENDENT_{j,t}$ variance inflation factor = 63.35.
[25] Test variables are unaffected in both cases and have a maximal variance inflation factor of 3.02 across analyses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)*TURNOVER3YR*$_{i,j,t}$	**1.0000**											
(2)*TURNOVER1YR*$_{i,j,t}$	**0.5360** (0.0000)	**1.0000**										
(3) *OPP SALE*$_{i,j,t}$	**0.0195** (0.0000)	**0.0109** (0.0148)	**1.0000**									
(4) *EXECUTIVE*$_{i,j,t}$	**-0.0527** (0.0000)	**-0.0365** (0.0000)	**0.3360** (0.0000)	**1.0000**								
(5) *KEY DIRECTOR*$_{i,j,t}$	**-0.0714** (0.0000)	**-0.0677** (0.0000)	**0.0257** (0.0000)	0.0081 (0.0713)	**1.0000**							
(6) *ACFE*$_{i,j,t}$	**-0.0459** (0.0000)	**-0.0307** (0.0000)	**-0.0090** (0.0450)	**0.0504** (0.0000)	**0.0785** (0.0000)	**1.0000**						
(7) *VISIBLE*$_{j,t}$	**0.0359** (0.0000)	**0.0209** (0.0000)	**0.0205** (0.0000)	**-0.0763** (0.0000)	**-0.0596** (0.0000)	**-0.0151** (0.0007)	**1.0000**					
(8) *BOARD TENURE*$_{i,j,t}$	**0.0771** (0.0000)	**0.0424** (0.0000)	**0.2012** (0.0000)	**0.0607** (0.0000)	**0.1119** (0.0000)	**-0.1053** (0.0000)	**-0.0330** (0.0000)	**1.0000**				
(9) *COMMITTEE MEMBER*$_{i,j,t}$	-0.0016 (0.7160)	**-0.0095** (0.0340)	**-0.3177** (0.0000)	**-0.7266** (0.0000)	**0.1217** (0.0000)	**0.0101** (0.0242)	**0.0409** (0.0000)	**-0.1207** (0.0000)	**1.0000**			
(10) *TIME TO RET*$_{i,j,t}$	**-0.1836** (0.0000)	**-0.0958** (0.0000)	**-0.0490** (0.0000)	**0.0853** (0.0000)	**-0.1124** (0.0000)	**0.0841** (0.0000)	**-0.0324** (0.0000)	**-0.3745** (0.0000)	**-0.0584** (0.0000)	**1.0000**		
(11) *BOARD POSITIONS*$_{i,j,t}$	**-0.0205** (0.0000)	**-0.0155** (0.0005)	**-0.0918** (0.0000)	**-0.1443** (0.0000)	**0.0812** (0.0000)	**0.0520** (0.0000)	**0.2158** (0.0000)	**-0.0771** (0.0000)	**0.1280** (0.0000)	**-0.0520** (0.0000)	**1.0000**	
(12) *POWERCEO*$_{j,t}$	**-0.0094** (0.0361)	**-0.0153** (0.0007)	**0.0147** (0.0010)	**0.0279** (0.0000)	**0.0553** (0.0000)	**-0.0204** (0.0000)	**0.1277** (0.0000)	**0.0320** (0.0000)	**0.0090** (0.0443)	**-0.0254** (0.0000)	**0.0552** (0.0000)	**1.0000**
(13) *BOARD SIZE*$_{j,t}$	**0.0817** (0.0000)	**0.0660** (0.0000)	**-0.0689** (0.0000)	**-0.1220** (0.0000)	**-0.1930** (0.0000)	**-0.0476** (0.0000)	**0.3610** (0.0000)	**-0.0307** (0.0000)	**0.0160** (0.0004)	**-0.0286** (0.0000)	**0.0811** (0.0000)	-0.0041 (0.3649)
(14) *%INDEPENDENT*$_{j,t}$	**0.0549** (0.0000)	**0.0312** (0.0000)	**-0.0952** (0.0000)	**-0.1985** (0.0000)	0.0046 (0.3053)	-0.0083 (0.0640)	**0.1465** (0.0000)	**-0.1155** (0.0000)	**0.2093** (0.0000)	**0.0145** (0.0012)	**0.1230** (0.0000)	**0.0618** (0.0000)
(15) *%BUSY*$_{j,t}$	**0.0283** (0.0000)	**0.0242** (0.0000)	**-0.0269** (0.0000)	**-0.0448** (0.0000)	**-0.0171** (0.0001)	0.0021 (0.6410)	**0.3032** (0.0000)	**-0.0830** (0.0000)	**0.0340** (0.0000)	**-0.0163** (0.0003)	**0.4004** (0.0000)	**0.0590** (0.0000)
(16) *BOARD OPPORTUNISM*$_{j,t}$	**-0.0295** (0.0000)	**-0.0255** (0.0000)	**-0.0171** (0.0001)	**-0.1254** (0.0000)	0.0041 (0.3658)	**0.0099** (0.0268)	**-0.0550** (0.0000)	**-0.0267** (0.0000)	**0.1165** (0.0000)	**-0.0224** (0.0000)	**-0.0339** (0.0000)	**0.0136** (0.0025)
(17) *FIRM SIZE*$_{j,t}$	**0.0677** (0.0000)	**0.0433** (0.0000)	-0.0040 (0.3747)	**-0.0642** (0.0000)	**-0.0556** (0.0000)	**-0.0286** (0.0000)	**0.5206** (0.0000)	**-0.0543** (0.0000)	**0.0137** (0.0022)	**-0.0274** (0.0000)	**0.2211** (0.0000)	**0.1187** (0.0000)
(18) *RESTATEMENT*$_{j,t}$	**0.0123** (0.0061)	**0.0183** (0.0000)	0.0055 (0.2161)	0.0078 (0.0809)	0.0061 (0.1771)	-0.0010 (0.8231)	**-0.0224** (0.0000)	0.0050 (0.2611)	-0.0038 (0.3992)	0.0079 (0.0788)	-0.0088 (0.0508)	-0.0064 (0.1506)
(19) *ROA3YR*$_{j,t}$	**-0.0304** (0.0000)	**-0.0176** (0.0001)	**0.0896** (0.0000)	**-0.0336** (0.0000)	0.0041 (0.3666)	**0.0114** (0.0112)	**0.1985** (0.0000)	**0.0447** (0.0000)	**0.0258** (0.0000)	**-0.0341** (0.0000)	**0.1049** (0.0000)	**0.0823** (0.0000)
(20) *ROA1YR*$_{j,t}$	**-0.0217** (0.0000)	**-0.0147** (0.0011)	**0.0975** (0.0000)	**-0.0270** (0.0000)	0.0043 (0.3376)	0.0076 (0.0902)	**0.1964** (0.0000)	**0.0438** (0.0000)	**0.0204** (0.0000)	**-0.0309** (0.0000)	**0.0964** (0.0000)	**0.0781** (0.0000)
(21) *TOBIN'S Q3YR*$_{j,t}$	**-0.0231** (0.0000)	**-0.0153** (0.0006)	**0.1456** (0.0000)	**0.0523** (0.0000)	**0.0313** (0.0000)	-0.0011 (0.7986)	**0.0843** (0.0000)	-0.0076 (0.0900)	**-0.0247** (0.0000)	**0.0316** (0.0000)	**0.0454** (0.0000)	**-0.0139** (0.0019)
(22) *TOBIN'S Q1YR*$_{j,t}$	**-0.0177** (0.0001)	**-0.0121** (0.0070)	**0.1580** (0.0000)	**0.0574** (0.0000)	**0.0276** (0.0000)	-0.0048 (0.2813)	**0.0922** (0.0000)	-0.0049 (0.2759)	**-0.0333** (0.0000)	**0.0358** (0.0000)	**0.0429** (0.0000)	-0.0024 (0.5997)
(23) *PERFORMANCE3YR*$_{j,t}$	**-0.0537** (0.0000)	**-0.0222** (0.0000)	**0.0264** (0.0000)	**0.0129** (0.0039)	**0.0189** (0.0000)	**0.0201** (0.0000)	**-0.0679** (0.0000)	**-0.0099** (0.0278)	0.0023 (0.6066)	0.0000 (0.9927)	**0.0220** (0.0000)	-0.0038 (0.3911)
(24) *PERFORMANCE1YR*$_{j,t}$	**-0.0414** (0.0000)	**-0.0264** (0.0000)	**0.0818** (0.0000)	0.0053 (0.2385)	**0.0155** (0.0006)	**0.0123** (0.0060)	**-0.0388** (0.0000)	0.0020 (0.6606)	0.0039 (0.3826)	-0.0047 (0.2986)	**0.0177** (0.0001)	0.0044 (0.3260)

TABLE 4: Correlation Table

This table presents the Pearson correlation coefficients for the full sample used in the analysis. All variable are as defined in table 2. Values in bold are significant at the 5% level, Z-stats are reported in parenthesis.

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
(13) *BOARD SIZE*$_{j,t}$	**1.0000**											
	0.1675	**1.0000**										
	(0.0000)											
(14) *%INDEPENDENT*$_{j,t}$	**0.1218**	**0.1448**	**1.0000**									
	(0.0000)	(0.0000)										
(15) *%BUSY*$_{j,t}$	**-0.0783**	**-0.0503**	**-0.0887**	**1.0000**								
	(0.0000)	(0.0000)	(0.0000)									
(16) *BOARD OPPORTUNISM*$_{j,t}$	**0.3612**	**0.1520**	**0.3093**	**-0.1060**	**1.0000**							
	(0.0000)	(0.0000)	(0.0000)	(0.0000)								
(17) *FIRM SIZE*$_{j,t}$	**-0.0219**	**-0.0330**	-0.0051	-0.0041	**-0.0263**	**1.0000**						
	(0.0000)	(0.0000)	(0.2547)	(0.3556)	(0.0000)							
(18) *RESTATEMENT*$_{j,t}$	**-0.0436**	**-0.0458**	**-0.1133**	**-0.0321**	**-0.1851**	**-0.0242**	**1.0000**					
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)						
(19) *ROA3YR*$_{j,t}$	**-0.0392**	**-0.0372**	**-0.1067**	**-0.0343**	**-0.1849**	**-0.0298**	**0.9179**	**1.0000**				
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)					
(20) *ROA1YR*$_{j,t}$	**-0.2086**	**-0.0272**	**-0.0698**	-0.0042	**-0.0879**	**-0.0242**	**-0.1457**	**-0.1068**	**1.0000**			
	(0.0000)	(0.0000)	(0.0000)	(0.3450)	(0.0000)	(0.0000)	(0.0000)	(0.0000)				
(21) *TOBIN'S Q3YR*$_{j,t}$	**-0.1951**	**-0.0417**	**-0.0697**	-0.0017	**-0.0960**	**-0.0182**	**-0.1500**	**-0.1355**	**0.9326**	**1.0000**		
	(0.0000)	(0.0000)	(0.0000)	(0.7118)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)			
(22) *TOBIN'S Q1YR*$_{j,t}$	**-0.1014**	**-0.0253**	**-0.0262**	**-0.0293**	**-0.0549**	-0.0002	**-0.1725**	**-0.0634**	**-0.2174**	**-0.1045**	**1.0000**	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.9592)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		
(23) *PERFORMANCE3YR*$_{j,t}$	**-0.0652**	**-0.0149**	**-0.0251**	**-0.0370**	**-0.0333**	-0.0006	**-0.1694**	**-0.1375**	**-0.1991**	**-0.2396**	**-0.5273**	**1.0000**
	(0.0000)	(0.0009)	(0.0000)	(0.0000)	(0.0000)	(0.8992)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	
(24) *PERFORMANCE1YR*$_{j,t}$												

TABLE 4: Correlation Table (continued)

This table presents the Pearson correlation coefficients for the full sample used in the analysis. All variable are as defined in table 2. Values in bold are significant at the 5% level, Z-stats are reported in parenthesis.

4.2. Multivariate Results

Table 5 presents results showing that the percentage of opportunistic insider selling is positively associated with the likelihood of director turnover estimated over a three-year and one-year window (*OPP SALE*$_{i,j,t}$, p-value < 0.001)[26] This finding confirms the first hypothesis that firms protect their reputation and legitimacy by distancing themselves from directors engaging in behavior viewed by the public as unethical. Assessing the economic magnitude,[27] a one standard deviation increase in opportunistic sales (35.0 percent of total share volume sold) is associated with an increase in turnover

[26] We report one sided t-statistics for all test variables where we formulated a directional hypothesis.
[27] Marginal effects are similar when calculating average marginal effects or marginal effects with values fixed at their means.

within one year equal to 4.2 percent of the average likelihood of turnover, when using a three-year window to compute turnover we find that an equal increase in opportunistic sales is associated with an increase in turnover of 3.2 percent of the average likelihood of turnover in the sample. The average increase in short term turnover when a director starts making opportunistically timed sales is equal to 11.2 percent of the average likelihood of turnover, on the long term moving from not selling shares opportunistically to selling shares opportunistically is associated with an increase in turnover of 8.74 percent of the average likelihood of turnover in the sample. Overall, these results provide strong support for our first hypothesis.

Related to the control variables[28],executives ($EXECUTIVE_{i,j,t}$, p-value = 0.000), key directors ($KEY\ DIRECTOR_{i,j,t}$, p-value = 0.000) and accounting experts ($ACFE_{i,j,t}$, p-value = 0.045) are significantly less likely to be replaced, as are directors in highly visible firms ($VISIBLE_{j,t}$, p-value = 0.072). Directors who are member of a key board committee ($COMMITTEE\ MEMBER_{i,j,t}$, p-value = 0.000), who hold several board positions ($BOARD\ POSITIONS_{i,j,t}$, p-value = 0.000), or who are further from retirement ($TIME\ TO\ RET_{i,j,t}$, p-value = 0.000) are also associated with a lower likelihood of replacement. Directors with high board tenure experience higher turnover ($BOARD\ TENURE_{i,j,t}$, p-value = 0.010).

	Expected Sign	$TURNOVER1YR_{i,j,t}$	$TURNOVER3YR_{i,j,t}$
$OPP\ SALE_{i,j,t}$	+	0.0084***	0.0189***
		(0.0027)	(0.0050)
$EXECUTIVE_{i,j,t}$	-	-0.0393***	-0.0704***
		(0.0047)	(0.0099)
$KEY\ DIRECTOR_{i,j,t}$	-	-0.0325***	-0.0614***
		(0.0024)	(0.0054)
$ACFE_{i,j,t}$	-	-0.0048*	-0.0120**
		(0.0025)	(0.0060)
$VISIBLE_{j,t}$	+/-	-0.0094***	-0.0124*
		(0.0032)	(0.0069)
$BOARD\ TENURE_{i,j,t}$	+	0.0005**	0.0011**
		(0.0002)	(0.0004)
$COMMITTEE\ MEMBER_{i,j,t}$	-	-0.0260***	-0.0432***
		(0.0043)	(0.0090)

[28] For brevity we discuss the control variables for the model estimating turnover over a three-year window, but mention differences in control variable behavior when turnover is measured over a one-year window.

