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Thesis Title

Three Essays on Market Mechanisms in the Governance of Modern Firms

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Abstract

This study investigates the role of market mechanisms on corporate governance through the interactions of corporate insiders (e.g., CEO and board of directors) and outside investors (e.g., short sellers and institutional investors) in information leakage, CEO human capital preference and product differentiation respectively.

Firstly, prior studies generally argue that family insiders are better informed due to their long-standing knowledge and dominant control over the firm. Using a novel insider trading and short selling dataset from the Hong Kong Stock Exchange (HKEx), we investigate potential information leakage from corporate insiders to short sellers, particularly in family firms. Even without the presence of market makers in the HKEx, we document a significant increase in short selling volume before insider trades are released to the public. The non-monotonic relationship between the short selling intensity and family control contributes to the debate on whether family presence facilitates or limits information leakage. In addition, trading by non-family insiders is more likely to convey private information, as compared to family insiders.

Secondly, a large body of literature has argued CEOs are the principal corporate decision makers and the most important corporate insiders. Drawing from the resource-based view, we investigate whether CEO human capital is a source of competitive advantage for a firm and how institutional investors value it in the Chinese market. Using a manager-firm matched panel dataset of Chinese firms, we find that institutional investors tend to tilt their portfolios toward firms whose CEOs have more business ties and industry experience in the long run while their preference for political capital is more likely to be short-term focused. In particular, this preference heterogeneity for different types of CEO human capital is more pronounced for institutional investors

with shorter horizons. Compared to long-term investors, short-term investors are less likely to respond to sustainable competitive advantage brought by CEO business ties and industry experience. Furthermore, that their dynamic marginal holdings increase around CEO turnover as a result of political capital change confirms that these investors are likely to aim for short-term benefits from the firm.

Thirdly, although the effect of institutional investors on firm performance is recognized in the literature, less well-studied is the role played by institutional investors in the governance of innovation process of publicly traded firms through inducing CEO efforts. We investigate how the presence of institutional investors can shape a firm's industrial competitiveness through the governance of R&D and advertising expenditure. Our evidence suggests that institutional investors can promote product differentiation by monitoring the management. However, the role of institutional monitoring is only effective in the governance of advertising rather than R&D. Furthermore, after classifying institutional investors into active and passive ones, we find that it is mainly active institutional investors that play the monitoring role.

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Chapter 1

Introduction

1.1 Overview of Market Mechanisms

Modern firms separate ownership from control of the firm's assets. As a result, managers are the agents of shareholders, a relationship fraught with conflicting interests. Since Jensen and Meckling (1976), the problem of managerial power and discretion has been analyzed as an "agency problem". In order to align the interests of managers with shareholders, it is important to provide them with adequate incentives and discipline such as compensation contract, board of directors, laws and regulations, the market for corporate control, and even competitive market environment. Also, from Coase (1937), economists begin to define modern firms as isolated legal entities, who contract with other independent legal entities or individuals when they engage in exchange relationships both internally and externally. This contract relationship equally applies to the outside shareholders when firms seek for external finance. However, outside shareholders only contractually own the firm but are absent from managerial activities in the firm. This arises the possibility that insiders (e.g., managers and board of directors) of a firm are better informed about the future returns of projects than potential suppliers of finance outside the firm. The asymmetric information between managers and shareholders make the provision of external finance less viable.

Thus, to protect the interests of shareholders, both regulators and shareholders must find ways to governance the information and incentive problems. This turns the discussion of modern finance to matters of information, incentives, and governance. Prior research has studied how conflicting of incentives can impede the maximization of shareholder value, and how governance mechanisms can minimize the agency and information problems, focusing on the conflicts of interests among various stakeholders (e.g., Jensen

and Meckling, 1976; Shleifer and Vishny, 1986; La Porta et al., 1999). To deal with these problems, investors need information and control, which can be achieved through market mechanisms. Effective market mechanisms incorporate two distinct features: investors' ability to accurately assess the condition of the firm based on the access to the necessary information (market monitoring) and their ability to induce subsequent managerial actions to reflect the assessment (market influence) (Bliss and Flannery, 2002).

Over the last decades, many efforts have been made to better understand the role of market forces through market monitoring in corporate governance when shareholders fail to discipline managerial activities appropriately. The stock price of a firm is the most obvious and observable public signal by which the stakeholders can monitor the firm. When investors trade actively, their buying and selling decisions may move stock prices and thus the firm value. By doing market monitoring over the price and return based on the corporate information, investors in the financial market can simply buy (sell) their shares when a good (bad) managerial action is observed. For example, the short selling mechanism, as the market force, provides an additional and effective channel for investors to exit the firm prior to unfavorable public information, such as negative earnings surprises, analyst downgrades, and financial misconduct (e.g., Christophe et al., 2004, 2010). Thus, short selling mechanism has been traditionally recognized that it can contribute to market efficiency (e.g., Diamond and Verrecchia, 1987; Boehmer et al., 2008). Specifically, in certain circumstances, shareholders may not be able to respond and react soon enough with the power (e.g., voting rights) they have been granted and the availability of market forces like short selling increases the probability and speed with which the market participants detect managerial misconduct.

In addition to the market forces, shareholders can also choose to be more active in corporate governance by influencing management's activities. However, both the incentive and the ability of individual investors to influence management's activities are limited due to the atomistic or diffuse nature of their ownership. As the capital market changes, so does the market mechanism of corporate governance. An increasingly significant mechanism affecting corporate governance practice worldwide is the emergence of institutional investors as shareholders. For example, in the US, the aggregated institutional shareholding percentage grew from 6.10% in 1950 to 46.70% in 2017. Globally, the aggregated institutional shareholding accounts for 22.50% of the total market value in 2017.[1] As a result of block ownership, institutional investors have the potential to influence managerial actions directly (activism or voice) and indirectly by trading their shares (voting with their feet or exit) (Schwartz and Hirschman, 1972). Thus, the involvement of institutional investors in monitoring or control activities, as another market mechanism is effective in alleviating the agency problems (Shleifer and Vishny, 1986; Hartzell and Starks, 2003; Gillan and Starks, 2007).

1.2 Motivations and Research Questions

Previous research shows that different market mechanisms can help reduce agency cost through different governance structures (e.g., Jensen and Meckling, 1976; Shleifer and Vishny, 1986; La Porta et al., 1999; Ferreira et al., 2009; Massa et al., 2015). The key feature to make these market mechanisms effective is the involvement of various stakeholders of the firm. Among various stakeholders, corporate insiders (e.g., CEO and board of directors) in the firm and institutional investors in the financial market are the most dominant ones according to their ownership over the firm. Tables 1.1, 1.2 and 1.3

[1] See CEO, insider and institutional stock holdings as percent of total shares outstanding, http://www.stern.nyu.edu/~adamodar/New_Home_Page/data.html

present the summary statistics of CEO, insider and institutional ownership across the world, in the US and in China respectively by industries which are updated in January 2017. In Table 1.1, we find that on average, the institutional ownership accounts for 22.50% of total shares outstanding and insider ownership accounts for 20.83% of total shares outstanding worldwide, which together owns about half of the firm. In the US, institutional investors are more prevalent with a total 44.70% stock holdings according to Table 1.2. In emerging markets like China, institutional investors are also playing an increasingly important role with a total shareholding of 11.86%. The ownership of insiders are relatively similar in the US (15.10%) and in China (22.53%). CEO, as the most important insider, has a higher ownership in China (13.86%) compared to that in the US (5.69%).

<Insert Table 1.1, 1.2 and 1.3 about here>

We aim to investigate how market mechanisms can help reduce agency problems and promote market efficiency through the interactions of different market participants like CEO, corporate insiders, short seller and institutional investors etc. The motivations for the next three chapters are listed as following:

1.2.1 The interaction between insiders and short sellers through market forces

Most research of corporate governance problems focuses on the failure to align managers' interests with shareholders in widely held firms. This argument implicitly assumes that larger insider ownership can alleviate agency problem and lead to better corporate governance as the more the managers own, the less likely they are to take actions that harm the firm value. To take one step further, this assumption is trying to suggest that agency cost might be minimized in concentrated firms, such as family firms which are closely held by controlling families. However, the agency cost in family firms

is not necessarily alleviated by the concentrated ownership. The potential conflicts of interest in family firms, can be complicated by factors such as culture-based family ties, shared family wealth, and nepotism (e.g., Bertrand and Schoar, 2006; Villalonga et al., 2015).

To identify the potential conflicts of interest between family insiders and non-family insiders, we examine the short sales around insider transactions in the Hong Kong Stock Exchange (HKEx). Short sellers are often suspected of being informed traders as short interest negatively predicts stock returns (Boehmer *et al*., 2008; Karpoff and Lou, 2010; Engelberg *et al*., 2012). In addition, a large body of literature documents that short sellers have good timing skills, demonstrated by initiating short positions prior to unfavorable public announcements, such as negative earnings surprises, analyst downgrades, and financial misconduct (see, e.g., Christophe et al., 2004, 2010). Two recent studies (i.e., Khan and Lu, 2013; Chakrabarty and Shkilko, 2013) explore the potential information interactions between short sellers and insiders, who are assumed to be the most informed group of a firm. While the above studies recognize short sellers' informed trading, the channel through which they obtain their information advantage is unclear. To shed light on this, we examine whether short sellers become informed around insider transactions particularly family-controlled firms.

1.2.2 The preference of institutional investors for CEOs

Previous studies about the relationship between institutional investors and corporate governance focus on the relative role of institutional activism on CEO turnover (Parrino et al., 2003; Aggarwal et al., 2011; Helwege et al., 2012). For example, Parrino et al. (2003) find that aggregate institutional ownership decrease by 12% on average in the year prior to forced CEO turnover. Yet we have little direct knowledge regarding why

institutional investors pay attention to the choice of CEO. The research so far on institutional investors' preference mainly considers performance and governance factors of the firm (Ferreira and Matos, 2008; Aggarwal et al., 2011; Chung and Zhang, 2011; McCahery et al., 2016). This is surprising given that a wide range of literature has emphasized the significant impact of manager-specific attributes and competencies on corporate decisions and firm performance (Bertrand and Schoar, 2003; Hambrick, 2007; Cronqvist et al., 2012; Hu and Liu, 2015).