		-0.0031***	-0.0094***
TIME TO RET$_{i,j,t}$	-	(0.0002)	(0.0004)
		-0.0094***	-0.0214***
BOARD POSITIONS$_{i,j,t}$	-	(0.0013)	(0.0030)
		-0.0071***	-0.0094*
POWERCEO$_{j,t}$	-	(0.0024)	(0.0053)
		0.0142***	0.0267***
BOARD SIZE$_{j,t}$	+/-	(0.0015)	(0.0034)
		0.0095***	0.0263***
%INDEPENDENT$_{j,t}$	+/-	(0.0014)	(0.0032)
		0.0402***	0.0470
%BUSY$_{j,t}$	+/-	(0.0140)	(0.0302)
		-0.0207***	-0.0352***
BOARD OPPORTUNISM$_{j,t}$	-	(0.0051)	(0.0105)
		0.0005***	0.0014***
FIRM SIZE$_{j,t}$	+	(0.0002)	(0.0003)
		0.0190***	0.0211***
RESTATEMENT$_{j,t}$	+	(0.0052)	(0.0078)
ROA$_{j,t}$		-0.0684***	-0.2400***
	-	(0.0124)	(0.0308)
Tobins' Q$_{j,t}$		-0.0010	-0.0072**
	-	(0.0013)	(0.0033)
Performance$_{j,t}$	-	-0.0158***	-0.0257***
		(0.0034)	(0.0040)
Constant		0.1261***	0.4390***
		(0.0293)	(0.0806)
Industry Fixed Effects		Yes	Yes
Year Fixed Effects		Yes	Yes
N		49777	49703
adj. R2		.0257	.0666

TABLE 5: Opportunistic insider trading and director turnover

*,**,*** indicates significance at the 10%, 5% and 1% levels. Numbers in parentheses are test statistics based on robust standard errors clustered at the director level. For variable definitions please refer to Table 2.

Finally, accounting and stock market performance as well as CEO power and practices of opportunistic trading by all other board members (*ROA*$_{j,t}$, p-value = 0.000; *PERFORMANCE*$_{j,t}$, p-value = 0.000; *POWER CEO*$_{j,t}$, p-value = 0.076; *BOARD OPPORTUNISM*$_{j,t}$, p-value = 0.001) are associated with a lower likelihood of director turnover. The percentage of independent board members (*%INDEPENDENT*$_{j,t}$, p-value = 0.000), board size (*BOARD SIZE*$_{j,t}$, p-value = 0.000), firm size (*FIRM SIZE*$_{j,t}$, p-value = 0.000), as well as

restatement announcement years ($RESTATEMENT_{j,t}$, p-value = 0.007) are associated with a higher likelihood of director turnover. The percentage of board members with three or more outside appointments only seems to be associated with turnover in the short term ($\%BUSY_{j,t}$, p-value = 0.004) but not in the long term ($\%BUSY_{j,t}$, p-value = 0.120). Tobin's Q, on the other hand, is negatively associated with turnover in the long term ($TOBIN'S\ Q_{j,t}$, p-value = 0.030), yet not in the short term ($TOBIN'S\ Q_{j,t}$, p-value = 0.464).

Table 6 presents the multivariate results comparing the association between opportunistic insider trading behavior and subsequent turnover conditional upon director value. Both on the short and the long term, the likelihood of turnover is positively associated with opportunistic insider selling for non-executive directors ($OPP\ SALE_{i,j,t}$ *when* $EXECUTIVE_{i,j,t} = 0$, [1YR] p-value < 0.004), non-key directors ($OPP\ SALE_{i,j,t}$ *when* $KEY\ DIRECTOR_{i,j,t} = 0$, p-value < 0.002), and non-accounting experts ($OPP\ SALE_{i,j,t}$ *when* $ACFE_{i,j,t} = 0$, p-value = 0.001). On the other hand, for executive directors ($OPP\ SALE_{i,j,t}$ *when* $EXECUTIVE_{i,j,t} = 1$, p-value > 0.417), and key directors ($OPP\ SALE_{i,j,t}$ *when* $KEY\ DIRECTOR_{i,j,t} = 1$, p-value > 0.120) the association between insider selling and the likelihood of their turnover is insignificant on both the short and the long term. Accounting experts seem to be shielded from turnover within one year following opportunistic behavior ($OPP\ SALE_{i,j,t}$ *when* $ACFE_{i,j,t} = 1$, p-value = 0.633), but their insider selling behavior has a marginally significant positive association with the likelihood of turnover within three years ($OPP\ SALE_{i,j,t}$ *when* $ACFE_{i,j,t} = 1$, p-value = 0.054). Control variables are in line with the main results of Table 5. Taken together, results in Table 6 support Hypothesis 2, showing that the association between insider selling behavior and turnover is less strong for directors who are harder to replace.

VALUABLE=		$EXECUTIVE_{i,j,t}$		$KEY\ DIRECTOR_{i,j,t}$		$ACFE_{i,j,t}$	
DEPENDENT=	Expected Sign	$TURNOVER1YR_{i,j,t}$	$TURNOVER3YR_{i,j,t}$	$TURNOVER1YR_{i,j,t}$	$TURNOVER3YR_{i,j,t}$	$TURNOVER1YR_{i,j,t}$	$TURNOVER3YR_{i,j,t}$
$OPP\ SALE_{i,j,t}$ When VALUABLE=0	+	0.0098***	0.0252***	0.0108***	0.0287***	0.0106***	0.0196***
		(0.0032)	(0.0059)	(0.0039)	(0.0069)	(0.0032)	(0.0059)
$OPP\ SALE_{i,j,t}$ When VALUABLE=1	+/-	0.0038	-0.0007	0.0053	0.0071	0.0022	0.0170*
		(0.0047)	(0.0091)	(0.0034)	(0.0068)	(0.0045)	(0.0088)
$EXECUTIVE_{i,j,t}$	-	-0.0361***	-0.0565***	-0.0392***	-0.0700***	-0.0392***	-0.0704***
		(0.0055)	(0.0114)	(0.0047)	(0.0099)	(0.0047)	(0.0099)
$KEY\ DIRECTOR_{i,j,t}$	-	-0.0324***	-0.0613***	-0.0305***	-0.0538***	-0.0326***	-0.0615***

		(0.0024)	(0.0054)	(0.0029)	(0.0062)	(0.0024)	(0.0054)
		-0.0048*	-0.0120**	-0.0049**	-0.0126**	-0.0019	-0.0111
$ACFE_{i,j,t}$	-	(0.0025)	(0.0060)	(0.0025)	(0.0060)	(0.0031)	(0.0069)
$VISIBLE_{j,t}$	+/-	-0.0094***	-0.0125*	-0.0094***	-0.0122*	-0.0094***	-0.0124*
		(0.0032)	(0.0069)	(0.0032)	(0.0069)	(0.0032)	(0.0069)
		0.0005**	0.0011**	0.0005**	0.0011***	0.0005**	0.0011**
$BOARD\ TENURE_{i,j,t}$	+	(0.0002)	(0.0004)	(0.0002)	(0.0004)	(0.0002)	(0.0004)
COMMITTEE		-0.0259***	-0.0425***	-0.0260***	-0.0431***	-0.0260***	-0.0432***
$MEMBER_{i,j,t}$	-	(0.0043)	(0.0090)	(0.0043)	(0.0090)	(0.0043)	(0.0090)
		-0.0031***	-0.0094***	-0.0031***	-0.0094***	-0.0031***	-0.0094***
$TIME\ TO\ RET_{i,j,t}$	-	(0.0002)	(0.0004)	(0.0002)	(0.0004)	(0.0002)	(0.0004)
BOARD		-0.0094***	-0.0214***	-0.0094***	-0.0214***	-0.0094***	-0.0214***
$POSITIONS_{i,j,t}$	-	(0.0013)	(0.0030)	(0.0013)	(0.0030)	(0.0013)	(0.0030)
		-0.0071***	-0.0092*	-0.0070***	-0.0088*	-0.0071***	-0.0094*
$POWERCEO_{j,t}$	-	(0.0024)	(0.0053)	(0.0024)	(0.0053)	(0.0024)	(0.0053)
		0.0142***	0.0268***	0.0142***	0.0267***	0.0142***	0.0267***
$BOARD\ SIZE_{j,t}$	+/-	(0.0015)	(0.0034)	(0.0015)	(0.0034)	(0.0015)	(0.0034)
		0.0095***	0.0263***	0.0095***	0.0266***	0.0095***	0.0263***
$\%INDEPENDENT_{j,t}$	+/-	(0.0014)	(0.0032)	(0.0014)	(0.0032)	(0.0014)	(0.0032)
		0.0403***	0.0475	0.0401***	0.0467	0.0401***	0.0469
$\%BUSY_{j,t}$	+/-	(0.0140)	(0.0302)	(0.0140)	(0.0302)	(0.0140)	(0.0302)
BOARD		-0.0207***	-0.0352***	-0.0207***	-0.0350***	-0.0207***	-0.0352***
$OPPORTUNISM_{j,t}$	-	(0.0051)	(0.0105)	(0.0051)	(0.0105)	(0.0051)	(0.0105)
		0.0005***	0.0014***	0.0005***	0.0014***	0.0005***	0.0014***
$FIRM\ SIZE_{j,t}$	+	(0.0002)	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0003)
		0.0190***	0.0210***	0.0191***	0.0212***	0.0190***	0.0211***
$RESTATEMENT_{j,t}$	+	(0.0052)	(0.0078)	(0.0052)	(0.0078)	(0.0052)	(0.0078)
$ROA_{j,t}$		-0.0684***	-0.2401***	-0.0682***	-0.2392***	-0.0685***	-0.2400***
	-	(0.0124)	(0.0308)	(0.0124)	(0.0308)	(0.0124)	(0.0308)
Tobins' $Q_{j,t}$		-0.0010	-0.0073**	-0.0010	-0.0072**	-0.0010	-0.0072**
	-	(0.0013)	(0.0033)	(0.0013)	(0.0033)	(0.0013)	(0.0033)
$Performance_{j,t}$	-	-0.0158***	-0.0257***	-0.0158***	-0.0257***	-0.0158***	-0.0257***
		(0.0034)	(0.0040)	(0.0034)	(0.0040)	(0.0034)	(0.0040)
Constant		0.1258***	0.4382***	0.1251***	0.4354***	0.1256***	0.4389***
		(0.0293)	(0.0806)	(0.0293)	(0.0808)	(0.0292)	(0.0806)
Industry Fixed Effects		yes	yes	yes	yes	yes	yes
Year Fixed Effects		yes	yes	yes	yes	yes	yes
N		49777	49703	49777	49703	49777	49703
adj. R2		.0257	.0667	.0257	.0667	.0257	.0665

TABLE 6: Opportunistic insider trading and director turnover of directors with high board value

*,**,*** indicates significance at the 10%, 5% and 1% levels. Numbers in parentheses are test statistics based on robust standard errors clustered at the director level. For variable definitions please refer to Table 2.

Finally, Table 7 presents the multivariate results comparing the association between opportunistic insider trading behavior and subsequent

turnover conditional upon director value characteristics for different levels of firm visibility. Both on the short and the long term the association between director opportunistic insider selling behavior and turnover is positive and (marginally) significant for directors with lower value to the board, regardless of firm visibility. Specifically, for less visible firms the likelihood of turnover is positively associated with opportunistic insider selling for non-executive directors ($OPP\ SALE_{i,j,t}$ *when* $EXECUTIVE_{i,j,t} = 0$ *and* $VISIBLE_{j,t} = 0$, p-value < 0.004), non-key directors ($OPP\ SALE_{i,j,t}$ *when* $KEY\ DIRECTOR_{i,j,t} = 0$ *and* $VISIBLE_{j,t} = 0$, p-value < 0.008), and non-accounting experts ($OPP\ SALE_{i,j,t}$ *when* $ACFE_{i,j,t} = 0$ *and* $VISIBLE_{j,t} = 0$, p-value < 0.006). For more visible firms the likelihood of turnover within three years also has a positive and significant association with opportunistic insider selling for non-executive directors ($OPP\ SALE_{i,j,t}$ *when* $EXECUTIVE_{i,j,t} = 0$ *and* $VISIBLE_{j,t} = 1$, p-value = 0.001), non-key directors ($OPP\ SALE_{i,j,t}$ *when* $KEY\ DIRECTOR_{i,j,t} = 0$ *and* $VISIBLE_{j,t} = 1$, p-value = 0.001), and non-accounting experts ($OPP\ SALE_{i,j,t}$ *when* $ACFE_{i,j,t} = 0$ *and* $VISIBLE_{j,t} = 1$, p-value = 0.009). When looking at director replacement within one year, we find that the association between the likelihood of turnover and opportunistic insider selling is positive and significant for non-accounting experts ($OPP\ SALE_{i,j,t}$ *when* $ACFE_{i,j,t} = 0$ *and* $VISIBLE_{j,t} = 1$, p-value = 0.050), and positive and marginally significant for non-executive directors ($OPP\ SALE_{i,j,t}$ *when* $EXECUTIVE_{i,j,t} = 0$ *and* $VISIBLE_{j,t} = 1$, p-value = 0.059), and non-key directors ($OPP\ SALE_{i,j,t}$ *when* $KEY\ DIRECTOR_{i,j,t} = 0$ *and* $VISIBLE_{j,t} = 1$, p-value = 0.057).

Turning our attention to directors with higher value we find that they are only shielded from turnover following opportunistic insider selling in less visible firms. We find that in highly visible firms opportunistic insider selling is not significantly associated with director turnover for executive directors ($OPP\ SALE_{i,j,t}$ *when* $EXECUTIVE_{i,j,t} = 1$ *and* $VISIBLE_{j,t} = 0$, p-value > 0.321), key directors ($OPP\ SALE_{i,j,t}$ *when* $KEY\ DIRECTOR_{i,j,t} = 1$ *and* $VISIBLE_{j,t} = 0$, p-value > 0.454), and accounting experts ($OPP\ SALE_{i,j,t}$ *when* $ACFE_{i,j,t} = 1$ *and* $VISIBLE_{j,t} = 0$, p-value > 0.406) for both turnover within one year and turnover within three years. In highly visible firms the association between opportunistic insider selling and turnover is positive and significant for key directors ($OPP\ SALE_{i,j,t}$ *when* $KEY\ DIRECTOR_{i,j,t} = 1$ *and* $VISIBLE_{j,t} = 1$, p-value < 0.036), and accounting experts ($OPP\ SALE_{i,j,t}$ *when* $ACFE_{i,j,t} = 1$ *and*

VISIBLE $_{j,t}$ = 1, p-value < 0.028) for both the long and the short term. The association between opportunistic insider selling for executives in highly visible firms is positive and significant in for turnover within one year (*OPP SALE*$_{i,j,t}$ *when EXECUTIVE$_{i,j,t}$* =1 *and VISIBLE $_{j,t}$ = 1*, p-value = 0.047), but becomes marginally significant for turnover within three years (*OPP SALE*$_{i,j,t}$ *when EXECUTIVE$_{i,j,t}$* =1 *and VISIBLE $_{j,t}$ = 1*, p-value = 0.053). Results for the control variables are in line with the main results found in Table 5. In sum, results found in Table 7 strongly support Hypothesis 3 showing that when firm visibility is high director value does not provide protection against turnover following opportunistic insider trading behavior.