Among all investors, we focus on institutional investors and examine whether they capture the value of CEO human capital in the Chinese stock market for several reasons. Firstly, similar to other investors, institutional investors have as strong preference for firms with good performance and governance, such as larger firm size, higher book-to-market ratio and liquidity and greater board independence (Ferreira and Matos, 2008; Aggarwal et al., 2011; Chung and Zhang, 2011; McCahey et al., 2016). However, financial balance sheets and corporate governance indicators are notoriously inadequate because they disregard intangible resources and people-based skills, probably the most strategically important resources to increase firm value (Grant, 1991). Because of the potential performance implications of CEO human capital, institutional owners consider these attributes when deciding whether to add new firms to their portfolios. Secondly, previous literature shows that institutional investors pay close attention to top management positions (Parrino et al., 2003; Helwege et al., 2012). Aggarwal et al. (2011) find that higher institutional ownership are more likely to terminate poorly performing CEOs. They could either "voting with their feet" by selling their own shares or play an active role in CEO turnover decision when dissatisfied with a firm's management giving their large holding proportion over the firm. This indicates institutional investors' preference for better CEOs. Thirdly, compared to individual

investors, institutional investors are more skilled with better access to market information and superior analysing ability (Gibson et al., 2004; Alti and Sulaeman, 2012; Edelen et al., 2016). Thus, institutional investors' sophistication enables them to be more sensitive to signals sent by top executives' attributes.

1.2.3 The influence of institutional investors on product innovation

Institutional activism is by no means a new phenomenon, as institutions have become the majority owners in most large US corporations. Institutional investors' engagement in corporate governance can range from voice to exit, affecting various corporate decisions, including CEO turnover, compensation, and acquisitions (Hirschman, 1970; Parrino et al., 2003; Gillan and Starks, 2007; Ferreira and Matos, 2008; McCahery, 2016). Yet we have little knowledge about whether institutional investors' monitoring can help firms to improve their industrial competitiveness through vertical product differentiation, which increases consumers' willingness to pay by creating unique products that appeal to consumers (Hotelling, 1929; Shaked and Sutton, 1987; Nevo, 2000; Gowrisankaran and Rysman, 2012; Hoberg and Phillips, 2015).

To improve product quality and enhance consumers' willingness to pay, firms incur sunk costs, including R&D expenditures and advertising outlays (Sutton, 1991). However, such expenditures do not always lead to product diversification, as they may also reflect the agency conflicts of free cash flow and managerial entrenchment. While many studies (e.g., Gabszewicz and Thisse, 1979; Shaked and Sutton, 1987; Sutton, 1991; Motta, 1992; Ofek and Sarvary, 2003) has investigated the direct effect of R&D and advertising expenditures on a firm's industrial position, the governance issues relating to such expenditures have received little attention in the prior literature. If incentive contracts for managers cannot fully overcome the adverse selection and moral

hazard problems associated with incomplete contracts, monitoring by institutional investors can promote incentives to innovate by insulating managers against the consequences of bad income realizations. Therefore, in this study, we investigate the extent to which institutional investors affect the outcome product diversification through their effect on the governance of R&D and advertising expenses.

Several studies show that R&D and advertising affect corporate outcomes, such as market value, systematic risk and the success of products (Shaked and Sutton, 1987; Sutton, 1991; Motta, 1992; Chauvin and Hirschey, 1993; Ofek and Sarvary, 2003; McAlister et al., 2007; Fosfuri and Giarratana, 2009). However, previous literature does not usually differentiate between the effects of R&D and advertising expenditures. In this study, we argue that R&D and advertising expenditures may have different impact on corporate outcomes for two important reasons. Firstly, R&D activities are inherently more difficult to monitor than advertising expenditures. This is because advertising is usually specifically targeted and its outcome can be predicted with a reasonable accuracy, whereas R&D outcomes are highly uncertain, difficult to define and measure. Secondly, managers are more able to periodically respond to institutional investors' concerns about advertising outlays than R&D expenditures. As it is relatively easy to periodically evaluate the progress of advertising, the monitoring activity of institutional investors can motivate managers to refocus and update their advertising plan or strategy throughout the advertising campaign. However, unless the product is successfully developed, it would be difficult to evaluate the periodic progress of R&D or make adjustments to the innovation strategies.

Our research focuses on the monitoring effect of institutional investors on the outcome of sunk costs (R&D and advertising), which is measured by ex-post product similarity [2]in the US market (Hoberg and Phillips, 2015).

1.3 Contributions and Implications

The agency problem associated with the separation of ownership and control in modern firms calls for effective corporate governance mechanisms, such as the board of directors, incentive-based contracts, monitoring provided by large shareholders or creditors and the legal and regulatory environment. The purpose of these mechanisms is to align the interests of managers with shareholders and thus maximize shareholder value. Previous research generally places more emphasis on the internal structural governance mechanisms (e.g., board of directors and CEO compensation).

However, emphasizing the importance of the internal governance mechanism ignores the influence the external mechanisms such as market mechanisms. Also, the important institutional changes in capital markets lead to the correspondent changes in corporate governance practices. Instead of the dominance of individual investors, the outstanding emergence and growth of short sellers and institutional investors provides new evidence for the role of market mechanisms in affecting governance structures. Among all those mechanisms mentioned above, market mechanisms are playing an increasingly significant role, which include both the market forces like short selling mechanism and the activism of institutional investors. This study focuses on the interaction of different market participants through market mechanisms and examines how these interactions

[2] Hoberg and Phillips (2015) develop a new algorithm to study how firms differ from their competitors using new time-varying measures of product similarity (Text-based Network Industry Classification, TNIC). This data is based on web-crawling and text parsing algorithms that process the text in the business descriptions of 10-K annual filings on the SEC Edgar website.

can help identify and reduce agency problems, which offers new insight on traditional governance practices.

Chapter 2[3]

Information Leakage in Family Firms: Evidence from Short Selling and Insider Sales

2.1 Introduction

Information leakage, where material and non-public information is selectively revealed to a group of investors, is common in capital markets. This largely explains abnormal market reactions such as abnormal institutional trading, short selling and option trading ahead of earnings surprises, analyst recommendations, and other major corporate events (e.g., Christophe *et al*., 2004, 2010; Irvine *et al*., 2007; Hao, 2016). However, it is difficult to clearly identify the sources of information leakage in major capital markets such as the US, due to the involvement of both investors placing their trades and financial intermediaries executing the trades.

Brokerages, as financial intermediaries handling the trades, are in a privileged position to access non-public trading information given their ability to observe both the size and directions of order flow before trade execution.[4] Following trade execution, a delay is allowed before reporting the trade to the public, offering them a further opportunity to tip information. For instance, the US Securities and Exchange Commission (SEC) charged Merrill Lynch a $7 million penalty for its inadequate policies and procedures for controlling the access to institutional customer order flow. The confidential information in "squawk boxes," which are internal intercom systems used by broker-dealers to broadcast institutional customer order information, was leaked to day traders

[3] This chapter is published as Sun, H. and Yin, S., 2017. Information leakage in family firms: Evidence from short selling around insider sales. *Journal of Corporate Finance*, *47*, pp.72-87. DOI: https://doi.org/10.1016/j.jcorpfin.2017.09.005

[4] According to the SEC, trade execution is not instantaneous. SEC regulations do not require a trade to be executed within a set period of time.

in other firms who then traded ahead of the orders placed by Merrill Lynch's customers (SEC, 2009).

Corporate insiders are another source of private information leakage given their in-depth knowledge of the firm. Market regulators are trying to limit insiders' scope to leak non-public and material information. For example, the SEC has run a series of campaigns against the rise of so-called "expert networks"[5], in which corporate insiders are hired as expert consultants from $300 to $1,000 an hour to speak confidentially to hedge fund managers. That expertise, however, can sometimes cross the line into material and non-public information (e.g., Zuckerman and Pulliam, 2010; Thompson, 2013).

Given the difficulties in isolating these two potential channels, and given that the literature mainly points to the leakage from financial intermediaries (e.g., Khan and Lu, 2013; Chakrabarty and Shkilko, 2013; McNally *et al*., 2017), it is worthwhile seeking an unique setting in which only one channel (corporate insiders) exists. This specific channel needs to be better understood. Thus, in this paper, we investigate whether information leakage still exists in a market without the presence of financial intermediaries to identify the leakage from corporate insiders, particularly insiders from family firms.[6] Our study offers insight into the internal governance of corporate insiders, especially for family firms where external discipline is difficult to implement.

We base our study on the Hong Kong Stock Exchange (HKEx). Unlike the US stock market, which is facilitated by dealers/market makers, the HKEx is a pure order-driven

[5] The experts can be company executives, directors and professionals (e.g., doctors, engineers and technology experts).

[6] Family firms dominate economic activities around the world, controlling about one-third of the S&P 500 firms in the US and over two-thirds of the firms in East Asia and Europe (Shleifer and Vishny, 1986; Claessens *et al.*, 2000; Faccio and Lang, 2002; Anderson *et al*., 2003, 2009, 2012). Also, prior literature illustrates that family insiders are well informed, as a result of their dominant control over the firm (e.g., Ali *et al*., 2007; Chen *et al*., 2008; Anderson *et al*., 2009).

system, standing out as an ideal representative for trading mechanisms without market makers. In addition, the HKEx is a global financial hub with sophisticated investors, such as short sellers. The presence and engagement of short sellers can facilitate our identification of abnormal market reactions as they are more likely to be better informed than average investors (e.g., Boehmer *et al*., 2008; Christophe *et al*., 2004, 2010; Karpoff and Lou, 2010; Engelberg *et al*., 2012). Furthermore, a significant number of Hong Kong firms are family owned and controlled (Claessens *et al.*, 2000; Jaggi *et al.*, 2009). The 10 most prominent families in Hong Kong control around 32.1% of all corporate assets (Tsui and Stott, 2004) and approximately half of Hong Kong's firms are family controlled (Jaggi *et al*., 2009).

Specifically, we study potential information leakage from corporate insiders to short sellers by examining abnormal short sales around insider transactions. Our results suggest that short sellers initiate their short positions before insider sales are publicly reported (i.e., ahead of average investors), indicating the potential for information leakage. Interestingly, in family controlled firms, the intensity of short selling exhibits a non-monotonic function of family control rights: it increases with family control in general, but weakens for firms with higher levels of family control. After distinguishing insider sales placed by family members from those placed by non-family insiders, we find that transactions by non-family insiders trigger larger abnormal short sales than those by family insiders. Furthermore, following Cohen *et al*. (2012), we conduct a sub-sample analysis by distinguishing between routine and opportunistic insider trades, as opportunistic ones are more likely to result from private information. We find greater abnormal short selling volume for opportunistic trades for weakly controlled family firms and by non-family insiders.

Our study makes several contributions to the literature. First, we study information leakage under a trading system that is fundamentally different from that the ones prevailing in the US. Trading systems with financial intermediaries acting as market markers assure liquidity and facilitate price discovery, yet pay a price of lower transparency compared to a pure order-driven system (e.g., Madhavan, 1992; Pagano and Röell, 1996; Malinova and Park, 2013). Recent studies in the US (e.g., Khan and Lu, 2013; Chakrabarty and Shkilko, 2013; McNally *et al.*, 2017) show that short sellers can obtain private price-relevant information from brokerages who execute insider sales. This indicates that the involvement of market makers could undermine market fairness through leaking private information, resulting in wealth transfers among investors.