VALUABLE=	Expected Sign	*EXECUTIVE*$_{i,j,t}$		*KEY DIRECTOR*$_{i,j,t}$		*ACFE*$_{i,j,t}$	
DEPENDENT=		*TURNOVER1YR$_{i,j,t}$*	*TURNOVER3YR$_{i,j,t}$*	*TURNOVER1YR$_{i,j,t}$*	*TURNOVER3YR$_{i,j,t}$*	*TURNOVER1YR$_{i,j,t}$*	*TURNOVER3YR$_{i,j,t}$*
OPP SALE$_{i,j,t}$ When VALUABLE=0 and VISIBLE j,t	+	0.0108***	0.0230***	0.0114***	0.0254***	0.0116***	0.0183***
		(0.0040)	(0.0073)	(0.0046)	(0.0082)	(0.0038)	(0.0071)
OPP SALE$_{i,j,t}$ When VALUABLE=0 and VISIBLE j,t	+	0.0082*	0.0291***	0.0098*	0.0344***	0.0086**	0.0222***
		(0.0052)	(0.0093)	(0.0062)	(0.0109)	(0.0052)	(0.0093)
OPP SALE$_{i,j,t}$ When VALUABLE=1 and VISIBLE j,t	+/-	0.0005	-0.0098	0.0029	-0.0010	-0.0042	-0.0018
		(0.0050)	(0.0099)	(0.0039)	(0.0080)	(0.0051)	(0.0100)
OPP SALE$_{i,j,t}$ When VALUABLE=1 and VISIBLE j,t	+	0.0129**	0.0245*	0.0105**	0.0243**	0.0150**	0.0547***
		(0.0077)	(0.0152)	(0.0058)	(0.0111)	(0.0078)	(0.0150)
EXECUTIVE$_{i,j,t}$	-	-0.0363***	-0.0575***	-0.0394***	-0.0702***	-0.0391***	-0.0699***
		(0.0055)	(0.0114)	(0.0047)	(0.0099)	(0.0047)	(0.0099)
KEY DIRECTOR$_{i,j,t}$	-	-0.0327***	-0.0619***	-0.0306***	-0.0543***	-0.0327***	-0.0543***
		(0.0024)	(0.0054)	(0.0029)	(0.0062)	(0.0024)	(0.0054)
ACFE$_{i,j,t}$	-	-0.0048*	-0.0120**	-0.0049**	-0.0126**	-0.0019	-0.0113
		(0.0025)	(0.0060)	(0.0025)	(0.0060)	(0.0031)	(0.0069)
VISIBLE $_{j,t}$	+/-	-0.0104***	-0.0183**	-0.0103***	-0.0183**	-0.0104***	-0.0188**
		(0.0037)	(0.0077)	(0.0037)	(0.0077)	(0.0037)	(0.0077)
BOARD TENURE$_{i,j,t}$	+	0.0005**	0.0011***	0.0005**	0.0011***	0.0005**	0.0011***
		(0.0002)	(0.0004)	(0.0002)	(0.0004)	(0.0002)	(0.0004)
COMMITTEE MEMBER$_{i,j,t}$	-	-0.0258***	-0.0424***	-0.0260***	-0.0432***	-0.0259***	-0.0431***
		(0.0043)	(0.0090)	(0.0043)	(0.0090)	(0.0043)	(0.0090)
TIME TO RET$_{i,j,t}$	-	-0.0031***	-0.0094***	-0.0031***	-0.0094***	-0.0031***	-0.0094***
		(0.0002)	(0.0004)	(0.0002)	(0.0004)	(0.0002)	(0.0004)
BOARD POSITIONS$_{i,j,t}$	-	-0.0093***	-0.0212***	-0.0093***	-0.0213***	-0.0094***	-0.0213***
		(0.0013)	(0.0030)	(0.0013)	(0.0030)	(0.0013)	(0.0030)
POWERCEO$_{j,t}$	-	-0.0070***	-0.0088*	-0.0070***	-0.0086	-0.0071***	-0.0092*
		(0.0024)	(0.0053)	(0.0024)	(0.0053)	(0.0024)	(0.0053)
BOARD SIZE$_{j,t}$	+/-	0.0142***	0.0267***	0.0142***	0.0268***	0.0142***	0.0268***
		(0.0015)	(0.0034)	(0.0015)	(0.0034)	(0.0015)	(0.0034)
%INDEPENDENT$_{j,t}$	+/-	0.0094***	0.0263***	0.0095***	0.0265***	0.0095***	0.0263***
		(0.0014)	(0.0032)	(0.0014)	(0.0032)	(0.0014)	(0.0032)
%BUSY$_{j,t}$	+/-	0.0402***	0.0476	0.0400***	0.0469	0.0401***	0.0472
		(0.0140)	(0.0302)	(0.0140)	(0.0302)	(0.0140)	(0.0302)
BOARD OPPORTUNISM$_{j,t}$	-	-0.0208***	-0.0356***	-0.0208***	-0.0354***	-0.0208***	-0.0356***
		(0.0051)	(0.0105)	(0.0051)	(0.0105)	(0.0051)	(0.0105)
FIRM SIZE$_{j,t}$	+	0.0005***	0.0014***	0.0005***	0.0014***	0.0005***	0.0014***

		(0.0002)	(0.0003)	(0.0002)	(0.0003)	(0.0002)	(0.0003)
$RESTATEMENT_{j,t}$	+	0.0191*** (0.0052)	0.0211*** (0.0078)	0.0191*** (0.0052)	0.0212*** (0.0078)	0.0189*** (0.0052)	0.0209*** (0.0078)
$ROA_{j,t}$	-	-0.0688*** (0.0124)	-0.2408*** (0.0308)	-0.0681*** (0.0124)	-0.2389*** (0.0308)	-0.0683*** (0.0124)	-0.2387*** (0.0308)
Tobins' $Q_{j,t}$	-	-0.0010 (0.0013)	-0.0073** (0.0033)	-0.0010 (0.0013)	-0.0072** (0.0033)	-0.0010 (0.0013)	-0.0073** (0.0033)
$Performance_{j,t}$	-	-0.0158*** (0.0034)	-0.0257*** (0.0040)	-0.0157*** (0.0034)	-0.0257*** (0.0040)	-0.0157*** (0.0034)	-0.0257*** (0.0040)
Constant		0.1254*** (0.0293)	0.4391*** (0.0805)	0.1254*** (0.0293)	0.4377*** (0.0808)	0.1268*** (0.0292)	0.4432*** (0.0805)
Industry Fixed Effects		yes	yes	yes	yes	yes	yes
Year Fixed Effects		yes	yes	yes	yes	yes	yes
N		49777	49703	49777	49703	49777	49703
adj. R2		.0257	.0668	.0257	.0668	.0258	.0668

TABLE 7: Opportunistic insider trading and director turnover of directors with high board value In visible firms

*,**,*** indicates significance at the 10%, 5% and 1% levels. Numbers in parentheses are test statistics based on robust standard errors clustered at the director level. For variable definitions please refer to Table 2.

4.3. Additional Analyses

We perform additional analyses to rule out the alternative explanation that non-executive directors ramp up their opportunistic trading when they anticipate being replaced. We also analyze the impact of opportunistic firm culture on our results. Furthermore, we show that having close connections to the CEO provides shelter from turnover following opportunistic insider selling.

4.3.1. Anticipation of Board Replacement

One possible alternative explanation for our findings could be that directors who approach the end of their term in the board (or who believe that they will not be nominated for renewal at the next opportunity) increase their trading behavior and thus become more likely to be classified as opportunistic traders. These trades are not necessarily opportunistic, as insiders who suspect that they will be replaced might start building down their stockholdings in the firm, which increases their trading activity. To address this concern, we investigate when directors' rates of turnover are most sensitive to opportunistic trading. If directors increase non-routine trading in anticipation of turnover, the relationship between turnover and opportunistic insider trading should be stronger for long-tenured or older directors, as the unconditional likelihood of their replacement is highest. To examine this relationship, we measure the impact of $OPPORTUNISM_{i,j,t}$ conditional on

directors being in the highest quartile of tenure (*HIGH TENURE*$_{i,j,t}$) or age (*HIGH AGE*$_{i,j,t}$) within their board. Both measures indicate whether director *i* is in the highest quartile of either tenure or age, respectively, at firm *j* in fiscal year *t*.

CHARACTERISTIC=		HIGH AGE$_{i,j,t}$		HIGH TENURE$_{i,j,t}$	
DEPENDENT=	Expected Sign	*TURNOVER1* $YR_{i,j,t}$	*TURNOVER3* $YR_{i,j,t}$	*TURNOVER1* $YR_{i,j,t}$	*TURNOVER3* $YR_{i,j,t}$
OPP SALE$_{i,j,t}$ When CHARACTERISTIC=0	+	0.0073***	0.0167***	0.0118***	0.0273***
		(0.0027)	(0.0053)	(0.0031)	(0.0059)
OPP SALE$_{i,j,t}$ When CHARACTERISTIC =1	+/-	0.0087	0.0179	0.0011	0.0017
		(0.0072)	(0.0118)	(0.0047)	(0.0084)
CHARACTERISTIC		0.0811***	0.2014***	0.0317***	0.0698***
		(0.0045)	(0.0092)	(0.0038)	(0.0079)
EXECUTIVE$_{i,j,t}$	-	-0.0248***	-0.0347***	-0.0392***	-0.0701***
		(0.0046)	(0.0097)	(0.0047)	(0.0098)
KEY DIRECTOR$_{i,j,t}$	-	-0.0325***	-0.0616***	-0.0341***	-0.0648***
		(0.0024)	(0.0053)	(0.0024)	(0.0054)
ACFE$_{i,j,t}$	-	-0.0041	-0.0103*	-0.0045*	-0.0113*
		(0.0025)	(0.0059)	(0.0025)	(0.0060)
VISIBLE $_{j,t}$	+/-	-0.0095***	-0.0126*	-0.0092***	-0.0120*
		(0.0031)	(0.0068)	(0.0032)	(0.0069)
Controls		yes	yes	yes	yes
Industry Fixed Effects		yes	yes	yes	yes
Year Fixed Effects		yes	yes	yes	yes
N		49777	49703	49777	49703
adj. R2		.0374	.0952	.0274	.0698

TABLE 8: Opportunistic insider trading and director turnover when high tenure or age

*,**,*** indicates significance at the 10%, 5% and 1% levels. Numbers in parentheses are test statistics based on robust standard errors clustered at the director level. HIGH AGE$_{i,j,t}$ measures 1 when the director is in the top quartile of age for firm j in year t and 0 otherwise, HIGH TENURE$_{i,j,t}$ measures 1 when the director is in the top quartile of board tenure for firm j in year t and 0 otherwise All other variables are as defined in table 2.

Table 8 reports the results of this analysis. Control variables are included, but coefficients are suppressed for brevity. Regardless whether turnover is measured over a one-year or three-year window, directors in the highest quartile of age (*HIGH AGE*$_{i,j,t}$, p-value = 0.000) and tenure (*HIGH TENURE*$_{i,j,t}$, p-value = 0.000) are significantly more likely to face replacement, in line with our assumption that these would be the most close to turnover. However, the opportunistic insider selling behavior of directors in the highest quartile of age (*OPP SALE*$_{i,j,t}$ *when HIGH AGE*$_{i,j,t}$=1, p-value > 0.129) and in the highest quartile of tenure (*OPP SALE*$_{i,j,t}$ *when HIGH*

$TENURE_{i,j,t}$=1, p-value > 0.820) is not significantly associated with their likelihood of replacement. In contrast, the opportunistic insider selling behavior of directors not in the highest quartile of age ($OPP\ SALE_{i,j,t}$ *when* $HIGH\ AGE_{i,j,t}$=0, p-value < 0.004) and not in the highest quartile of tenure ($OPP\ SALE_{i,j,t}$ *when* $HIGH\ TENURE_{i,j,t}$=0, p-value = 0.000) is positive and significantly associated with their likelihood of replacement. Taken together these results indicate that it is unlikely that directors who anticipate leaving the board will increase their opportunistic selling behavior, which strengthens our confidence in our interpretation that directors get replaced following opportunistic insider selling.

4.3.2.Firm Culture

When examining the impact of misbehavior on director replacement, outsiders' perceptions of this behavior are important, as well as insiders' perceptions (Kachelmeier et al. 2016). From prior research, we know that individuals prefer to associate with others who share similar characteristics, attitudes, and behaviors (McPherson, Smith-Lovin, and Cook 2001) and that boards prefer to appoint directors who resemble the existing board (Westphal and Zajac 1995). We thus infer that the behavior of other board members, or firm culture more broadly, likely influences disciplinary turnover following director unethical behavior. To investigate this inference, re-run all our analyses with firm and year fixed effects, and firm*year fixed effects wherever possible[29], which absorb the impact of firm culture on the association between director opportunistic insiders selling behavior and their likelihood of replacement. In untabulated analysis we find that in general our results become stronger after the inclusion of firm fixed effects, and firm*year fixed effects. There are two exceptions to this, after the inclusion of firm fixed effects the association between opportunistic insider selling and turnover within three years becomes marginally significant for key directors ($OPP\ SALE_{i,j,t}$ *when* $KEY\ DIRECTOR_{i,j,t}$ = 1, p-value = 0.059). When controlling for firm*year fixed effects the association between the opportunistic insider selling behavior of key directors and their likelihood of replacement becomes significant ($OPP\ SALE_{i,j,t}$ *when* $KEY\ DIRECTOR_{i,j,t}$ = 1, [1YR] p-value < 0.057). Secondly, when controlling for firm fixed effects the association

[29] Because our firm visibility measure is defined on a yearly basis we cannot re-run this analysis with firm*year fixed effect. Here we only use firm fixed effects.

between executives' opportunistic insider selling behavior and their likelihood of replacement in visible firms becomes marginally significant ($OPP\ SALE_{i,j,t}$ *when* $EXECUTIVE_{i,j,t}$ =1 *and* $VISIBLE_{j,t} = 1$, p-value < 0.059).

4.3.3. Tied directors

In addition to director (firm-specific) human capital, a director's firm-specific relational capital is likely to play an important role in the firm's replacement decision. Given that prior research indicates that CEOs have substantial influence on who occupies the board (e.g., Cohen, Krishnamoorthy, and Wright 2008; Carcello, Hermanson, and Ye 2011; Cohen, Gaynor, Krishnamoorthy, and Wright 2011; Khanna, Kim, and Lu 2015), we focus on independent directors' social ties with their CEOs as a measure of firm-specific relational capital. Recent research has shown that social connections between CEOs and independent directors result in increased management compensation, relaxed management oversight, and a reduced likelihood of CEO dismissal in cases of fraud (Hwang and Kim 2009; Coles, Daniel, and Naveen 2014; Bruynseels and Cardinaels 2014; Khanna et al. 2015). Given that management benefits from having connected or "friendly" directors on the board, we expect these directors in turn to benefit from CEO support (or even protection) when engaging in undesirable behavior, such as opportunistic insider trading. As a result, they would be less likely to be subject to disciplinary turnover following opportunistic insider trading, compared to their non-connected counterparts engaging in similar behavior.

The measure of director–CEO connectedness is based on a study by Bruynseels and Cardinaels (2014), who report that the presence of friendship ties between CEOs and audit committee members results in low-quality management oversight. These friendship ties are proxied by shared memberships in non-professional organizations, such as charities, leisure clubs, country clubs, or other non-profit associations. The variable $TIED\ DIRECTOR_{i,j,t}$ equals one if the director and the CEO share a past or present membership in these types of organizations and zero otherwise. We then estimate a model specification identical to model (2) where we calculate the association between directors opportunistic insider selling behavior and their likelihood of replacement conditional upon them having a social connection to the CEO.

Turnover window	Expected Sign	$TURNOVER1YR_{i,j,t}$	$TURNOVER3YR_{i,j,t}$
$OPP\ SALE_{i,j,t}$ When $TIED\ DIRECTOR_{i,j,t}$ =0	+	0.0093***	0.0211***
		(0.0029)	(0.0054)
$OPP\ SALE_{i,j,t}$ When $TIED\ DIRECTOR_{i,j,t}$ =1	+/-	-0.0033	-0.0083
		(0.0093)	(0.0171)
$TIED\ DIRECTOR_{i,j,t}$	+/-	-0.0001	0.0031
		(0.0045)	(0.0103)
$EXECUTIVE_{i,j,t}$	-	-0.0397***	-0.0712***
		(0.0048)	(0.0100)
$KEY\ DIRECTOR_{i,j,t}$	-	-0.0325***	-0.0614***
		(0.0024)	(0.0053)
$ACFE_{i,j,t}$	-	-0.0048**	-0.0120**
		(0.0024)	(0.0057)
$VISIBLE_{j,t}$	+/-	-0.0093**	-0.0123
		(0.0038)	(0.0083)
Controls$		yes	yes
Industry Fixed Effects		yes	yes
Year Fixed Effects		yes	yes
N		49777	49703
adj. R2		.0257	.0666

TABLE 9: Opportunistic insider trading and director turnover of directors with social ties to the current CEO

*,**,*** indicates significance at the 10%, 5% and 1% levels. Numbers in parentheses are test statistics based on robust standard errors clustered at the director level. $TIED\ DIRECTOR_{i,j,t}$ is an indicator variable measuring 1 is the director shares a social connection with the current CEO at firm j in year t and 0 otherwise. All other variables are as defined in table 2, control variable are not shown for brevity.

Table 9 reports the results of this analysis. Control variables are included, but coefficients are suppressed for brevity. We find that regardless of turnover measurement window, the association between the likelihood of turnover and opportunistic insider selling behavior of directors that do not have a social connection to the CEO is positive and significant ($OPP\ SALE_{i,j,t}$ *when* $TIED\ DIRECTOR_{i,j,t} = 0$, p-value < 0.002). The association between opportunistic insider selling behavior and turnover of directors with a social connection to the CEO, on the other hand, is insignificant across turnover measurement windows ($OPP\ SALE_{i,j,t}$ *when* $TIED\ DIRECTOR_{i,j,t} = 1$, p-value > 0.627).

5. Conclusion

The importance of limiting opportunistic insider trading is a concern of regulators, investors, and firms. In this paper, we investigate whether firms self-regulate this behavior by replacing directors engaged in it, and whether firms do so equally for all insiders. As such, we are the first to examine labor market consequences of opportunistic insider trading among directors. Previous literature on director turnover has shown that board ineffectiveness (e.g., restatement, fraud, investigation by the SEC, option backdating, disclosures of internal control material weaknesses) increases the likelihood of director turnover (Srinivasan 2005; Arthaud-Day et al. 2006; Fich and Shivdasani 2007; Johnston et al. 2011; Ertimur et al. 2012). However, it is unknown whether undesirable behavior among individual directors also affects director turnover.

Opportunistic insider trading often leads to negative public sentiment and reputational costs that can damage organizational legitimacy (Gao et al. 2014; Cui et al. 2015). Based on institutional theory, we expect firms to respond to this threat by distancing themselves from directors who engage in opportunistic trading, increasing the likelihood that those directors will be replaced after their mandate. Moreover, we examine whether this effect is more pronounced for directors trading in periods of heightened public scrutiny (e.g., around restatements announcements) and less pronounced for directors who are key to the firm or have social ties to the CEO. We test this prediction using a sample of a sample of 11,515 directors in 2,390 firms from 2005 to 2014. Our results show that opportunistic insider selling, measured by the methodology developed by Cohen et al. (2012), is associated with a higher likelihood of director turnover. We also find evidence that directors who are especially valuable to the board or costly to replace are not subject to an increase in likelihood of turnover when engaging in opportunistic insider trading. However, valuable directors are only shielded from disciplinary replacement in less visible firms. When firms are highly visible, both valuable and less valuable directors are significantly more likely to be replaced following opportunistic insider selling behavior.

The results presented in this study contribute to the literature in three ways. First, we are the first to demonstrate a relation between individual directors' decisions to trade opportunistically and their likelihood of being

replaced from their firms' board. Second, we are also the first to provide evidence on labor market consequences of insider trading among directors. Third, our work shows that firms self-regulate undesirable opportunistic insider trading, albeit not equally for all directors, depending on their value to the board and the support they receive from the CEO. This should be of interest to regulators and investors, as we show that firms protect their legitimacy by distancing themselves from directors displaying unethical behavior.

The results in this study provide a foundation for further investigation of the relationship between director replacement and opportunistic insider trading behavior. For example, we suspect that by sending a strong signal of commitment to socially acceptable behavior, a board not only defends its legitimacy but also influences future director behavior. By replacing a director who behaves opportunistically, the firm signals to the remaining directors that this behavior will not be accepted. Using an event study methodology, it is thus possible to evaluate the effectiveness of director replacement as a tool for influencing future directors' opportunistic trading behavior.

Another possible avenue for future research is whether the stigmatization of directors who were replaced due to opportunistic trading behavior persists over time. Opportunistic directors thus might be punished through the loss of their position at the firm and through their limited ability to acquire new board positions. Furthermore, following the insider trading literature, profits from inside information can be seen as a part of director and executive compensation. Indeed, firms imposing restrictions on insider trading behavior subsequently experience significant rises in executive compensation (Roulstone 2003). Actively ousting opportunistic insider traders from the board limits insiders' ability to realize insider trading profits, thereby reducing their expected benefits from their board positions. Thus, while the removal of opportunistic directors safeguards firm legitimacy, it also might limit the firms' capacity to attract talented executives and directors. As such, future research might investigate the impact of firms developing a reputation for active monitoring of opportunistic insider trading on recruitment and remuneration of future directors and executives.

This study is subject to some limitations. Though we find a link between opportunistic insider trading and director turnover, we cannot

observe the nature of the turnover. As a result, we cannot distinguish between voluntary and forced director turnover. It is thus impossible for us to demonstrate actual disciplinary director replacement following opportunistic insider trading. The observed turnover might be due to age, tenure restrictions, or other limitations in the firms' code of conduct. To alleviate some of these concerns, we control for director tenure and time until retirement. Further, all opportunistic trades are treated equally in our turnover analysis. The potential impact of these opportunistic trades on firm legitimacy, however, will vary. An insider acting on non-public information that is potentially material will be punished more severely than an insider placing opportunistic trades based on less price-relevant information.

Chapter III

The Association Between Audit Committee Opportunistic Insider Trading and Financial Reporting Quality

Abstract

In this paper, I examine the association between opportunistic insider trading in the audit committee (AC) and financial reporting quality. Interpreting AC opportunistic insider trading behavior as a signal of AC members' focus on private rent extraction rather than increasing wealth I hypothesize that opportunistic ACs are negatively associated with financial reporting quality. Using a sample of U.S. companies in fiscal years 2006 to 2013, I find that AC engaging in opportunistic insider trading are associated with a higher likelihood of misstatements and increased level of earnings management. Additional analysis shows that this result is driven by the opportunistic trading behavior of supervisory financial experts. Furthermore, high quality auditors are able to mitigate this relationship. These results show that even though firms and regulators already actively limit insider trading opportunities they should be extra cautious when it comes to members of the AC.

1. INTRODUCTION

In this paper, I study the association between audit committee (AC) opportunistic insider trading and financial reporting quality. Specifically, I investigate the relationships between AC opportunistic insider trading and the likelihood of earnings misstatements and earnings management.

Given their importance in the oversight of the financial reporting process, current policy mandates AC members be independent of management to safeguard their incentives in exercising their monitoring duties (SEC, 2003). To further the AC's ability to effectively perform its duties, firms are pressured to increase the financial expertise of their AC. However, current standards disregard AC member insider trading and the incentives this behavior might create. AC members can own and trade company shares while taking into account certain restrictions[30] (Magilke et al. 2009; Jagolinzer, Larcker, and Taylor 2011), whereas external auditors are prohibited from having any direct investments in engagement firms to maintain their independence (17 CFR 210.2-01.). This differential treatment for external auditors indicates that insider trading can be considered as a potential threat to independence when exercising an oversight function. As a consequence, AC members' independence can be affected by their ability to engage in insider trading behavior as well. I argue that ACs engaged in information-driven, opportunistic insider trading are more likely to be focused on personal rent extraction rather than monitoring the financial reporting process. As such, more opportunistic ACs will be associated with lower financial statement quality.

Insiders have a persistent capacity to realize abnormal profits when trading their own company's shares (Jaffe 1974; Bettis, Vickrey and Vickrey 1997; Ravina and Sapienza 2010). When engaging in insider trading behavior, insiders can take advantage of their superior access to information to extract rents. Their ability to do so increases with information asymmetry between inside and outside investors (Aboody and Lev 2000; Huddart and Ke 2007). This rent extraction is particularly high when insiders are trading

[30] Regulatory initiatives include 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. In addition firms can also implement ex ante voluntary insider trading policies, such as defining blackout periods or requiring approval from the general council (Bettis et al. 2000; Jagolinzer et al. 2011; Lee, Lemmon, Li, and Sequeira 2014).

opportunistically on their private information (Cohen, Malloy and Pomorski 2012). Because of the role of the AC, members of this committee have better access to and insight into financial statement information, allowing them to enjoy higher insider trading rents (Ravina and Sapienza 2010; Duellman, Guo, Zhang and Zhou 2018).

When engaging in opportunistic insider trading, AC members attempt to exploit their superior access to information for financial gain. Higher audit quality and a more robust financial reporting process reduce information asymmetry (Copley and Douthett 2002; Pittman and Fortin 2004; Almutairi, Dunn and Skantz 2009), thereby limiting potential trading opportunities and gains for insiders and increasing their cost of monitoring. AC members' display of opportunistic insider trading behavior could thus be indicative of lower motivation to monitor the financial reporting process. In this paper I indeed show a strong negative association between opportunistic insider trading in the AC and financial reporting quality.

Prior research into AC effectiveness has identified the impact of a number of firm and AC characteristics that influence AC oversight of the financial reporting process. ACs that are more independent and have more financial expertise have a greater capacity to monitor and maintain a high level of financial reporting quality (Abbott and Parker 2000;Chen and Zhou 2007; Cassell et al. 2012). These papers, however, focus on static characteristics of firms and ACs, ignoring AC member economic incentives. Studies that do investigate incentives generally find that financial statement quality and AC oversight are worse when more committee members are compensated with stock options (Archambeault, DeZoort and Hermanson 2008; Cullinan, Du, and Wright 2008; Magilke, Mayhew and Pike 2009; Keune and Johnstone 2015). While these studies identify the impact of equity compensation on AC effectiveness I take this one step further and look what AC members do with their equity.

I use the methodology of Cohen, Malloy and Pomorski (2012) to identify "opportunistic" or information-driven insider trades at the director level. I then aggregate individual director-level trading information into an AC-level measure for opportunistic insider trading and relate this measure to different proxies for financial reporting quality: the likelihood if (adverse) earnings misstatement and the magnitude of abnormal accruals (Reichelt and Wang

2010; Carcello et al. 2011; Cohen et al. 2014). Next, I investigate the moderating impact of auditor reputation on the relationship between AC opportunistic insider trading and financial reporting quality. Lastly, I explore whether the association between AC member opportunistic insider trading and financial reporting quality depends on the role opportunistically trading members assume within the audit committee (e.g. AC chair or financial expert).

I perform the misstatement risk analysis on a sample of 3,230 firm-years from 934 unique firms and the earnings management analysis on a sample of 2,935 firm-years from 851 unique firms over fiscal years 2006 to 2013. In spite of their role representing the interests of shareholders, findings indicate that ACs do not refrain from opportunistic trading behavior exploiting uninformed investors. I find that ACs opportunistically trade an average of 8,650 shares per fiscal year, accounting for about 0.01 percent of total share volume traded in their firm. When focusing only on ACs with non-zero opportunistic trading, opportunistic insider trading by AC members accounts for 0.021 percent of total share volume.

As predicted, ACs whose members are trading opportunistically are associated with a significantly higher likelihood of earnings being misstated and experience a significantly higher level of earnings management. These results are economically significant as I find that a one standard deviation increase in AC opportunistic insider trading is associated with a 12.6 (15.6) percent higher likelihood of earnings being misstated. A one standard deviation increase in AC opportunistic trading is associated with a 5.6 percent increase in the absolute value of discretionary accruals. However, when firms employ a Big 4 auditor, this relationship disappears indicating that auditors can curb aggressive reporting practices of firms and maintain high financial reporting quality. Interestingly, I find that these results are specific to *opportunistic* insider trading behavior by AC members and cannot be attributed to non-opportunistic insider trading by AC members. This indicates that these results can be attributed to rent extraction behavior of AC members, rather than insider trading in general. In additional analyses, I find that the opportunistic insider trading behavior of non-accounting financial experts is driving the negative association between AC insider trading and financial reporting quality. While non-accounting financial expert opportunistic insider

trading behavior drives all previous results the behavior of accounting financial experts can only partially explain the results. Accounting financial expert opportunistic insider trading behavior is only significantly associated with the magnitude of absolute discretionary accruals. The behavior of the AC chair, on the other hand, does not seem to be associated with financial reporting quality in general.

I contribute to the literature investigating AC insider trading by going beyond documenting insiders' access to information and trading behavior. I find evidence that ACs do not always act in the best interest of shareholders but might take advantage of their positon and engage in opportunistic trading. I analyze the impact of AC members' incentives to protect their informational advantage on their motivation to fulfill their duties in the AC. Additionally, I contribute to the insider trading literature by showing that AC members are not only willing to take advantage of their superior access to information (Ravina and Sapienza, 2010; Duellman et al., 2018), but that this behavior is also associated with overall AC effectiveness.

Secondly, I contribute to the literature investigating the impact of AC members' economic incentives on their effectiveness. I show that what AC members do with their equity, rather than equity incentive compensation per se, correlates with AC effectiveness. With this I move beyond the incentives created by the firm and analyze the association between director behavior and AC performance, measured by financial reporting quality.

The finding that AC insider trading is associated with financial reporting quality is of importance to investors, corporations, legislators and regulators. This result is relevant for firms and investors as they might use this insight to better align the interests of the AC with those of the shareholders. Investors and firms wanting to safeguard AC incentives to oversee the financial reporting process might consider imposing stricter restriction on AC insider trading. The findings in this paper are relevant to legislators and regulators as well, showing that economic incentives created by individual insider trading behavior can influence the effectiveness of AC oversight. Hopefully this can encourage public policy to move beyond regulating AC characteristics but to also consider restricting opportunistic insider trading behavior in ACs.

The rest of the paper is structured as follows. Section 2 reviews related literature and develops the hypotheses. The research design and sample

selection are discussed in section 3, while section 4 discusses the results. Finally, I briefly summarize the results and come to a conclusion in section 5.

2. LITERATURE AND HYPOTHESES

As monitors of the financial reporting process, the AC is an essential element in firms' capacity to achieve high financial reporting quality (Cohen, Hoitash, Krishnamoorthy and Wright, 2014). Especially since the Sarbanes-Oxley Act (SOX) the AC has been responsible for overseeing the quality of the financial reports (U.S. House of Representatives 2002). In a review of the literature on AC effectiveness, DeZoort, Hermanson, Archambeault, and Reed (2002) identify four AC elements that are essential to audit committee effectiveness: composition, authority, resources, and diligence. The former three factors focus on the input side of the AC process, and are the focus of the majority of prior research on AC effectiveness. This body of research has consistently found that AC independence and expertise are essential elements of high-quality ACs (Abbott and Parker 2000; Chen and Zhou 2007; Cassell et al. 2012; Cohen et al. 2014; DeFond and Zhang, 2014). The last factor, AC diligence, is a process factor looking at the motivation and incentives needed to translate AC inputs into AC effectiveness (DeZoort et al 2002) and the focus of the present study. Specifically, I examine how the diligence and motivation of the AC, as reflected in their opportunistic insider trading behavior, influences their oversight of the financial reporting process.