Second, our study suggests that the insider channel for information leakage should not be neglected. Although Anderson *et al.* (2012) highlight that corporate insiders in family firms can be motivated to engage in informed trading, which helps explain the abnormal short sales around negative earnings surprises, they are not able to present direct evidence as their dataset does not flag insider trades. Our data allows us to identify each corporate insider through monitoring their trades. We, thus, provide direct evidence that private information leakage can originate from the investors making the trading (i.e., corporate insiders). Understanding this channel emphasizes the need to focus on the underlying governance of a firm, rather than simply building a Chinese Wall such as the Regulation Fair Disclosure when regulating insider trading.

Finally, prior literature on informed trading in family firms (e.g., Chan *et al.*, 2010; Anderson *et al*., 2012) focuses mainly on the contrast between family and non-family firms. It overlooks the sharp heterogeneity in that family ownership and control vary substantially across family firms. The significant variations in family control and

involvement in Hong Kong provide us with a rare opportunity.[7] Given these features, we explore whether the desire of a controlling family to limit information leakage can be moderated by its relative control over the firm and document a non-monotonic relationship between family control and the intensity of information leakage. Furthermore, the literature on potential conflicts between the controlling family and non-family employees (e.g., e.g., Perez-Gonzalez, 2006; Bennedsen *et al*., 2007; Bertrand *et al*., 2008) calls for compelling empirical evidence. Our data enables us to locate each insider's identity. This helps us examine whether the affiliation to the family influences their likelihood of leaking information, thus explicitly manifesting the potential conflicts of interest.

The remainder of this paper is structured as follows. Section 2.2 presents literature and hypothesis development. Section 2.3 explains the institutional background. Section 2.4 describes the data sources and descriptive statistics. Section 2.5 presents the research methodology. Section 2.6 discusses the empirical results and robustness checks. Section 2.7 concludes the paper.

2.2 Literature and Hypothesis Development

Prior studies generally argue that family insiders are better informed due to their long-standing knowledge and dominant control over the firm (e.g., Demsetz, 1986; Anderson and Reeb, 2003; Ali *et al*., 2007; Chen *et al*., 2008; Anderson *et al*., 2009; Chan *et al*., 2010). With easy access to privileged information, they can exploit this potential advantage for private benefits by engaging in informed trading either by themselves or by tipping information to outside investors. Even in the presence of strict insider trading

[7] According to summary statistics, family voting rights vary from 30% to 80%, and family board seats vary from 0 to 7 among family firms.

regulations,[8] heavily monitored and scrutinized family insiders can still leak information to their relatives or friends, who bear less attention from the public.

On the other hand, the controlling family also has incentives to limit informed trading. First, as long-term investors, they are less likely to trade for short-term benefits. Founding family often see themselves as stewards of the family business for future generations and their control often spans multiple decades, sometimes even centuries (Villalonga and Amit, 2006). For example, the founding family members in S&P 500 firms have on average held their positions for more than 78 years, and have typically invested more than 69% of their personal wealth in the firm (Anderson and Reeb, 2003). The long investment horizon and their undiversified holdings bind them to focus on the firm's long-term growth rather than the short-term profits from trading on private information (Villalonga and Amit, 2006; Hillier *et al*., 2015). Second, family affiliation and the ties of both the founders and heirs motivate them to be especially concerned about the reputation and commitment to the firm. Therefore, they are less likely to engage in information-based transactions or information leakage to outside investors, which could harm their economic benefits and reputation.

In our study, we focus on family firms and explore whether family control and affiliation to the family can influence corporate insiders' potential to engage in information leakage.

2.2.1 Family control and potential information leakage

The desire of a controlling family to limit information leakage can be moderated by its controlling power over the firm. As Fan and Wong (2002, p. 406) argue, *"[o]nce the controlling owner obtains effective control of the firm, any increase in voting rights*

[8] Some firms have their own insider trading policy and code of practice going beyond regulations (Jagolinzer *et al*., 2011).

does not further entrench the controlling owner, but his/her higher cash flow rights in the firm mean that it will cost more to divert the firm's cash flows for private gain." In firms with concentrated family dominance, benefits extracted from informed trading are relatively small, as compared to the overall stock discount losses caused by negative signals to the market. The concentrated family ownership and control provides a guarantee that they are willing to build a reputation for not expropriating outside investors (Gomes, 2000). Strong control also makes the controlling family more capable of limiting information leakage. The relatively small group of controlling family shareholders, resulting from concentrated family control, largely eliminates the opportunity for outside investors to engage in informed trading (Anderson *et al*., 2009). Thus, we hypothesize that the stronger the family control, the more likely the family will protect the firm against information leakage and informed trading.

2.2.2 Family affiliation and potential information leakage

The conflicts of interest between family insiders and non-family insiders in family firms can also trigger information leakage. The family's objective function often includes a wide range of goals such as "*preserving the family's legacy and reputation, implementing the family's values, mission and vision, and protecting the family name, maintaining family unity and harmony…*" (Villalonga *et al*., 2015, pp.645). Hence, the family management is perhaps not value-maximizing, but rather utility-maximizing for the founding family (Bertrand and Schoar, 2006). For example, family founders may derive utility by hiring top management from their kinship network, rather than outsiders via a competitive process. Furthermore, hiring family members may also damage the relationships between family and non-family employees, leading to resentment from non-family employees (Schulze *et al.,* 2001; Bennedsen *et al*., 2007; Anderson *et al*., 2012). Apart from the resentment of the privileged positions held by the

controlling family, to maximize their own wealth, non-family directors and managers are less likely to share all of the objectives with the controlling family. Thus, non-family insiders may impose their self-serving desires through information leakage. For the reasons discussed, we hypothesize that non-family insiders in family firms are more likely to leak private information compared to family insiders.

2.3 Institutional Background

2.3.1 The stock market mechanism in Hong Kong

In the US stock market, the center of transaction execution is the market maker who quotes two-way prices (i.e., bid and ask). Customers, who may be investors or other intermediaries, place their orders with the market maker, who will adjust his/her prices depending on the state of his/her book. In contrast, the execution center in an order-driven market is the exchange in which intermediaries have no role in the transaction execution process. Investors' orders are routed to a central order book and executed against one another. The electronic system in Hong Kong, known as the Automatic Order Matching and Execution System (AMS), matches appropriate bid and ask orders automatically.

An order-driven system is more transparent in terms of both trade matching and information disclosure. In the US, while trade execution is usually seamless, it could take time. Since the SEC does not require a trade to be executed within a set period of time, it provides financial intermediaries an opportunity to tip impending trading information to a third party prior to trade execution. After a trade is executed, in order to protect their positions, market makers are allowed a delay in reporting the executed trade to the public, which offers a further chance to tip trading information. In contrast, in the HKEx, the electronic screen in an AMS displays the order and trade information

to the public in real time (e.g., the current best five bid and ask prices and the number of shares available). Trades executed in the HKEx are released to the market as soon as they are matched and are then available to all investors who subscribe to trading information simultaneously.

2.3.2 Insider trading and short selling in Hong Kong

Part XV of the Securities and Futures Ordinance (SFO) launched by the Securities and Futures Commission (SFC) in Hong Kong refers to the disclosure of interests, requiring substantial shareholders (5% or more of voting shares), directors, and chief executives of a listed firm to disclose all their interests in the listed corporation or any associated companies. Under the framework of the SFO, any substantial shareholder, director, chief executive, or employee of a listed company or its associated companies can be an insider of the listed firm. The board of directors and top management, regardless of their shareholding percentage, must notify the SFC by filing Form 3A within three business days of any change in the nature of their interests, which is the original source for insiders' trading information.

In January 1994, the HKEx launched a pilot scheme for regulated short selling under which 17 securities became eligible for short selling. Up to date, not all stocks on the HKEx can be short sold. Based mainly on liquidity and market value criteria, the HKEx updates the list of securities eligible for short selling on a quarterly basis. As of November 14, 2014, the end of our sample period, 755 stocks on the Main Board were eligible for short selling.

2.3.3 Family firms in Hong Kong

Whereas ownership of many public firms in Western countries such as the US and UK are widely diffused, the Hong Kong-listed firms feature a high concentration of family

ownership and control. To safeguard family interests, they also routinely appoint family members to sit on the board (Jaggi *et al*., 2009; Leung *et al*., 2012). It is reported that families control approximately half of Hong Kong's firms through pyramid structures, disproportionate board representation, and historical ties to the firm (Jaggi *et al*., 2009).

According to the Director's Handbook issued by the HKEx in April 2017,[9] a "controller" means any director, chief executive, or controlling shareholder who can exercise or control the exercise of 30% or more of the voting power at general meetings. Accordingly, we take a threshold of 30% or more of the voting rights across all family members to define family-controlled firms.[10] Further, a "majority-controlled company" refers to a company held by any person who can exercise or control the exercise of more than 50% of the voting power at general meetings, or control the composition of a majority of the board of directors. We, thus, define a strongly controlled family firm if family voting rights exceed 50%, and otherwise as a weakly controlled family firm.

The HKEx also serves as the primary location for Chinese mainland firms seeking foreign financing. By the end of 2014, there were about 300 firms listed in Hong Kong that were controlled by the Chinese government, accounting for one fifth of all publicly listed firms on the Main Board[11] of the HKEx. [12] Thus, in addition to family firms and widely held firms, we also include H shares and red chips as state-controlled firms.

2.4 Data and Descriptive Statistics

[9] See Director's Handbook, "http://www.hkexgroup.com/-/media/HKEX-Group-Site/ssd/Corporate-Governance/Documents/Handbook_website.pdf"

[10] We conduct robustness checks for different thresholds of family voting rights from 20% to 35%. The results are largely consistent and available upon request.

[11] The Main Board and the Growth Enterprise Market (GEM) comprise the HKEx securities market. They provide a marketplace for capital formation by different types of companies. Main Board companies are generally larger and have a longer history and profit record. Those without a profit record must satisfy alternative financial tests. See https://www.hkex.com.hk/eng/global/faq/hkex%20markets.htm

[12] The number of H shares and red chips is sourced from the China Stock Market and Accounting Research Database (CSMAR).

2.4.1 Data sources and sample selection

On one hand, short sellers are considered particularly well-informed and sophisticated investors in anticipating adverse corporate announcement. On the other hand, there is an extensive literature on insider trading. One related stream is the literature on return predictability of insider sales. The evidence in Seyhun (1986, 1998) and Jagolinzer (2009), and Cohen et al. (2012) suggests that insider sales predict negative abnormal returns. In contrast, insider purchases are more likely to convey favorable corporate information, which we expect their lack of leakage and/or influence on short selling. Thus, although insiders can execute both purchases and sales, only insider sales are selected as short sellers are more sensitive to negative corporate events.