2.1. AC Diligence

Given the difficulty to measure AC diligence, research in this area tends to focus on readily observable proxies. Early research mainly concentrated on AC meeting frequency as a measure of AC motivation (DeZoort et al. 2002). More frequent AC meetings are associated with reduced likelihood of restatements (Abbott et al. 2004), fraud (Beasley et al. 2000), or financial reporting problems (McMullen and Raghunandan, 1996). More recently, studies have looked at incentives of AC members, focusing on the impact of stock option compensation on financial reporting quality. Firms award these equity incentives to align the interest of AC members with outside shareholders (Jensen 1993). However, findings from prior research indicate that AC equity incentives rather achieve the contrary. ACs compensated with stock options are associated with decreased objectivity (Magilke, Mayhew

and Pike 2009), increased misstatement risk (Archambeault et al. 2008) and poorer resolution of misstatements once detected (Keune and Johnstone 2015). Furthermore, Mangena and Pike (2005) finds that ACs with higher shareholdings are associated with significantly less interim disclosures. Collectively, these studies indicate that awarding AC members with equity incentives reduces their diligence rather than increasing it. Bebchuk and Fried (2005) offer a possible explanation for this result. They argue that while equity incentives can align insiders with outside shareholder interests, the ease with which insiders can buy and sell their shareholdings in the firm creates strong incentives for individual rent extraction. In this study I investigate the association between this insider trading behavior and the effectiveness of AC oversight of the financial reporting process.

2.2. Audit Committees and Insider Trading

Prior research has shown that insiders can profit from their access to private information and benefit from information asymmetry to extract rents from the market (Jaffe 1974; Seyhun 1986, 1992, 1998; Bettis, Vickrey and Vickrey 1997; Aboody and Lev 2000; Huddart and Ke 2007; Ravina and Sapienza 2010; Duellman et al, 2018). Research on insider trading generally focusses on executive insiders, spending limited attention on independent directors' trades. A notable exception is Ravina and Sapienza (2010), who focus on the differences in insider trading abnormal returns generated by independent directors versus executives. Their findings show that independent directors realize returns fairly similar to executives, which they interpret as evidence that independent directors and executives have similar access to non-public information. Interestingly, in additional analysis Ravina and Sapienza (2010) show that independent members of the AC significantly outperform other independent directors when trading in their companies' stock, showing the value of the information being communicated to the members of the AC. In recent work Duellman et al. (2018) extend this finding and show that the increased information rent enjoyed by AC members is mainly attributable to non-accounting financial experts[31] sitting in the AC. They argue that these

[31] Non accounting financial experts or supervisory financial experts gain their expertise through a role overseeing accounting processes (e.g. CEO or managing director). Their expertise goes beyond the accounting rules and processes and provides insights into industry and economic trends and firm risk factors (Duellman et al. 2018).

experts not only have access to information through their position in the AC but also have superior information processing skills allowing them to extract more rents. While these experts are brought onto the AC to increase its competencies and decrease information asymmetry, they profit from their access to information the most. Whereas these studies show that information access and information processing skills are relevant for the profitability of AC member insider trading I investigate whether this behavior also impacts their diligence in the oversight of the financial reporting process.

2.3. Audit Committee Insider Trading and Diligence

AC members' access to financial information makes it possible for them to extract significant information rents through their insider trading behavior (Ravina and Sapienza 2010; Duellman et al. 2018). Especially when information asymmetry between AC members and outside investors is high, AC members have more opportunities to opportunistically trade and realize personal financial gains (Ravina and Sapienza 2010; Cui et al. 2015; Duellman et al 2018). These profitable, information-based transactions generally are associated with greed, unfairness and exploitation of outside investors by informed insiders (Gao et al. 2014; Cui et al. 2015). While access to information is crucial for the AC to be able to effectively oversee the financial reporting process (DeZoort et al. 2002), the ability of insiders to use it for personal gain increases the cost of effective oversight of the financial reporting process. Increased monitoring of the financial reporting process increases the quality of information communicated to outside stakeholders and decreases information asymmetry (Copley and Douthett, 2002; Pittman and Fortin, 2004; Almutairi et al 2009), which at the same time reduces the value of opportunistic trading opportunities.

ACs that are willing to profit from their information advantage, and engage in opportunistic insider trading (Ravina and Sapienza 2010; Cohen et al. 2012; Duellman et al. 2018) act in their own interest rather than in the interest of outside shareholders. Their behavior could be indicative of a reduced motivation to oversee the financial reporting process. Their incentive to improve financial reporting quality and to reduce information asymmetry might be limited, as this potentially affects their ability to realize significant returns . As such, information-based trading behavior by AC members can be

a signal of reduced AC diligence, which in turn is associated with lower AC effectiveness. Hence, I propose the following hypothesis:

***H_1**: "Audit committees that engage in more opportunistic insider trading are associated with lower financial statement quality"*

3. SAMPLE AND VARIABLES

The primary focus of my study is the association between AC members' insider trading behavior and the quality of monitoring of the financial reporting process. I examine the monitoring process by looking at restatements and the level of discretionary accruals. The sample consists of all listed companies that have actively trading directors on their board. I obtain individual director insider trading information from Thomson Reuters Insiders' Filing feed. This data set includes insider trading data of directors, officers, and large stockholders with holdings greater than 10 percent of a firm's stock for firms listed on NYSE, AMEX, or NASDAQ. I extract information on all open market transactions by insiders from January 2002 until March 2014, allowing effective analysis of the impact of opportunistic trading for fiscal years 2006 to 2013[32]. I combine this with director information from the Boardex database from Management Diagnostics Limited which provides detailed director biographical information and a broad spectrum of individual director and board characteristics. I use this information to create AC level insider trading variables resulting in a total of 15,352 firm-years with insider trading information.

I subsequently add audit firm and engagement information from Audit Analytics, accounting information from Compustat and director compensation data from Execucomp. This results in a loss of 8,708 firm-years which do not have a counterpart in either database. Next, due to the different regulatory environment I remove financial firms from the sample[33], resulting in a loss of 1,474 firm-years. Finally, I lose another 1,940 observations that do not have complete information for all control variables. The misstatement sample thus includes 3,230 firm-years from 934 unique firms. In the abnormal accruals test I lose another 295 observations that have insufficient information to

[32] I include fiscal year 2013 for firms with a fiscal year end on or before march 31st 2014.

[33] Results remain unchanged if I include financial firms.

compute all variables. The accruals sample thus contains 2,935 firm-years from 851 unique firms. Details can be found in table 1.

Observation with Insider trading information	**15,352**
Observation without link to Audit Analytics, Compustat or Execucomp	(8,708)
Observation from financial sector	(1,474)
Observation with missing control variables	(1,940)
Final misstatement sample	**3,230**
Observations without needed accruals information	(295)
Final abnormal accruals sample	**2,935**

Table 1: Sample Selection

3.1. Test Variable

The main interest of this study is to investigate the association between AC members' opportunistic insider trading behavior and their effectiveness as an audit committee in overseeing the financial reporting process. I measure opportunistic insider trading at the AC level by firstly classifying individual directors' trades following the methodology developed in Cohen et al (2012). This method is widely used in recent research to link opportunistic, information-driven trading to abnormal returns (Cohen et al. 2012; Khan and Lu 2013), SEC investigations (Cohen et al. 2012), strategic timing of earnings news (Michaely, Rubin, and Vedrashko 2016), or news warnings in the face of impending earnings disappointment (Billings and Cedergren 2015).

Cohen et al. (2012) classify individual directors' transactions as routine when they occur in the same month each year. Trades that are placed during months without a discernable pattern in the three preceding years are classified as opportunistic. As such, insiders can have both opportunistic and routine transactions within the same year. I start by classifying individual directors' transactions in each calendar year where they have a trading history in the three preceding years. I then include fiscal year information from Compustat and allocate trades to their corresponding fiscal year. Using director level information from Boardex to identify which directors serve on the AC I sum all AC members' trades within the fiscal year and measure the volume of shares traded opportunistically by all members of the AC. For comparability I scale total shares traded opportunistically by AC members by the total

amount of shares traded in the firm over the same fiscal year[34]. The resulting variable (*AC Opportunistic Trading*$_{i,t}$) thus measures a continuous ratio between 0 and 1 where higher values represent a higher proportion of total firm share volume traded opportunistically by AC members[35].

3.2. Dependent Variables

I examine two widely used measures of financial reporting quality to test the relationship between AC opportunistic insider trading and AC oversight. First, I examine misstatement risk as a very direct measure of a failure the financial reporting oversight process (Carcello, Neal, Palmrose and Scholz 2011; DeFond and Zhang 2014; Cohen et al. 2014; Christensen et al. 2016). Misstatements indicate that financial statements have been issued containing errors serious enough to affect their validity. Second, I examine the absolute value of discretionary accruals to capture the degree of bias infused into the financial statements by management (Reichelt and Wang 2010; Cohen et al. 2014). Lower financial reporting quality, as measured by both variables, contributes to higher information asymmetry (Elayan, Li and Meyer 2008; Bhattacharya, Desai and Venkataraman 2012), increasing the value of insiders' access to superior information.

To measure the likelihood of accounting misstatements I first identify information on all financial restatements using Audit Analytics. I then use all misstated years throughout the sample, rather than only the announcement years (Cohen et al. 2014). Thus my first proxy (*Misstated Fiscal Year*$_{i,t}$) is an indicator variable which equals 1 if the current fiscal year is later identified as being misstated. The second proxy (*Adverse Misstated Fiscal Year*$_{i,t}$) equals 1 if the current fiscal year is later identified through a restatement as being misstated and the misstated income was greater than the restated income. To measure earnings management, I use the modified Jones model (Dechow, Sloan, and Sweeney 1995) adjusted by Kothari, Leone and Wasley (2005),

[34] Total shares traded during the fiscal year is extracted from Compustat using data item cshtr_f.

[35] I replace missing values of *AC opportunistic trading*$_{i,t}$ for all firms with identified traders on the board, but no identified audit committee members with zero to conserve observations. Results remain similar if only firms with identified traders in the AC are used.

including a correction for firm performance using the return on assets (*Discretionary Accruals*$_{i,t}$).

3.3. Controls

I include variables measuring board, firm and characteristics that are known to affect financial reporting quality. At the board level I include AC expertise, AC shareholdings, average board member compensation, the average ratio of equity compensation, average board appointments, average board member tenure, board independence, and board size (Abbott, Parker and Peters 2004; Mangena and Pike 2005; Archambeault, DeZoort and Hermanson, 2008; Cullinan, Du, and Wright, 2008; Krishnan and Visvanathan 2008; Hoitash and Hoitash 2009; Magilke, Mayhew and Pike, 2009; Cohen et al 2014; Keune and Johnstone, 2015). At the firm level I include indicators for firm complexity (number of business units/number of foreign operations/debt-equity ratio/current ratio/loss), size and performance (shares volume traded/total assets/ROA), growth (sales growth) (Beasley 1996; Hay, Knechel and Wong 2006; Reichelt and Wang 2010; Carcello et al. 2011). In addition, I control for external oversight of the financial reporting process by a high quality auditor (Big 4/msa-industry expery) (Cohen, Krishnamoorty and Wright 2004; Numan and Willekens, 2012; DeFond and Zhang 2014). Furthermore, to take into account a general opportunistic culture in the firm, I control for the opportunistic insider trading behavior of all non-AC board members, as well as the CEO and CFO. Finally, to reduce the impact of any potential omitted variable biases I run all regressions using firm and year fixed effects. All variables are as defined in table two.

Varriable Name	Varriable Definition
Dependent Variables	
Misstated Fiscal Year$_{i,t}$	Indicator variable which equals 1 for all misstatement years and 0 otherwise.
Adverse Misstated Fiscal Year$_{i,t}$	Indicator variable which equals 1 for all misstatement years with an adverse impact on earnings and 0 otherwise.
Discretionary Accruals$_{i,t}$	Absolute value of discretionary accruals. Measured using the modified Jones model controlling for current year performance as adjusted by Kothari et al. (2005).
Test Variable	
AC Opportunistic Trading$_{i,t-1}$	Ratio of shares traded in opportunistic transactions by all members of the audit committee to total firm shares traded in fiscal year T-1.
Control Variables	
CEO CFO Opportunistic Trading$_{i,t-1}$	Ratio of shares traded in opportunistic transactions by the CEO and CFO to total firm shares traded in fiscal year T-1.
Board Opportunistic Trading$_{i,t-1}$	Ratio of shares traded in opportunistic transactions by all non-AC members of the board to total firm shares traded in fiscal year T-1.
AC Shareholding$_{i,t}$	Ratio of total shares held by all audit committee members to total shares outstanding.
LN Board Compensation$_{i,t}$	Natural log of total compensation received by all members of the board of directors.
Equity Ratio$_{i,t}$	Ratio of total equity compensation received by all members of the board of directors to the total compensation received by all members of the board of directors.

AC Accounting Expertise$_{i,t}$	Number of audit committee members with accounting expertise to total members of the audit committee.
Average Board Listed Positions$_{i,t}$	Average number of board appointments at publicly traded firms by board members.
Average Board Tenure$_{i,t}$	Average tenure to the board of board members.
Board Independence$_{i,t}$	Number of independent board members to total board members.
Board Size$_{i,t}$	Number of directors on the board.
Firm Growth$_{i,t}$	Percent change in sales, measured as the increase in sales compared to the previous year scaled by sales in the previous year.
Firm Size$_{i,t}$	Natural log of total assets at the beginning of the fiscal year.
Business Units$_{i,t}$	Natural log of total business segments.
Foreign Operations$_{i,t}$	Natural log of total foreign segments.
Current Ratio$_{i,t}$.	Ratio of current assets to total assets.
Leverage$_{i,t}$	Ratio of total long-term debt to total assets
ROA$_{i,t}$	Ratio of earnings before interests and taxes to total assets.
Loss$_{i,t}$	Indicator variable which equals 1 when the firm realizes a loss in the current year and 0 otherwise.
Big 4$_{i,t}$	Indicator variable which equals 1 if the current auditor is one of the big four auditors, 0 otherwise.
Industry Expert Auditor$_{i,t}$	Indicator variable which equals 1 if the current auditor has an market share of 30 percent or more, 0 otherwise. An audit market is defined as a two-digit SIC industry in a U.S. Metropolitan Statistical Area (MSA, U.S. Census Bureau definition)

Table 2: Variable Descriptions

3.4. Descriptive Statistics

Table 3 presents descriptive statistics for these variables. Panel A reports descriptive statistics for the three dependent variables. In line with earlier research I find that on average 12.69 percent of firm- year observations cover misstated years, while 10.62 percent are adversely misstated (Cohen et al. 2014). The average absolute value of discretionary accruals is 21.12 percent. Panel B of table 3 presents descriptives for the test variables used. I find that the opportunistic share volume traded by members of the AC amounts to an average of 0.01 percent of total share volume over the fiscal year. The average AC trades about 8,650 shares opportunistically out of an average of 16,895 shares traded by the AC. A quarter of ACs trade at least some shares opportunistically. In those ACs, members trade about 33,309 shares opportunistically, or an average of 0.021 of total share volume traded.