Also, this study is facilitated by newly available high-frequency short sales data and the intraday transaction data. In contrast, the prior literature has generally used monthly short interest data (total short interest at one point in time, not transaction data for the month), or in very few instances has used proprietary transaction data. By combining daily short selling with daily insider sales data, I am able to take advantage of the higher frequency data to conduct an event study of short sales around insider sales. Examining the lead-lag relation between the trades of the two groups is thus a powerful setting to study whether short sellers' information is from public or non-public sources.

We examine short selling around insider transactions on the HKEx from January 2009 to December 2014. The insider transactions for all open market sales are downloaded from Thomson One, which provides trading by the chairman, chief executives, other senior executives, executive directors, non-executive directors, and independent non-

executive directors.[13] Each transaction records the firm's name, the firm's stock code, the name of the insider who executed the trade, the insider's position in the firm, the transaction date, the number of shares traded, the transaction price, the transaction value, and the insider's shareholding after the transaction. The dataset selection procedure is summarized in Table 2.1.

The original sample contains 7,921 transactions covering 726 firms. Some insiders execute multiple transactions in a single day. These multiple transactions executed by the same person on the same day are consolidated and recorded as one transaction. To control for the compounding effects of earnings and dividend announcements, insider sales within 20 days of these events are eliminated (Chakrabarty and Shkilko, 2013). The data for earnings and dividend announcements are collected from the China Stock Market and Accounting Research Database (CSMAR). As each insider can also have multiple transaction records on different dates over the study period, only the first transaction within any 30 consecutive days is taken as one event. Since not all Hong Kong stocks are eligible for short selling, it further reduces the number of observations to 1,341 transactions for 320 firms.[14] Financial firms such as banks, insurance companies, investment funds, and real estate companies are also excluded.[15] Finally, we obtain a dataset of 1,148 observations for 254 firms.

<Insert Table 2.1 about here>

The daily short selling volume is obtained from the HKEx. The stock market and

[13] When analyzing insider trading, we define both directors and top management as insiders in our main analysis. In a further robustness check, we exclude managers who are not on the board, and the results remain unchanged.

[14] A dynamic short selling list is manually identified using the short selling announcements on the HKEx website. The HKEx website posts only the latest list of securities that are eligible for short selling, but announcements for every previous change to the short selling list can be found. Thus, the short selling list posted on March 24, 2015, is taken as the benchmark short selling list and every dynamic short selling list between two adjustments is back deducted.

[15] A sample with all firms, including financial firms, is analyzed as a robustness check, and the results remain qualitatively similar.

accounting data are from Bloomberg. To measure the controlling power in listed firms, we manually collect insiders' biographies and shareholding information from annual reports. This allows identification of family members on the board and their respective shareholding interests. In Hong Kong, directors' interests are disclosed under four categories: personal interests, family interests, corporate interests, and other interests. Personal interests document beneficial interests directly registered in the name of the director. Family interests identify shares held by a director's spouse or children under the age of 18. Corporate interests record those interests that a director is deemed to have, with respect to any corporation in which he or she is entitled to either exercise or control the exercising of one-third or more of the voting power in general meetings, or where the corporation or its directors are accustomed to acting in accordance with his or her directions or instructions. Other interests normally refer to interests in the form of options, beneficiaries, or trustees. These four categories are aggregated across all members of the controlling family to form the total voting rights of the family.

2.4.2 Descriptive statistics

Table 2.2 reports summary statistics for directors' trades, large controlling shareholders, and family control characteristics. Panel A reports the summary statistics for transaction size by category of directors. Other senior executives include chief financial officers, chief operating officers, chief investment officers, and managers. The overall transaction size for Hong Kong directors, 0.509% as the number of shares outstanding, is comparable to the 0.58% for US directors (Lakonishok and Lee, 2001), but smaller than the 1.38% for UK directors (Fidrmuc *et al*., 2006). Unlike the US market in which management accounts for most of directors' sales, chief executives in Hong Kong have a lower trading volume (0.98%) than the chairmen (1.47%).

Panel B records summary statistics for the controlling power of large controlling shareholders measured at the end of 2012.[16] For the 141 family-controlled firms (55.5% of all firms), controlling power refers to the voting rights of all family members; for the 41 state-controlled firms (16.1% of all firms), the controlling power of large controlling shareholders refers to the voting rights of the state; for the 72 non-controlled firms (28.3% of all firms), it refers to the voting rights of the largest substantial shareholder. According to Panel B, both the family and the state control, on average, over 50% of the voting rights, with the highest approaching 80%. Even for non-controlled firms, the largest shareholder has a relatively high stake of 20% compared to the UK (5%) and US (10%) markets, respectively (Lakonishok and Lee, 2001; Fidrmuc *et al.*, 2006). Finally, Panel C shows summary statistics of family control. It shows that family firms have 1.766 family members sitting on their board on average, accounting for 20% of the board.

<Insert Table 2.2 about here>

Table 2.3 presents the summary statistics for insider sale event and firm characteristics. In Panel A, the number of insider sales per firm has a mean of 4.52, which indicates that the sample firms have four insider sales on average over the study period. The short selling volume per day measures the daily short selling activity for each firm. The daily short selling volume accounts for an average of 0.022% of total shares outstanding. The average daily short selling volume in the [-30, -11] window measures short selling activity from 30 to 11 days before the insider sale event. The event day short selling volume (0.024%) is larger than the average short selling volume (0.018%). This

[16] Generally, block shareholders do not change substantially across several years. Therefore, we take the control structure at the end of 2012 for our sample of 2009 to 2014.

provides preliminary evidence that short sellers are more active on the day of insider sales.

Panel B of Table 2.3 reports summary statistics and correlation matrix for firm characteristics. *Firm size* is the natural logarithm of the daily market value. *Book to market* is the quarter-end book value of equity divided by the daily market value of equity. *Turnover* is the natural logarithm of the daily number of shares traded. *Bid-ask spread* is measured as the daily bid price minus the daily ask price, divided by the average of the daily bid and ask prices. $Short_{(t-5;t-1)}$ represents the cumulative daily short selling volume five days prior to the insider sale date as a percentage of firm's shares outstanding. $CAR_{(t-5;t-1)}$ measures the cumulative daily abnormal size-adjusted returns during the five days prior to the insider sale date. AR_t is denoted as the size-adjusted abnormal returns on the insider sale date. For size-adjusted returns, we first sort all stocks into deciles based on daily market capitalization, and then calculate the equally weighted average returns for each portfolio on a daily basis as the benchmark returns. The size-adjusted abnormal return for event i on day t is its daily return on day t minus the return on the portfolio to which it belongs.

According to the correlation matrix, larger firms show higher turnover and lower bid-ask spread, indicating better liquidity. However, the size of firm does not correlate with short selling volume and cumulative abnormal return before insider sales. In addition, the negative correlation between $Short_{(t-5;t-1)}$ and AR_tpresents consistent evidence that short interest negatively predicts stock returns (Boehmer *et al*., 2008; Karpoff and Lou, 2010; Engelberg *et al*., 2012).

<Insert Table 2.3 about here>

2.5 Methodology

2.5.1 Daily abnormal short sales

To investigate the intensity of short sales around insider transactions, we employ an event-study approach to measure the abnormal short selling volume around each insider sale. The date of the insider sale is taken as the event day. The event window [-10, +10] is the period from 10 trading days before to 10 days after the event date (day 0). We use an estimation window of [-30, -11], which runs from 30 to 11 days prior to the event, to estimate the expected daily short selling volume for each event.[17] The short selling volume for firm i and insider sale event j on day t is denoted by ss_{ijt}. The expected daily short selling volume $\bar{ss}_{ij}$ is estimated as the mean of daily short selling volume from day -30 to day -11, which is

$$\bar{ss}_{ij} = \frac{1}{20}\sum_{t=-30}^{t=-11} ss_{ijt} \tag{1}$$

The daily abnormal short selling volume within the event window is

$$\tilde{ss}_{ijt} = ss_{ijt} - \bar{ss}_{ij}\,, \quad t \in [-10, +10]\,. \tag{2}$$

Denoting the number of shares outstanding by $nosh_{it}$, the abnormal short selling volume for each day in the event window is

$$ass_{ijt} = 100 \times \frac{\tilde{ss}_{ijt}}{nosh_{ijt}}, \quad t \in [-10, +10]. \tag{3}$$

2.5.2 Cumulative abnormal short sales

[17] According to Chakrabarty and Shkilko (2013), estimation window [-60, -11] may allow the inclusion of compounding events in addition to insider sales. Thus, we report the results when the estimation window is set as [-30,-11] in the paper. However, in unreported results, we also conduct analysis based on an estimation window of [-60, -11] and the results are qualitatively similar.

According to Hong Kong regulations, insiders are required to disclose their trades to the public within three business days following the transaction by filing Form 3A. Based on this, we construct cumulative abnormal short sales across different windows within three business days including [0, 1], [0, 2], [0, 3], [1, 2], and [1, 3] to test whether short sellers are informed. Following previous literature (i.e., Khan and Lu, 2013; Chakrabarty and Shkilko, 2013), we expect that the filing date is when average investors first become aware of the insider trade. Despite short sellers' ability to analyze visible order flow, the insider status and trading interest are not immediately observable until the transaction is disclosed. Thus, we argue that if short sellers continuously react to insiders' transactions within three business days in addition to day zero, it indicates that their trading is informed.

2.5.3 Determinants of abnormal short sales

Prior research shows that both insider trading and short selling intensity can be affected by a series of return-related and liquidity-related variables. Diether *et al*. (2009) show that short sellers begin to increase their positions once lasting positive returns are obtained. Similarly, insiders are also likely to trade following positive returns (Lakonishok and Lee, 2001; Khan and Lu, 2013). Thus, it is important to control for both lagged returns and current returns as determinants of short selling activity. To investigate the determinants of abnormal short sales, we run a multiple regression model as follows:

$$ass_{ijt} = \alpha + \beta_1 Insider_{ij} + \boldsymbol{X_{ijt}}^{T}\boldsymbol{\beta} + \varepsilon_{ijt}\,, \qquad t \in [-10, +10]. \tag{4}$$

In Equation (4), i indicates firm i; j indicates event j, which is an executed insider transaction for firm i; and t indicates day t within a 21-day event window. The

dependent variable ass_{ijt} is daily abnormal short sales. $Insider_{ij}$ is an indicator variable which captures short sellers' trading intensity within the three-day disclosure window. We use $Insider_{[0]}$, $Insider_{[0,1]}$, and $Insider_{[0,2]}$ for event day 0, event window [0, 1] and [0, 2], respectively. $Insider_{[0]}$ equals one when the day is day 0, and zero otherwise. $Insider_{[0,1]}$ equals one when the day is day 0 or day 1, and zero otherwise. $Insider_{[0,2]}$ equals one when the day is day 0, day 1, or day 2, and zero otherwise.