The descriptive statistics for the control variables are shown in panel C of table 3. Compared to AC opportunistic insider trading behavior, the CEO, CFO and remainder of the board trade much more actively. The rest of the board (CEO and CFO) trades about 40 (34) times more shares opportunistically compared to the members of the AC. AC members hold and average of 0.05 percent of total shares outstanding. About 35.33 percent of the average AC classifies as an accounting expert, not every company in the sample has an accounting expert on their AC. Most of these companies, however, have elected an expert with non-accounting financial expertise to their AC[36]. Board members get a total of $1,500,663 in total compensation, 57.37 percent of which is equity compensation. Since my sample is wholly post SOX all ACs are fully independent and I do not include this variable. The average board, however, is not fully independent with an average of 79.94 percent of board members classifying as independent. The average firm in the sample does quite well, with an average ROA of 9.83 percent and an average growth rate of 10.66 percent, however 13.75 percent of firm-years are loss-making.

[36] Results remain unchanged if I control for financial expertise or without discriminating between accounting and non-accounting financial expertise.

	N	mean	sd	p25	p50	p75
Panel A: Dependent Variables						
Misstated Fiscal Year$_{i,t}$	3230	0.1269	0.3330	0.0000	0.0000	0.0000
Adverse Misstated Fiscal Year$_{i,t}$	3146	0.1062	0.3081	0.0000	0.0000	0.0000
Discretionary Accruals$_{i,t}$	2935	0.2112	0.2915	0.0307	0.0913	0.2656
Panel B: Audit Committee Insider Trading						
AC Opportunistic Trading$_{i,t-1}$	3230	0.0001	0.0012	0.0000	0.0000	0.0000
Panel C: Controls						
CEO CFO Opportunistic Trading$_{i,t-1}$	3230	0.0020	0.0049	0.0000	0.0004	0.0018
Board Opportunistic Trading$_{i,t-1}$	3230	0.0017	0.0051	0.0000	0.0002	0.0011
AC Shareholding$_{i,t}$	3230	0.0005	0.0020	0.0000	0.0000	0.0001
LN Board Compensation$_{i,t}$	3230	7.0945	0.6757	6.7085	7.1825	7.5638
Board Compensation$_{i,t}$ (‘000 USD)	3230	1,500.663	1,111.040	818.357	1,315.205	1,926.222
Equity Ratio$_{i,t}$	3230	0.5737	0.1990	0.4834	0.5780	0.6967
AC Accounting Expertise$_{i,t}$	3230	0.3719	0.2817	0.2000	0.3333	0.6000
Average Board Listed Positions$_{i,t}$	3230	1.6821	0.8390	1.0000	1.5000	2.0000
Average Board Tenure$_{i,t}$	3230	12.2291	8.1685	6.1000	10.5000	16.6000
Board Independence$_{i,t}$	3230	0.7994	0.0996	0.7500	0.8182	0.8889
Board Size$_{i,t}$	3230	9.1325	2.0588	8.0000	9.0000	10.0000
Firm Growth$_{i,t}$	3230	0.1066	0.2118	0.0037	0.0829	0.1834
Firm Size$_{i,t}$	3230	7.4898	1.5456	6.3840	7.4497	8.4734
Business Units$_{i,t}$	3230	1.8337	0.7313	1.0986	1.9459	2.4849
Foreign Operations$_{i,t}$	3230	1.9981	0.7495	1.0986	2.1972	2.5649
Current Ratio$_{i,t}$.	3230	0.4593	0.2188	0.2978	0.4653	0.6212
Leverage$_{i,t}$	3230	0.1734	0.1618	0.0054	0.1563	0.2756
ROA$_{i,t}$	3230	0.0983	0.0947	0.0586	0.0956	0.1440
Loss$_{i,t}$	3230	0.1375	0.3444	0.0000	0.0000	0.0000
Big 4$_{i,t}$	3230	0.9260	0.2618	1.0000	1.0000	1.0000
Industry Expert Auditor$_{i,t}$	3230	0.6582	0.4744	0.0000	1.0000	1.0000

Table 3: Descriptive Statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) *Misstated Fiscal Year*$_{i,t}$	**1.0000**											
(2) *Adverse Misstated Fiscal Year*$_{i,t}$	**0.9950** (0.0000)	**1.0000**										
(3) *Discretionary Accruals*$_{i,t}$	-0.0206 (0.2656)	-0.0057 (0.7606)	**1.0000**									
(4) *AC Opportunistic Trading*$_{i,t-1}$	0.0249 (0.1578)	0.0309 (0.0831)	0.0152 (0.4115)	**1.0000**								
(5) *CEO CFO Opportunistic Trading*$_{i,t-1}$	0.0090 (0.6093)	0.0149 (0.4047)	0.0159 (0.3881)	**0.0458** (0.0092)	**1.0000**							
(6) *Board Opportunistic Trading*$_{i,t-1}$	-0.0109 (0.5345)	-0.0027 (0.8795)	0.0156 (0.3991)	**0.2102** (0.0000)	**0.4065** (0.0000)	**1.0000**						
(7) *AC Shareholding*$_{i,t}$	0.0076 (0.6677)	0.0171 (0.3389)	-0.0257 (0.1640)	**0.3129** (0.0000)	**0.0697** (0.0001)	**0.1043** (0.0000)	**1.0000**					
(8) *LN Board Compensation*$_{i,t}$	-0.0253 (0.1498)	-0.0132 (0.4609)	-0.0095 (0.6088)	**-0.0539** (0.0022)	**-0.2066** (0.0000)	**-0.1748** (0.0000)	**-0.1003** (0.0000)	**1.0000**				
(9) *Equity Ratio*$_{i,t}$	**-0.0427** (0.0153)	-0.0167 (0.3494)	**0.0566** (0.0021)	0.0113 (0.5217)	-0.0238 (0.1756)	**-0.0361** (0.0404)	-0.0168 (0.3410)	**0.3926** (0.0000)	**1.0000**			
(10) *AC Accounting Expertise*$_{i,t}$	0.0130 (0.4586)	0.0068 (0.7019)	**-0.0402** (0.0294)	0.0146 (0.4081)	**-0.0607** (0.0006)	-0.0005 (0.9754)	-0.0258 (0.1433)	**-0.0448** (0.0109)	0.0096 (0.5868)	**1.0000**		
(11) *Average Board Listed Positions*$_{i,t}$	0.0319 (0.0700)	0.0345 (0.0527)	-0.0175 (0.3420)	-0.0181 (0.3025)	**-0.0548** (0.0018)	**-0.0801** (0.0000)	**-0.0425** (0.0158)	**0.2614** (0.0000)	**0.0522** (0.0030)	-0.0342 (0.0519)	**1.0000**	
(12) *Average Board Tenure*$_{i,t}$	-0.0025 (0.8878)	-0.0134 (0.4518)	-0.0147 (0.4257)	0.0039 (0.8255)	**0.0874** (0.0000)	**0.0931** (0.0000)	**0.0645** (0.0002)	**-0.1535** (0.0000)	**-0.0604** (0.0006)	**-0.1008** (0.0000)	**-0.1760** (0.0000)	**1.0000**
(13) *Board Independence*$_{i,t/.}$	**-0.0414** (0.0186)	-0.0330 (0.0641)	-0.0023 (0.9002)	-0.0066 (0.7077)	**-0.1195** (0.0000)	**-0.1654** (0.0000)	-0.0298 (0.0899)	**0.3654** (0.0000)	**0.0968** (0.0000)	0.0337 (0.0557)	**0.2167** (0.0000)	**-0.2077** (0.0000)
(14) *Board Size*$_{i,t}$	-0.0277 (0.1154)	-0.0195 (0.2737)	**-0.0733** (0.0001)	**-0.0480** (0.0064)	**-0.1209** (0.0000)	**-0.0946** (0.0000)	**-0.0764** (0.0000)	**0.5463** (0.0000)	**-0.0602** (0.0006)	-0.0335 (0.0572)	**0.2174** (0.0000)	**-0.0767** (0.0000)
(15) *Firm Growth*$_{i,t}$	-0.0259 (0.1410)	-0.0335 (0.0604)	**0.0972** (0.0000)	0.0102 (0.5630)	0.0221 (0.2096)	**0.0421** (0.0167)	0.0159 (0.3677)	-0.0338 (0.0544)	**0.1411** (0.0000)	**0.0509** (0.0038)	-0.0245 (0.1641)	**-0.0447** (0.0110)
(16) *Firm Size*$_{i,t}$	-0.0157 (0.3728)	-0.0124 (0.4868)	**-0.0775** (0.0000)	**-0.0826** (0.0000)	**-0.1981** (0.0000)	**-0.1826** (0.0000)	**-0.1026** (0.0000)	**0.6431** (0.0000)	**0.0562** (0.0014)	**-0.1049** (0.0000)	**0.2946** (0.0000)	**-0.0511** (0.0037)
(17) *Business Units*$_{i,t}$	0.0307 (0.0815)	0.0343 (0.0546)	**-0.0597** (0.0012)	-0.0108 (0.5405)	-0.0219 (0.2136)	**-0.0642** (0.0003)	-0.0326 (0.0642)	**0.1601** (0.0000)	**-0.1177** (0.0000)	-0.0339 (0.0538)	**0.0989** (0.0000)	**0.0402** (0.0224)
(18) *Foreign Operations*$_{i,t}$	-0.0289 (0.1006)	-0.0276 (0.1216)	**0.0840** (0.0000)	**-0.0386** (0.0281)	**-0.0364** (0.0385)	-0.0331 (0.0602)	**-0.0457** (0.0094)	**1.1497** (0.0000)	**0.0906** (0.0000)	0.0111 (0.5284)	**1.1070** (0.0000)	0.0019 (0.9129)
(19) *Current Ratio*$_{i,t}$.	-0.0305 (0.0827)	-0.0127 (0.4752)	**0.0801** (0.0000)	0.0274 (0.1199)	**0.0774** (0.0000)	**0.1078** (0.0000)	0.0187 (0.2873)	**-0.2468** (0.0000)	**0.0723** (0.0000)	**0.0772** (0.0000)	**-0.0921** (0.0000)	**0.0665** (0.0002)
(20) *Leverage*$_{i,t}$	0.0299 (0.0898)	0.0130 (0.4645)	**-0.0635** (0.0006)	-0.0283 (0.1077)	-0.0298 (0.0904)	**-0.0713** (0.0001)	-0.0105 (0.5494)	**0.1537** (0.0000)	**-0.0768** (0.0000)	**-0.0514** (0.0035)	**0.1093** (0.0000)	**-0.0593** (0.0007)
(21) *ROA*$_{i,t}$	**-0.0856** (0.0000)	**-0.0733** (0.0000)	-0.0251 (0.1741)	**-0.0556** (0.0016)	0.0196 (0.2645)	0.0341 (0.0529)	0.0076 (0.6639)	**0.0414** (0.0187)	-0.0043 (0.8070)	0.0019 (0.9159)	-0.0233 (0.1855)	**0.0939** (0.0000)
(22) *Loss*$_{i,t}$	**0.0612** (0.0005)	**0.0649** (0.0003)	0.0087 (0.6386)	**0.0451** (0.0103)	-0.0280 (0.1111)	-0.0151 (0.3913)	-0.0265 (0.1324)	**-0.0697** (0.0001)	-0.0339 (0.0539)	0.0104 (0.5544)	-0.0101 (0.5660)	**-0.0760** (0.0000)
(23) *Big 4*$_{i,t}$	**0.0509** (0.0038)	**0.0472** (0.0081)	-0.0272 (0.1401)	**-0.1152** (0.0000)	**-0.1307** (0.0000)	**-0.1149** (0.0000)	**-0.0919** (0.0000)	**0.2565** (0.0000)	**0.0540** (0.0022)	0.0136 (0.4389)	**0.1249** (0.0000)	**-0.0448** (0.0109)
(24) *Industry Expert Auditor*$_{i,t}$	0.0218 (0.2147)	**0.0359** (0.0439)	**-0.1130** (0.0000)	**-0.0589** (0.0008)	**-0.0617** (0.0004)	-0.0338 (0.0544)	**-0.0469** (0.0076)	**0.1231** (0.0000)	**-0.0722** (0.0000)	-0.0087 (0.6231)	**0.0770** (0.0000)	**0.0462** (0.0086)

Table 4: Correlations

This table presents the Pearson correlation coefficients for all variables used in the analysis. All variable are as defined in table 2. Values in bold are significant at the 5% level, Z-stats are reported in parenthesis.

	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
(13) *Board Independence*$_{i,t/.}$	**1.0000**											
(14) *Board Size*$_{i,t}$	**0.2033** (0.0000)	**1.0000**										
(15) *Firm Growth*$_{i,t}$	**-0.0752** (0.0000)	**-0.1151** (0.0000)	**1.0000**									
(16) *Firm Size*$_{i,t}$	**0.2338** (0.0000)	**0.6182** (0.0000)	**-0.0681** (0.0001)	**1.0000**								
(17) *Business Units*$_{i,t}$	**0.1035** (0.0000)	**0.2736** (0.0000)	**-0.0890** (0.0000)	**0.3165** (0.0000)	**1.0000**							
(18) *Foreign Operations*$_{i,t}$	**0.1075** (0.0000)	**0.0475** (0.0069)	-0.0240 (0.1736)	**0.0825** (0.0000)	**0.1972** (0.0000)	**1.0000**						
(19) *Current Ratio*$_{i,t.}$	**-0.0982** (0.0000)	**-0.3034** (0.0000)	**0.0639** (0.0003)	**-0.4887** (0.0000)	**-0.1666** (0.0000)	**0.2337** (0.0000)	**1.0000**					
(20) *Leverage*$_{i,t}$	**0.0560** (0.0015)	**0.1999** (0.0000)	**-0.0594** (0.0007)	**0.3462** (0.0000)	**0.1454** (0.0000)	**-0.1633** (0.0000)	**-0.4697** (0.0000)	**1.0000**				
(21) *ROA*$_{i,t}$	**-0.0909** (0.0000)	**0.0512** (0.0036)	**0.2061** (0.0000)	**0.1147** (0.0000)	**0.0647** (0.0002)	**0.0656** (0.0002)	**0.0572** (0.0011)	**-0.1016** (0.0000)	**1.0000**			
(22) *Loss*$_{i,t}$	0.0184 (0.2963)	**-0.0921** (0.0000)	**-0.1884** (0.0000)	**-0.1777** (0.0000)	**-0.0931** (0.0000)	-0.0296 (0.0928)	**0.0557** (0.0016)	**0.1000** (0.0000)	**-0.5597** (0.0000)	**1.0000**		
(23) *Big 4*$_{i,t}$	**0.1421** (0.0000)	**0.2423** (0.0000)	**-0.0611** (0.0005)	**0.2937** (0.0000)	**0.0602** (0.0006)	**0.0567** (0.0013)	**-0.1367** (0.0000)	**0.1022** (0.0000)	**0.0548** (0.0019)	**-0.1001** (0.0000)	**1.0000**	
(24) *Industry Expert Auditor*$_{i,t}$	**0.0513** (0.0035)	**0.1910** (0.0000)	**-0.0722** (0.0000)	**0.2614** (0.0000)	**0.1258** (0.0000)	-0.0288 (0.1013)	**-0.1137** (0.0000)	**0.1070** (0.0000)	**0.0461** (0.0087)	**-0.0497** (0.0047)	**0.2676** (0.0000)	**1.0000**

Table 4: Correlations (continued)

This table presents the Pearson correlation coefficients for all variables used in the analysis. All variable are as defined in table 2. Values in bold are significant at the 5% level, Z-stats are reported in parenthesis.

Table 4 presents correlations on between all variables used. There is no univariate evidence for a negative relation between AC member opportunistic trading and all three proxies of financial reporting quality. However, this analysis does not control for likely covariates such as size firm performance, so I interpret this with caution. Board and AC member opportunistic insider trading behavior is significantly positively correlated (*corr*= 0.2102; *p-value* <0.001), as is CEO-CFO and AC opportunistic trading (*corr*= 0.0458; *p-value* =0.0092). All opportunistic trading behavior is negatively correlated with total compensation, which could be in line with insider trading profits and compensation being supplements to each other. There are some large correlations between control variables, indicating some issues with multicollinearity. To ensure sure my findings are not affected by multicollinearity I standardize all continuous variables with VIF's higher than 10[37]. I report correlations for the standardized variables.

[37] I standardize *Equity Ratio*$_{i,t}$, *Board Independence*$_{i,t}$, *Board Size*$_{i,t}$, *Firm Size*$_{i,t}$, *Business Units*$_{i,t}$, *Foreign Operations*$_{i,t}$, *Current Ratio*$_{i,t}$.

4. Multivariate results

In this section, I examine the association between AC opportunistic insider trading and AC oversight of the financial reporting process. To ensure my results are not driven by AC members trading on their knowledge of poor financial reporting quality I use lagged values of AC opportunistic insider trading.

4.1. Audit Committee Opportunistic Insider Trading and Financial Reporting Quality

Table 4 provides results for testing the association between AC opportunistic insider trading and financial reporting quality. The first colomn presents results using *Misstated Fiscal Year*$_{i,t}$ as a dependent variable while the second column examines *Adverse Misstated Fiscal Year*$_{i,t}$. The results in both columns are obtained using linear probability models. The third column presents OLS results using *Discretionary Accruals*$_{i,t}$ as a proxy for financial statement quality. In all columns *AC Opportunistic Trading*$_{i,t-1}$ serves as a test variable, all models include firm and year fixed effects. The results in table 4 indicate a positive and significant relationship between AC opportunistic insider trading behavior and financial reporting quality. AC opportunistic insider trading in year t-1 is positively and significantly associated with both the likelihood of misstatements (coeff=13.1000, p-value=0.009) and adverse misstatements (coeff=13.3982, p-value=0.004), while also having a positive and significant association with the amount of earnings management (coeff=22.4312, p-value=0.046). To assess the overall economic impact of these effects I estimate the marginal effects of AC opportunistic insider trading[38]. I find that a one standard deviation increase in AC opportunistic insider trading is associated with a 12.60 (15.58) percent increase in (adverse) misstatement risk compared to the average likelihood of misstatements in the sample. A similar increase in AC opportunistic insider trading is associated with a 5.58 percent increase the absolute value of discretionary accruals compared to the average in the sample. These results are consistent with AC more engaged in opportunistic insider trading behavior being associated with less stringent oversight of the financial reporting process and provide support for H1.

[38] I estimate marginal effects at the means of each variable, interpretations are identical for average marginal effects.

Dependent	*Misstated Fiscal Year*$_{i,t}$	*Adverse Misstated Fiscal Year*$_{i,t}$	*Discretionary Accruals*$_{i,t}$
AC Opportunistic Trading$_{i,t-1}$	13.0999*** (2.60)	13.3981*** (2.90)	22.4312** (2.00)
CEO CFO Opportunistic Trading$_{i,t-1}$	1.2823 (0.93)	1.0997 (0.86)	0.8373 (0.64)
Board Opportunistic Trading$_{i,t-1}$	0.6152 (0.45)	0.6196 (0.49)	-1.2913 (-0.96)
AC Shareholding$_{i,t}$	-3.6691 (-1.08)	-3.4148 (-1.08)	-4.3064 (-1.27)
LN Board Compensation$_{i,t}$	0.0048 (0.29)	0.0021 (0.13)	-0.0203 (-1.28)
Equity Ratio$_{i,t}$	-0.0175 (-1.38)	-0.0158 (-1.02)	-0.0004 (-0.03)
AC Accounting Expertise$_{i,t}$	0.0016 (0.04)	-0.004 (-0.12)	-0.0237 (-0.67)
Average Board Listed Positions$_{i,t}$	0.0150 (1.60)	0.0177** -2.03	0.0010 (0.11)
Average Board Tenure$_{i,t}$	-0.0023** (-2.05)	-0.0017 (-1.54)	-0.0005 (-0.49)
Board Independence$_{i,t}$	-0.0236* (-1.71)	-0.0249* (-1.94)	-0.0079 (-0.61)
Board Size$_{i,t}$	-0.0245 (-1.47)	-0.0215 (-1.37)	0.0048 (0.31)
Firm Growth$_{i,t}$	-0.0079 (-0.24)	-0.0187 (-0.61)	0.1222*** (3.99)
Firm Size$_{i,t}$	0.0408 (0.86)	0.0255 (0.57)	0.0030 (0.07)
Business Units$_{i,t}$	0.0181 (1.08)	-0.0041 (-0.26)	-0.0269* (-1.70)
Foreign Operations$_{i,t}$	0.0008 (0.04)	0.0137 (0.75)	0.0137 (0.74)
Current Ratio$_{i,t}$.	-0.0154 (-0.72)	-0.0216 (-1.09)	-0.0179 (-0.90)
Leverage$_{i,t}$	-0.0313 (-0.40)	-0.0724 (-0.97)	0.1113 (1.52)
ROA$_{i,t}$	-0.0377 (-0.34)	0.0023 (0.02)	-0.2770*** (-2.63)
Loss$_{i,t}$	0.0377 (1.62)	0.0474** (2.17)	-0.0188 (-0.86)
Big 4$_{i,t}$	-0.0386 (-0.53)	-0.0454 (-0.66)	0.0791 (1.16)
Industry Expert Auditor$_{i,t}$	-0.0111 (-0.47)	0.0061 (0.28)	-0.0213 (-0.98)
Constant	0.1724** (2.23)	0.1447** (1.98)	0.1615** (2.24)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
Observations	3230	3146	2935

Table 5: Audit Committee Opportunistic Insider Trading and Financial Reporting Quality

*,**,*** indicates significance at the 10%, 5% and 1% levels (two tailed). Numbers in parentheses are test statistics. For variable definitions please refer to Table 2

Opportunistic insider trading by the CEO and CFO or the remainder of the board does not seem to have a significant relationship with financial reporting quality (p-value >0.1 for all regressions), nor does AC shareholding have a significant impact (p-value >0.1 for all regressions). Inconsistent with earlier literature I do not find a significant association between financial reporting quality and compensation nor compensation composition (p-value >0.1 for all regressions). Similarly, the percentage of AC members with accounting expertise does not have a significant association with financial reporting quality (p-value >0.1 for all regressions).

4.2. Additional Analysis: Financial Reporting Quality and the Strength of the Outside Auditor

Next to the AC, the external auditor is also an important factor in the oversight of the financial reporting process. Auditors provide external monitoring of the financial reporting process, assessing whether the financial statements deliver a faithful representation of the firms' underlying economics (DeFond and Zhang 2014). In this process, auditors have strong litigation and reputational incentives prompting them to curb aggressive reporting practices of firms and maintaining high financial reporting quality (Larcker and Richardson 2004; DeFond and Zhang 2014). Indeed, prior research indicates that auditor reputational incentives and visibility limits the negative association between both managerial or AC incentives and financial reporting quality (Keune and Johnstone 2012, 2015). It is possible, therefore, that a highly reputable auditor can limit the negative association between AC opportunistic insider trading and financial reporting quality as they perform their oversight role. To conduct this analysis, I estimate the association between $AC\ Opportunistic\ Trading_{i,t-1}$ and all measures of financial reporting quality conditional upon the firm employing a Big 4 auditor. While this approach is equivalent to a traditional interaction analysis, it allows for a direct comparison of the effect of AC opportunistic trading for firms that do or do not employ a Big 4 auditor, which makes the results much easier to interpret compared to a traditional interaction model (Christensen, Hail, and Leuz 2013).

The results of this analysis are described in table 6. I find the negative association between AC opportunistic insider trading and financial reporting

quality is concentrated in firms that do not employ a Big 4 auditor. When the financial statements are not audited by a Big 4 firm, AC opportunistic insider trading is positively associated with the likelihood of earnings being misstated (coeff=15.0358, p-value=0.004), or adversely misstated (coeff=15.5136, p-value=0.007), and with the magnitude of absolute abnormal accruals (coeff=56.1655, p-value=0.000). However, when the financial statements are audited by a Big 4 firm AC opportunistic insider trading is not significantly associated with any of the measures of financial statement quality (p-value >0.1 for all regressions). Taken together, these results indicate that auditors' reputational incentives moderate the association between AC opportunistic insider trading and financial reporting quality.

	Misstated Fiscal Year$_{i,t}$	*Adverse Misstated Fiscal Year*$_{i,t}$	*Discretionary Accruals*$_{i,t}$
AC Opportunistic Trading $_{i,t-1}$ *When Big 4* $_{i,t}$ *=0*	15.0358***	15.5136***	56.1655***
	(2.89)	(3.25)	(3.53)
AC Opportunistic Trading $_{i,t-1}$ *When Big 4* $_{i,t}$ *=1*	-8.7436	-11.2894	-4.8661
	(-0.56)	(-0.78)	(-0.34)
CEO CFO Opportunistic Trading$_{i,t-1}$	1.3884	1.2163	0.7634
	(1.01)	(0.95)	(0.58)
Board Opportunistic Trading$_{i,t-1}$	0.5437	0.5434	-1.2592
	(0.40)	(0.43)	(-0.94)
AC Shareholding$_{i,t}$	-2.4045	-1.9680	-4.1552
	(-0.69)	(-0.61)	(-1.22)
LN Board Compensation$_{i,t}$	0.0050	0.0022	-0.0196
	(0.30)	(0.13)	(-1.24)
Equity Ratio$_{i,t}$	-0.0172	-0.0149	0.0003
	(-1.35)	(-0.96)	(0.03)
AC Accounting Expertise$_{i,t}$	0.0019	-0.0038	-0.0251
	(0.05)	(-0.11)	(-0.71)
Average Board Listed Positions$_{i,t}$	0.0151	0.0178**	0.0010
	(1.61)	(2.04)	(0.11)
Average Board Tenure$_{i,t}$	-0.0023**	-0.0017	-0.0005
	(-2.04)	(-1.55)	(-0.46)
Board Independence$_{i,t}$	-0.0232*	-0.0244*	-0.0074
	(-1.68)	(-1.91)	(-0.57)
Board Size$_{i,t}$	-0.0246	-0.0217	0.0051
	(-1.48)	(-1.39)	(0.33)
Firm Growth$_{i,t}$	-0.0078	-0.0184	0.1182***
	(-0.24)	(-0.60)	(3.86)
Firm Size$_{i,t}$	0.0415	0.0264	0.0010
	(0.88)	(0.60)	(0.02)
Business Units$_{i,t}$	0.0167	-0.0059	-0.0272*
	(0.99)	(-0.37)	(-1.72)
Foreign Operations$_{i,t}$	0.0005	0.0135	0.0128
	(0.03)	(0.73)	(0.69)
Current Ratio$_{i,t}$.	-0.0166	-0.0231	-0.0196
	(-0.77)	(-1.16)	(-0.99)
Leverage$_{i,t}$	-0.0344	-0.0757	0.1040
	(-0.44)	(-1.02)	(1.42)
ROA$_{i,t}$	-0.0410	-0.0018	-0.2793***
	(-0.37)	(-0.02)	(-2.65)

$Loss_{i,t}$	0.0382*	0.0480**	-0.0183
	(1.65)	(2.20)	(-0.84)
$Big\ 4_{i,t}$	-0.0371	-0.0437	0.0873
	(-0.50)	(-0.63)	(1.29)
$Industry\ Expert\ Auditor_{i,t}$	-0.0109	0.0064	-0.0215
	(-0.47)	(0.29)	(-0.99)
Constant	0.1726**	0.1451**	0.1593**
	(2.23)	(1.99)	(2.22)
Year Fixed Effects	yes	yes	yes
Firm Fixed Effects	yes	yes	yes
Observations	3230	3146	2935

Table 6: Audit Committee Opportunistic Insider Trading and Auditor Reputation

*,**,*** indicates significance at the 10%, 5% and 1% levels (two tailed). Numbers in parentheses are test statistics. For variable definitions please refer to Table 2

4.3. Falsification Test: Other Insider Trading Activity

To assure that my findings are driven by information-based opportunistic insider trading, I construct an additional test variable based on AC member routine insider trading. I measure AC members' routine trading activity ($AC\ routine\ trading_{i,t-1}$) similarly to $AC\ opportunistic\ trading_{i,t-1}$. I identify all transactions where the same insider places a trade in that same month every year for four consecutive years and sum up the total share volume traded in these routine transactions by AC members throughout the fiscal year. Then, I scale this by total share volume traded in the firm. These routine transactions are not likely to be information-based (Cohen et al, 2012) and do not indicate attempted rent extraction by AC members.

I repeat the previous analyses replacing $AC\ opportunistic\ trading_{i,t-1}$ with $AC\ routine\ trading_{i,t-1}$ and test both the association between AC routine trading behavior and financial reporting quality and the moderating impact of auditor reputation. In untabulated results I find that AC member routine insider trading behavior is not significantly related to the likelihood of the financial statements being (adversely) misstated, nor to the magnitude of abnormal actuals (p-value >0.1 for all regressions). This does not change when taking the presence of a Big 4 auditor into account. For both firms with and without a Big 4 auditor, routine insider trading behavior is not significantly related to the likelihood of the financial statements being (adversely) misstated, nor to the magnitude of abnormal actuals (p-value >0.1 for all regressions). These results increase my confidence that AC opportunistic insider trading does

capture AC members' reduced diligence in the monitoring of the financial reporting process.

4.4. Additional Analyses: Whose Trading Matters Most?

All tests thus far have considered the AC as a homogenous group where the insider trading behavior of all members is equally important in determining AC motivation and diligence in their oversight of the financial reporting process. The behavior of some AC members, however, might have more impact on this process than others. One such member is the chair of the AC, they fulfill a leadership position within the committee (DeZoort et al, 2002) and are in prime position to influence group decision-making. AC chairs set the agenda for AC meetings and are the main channel for communication between the AC and external parties (Beasley, Carcello, Hermanson and Neal 2009; Engel et al. 2010). Compared to the remainder of the AC, the chair thus has superior access to information as well as the ability to steer the AC decision-making process. On the other hand, AC chairs have strong reputation incentives to maintain strong oversight of the financial reporting process. To test whether opportunistic insider trading behavior of the AC chair is driving the negative association between AC insider trading and financial reporting quality I split *AC Opportunistic Trading* $_{i,t-1}$ into two parts: *AC Chair Opportunistic Trading* $_{i,t-1}$ and *AC Member Opportunistic Trading* $_{i,t-1}$ and rerun the previous analyses replacing *AC Opportunistic Trading* $_{i,t-1}$ with both variables.

Table 7 panel A presents the results of this analysis, I include all controls but do not report them for brevity. I find that the opportunistic insider trading behavior of the AC chair is not significantly associated with the likelihood of the financial statements being (adversely) misstated, nor with the magnitude of absolute discretionary accruals (p-value>0.100 for all regressions). This does not change when taking into account the presence of a Big 4 auditor. For both firms with and without a Big 4 auditor AC chair opportunistic insider trading behavior is not significantly related to the likelihood of the financial statements being (adversely) misstated, nor to the magnitude of abnormal accruals (p-value >0.1 for all regressions). In line with Duellman et al (2018), who find that AC chairs do not realize significant abnormal returns following their insider trading behavior, I find that the AC chair does not seem to be taking advantage of their position to facilitate extracting insider trading rents.