Following prior literature, we use a set of variables to control for other potential determinants of abnormal short sales, including *Firm size*, *Turnover*, *Bid-ask spread*, *book-to-market*, $Short_{(t-5;t-1)}$, $CAR_{(t-5;t-1)}$, and AR_t . The heteroskedasticity-consistent standard errors are used to estimate the coefficients. The standard errors are clustered at the event level. Industry and year effects are also controlled for multiple regressions.

2.6 Empirical Results

2.6.1 Univariate analysis for abnormal short sales

Panel A of Table 2.4 reports the daily abnormal short sales in the [-10, +10] event window for all firms, family-controlled firms, non-controlled firms, and state-controlled firms.[18] For all firms, the abnormal short selling volume accounts for 0.0041%, 0.0083%, and 0.0060% of shares outstanding on day -1, day 0, and day 1, respectively. Unlike Khan and Lu (2013), who find that short sellers can initiate their short positions as many as seven days prior to insiders' sales, the front-running phenomenon of short

[18] Two or more directors with different titles in the same firm can execute their trades on the same day. We take this day only once as an insider event when implementing the event study. This further reduces the insider sales observations to 946 compared to the 1,148 in Table 1. In Table 10, for robustness check, we also have a full 1,148 observations when running regressions depending on directors' rank.

sellers is not found in our study. Khan and Lu (2013) suspect that the leakage occurs when information about the upcoming trading is intercepted during the course of trade execution. In Hong Kong, without the presence of market makers, the front-running phenomenon no longer exists. The abnormal short sales on the event day can be attributed to short sellers' ability to analyze visible order flow. Insider sales are often large, and thus create significant disturbances in the supply of shares. Such disturbances are detected by sophisticated tape monitors, who subsequently sell short (Chakrabarty and Shkilko, 2013). On the HKEx, the electronic screen displays order and trade information to the public on a real-time basis. Trades executed are released to the market as soon as they are matched. Thus, it is easier for short sellers to monitor the order flow compared to a quote-driven market.

Panel B reports the cumulative abnormal short sales. We document significantly positive abnormal short sales across [0, 1], [0, 2], and [0, 3] event windows (0.0110%, 0.0141%, and 0.0142% of shares outstanding, respectively) for family-controlled firms, but not for non-controlled and state-controlled firms. Even after excluding day 0, family-controlled firms still exhibit significantly cumulative abnormal short sales (0.0076%) in the [1, 2] event window.[19] Our initial evidence on abnormal short sales shows potential information leakage as short position opened before the public announcement of an insider sale and closed upon market reaction to the announcement.

<Insert Table 2.4 about here>

2.6.2 Abnormal short sales and potential information leakage

[19] As all transactions should be released to the public by day 3, we do not find the cumulative abnormal short sales significant in the [1, 3] event window.

Table 2.5 reports the regression results concerning abnormal short sales around insider transactions. Based on variable definition, $Insider_{[0]}$, $Insider_{[0,1]}$ and $Insider_{[0,2]}$ record the intensity of abnormal short sales before average investors become aware of insider trading. If information leakage regarding insider sales exists, we expect to observe positive abnormal short sales within three business days. Model (1) shows that the event effect on short selling activity is significantly positive. For family-controlled firms, we find a statistically significant insider sale effect on short selling in Models (4), (5), and (6). While for non-controlled and state-controlled firms, we observe either a weak relationship or no relationship at all between the insider sale event and abnormal short selling.

For the control variables, our results suggest that short selling activity is more intense in firms with higher turnover and a heavier historical short position. Also, short sellers favor initiating short selling after positive cumulative abnormal returns, which is consistent with Khan and Lu (2013) and Chakrabarty and Shkilko (2013).

<Insert Table 2.5 about here>

2.6.3 Abnormal short sales and family control

In this sub-section, we explore how family control influences the potential information leakage from corporate insiders. Family voting rights and family board members are used to measure family control.[20] Table 2.6 shows that short selling intensity has a non-monotonic relationship with family control. Based on the magnitude and significance of the coefficients on $Insider_{[0]}$, $Insider_{[0,1]}$, and $Insider_{[0,2]}$, the intensity of abnormal

[20] In unreported results, we also take family board presence as a proxy for family control, and the results are qualitatively the same. Family board presence is the number of family members sitting on the board as a percentage of the total number of board members. The threshold of family board presence to define a family firm as a strongly family-controlled firm is 20%.

short sales is stronger in firms with weak family control (family voting rights <50% and family board seats <2[21]), in Models (1), (2), (3) and (7), (8), (9) than in firms with strong family control in Models (4), (5), (6) and (10), (11), (12).

The difference in short selling intensity due to relative controlling power supports that corporate insiders in strongly controlled family firms are less likely to leak private information compared to weakly controlled family firms. This is because, holding an undiversified portfolio, family shareholders with strong control may have a longer investment horizon and more reputational concerns for the firm. Also, given strong control, the controlling family are more capable of limiting information leakage.

<Insert Table 2.6 about here>

2.6.4 Abnormal short sales and non-family insiders

Among family-controlled firms, we further explore whether the likelihood of leaking information depend on insider's affiliation with the family. Insider sales are classified into two groups. One group includes trades executed by family insiders, while the other refers to trades executed by insiders who do not belong to the family. Models (1), (2), and (3) in Table 7 shows that abnormal short sales increase significantly for event day 0, event windows [0, 1], and [0, 2], following trades executed by non-family insiders, while no significant impact is observed for transactions executed by family insiders.

The results confirm the conjecture about potential conflicts of interest between family insiders and non-family insiders. Overall, insiders who are not related to the family can be a source of information leakage due to the desire to pursue personal interest. Thus,

[21] According to the summary statistics in Table 2, average family voting rights is 51.186% and average family board seats is 1.766. Thus, we take a threshold of 50% for family voting rights and 2 for family board seats. Our criteria are also consistent with the definition for a majority-controlled company by the Director's Handbook issued by the HKEx.

family affiliation can have a significant effect on corporate insiders' potential to leak information.

<Insert Table 2.7 about here>

2.6.5 Insider sales and abnormal returns

To assess the stock return predictability of insider trading, we calculate abnormal stock returns following insider sales. Table 2.8 reports cumulative abnormal returns (CARs) for various event windows around insider sales.[22] CARs are significantly positive at the 1% level in windows [-5, -1] and [-10, -1] for all firms. This suggests that insiders prefer to sell their shares after a short term of positive abnormal returns.

In Panel A, we do not document significantly negative cumulative abnormal returns for family-controlled firms in the [0, +10] event window. Among family firms, in Panel B, firms with weak family control (family voting rights <50%, family board seats <2, and family board presence <20%) display significantly negative cumulative abnormal returns in the [0, +10] event window, compared to firms with strong family control (-0.0131%, -0.0154% and -0.0115% respectively). [23]This provides further evidence that short sellers initiate larger short positions around insider sales in firms with relatively weaker family control because it is more profitable. Similarly, in Panel C, we document larger significantly negative cumulative abnormal returns for transactions executed by insiders who are not affiliated to the family. This suggests that transactions by non-

[22] The abnormal returns defined by the market model are also tested. The results remain qualitatively the same.

[23] According to the trading regulation disclosed by the HKEx, 0.005% of the amount of the consideration for each transaction of securities admitted to trading, listed, or approved to be listed on Exchange. Compared with the economic significance of CARs ((-0.0131%, -0.0154% and -0.0115% respectively), short sellers can make positive abnormal returns by constructing short strategy after deducting trading fees.

family directors and managers are more profitable. Overall, informed trading by short sellers is more active following insider transactions with higher abnormal returns.

<Insert Table 2.8 about here>

2.6.6 Robustness tests

2.6.6.1 Opportunistic and routine insider trades

Cohen *et al*. (2012) develop a new algorithm to decode the information content of insider trading. For each insider, they analyze his/her past trading history and search for consistent patterns through the timing of their trades. Based on their algorithm, insider trades can be classified as opportunistic and routine ones. They suggest that opportunistic insider transactions are more likely to be driven by private information, while routine transactions are more likely to be driven by diversification or liquidity reasons. Following Cohen *et al*. (2012), we identify the transactions made by an insider who places a trade in the same calendar month for at least two consecutive years, or the trading time interval between two consecutive trades is fixed as routine trades, and the rest as opportunistic trades.[24] Because the information content of opportunistic insider trades is high, the potential of information leakage around those transactions is also expected to be high.

Table 2.9 shows the regression results for routine insider trades and opportunistic insider trades.[25] $Insider_{[0]}$_r, $Insider_{[0,1]}$_r, and $Insider_{[0,2]}$_r capture the insider sale effect on short selling intensity for routine transactions, while $Insider_{[0]}$ _o,

[24] We expand the range of routine trades based on the data structure. Following Cohen *et al*. (2012), if the trade pattern of an insider is March 1, 2012, June 1, 2012, Sept. 1, 2012, and Dec. 1, 2012, his/her transactions are classified as routine trades. Besides, we also identify the trades made by an insider whose trading time interval is fixed as routine trades.

[25] For family control, we only report the results measured by family voting rights here. The results measured by family board seats and family board presence are qualitatively the same.

$Insider_{[0,1]}\_o$, and $Insider_{[0,2]}\_o$ capture the insider sale effect for opportunistic transactions.

Consistent with Cohen *et al*. (2012), for routine trades, we do not find any insider sale effect on abnormal short sales, indicating no information leakage from corporate insiders to short sellers regarding routine insider sales. While for opportunistic trades, we find that the intensity of short selling is positive and significant only in family-controlled firms. Further evidence suggests the opportunistic insider trades in weakly controlled family firms drive abnormal short sales. When comparing the opportunistic trading effect between family and non-family insiders, we find that non-family insiders are more likely to leak information to outside investors.

<Insert Table 2.9 about here>

2.6.6.2 Insiders' rank and abnormal short sales

According to the information hierarchy hypothesis proposed by Seyhun (1986), insiders who are more knowledgeable about the overall operational activities of a firm, such as the chief executive officer (CEO) and the board of directors, are more successful predictors of future stock price movements. However, because they are more rigorously scrutinized, they may choose not to use their information advantage for trading (Jeng *et al*., 1999). [26]We test whether short selling activity around insider trading depends on the rank of directors/executives. As the information hierarchy hypothesis suggests, the intensity in short selling decreases as the rank of insiders making the sale moves through the following categories: chief executive, chairman, other senior executives

[26] The main question is that whether insiders can benefit from their information advantage. Some insiders are more inside than others. The chief executive, for example, is likely to have better information about the firm's prospects than lesser officers. However, the CEO's trades are likely to be carefully scrutinized, both by shareholders and by regulators due to their high influence and visibility compared to other less important insiders.

(chief financial officer/chief operating officer/chief investment officer/managers), executive directors, non-executive directors, and independent non-executive directors.[27]

Table 2.10 reports the regression results for abnormal short sales depending on the insiders' rank. In Panel A, we document significantly positive abnormal short sales for executive directors, but not for the chief executive and chairman. The results are, nonetheless, consistent with Jeng *et al*. (1999) and Fidrmuc *et al*. (2006). Fidrmuc *et al.* (2006) find that a CEO's transactions exhibit the lowest information effects of all types of directors and Jeng *et al*. (1999) explain this phenomenon by arguing that CEOs are heavily scrutinized, leading them to trade cautiously.

<Insert Table 2.10 about here>

2.6.6.3 Alternative explanation for contrarian trading

It is possible that insiders are speculating that the stock is temporarily overpriced, or are attempting to earn a premium for providing liquidity if there is temporary buying pressure on the stock. We do not distinguish contrarian trading from information-based trading as it is possible that the contrarian trading by insiders can be based on private information. Therefore, all insider trading patterns including contrarian trading behavior can be a sign of information leakage. Our main focus is examining the abnormal short sales around insider sales to test whether there are information flows between insiders and short sellers.

2.7 Conclusion

[27] According to Chapter 3 of the Listing Rules and Guidance (Authorised Representatives, Directors, Board Committees and Company Secretary) disclosed by the HKEx, every board must include at least three independent non-executive directors, and at least one of the independent non-executive directors must have appropriate professional qualifications or accounting or related financial management expertise.

Using corporate insiders' transaction records and daily short sales on the HKEx, we investigate the channel of information leakage from corporate insiders to short sellers. Our research design overcomes the identification challenge from distinguishing the information sources between corporate insiders and market makers, since the latter does not present in Hong Kong's order-driven system. We find that even in the absence of market makers, short sellers initiate their short positions before insider sales are publicly reported. Among family firms, the intensity of short selling is a non-monotonic function of family control and trading by non-family insiders triggers stronger abnormal short sales, as compared to family insiders.

Our empirical evidence suggests that even without the involvement of financial intermediaries who are largely alleged to be the source of information leakage in the US, short sellers can still respond and move faster than average investors. This indicates that, corporate insiders can be another source of information leakage in the capital markets, which calls for more underlying governance of a firm. We also provide evidence on conflicts of interests in family firms from insiders' likelihood of information leakage. Our study is related to the strand of literature investigating potential conflicts of interest among family firms, which are complicated by factors such as culture-based family ties, shared family wealth, and nepotism (e.g., Bertrand and Schoar, 2006; Perez-Gonzalez, 2006; Villalonga *et al.*, 2015). Overall, insiders in firms with strong family control are less likely to engage in opportunistic behavior. The conflict between family and non-family insiders as a result of resentment towards family dominance and self-serving desires motivates non-family insiders to engage in private information leakage.

Chapter 3

CEO Human Capital, Competitive Advantage and Institutional Investors

3.1 Introduction

According to the resource-based view (Barney, 1991), inimitable resources including assets, capabilities, processes, routines, and knowledge can be heterogeneously distributed across competing firms. Firms can acquire different resources to establish their own competitive advantage from the perspective of strategic management and these differences help explain why some firms consistently outperform others (Barney, 1995, 2001). Extant literature suggests that firm-specific human capital, such as workers' skills, employees' education levels, and industry experience, can be a source of sustained competitive advantage (Hall, 1993; Coff, 1997; Hitt et al., 2003; Hatch and Dyer, 2004; Campbell et al., 2012). However, little attention has been drawn on how CEO human capital can shape a firm's competitiveness. Drawing on the resource-based view, we develop an integrative framework to analyze how the CEO helps a firm obtain competitive advantage by providing resources to the firm through his/her human capital.

A large body of literature has studied CEOs because they are the principal corporate decision makers and thus the key determinants of how firms are managed and how they perform (Hambrick and Mason, 1984; Bertrand and Schoar, 2003; Kaplan et al., 2012; Graham et al., 2013). Previous studies show that manager fixed effects, such as CEO overconfidence, general ability, and personal risk-taking, can significantly affect corporate policies like dividend payout, interest coverage, cost-cutting policy, acquisition, and innovation (Bertrand and Schoar, 2003; Malnebdier and Tate, 2008;

Hirshleifer et al., 2012; Kaplan et al., 2012; Cain and McKeon, 2016). While every firm has a CEO, CEOs have contrasting styles and may bring different competitive advantage to firms. For example, when Contel Corporation announced its appointment of John N. Lemasters as the new CEO, the board stated that "his technical savvy sets him apart from other Contel executives, most of whom are accountants by training. He is a hip guy technologically . . .'' In contrast, James V. Napier, Contel's departing CEO and president, was said to have ''exclusively financial'' strengths (Huang, 2014). Thus, a CEO brings strengths to the firm that complement its core competence and that is how he/she adds to the firm's competitive advantage.

Superior managerial skills or social networks, as different types of CEO human capital, are difficult for competitors to imitate because they are developed mostly through CEO personal education and working experience (Harris and Helfat, 1997). Thus, the heterogeneity and imperfect transferability of these intangible resources brought by CEO human capital help the firm obtain sustainable competitive advantage. For instance, given the complexity and comprehensiveness of managerial work, industry-specific and firm-specific knowledge is needed for proper corporate decision making (Custódio and Metzger, 2013; Huang, 2014; Hu and Liu, 2015; Miller et al., 2015). CEO social networks can widen the firm's information channels, promote governance mechanisms, and reduce transaction costs in interfirm business (Granovetter, 1985; Uzzi, 1997, 1999; Adler and Kwon, 2002).

This paper aims to shed light on the question of how CEO human capital can be a source of competitive advantage from the perspective of transaction cost economics (TCE) in particular (Williamson, 1975, 1985). One of the most important research questions in the field of firm theory revolves around whether to organize activities internally (within a firm) or externally (using the market). The answer from TCE is that

firms should internalize transactions when the transaction cost through contract is high and favor the market otherwise. Because TCE mainly concerns characteristics of exchange (e.g., specificity, uncertainty, frequency), it typically holds the firm's resources and capabilities constant. Thus, what is missing from the TCE perspective is how the heterogeneity in firm-specific resources can influence the governance of exchange (Mayer and Salomon, 2006; Lo et al., 2012). We provide an approach to integrate the transaction cost economics with the resource-based view based on the role of CEO human capital in reducing transaction costs.

Although CEO human capital can bring competitive advantage to firms in both developed and emerging economies, we choose to focus on emerging economies. Compared to developed markets, in the emerging market context, CEOs may serve a relatively more important function because they can help firms operate in a context of weak institutions, government control, and other constraints. In an emerging market where formal institutions such as laws and regulations are weak, managers' resources can help firms perform basic functions more efficiently (Peng and Luo, 2000; Peng et al., 2015). As the literature suggests, the social capital embedded within the CEO's attributes is more desirable in uncertain environment characterized by weak institutional support and distorted information when entering exchange relationships (Pfeffer and Salancik, 1978; Powell, 1990). More interestingly, a distinct feature of institutional transitions like China is that "while market forces have certainly become more important, government influences are not necessarily in decline" (Li et al., 2013, p. 206). This gives rise to another important type of CEO human capital, political ties, in emerging markets (Li and Zhang, 2007; Li et al., 2008; Shi et al., 2014). Thus, we take China as a representative study context of emerging markets to investigate whether the CEO's political capital, in addition to market-based human capital, such as industry-

related experience and business ties, help him/her better cope with the environment and thus manage resources more efficiently.

However, it is always a challenge to identify and measure competitive advantage brought by CEO human capital. We innovatively measure it from the financial market. CEO human capital draws great attention from shareholders as the superior skills and competencies embedded in the CEO's human capital can help the firm better perform its strategic goals than its competitors, thereby generating higher returns for shareholders (Hitt et al., 1994). Previous studies also show that the human capital attributes of top executives can send strong signals to outside investors about the firm's long-term performance (Mahajan and Lummer, 1993; Higgins and Gulati, 2003). Building on this, we ask whether CEO human capital, as a source of competitive advantage, along with the firm, industry, or market factors, can in part account for investors' perceptions of the firm.

Among all investors, we focus on institutional investors in particular. Compared to individual investors, institutional investors are more skilled with better access to market information and superior analyzing ability (Gibson et al., 2004; Alti and Sulaeman, 2012; Edelen et al., 2016). More interestingly, institutional investors do not act as a homogeneous block but are financial intermediaries with extensive difference in terms of objectives and strategies, such as how long they hold a stock (Hoskisson et al., 2002). There are strong reasons to expect institutions with different investment strategies and horizons to display different attitudes toward sustainable competitive advantage brought by CEO human capital.

Overall, this paper makes three contributions. First, we integrate the resource-based view with the transaction cost economics perspective when discussing the role of CEO

human capital in shaping a firm's competitiveness. On one hand, TCE has been criticized for its inability to account for firm-specific capabilities and resources and how they matter to the design of interfirm exchange relationships (e.g., Mayer and Salomon, 2006; Lo et al., 2012). On the other hand, the resource-based view has been criticized for being unable to offer a testable framework for how governance of the exchange matters in generating the firm's competitive advantage (e.g., Williamson, 1999). Our study considers the role of CEO human capital in governance of the exchange so as to generate competitive advantage. Second, we argue that the governance mechanism of exchange brought by CEO human capital is more desirable in an emerging market. Specifically, in an emerging market context with weak institutions and missing markets, CEOs can make a more meaningful contribution to reducing transaction costs when dealing with both private economic agents and the government, whereas the governance mechanism mainly relies on laws and regulations to regulate the market behavior when institutions are strong. Finally, to the best of our knowledge, we are the first to investigate the relationship between institutional investors' perceptions of CEO human capital, which have implications for all shareholders. More interestingly, institutional investors do not act as a homogeneous block but are financial intermediaries with extensive heterogeneity in their objectives and strategies (Hoskisson et al., 2002; Ryan and Schneider, 2003), including how long they hold a stock. Given that different types of CEO human capital might bring in competitive advantages with various levels of sustainability, it is important to consider the heterogeneity of institutional investors when exploring their preference for top-management attributes.

Drawing on the resource-based view, we examine whether institutional investors value competitive advantage brought by intangible CEO human capital. Informed by the difference between market-based exchange and political-based (government-business)

exchange, our selection of the three sets of contingency variables, business ties, industry experience, and political ties, is driven by their relevance to market-based and political-based exchange. Our findings suggest that CEOs' business ties and industry experience matter more than their political ties in a sample of Chinese listed firms. The results also show that CEO characteristics that can enhance a firm's competitive advantage are valued by long-term investors more than by short-term investors.