Shifting attention to the members of the AC I find that they drive the negative association between AC opportunistic insider trading and financial reporting quality. AC member opportunistic insider trading has a positive and strongly significant association with the likelihood of earnings being misstated (coeff=13.3016, p-value=0.008), or adversely misstated (coeff=13.7088, p-value=0.003), and a marginally significant association with the magnitude of absolute abnormal accruals (coeff=21.4438, p-value=0.060). This positive and significant association only occurs when the firm does not employ a Big 4 auditor. When the financial statements are not audited by a Big 4 firm AC member opportunistic insider trading is positively associated with the likelihood of earnings being misstated (coeff=15.1253, p-value=0.004), or adversely misstated (coeff=15.5732, p-value=0.001), and with the magnitude of absolute abnormal accruals (coeff=57.0531, p-value=0.000). When the financial statements are audited by a Big 4 firm AC member opportunistic insider trading does not seem to have a significant association with financial reporting quality.

Contrary to AC chairs, non-accounting financial experts do extract significant information rents from their position in the AC. Their superior insight into firm processes, industry trends and market conditions gives them an information processing advantage that allows them to take advantage of information asymmetries and realize significant abnormal returns (Duellman et al. 2018). Additionally, SOX 407 requires financial experts on the AC to increase AC capabilities and improve AC effectiveness, increasing their potential influence over the oversight of the financial reporting process. To test whether opportunistic insider trading behavior of AC non-accounting experts is driving the negative association between AC insider trading and AC effectiveness I split *AC Opportunistic Trading* $_{i,t-1}$ into two parts: *AC Supervisory Expert Opportunistic Trading* $_{i,t-1}$ and *AC Non-Supervisory Expert Opportunistic Trading* $_{i,t-1.}$ For completeness I also generate two variables based on accounting financial experts' opportunistic insider trading behavior (*AC Accounting Expert Opportunistic Trading* $_{i,t-1}$ and *AC Non-Accounting Expert Opportunistic Trading* $_{i,t-1}$*). I* rerun the previous analysis replacing *AC Opportunistic Trading* $_{i,t-1}$ with both variables.

Table 7 panel B presents the results of this analysis, I include all controls but do not report them for brevity. I find that the opportunistic insider trading

behavior of non-accounting financial experts is significantly negatively associated with financial reporting quality. AC non-accounting financial expert opportunistic insider trading has a positive and significant association with the likelihood of earnings being misstated (coeff=13.1044, p-value=0.010), or adversely misstated (coeff=13.4570, p-value=0.004), and with the magnitude of absolute abnormal accruals (coeff=26.6299, p-value=0.023). When the financial statements are not audited by a Big 4 firm AC non-accounting financial expert opportunistic insider trading has a positive and significant association with the likelihood of earnings being misstated (coeff=15.1782, p-value=0.004), or adversely misstated (coeff=15.6553, p-value=0.001), and with the magnitude of absolute abnormal accruals (coeff= 57.3636, p-value=0.000). When the financial statements are audited by a Big 4 firm AC non-accounting financial expert opportunistic insider trading does not seem to have a significant association with financial reporting quality. AC non-expert member opportunistic insider trading is not significantly associated with financial reporting quality (p-value >0.1 for all regressions), which does not change conditional upon the presence of a Big 4 auditor. In non-tabulated results I find that the opportunistic insider trading behavior of accounting financial experts does not have a significant association with the likelihood of earnings being misstated whereas the behavior of non-accounting experts has a positive and significant association with the likelihood of earnings being misstated (coeff=14.6207, p-value=0.005), or adversely misstated (coeff=14.8870, p-value=0.002). This relation is concentrated in firms not employing a Big 4 auditor. However, the opportunistic insider trading behavior of accounting financial experts does have a positive and significant association with the magnitude of discretionary accruals (coeff=54.8646, p-value=0.000), which is concentrated in firms not employing a Big 4 auditor.

Panel A: AC Chair Opportunistic Insider Trading

	Misstated Fiscal Year$_{i,t}$		*Adverse Misstated Fiscal Year$_{i,t}$*		*Discretionary Accruals$_{i,t}$*	
AC Chair Opportunistic Trading$_{i,t-1}$	-24.4301		-53.6938		51.2143	
	(-0.40)		(-0.90)		(0.85)	
AC Member Opportunistic Trading$_{i,t-1}$	13.3016***		13.7088***		21.4438*	
	(2.64)		(2.96)		(1.88)	
AC Chair Opportunistic Trading$_{i,t-1}$ When Big 4$_{i,t}$=0		-33.1662		-40.2682		19.6019
		(-0.28)		(-0.37)		(0.18)
AC Chair Opportunistic Trading$_{i,t-1}$ When Big 4$_{i,t}$ =1		-17.9403		-54.3555		72.2629
		(-0.26)		(-0.77)		(1.02)

AC Member Opportunistic Trading$_{i,t-1}$ When Big 4$_{i,t}$=0		15.1253***		15.5732***		57.0531***
		(2.90)		(3.26)		(3.55)
AC Member Opportunistic Trading$_{i,t-1}$ When Big 4$_{i,t-}$ =1		-8.3364		-9.1198		-8.8395
		(-0.51)		(-0.61)		(-0.59)
Controls	yes	yes	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes	yes	yes
N	3230	3230	3146	3146	2935	2935

Panel B: Supervisory Financial Experts Opportunistic Insider Trading

	Misstated Fiscal Year$_{i,t}$		*Adverse Misstated Fiscal Year$_{i,t}$*		*Discretionary Accruals$_{i,t}$*	
AC Supervisory Expert Opportunistic Trading$_{i,t-1}$	13.1044***		13.4569***		26.6299**	
	(2.59)		(2.90)		(2.27)	
AC Non-Supervisory Expert Opportunistic Trading$_{i,t-1}$	12.7642		8.8889		-13.8227	
	(0.36)		(0.28)		(-0.44)	
AC Supervisory Expert Opportunistic Trading$_{i,t-1}$ When Big 4$_{i,t}$=0		15.1782***		15.6553***		57.3636***
		(2.92)		(3.28)		(3.57)
AC Supervisory Expert Opportunistic Trading$_{i,t-1}$ When Big 4$_{i,t}$ =1		-14.8860		-17.3622		-4.2305
		(-0.85)		(-1.07)		(-0.26)
AC Non-Supervisory Expert Opportunistic Trading$_{i,t-1}$ When Big 4$_{i,t}$ =0		-6.6552		-12.4082		-1.7012
		(-0.06)		(-0.13)		(-0.02)
AC Non-Supervisory Expert Opportunistic Trading$_{i,t-1}$ When Big 4$_{i,t}$=1		16.9387		13.4534		-8.3476
		(0.46)		(0.40)		(-0.25)
Controls	yes	yes	yes	yes	yes	yes
Year Fixed Effects	yes	yes	yes	yes	yes	yes
Firm Fixed Effects	yes	yes	yes	yes	yes	yes
N	3230	3230	3146	3146	2935	2935

Table 7: Whose Trading Matters?

*,**,*** indicates significance at the 10%, 5% and 1% levels (two tailed). Numbers in parentheses are test statistics. For variable definitions please refer to Table 2

5. SUMMARY AND CONCLUSION

This paper studies the relation between AC opportunism and firm level financial reporting quality. Previous research into the association between economic incentives and AC effectiveness has focused on the equity compensation AC members receive. In this study I take into account what AC members do with their equity, investigating that association between their insider trading behavior and the quality of the financial statements. I argue that potential profits which AC members can realize through their

opportunistic insider trading, increase monitoring costs and reduce motivation to oversee the financial reporting process.

I study these issues using a misstatement sample of 3,230 firm-years from 934 unique firms and an earnings management sample of 2,935 firm-years from 851 unique firms spread over fiscal years 2006 to 2013. I find that financial statement quality is negatively associated with AC opportunistic insider trading behavior. Specifically, a one standard deviation increase in AC opportunistic insider trading is associated with a 12.6 (15.6) percent higher likelihood of earnings being misstated and a 5.6 percent increase in the absolute value of discretionary accruals. However, this relationship is fully moderated by the presence of a Big 4 auditor, indicating reputational incentives prompt auditors to curb aggressive reporting practices and maintain high financial reporting quality. Supplementary analyses show that these effects can be attributed to AC opportunistic insider trading behavior, rather than routine AC insider trading behavior. In additional analyses, I find that AC chair opportunistic insider trading has no significant impact on AC effectiveness. Instead, ACs non-accounting financial experts' opportunistic trading behavior drives the significant and negative association between AC opportunistic insider trading and financial reporting quality. Taken together, these findings show that AC opportunistic insider trading behavior has a strong negative association with AC effectiveness. This finding should be of particular concern for investors, regulators and legislators as they strive to increase financial reporting quality.

These results show that even though firms and regulators actively limit insider trading opportunities for their insiders, they should be extra cautious when it comes to members of the AC. With these results I contribute to the growing literature analyzing the impact of director economic incentives on AC effectiveness by going beyond stock based compensation and considering active AC member insider trading behavior. Additionally, I contribute to the literature studying the trading behavior of directors and show that AC members engaging in opportunistic insider trading behavior are also associated with lower AC effectiveness.

I acknowledge that this study is subject to a number of limitations. First, like AC compensation, AC opportunistic insider trading behavior is a function of the overall governance structure of the company. Even though I run my

analysis using firm fixed effects and taking multiple AC and overall governance factors into account I acknowledge that my study is subject to concerns regarding the possible endogenous nature of AC opportunistic insider trading behavior. Second, due to necessary control variables my sample is limited to current or previous S&P 1500 firms raising concerns about the generalizability of the results to smaller firms. Third, while I do go into some of the AC dynamics and attempt to identify which AC members' opportunistic trading behavior drives this association the current study cannot identify "captured" ACs. Finally, the AC is only one party involved in the financial reporting process. While these results shed some light into one of the factors associated with financial statement quality my findings only represent one facet of the interests at play in this context.

General Conclusion

This dissertation provides insight into the determinants and consequences of opportunistic insider trading behavior. In doing so, this dissertation provides valuable additional insight into the factors associated with opportunistic insider trading behavior, and the consequences of this behavior for both directors and firms.

Chapter one investigates the association between director equity incentives and their likelihood of engaging in opportunistic behavior. Building on the concerns raised by Bebchuk and Fried (2005) that the possible incentive alignment between outside shareholders and insiders achieved by equity compensation is undermined by the ease with which insiders can purchase and sell stock, this chapter investigates how equity compensation is actually associated with the trading behavior of insiders. Crucially, this association is investigated taking into account the impact of the strength of the social capital environment in which insiders operate. In regions with high social capital, greater trust is fostered over time, and a culture is created that cultivates cooperation. In such a culture, people rely one each other in a continuous repetition of games, leading to the development of a code of conduct that encourages actors to honor obligations (Fukuyama 1997; Jha and Chen 2015). Hence, the first chapter argues and finds that in environments with high social capital equity incentives can discourage insiders from engaging in opportunistic, information-driven insider trading. In low social capital environments however, providing insiders with equity compensation is associated with increased opportunistic insider trading behavior. This indicates that when norms are loose, firms provide insiders with the means to engage in opportunistic insider trading when awarding them equity compensation. These findings add to the discussion on the effectiveness of equity compensation as a tool to align interests between outside shareholders and corporate insiders. The results in the first chapter indicate that it is essential to take into account the social environment when evaluating the potential impact of equity compensation on director behavior and attitude.

Specifically firms should be cautious when awarding equity compensation to directors in environments where social norms are not strong.

Next to the ex-ante factors associated with insiders' decisions to engage in opportunistic insider trading behavior, this dissertation looks at the ex-post consequences following opportunistic insider trading behavior. In chapter two, the reaction of the firm to opportunistic trading behavior is considered, while chapter three looks at the association between audit committee members' trading behavior and their effectiveness in overseeing the financial reporting process.

The second chapter of this dissertation investigates the association between director opportunistic insider trading behavior and their likelihood of being replaced. The findings indicate that, in general, directors who are more involved in opportunistic insider trading behavior have a higher likelihood of being replaced although this does not apply equally to all members of the board. Directors who are particularly valuable or costly to replace are shielded from disciplinary action following opportunistic behavior. However, when a firm is more visible and hence director opportunistic insider trading behavior becomes more costly, this type of behavior is positively associated with turnover for all types of directors, regardless of their value to the board. This chapter contributes to the literature investigating the replacement of members of the board of directors. Previous papers have focused on the impact of broad, firm-level events such as financial restatements (Srinivasan 2005, Arthaud-Day et al. 2006) or fraud accusations (Karpoff, Lee, and Martin 2008) on the turnover of individual directors. This chapter extends this line of research by showing that directors engaging in opportunistic insider trading behavior are more likely to be removed from their position. In this way, this chapter provides insight into whether insiders are evaluated based on their own, individual behavior rather than the outcomes of the group. In addition, this chapter adds to the insider trading literature by documenting the impact of insider trading behavior on the director labor market.

Finally, in the third chapter I investigate the association between audit committee opportunistic insider trading behavior and the quality of their oversight of the financial reporting process. The findings indicate that audit committees whose members are engaged in more opportunistic insider trading are associated with lower financial reporting quality. More opportunistic audit

committees are associated with a higher risk of misstatements and increased levels of earnings management. This relationship is driven by the trading behavior of audit committee members with experience overseeing the financial reporting process (i.e. financial experts), who are also the ones who benefit the most from insider trading (Duellman et al. 2018). However, when a high quality auditor is in place, this negative association between audit committee behavior and financial reporting quality is fully mitigated, indicating that strong external oversight is an important factor in the financial reporting process. The results in this chapter contribute to the literature investigating audit committee effectiveness. Whereas previous literature focused on static audit committee characteristics (Abbott and Parker 2000;Chen and Zhou 2007; Cassell et al. 2012), or externally awarded economic incentives (Archambeault, DeZoort and Hermanson 2008; Cullinan, Du, and Wright 2008; Magilke, Mayhew and Pike 2009; Keune and Johnstone 2015), this chapter focuses on opportunistic insider trading as an internal and dynamic measure of audit committee diligence. The results in this chapter indicate that the behavior of individual audit committee members is highly relevant to the committee's effectiveness in overseeing the financial reporting process.

The research in this dissertation is, of course, subject to a number of limitations. First, given the research focus on insider trading behavior in the United States, further research is needed to determine the generalizability of the findings to other settings. Insider trading is a global issue, yet regulation and enforcement is vastly different across different countries (Bhattacharya and Daouk 2002), making it unreasonable to expect all results to hold across countries. Second, the results in all three chapters rely on the correct identification of opportunistic insider trading behavior using the Cohen et al. (2012) measure. However, this classification scheme is quite broad in which transactions it labels as opportunistic, increasing the probability of a significant measurement error. While numerous robustness tests are included to increase confidence in the results, the evidence displayed in the three chapters should be interpreted with caution. Furthermore, engaging insider trading behavior is not an exogenous decision taken by corporate insiders. When considering where to opportunistically take advantage of their superior access to information multiple factors taken into account. While all three

studies attempt to limit the potential impact of endogeneity on the results presented, it cannot be excluded that the underlying process leading to insiders engaging in opportunistic insider trading behavior also influences the determinants and consequences considered in this dissertation.

The results in this dissertation provide further insight into the determinants and consequences of opportunistic insider trading behavior. This should be highly relevant to regulators, boards of directors and shareholders. Hopefully, the results in this dissertation can contribute to a more nuanced policy debate where not only the act of insider trading is considered, but also the environment it takes place in.

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