3.2 Theory and Hypotheses

3.2.1 CEO human capital, the resource-based view, and competitive advantage

A firm's profitability depends on its establishment of competitive advantage over its rivals as such advantage enables the firm to do things that lead to higher sales, lower costs, or in other ways add financial value to the firm (Grant, 1991). According to Barney (1991, 2001), the resource-based view emphasizes that heterogeneous resources, which are valuable, rare, and costly to imitate, are the sources of a firm's competitive advantage. The differences in resources and further competitive advantage help explain why some firms consistently outperform others (Barney, 2001). Barney (1995) groups firm resources into four categories: financial, physical, human, and organizational. Among these, human resources include the knowledge, skills, experience, relationships, and intelligence of individuals associated with a firm.

Under the resource-based view, CEO human capital, as firm-specific human resource, is assumed to contribute to a firm's competitive advantage due to its inimitability based on its intangible, firm-specific, and socially complex nature (Castanias and Helfat, 1991; Harris and Helfat, 1997; Geletkanycz et al., 2001; Combs and Skill, 2003; Hatch and Dyer, 2004; Pandher and Currie, 2013; Peng et al., 2015). Generally, CEO human capital consists of his/her expertise, experience, knowledge, reputation, and skills to

manage the firm (Haynes and Hillman, 2010). A broader definition also includes his/her social capital, which is "the sum of the actual and potential resources embedded within, available through, and derived from, the network of relationships possessed by an individual" (Nahapiet and Ghoshal, 1998, p. 243), such as business and political ties embodied in the capabilities (Peng and Luo, 2000; Ployhart and Moliterno, 2011).

Next, we analyze how CEO business ties, industry experience, and political ties embedded in CEO human capital, as internal firm resources, help a firm achieve competitive advantage by reducing transaction costs.

3.2.2 Hypothesis development

3.2.2.1 Business ties

Powell's (1990) analysis of exchange suggests that transactions can take place through loose collections of individuals who maintain impersonal and constantly shifting exchange ties, as in the market (arm-length), or through stable networks of exchange partners who maintain close social relationships (relationship-based). Compared to arm-length transactions, relationship-based interfirm transactions can help the focal firm reduce transaction costs by limiting the opportunistic behavior of the exchange partners.

Opportunism is an important behavior assumption in transaction cost economics (Williamson, 1981, 1985). TCE states that given the occasion, decision makers may seek "with guile" to serve their own interests and it is costly to distinguish opportunistic from non-opportunistic behavior ex ante. The governance problem of opportunism is more salient when the transaction has high asset specificity because the vulnerable party cannot easily switch to another business partner without any cost due to the unique and

dedicated investment. As a result, opportunism of exchange partners can lead to market failure due to the high transaction cost.

Transactions based on networks offer the advantage of reducing the threat of opportunism. Opportunistic behavior can only be an attractive option for the exchange partner when the potential benefits from it outweigh the costs. Due to the transferability of the social network, opportunistic behavior with any exchange partner can be easily captured by other partners connected to the network. This transferability leads to an additional cost of being opportunistic, which is a potential loss of transaction opportunities with all ties across the network. To a large extent, the more developed the business network, the higher the cost of network ostracism associated with opportunism. Therefore, exchange partners based on relationships are less likely to be opportunistic, which further reduces transaction costs.

Managers' business ties, contacts, and networks can be a source of competitive advantage by promoting relationship-based transactions. Embedded relationships within CEO business ties have three main components that regulate the expectations and behaviors of exchange partners: trust, fine-grained information transfer, and joint problem-solving arrangements (Uzzi, 1997). Trust can be considered as confidence that one partner will not exploit the vulnerabilities of the other (Barney and Hansen, 1995). This trust is built on repeated transactions via the network. The primary outcome of governance by trust is expressed as the belief that an exchange partner would not act in self-interest at another's expense. Fine-grained information transfer benefits networked firms by increasing the breadth and ordering of their behavioral options and the accuracy of their long-run forecasts. With respect to joint problem-solving arrangements, relative to market-based mechanisms of alignment such as exit (Schwartz and Hirschman, 1972), arrangements embedded with social ties can facilitate problem-

solving mechanisms that enable actors to coordinate functions and work out problems. According to TCE, all these components join to tackle the problem of opportunistic behavior by business partners, thus reducing transaction costs for the firm. Based on the above argument, we formulate the first hypothesis:

Hypothesis 1: CEO business ties are a source of competitive advantage to the firm by reducing transaction costs in market-based exchanges.

3.2.2.2 Industry-specific experience

In addition to opportunism, TCE has another important behavior assumption: bounded rationality (Simon, 1957). Unlike the "economic agent," to whom hyper-rationality is attributed, decision makers in the TCE framework are endowed with less powerful analytical and data-processing ability. Although bounded rationality does not claim these agents are irrational, it suggests their limited competence in formulating and solving complex problems and in processing (receiving, storing, retrieving, transmitting) information (Simon, 1957; Williamson, 1981).

Given bounded rationality, it is impossible for decision makers to deal with complexity in all contractually relevant aspects due to environment or behavior uncertainties. Before the signing of a contract, the screening of potential partners and negotiation of contracts cannot sufficiently cover all possible contingencies that may arise in the future. As a consequence, incomplete contracting is the best that can be achieved. Following the signing of a contract, it can also be costly to monitor and verify the performance of the exchange party. Thus, the governance problem of performance evaluation arises as certain monitoring and contract enforcing mechanisms are executed to ensure compliance with obligations stipulated in the contract. Transaction costs associated with bounded rationality might include screening, communication, negotiation, and

coordination costs before the contract and monitoring and enforcement cost after the contract.

CEOs are important decision makers in formulating and enforcing contracts. CEOs' previous industry-specific experience can contribute to a firm's competitive advantage by improving decision makers' bounded rationality and thus reducing transaction costs. First, industry experience equips the CEO with better capacity to screen and select potential exchange partners. For example, CEO knowledge about the industry permits a fairly sophisticated, although implicit process for screening potential partners. Second, when initiating contracts, specific industry knowledge enables CEOs to better gather and process information for more efficient strategic decision making in communication, negotiation, and coordination. Third, throughout the enforcement of the contract, industry-specific experience provides the CEO with knowledge and skills to monitor and evaluate performance. Empirical work documents that industry-specific expertise can enhance firm performance through more successful acquisitions (Custódio and Metzger, 2013), better matched divestiture decisions (Huang, 2014), and more efficient corporate investment (Hu and Liu, 2015). Thus, we propose the following hypothesis:

Hypothesis 2: CEO industry experience is a source of competitive advantage for a firm by reducing transaction costs in market-based exchanges.

3.2.2.3 Political ties

In addition to a wide range of market-based exchanges with customers, suppliers, and competitors, firms are also involved in business-government exchange relationships (Granovetter, 1985; Faccio, 2006). The literature describes the process of business-government exchange as firms offering government agencies and officials financial or political support in exchange for business information and policy favors (Boddewyn and

Brewer, 1994; Bonardi et al., 2005). In this process, firms compete with each other for policy favors by employing various political strategies and those who have successful connections to the government can generate valuable political resources and then obtain non-market competitive advantage that cannot imitated by unconnected rivals.

However, the business-government exchange can result in higher transaction costs than market-based exchanges (Bonardi et al., 2006; Kingsley et al., 2012). The absence of an explicit price mechanism to regulate the business-government exchange makes it more difficult to specify the potential uncertainties when writing the political contract. Also, due to governments' relatively more powerful position, a significant political hazard may arise from their opportunistic behaviors as they are less binding to contract items. Consequently, a proper governance structure needs to be developed to reduce the transaction costs in political exchanges while they can help the firm acquire a non-market competitive advantage.

CEO political ties can help the firm secure a non-market competitive advantage by facilitating business-government exchanges and mitigating political hazards. In both developed and emerging economies, managers build ties not only with managers at other firms, but also with the government. CEO political ties, defined as political connections, are based on having personal ties with members of political party and the state (Peng and Luo, 2000; Sun et al., 2010, Wu et al., 2012). CEOs with political ties tend to know how to influence political decisions in favor of their firms and also how to co-opt political elites to manage resources (Brødsgaard, 2012; Shi et al., 2014). In addition, in view of the potential political hazards, the CEO's political connections serves to develop trust between the firm and political parties, thereby reducing the transaction costs resulting from the higher possibility of opportunism compared to market-based transactions (Hillman and Hitt, 1999). Previous literature also shows that

political ties can enhance firm value through favorable regulatory policies (Johnson and Mitton, 2003), higher chances of government bailout (Faccio et al., 2006), and easier access to financial resources such as bank loans (Claessens et al., 2008). Thus, we formulate the following hypothesis:

Hypothesis 3: CEO political ties are a source of competitive advantage to the firm by reducing transaction costs in political exchanges.

3.3 Empirical Methods

3.3.1 Empirical design

We measure how competitive advantage brought by CEO human capital is valued from the perspective of institutional investors. Previous studies have highlighted that the attributes of top management can send strong signals to outside investors about the long-term performance of the firm (Mahajan and Lummer, 1993; Higgins and Gulati, 2003). Sophisticated market participants such as institutional investors are in the best possible position to evaluate the importance of CEO characteristics to a firm's performance and long-term growth, and the reactions of these investors should, therefore, provide us with information about whether or not intangible CEO characteristics are valued.

Research on the preferences of institutional investors has focused on firms' financial performance and corporate governance (Parrino et al., 2003; Aggarwal et al., 2011; Chung and Zhang, 2011; Edelen et al., 2016). Not surprisingly, all institutional investors across the world have a strong preference for firms with good performance and good governance, such as larger firm size, higher book-to-market ratio and liquidity, and greater board independence (Ferreira and Matos, 2008; Aggarwal et al., 2011; Chung

and Zhang, 2011; McCahey et al., 2016). However, previous studies also acknowledge that institutional investors are far from homogenous regarding their investment preferences. A distinguished feature is related to their investment horizon. Institutional investors may have different investment horizons as a result of differences in investment objectives, styles, and competitive pressures. Institutions with long-term investments have better knowledge of the firm and are more specialized in long-term future earnings (Chen et al., 2007; Bushee, 2001; Bushee et al., 2014). Long-term institutional investors tend to know better about the firm and care more about long-term growth opportunities rather than short-term trading benefits. In contrast, short-term institutional investors tend to overweight short-term expected earnings but underweight long-term expected earnings (Yan and Zhang, 2009). Thus, institutional investors' perception of a firm's competitive advantage can also depend on their investment horizon.

Drawing from the potential performance implications of CEO human capital based on the resource-based view, we argue that a change in institutional investors' shareholding is a good measure to explore whether they value a firm's competitive advantage. The human capital factors and their hypothesized effects on a firm's competitive advantage and institutional holding are summarized in Figure 3.1.

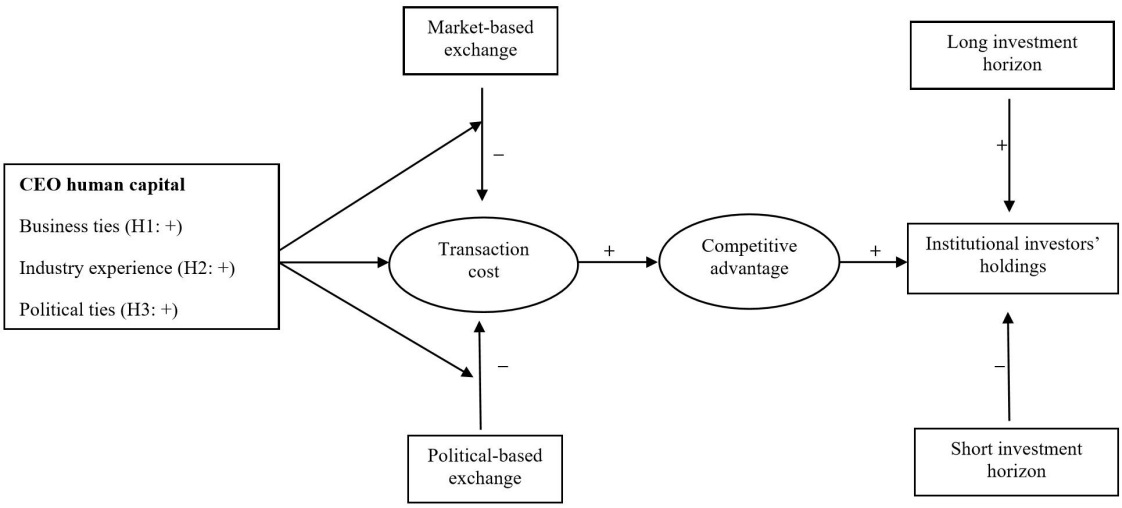

Figure 3.1 Graphical representation of the empirical design

3.3.2 Sample

To investigate whether institutional investors value CEO human capital, we select all the Zhong-Zheng 800 Index (CSI 800) constituent companies listed at the end of 2010 as an initial sample. The Zhong-Zheng 800 consists of 800 firms of all sizes listed in the Chinese A-share market, both the Shanghai and Shenzhen Stock Exchanges. Financial firms and firms that went public after 2004 are excluded.[28] For the sample firms, we construct a manager-firm matched panel dataset, where we track individual CEOs across different firms from 2004 through 2010. For each CEO, we hand-collect his/her curriculum vitae from the firm's annual report and the Sina finance website (http://finance.sina.com.cn/stock/), which summarize CEO biographical information in a textual format. Finally, we obtain a sample of 467 firms with 775 individual CEOs.

3.3.3 Variables

3.3.3.1 Dependent Variables

[28] Our data for institutional investors in China starts from 2004. Although the China Securities Regulatory Commission (CSRC) has started to introduce financial institutions as institutional investors since 2000, the data for institutional investors is noisy before 2004.

Among all institutional investors, we choose to focus on mutual funds, as they are the most market-based and independent. Other financial institutions, such as insurance companies, commercial banks, and securities companies, are considered less independent and less market-oriented because they have close business ties with the listed firms either as underwriters for the shares issued or providers of other financial services (Cornett et al., 2007; Yuan et al., 2009). Based on interviews with top managers of financial institutions and boards of directors of listed firms, Yuan et al. (2009) confirm that mutual funds play a more active role in disciplining corporate management, while other institutions, like banks and securities companies, are passive shareholders.

We obtain the quarterly holdings for each mutual fund in each firm from the China Stock Market Database (CSMAR). To measure overall annual institutional holdings for each firm, we aggregate the number of shares owned by all mutual funds for the same firm in the fourth quarter. The number of shares owned by all mutual funds as a percentage of a firm's tradable shares is defined as institutional ownership.

In addition to the overall holdings level, we classify institutional investors into long-term and short-term investors based on their investment horizon. Following Gaspar et al. (2005, 2012), we use the annual average churn rate (ACR) to measure each institutional investor's investment horizon, calculated by averaging the quarterly churn rate across four quarters in a year (see Appendix 2 for calculation details). Based on the ACR, for each year, we sort all institutional investors into three tertile portfolios. Those ranked in the top tertile (with the highest ACR) are classified as short-term institutional investors and those ranked in the bottom tertile (with the lowest ACR) are classified as long-term institutional investors. Given the horizon classification for each institutional investor, for each firm, we define the aggregated holdings by all long-term institutional investors

as long institutional ownership and the aggregated holdings by all short-term institutional investors as short institutional ownership.

3.3.3.2 Main explanatory variables

To measure CEO human capital, we manually decode detailed textual information based on the CEOs' previous and current working experience from the biographical data in the curriculum vitae.

Business ties are measured by the number of organizations a CEO has worked for throughout his/her career excluding government positions. By definition, business ties are a proxy for the CEO's market-based social connections to other firms and organizations. Each working experience represents a specific social network that refers not only to the members of the organization but also to its external connections. CEOs who have worked in different firms bring with them knowledge gained through personal experiences with other firms' policies and practices as well as relationships with former contacts and associates (Granovetter, 1985; Geletkanycz and Boyd, 2011; Hu and Liu, 2015). As the connections within the same business group or conglomerate tend to highly overlap, we count multiple ties within the same business conglomerate as only one business tie.[29] Based on the number of connections, we define business ties as a dummy variable that equals 1 when it is above the average and 0 otherwise.[30] Industry-specific experience is measured as a dummy variable that equals 1 when a CEO's prior working organizations are in the same industry as the focal firm where he/she serves and 0 otherwise.[31] Political ties are measured as a dummy variable that equals 1 when a

[29] We also construct business ties in which different organizations in the same business conglomerate are counted as for a robustness check. The results are largely consistent and can be provided upon request.
[30] We also conduct a robustness check by measuring business ties as the number of organizations, which is a continuous variable. The results are largely consistent and available upon request.
[31] The industry classification follows the Shenwan Level I industry criteria (Hu and Liu, 2015).

CEO has any central government, local government, military, or committee working experience and 0 otherwise.

3.3.3.3 Control variables

We also control for a series of other variables that can affect institutional holdings (Parrino et al., 2003; Ferreira and Matos, 2008; Aggarwal et al., 2011). The financial data are downloaded from the China Stock Market Database (CSMAR). All control variables are calculated annually. Return on assets (ROA) is measured by the profit before interest and tax scaled by total assets. Return refers to the annual stock return. Market to book is defined as the market value of equity divided by the book value of equity. Firm age is calculated as the current year minus the start year of the firm. Volatility is the one-year stock volatility calculated based on the daily closing price. Firm size is measured by the natural logarithm of total sales. Leverage is the book value of debt divided by the book value of equity. Controller refers to the type of ultimate controller; it is defined as an ordinal variable that equals 1 when the controller is enterprises, 2 when the controller is the government, 3 for individuals, and 0 otherwise. Independent indicates the number of independent directors as a percentage of the number of all members of the board of directors. Large1per measures the percentage of the shareholding of the largest shareholder. Duality is defined as a dummy variable that equals 1 when CEO and chairman are dual and 0 otherwise. Previous studies also show that education experience is an important index for CEO human capital (e.g., Custódio and Metzger, 2013; Miller et al., 2015). Thus, we also control the CEO's education level. Education is defined as an ordinal variable that equals 1 when a CEO holds as his/her highest degree a bachelor's degree, 2 for a master's degree, three for a PhD, and 0 otherwise.

All variable definitions are summarized in Table 3.1. Table 3.2 provides descriptive statistics and pairwise correlations of the variables used in the regression analysis. The magnitude of VIF is generally small, indicating that the probability of multicollinearity is relatively low.[32]

<Insert Tables 3.1 and 3.2 about here>

3.3.4 Models

We apply panel data fixed-effects regressions to explore whether and how institutional investors value CEO human capital based on a manager-firm matched dataset. [33]Our main dependent variable is the level of aggregated institutional ownership, which captures the percentage holding by mutual fund. The main explanatory variables are three types of human capital: business ties, industry experience, and political ties. We first test Hypotheses 1, 2, and 3 with each type of human capital in the regressions separately. Then we add industry experience and political ties to business ties. To test whether the investment horizon of institutional investors matters, we run separate regressions for firms with the dependent variable replaced by their long institutional ownership and short institutional ownership, respectively.

A potential caveat of our study is that different types of CEOs may endogenously match with different types of firms. In this case, the resulting difference in institutional holdings may reflect firm-specific characteristics rather than a causal effect of CEO human capital. Based on robustness and potential endogeneity concerns, we identify a

[32] We can use the VIF command after the regression to check for multicollinearity. VIF stands for variance inflation factor. As a rule of thumb, a variable whose VIF values are greater than 10 may merit further investigation. Tolerance, defined as 1/VIF, is used by many researchers to check on the degree of collinearity. A tolerance value lower than 0.1 is comparable to a VIF of 10. It means that the variable could be considered as a linear combination of other independent variables. In our case, our VIF values are smaller than 10 in Appendix Table A2.1. Therefore, multicollinearity is not a concern in our study.

[33] The p-value for the Hausman Test is 0.000. The null hypothesis for Hausman Test is difference in coefficients is not systematic between fixed effects model and random effects model". Based on the test, the null hypothesis is rejected, therefore, fixed effects model is applied.

dummy variable, denoted as turnover, which equals 1 if a firm experiences CEO turnover in that year and 0 otherwise. Then, we construct interactions with turnover and different types of CEO human capital. This helps us capture any dynamic institutional holdings change resulting from differences in human capital between the old and new CEO, which makes the firm fixed effect a smaller concern as other firm characteristics are almost unchanged. Also, the interactions can measure the moderating effect of CEO turnover in terms of CEO human capital on institutional shareholding.

In all models, standard errors are heteroskedasticity-robust and clustered at the firm level. All control variables are lagged for one year to mitigate the endogeneity problem. Year dummies are added to control for possible year-specific effects. To reduce the influence of outliners, each of these continuous variables is winsorized at the 1st and 99th percentiles.

3.4 Results

Table 3.3 presents the panel data regression results for the effect of CEO human capital on mutual fund ownership. We first run regressions with business ties, industry experience, and political ties in Models (1), (2), and (3) separately. Then, industry experience and political ties are added in Model (4). We also report regression results with the CEO turnover dummy and its interactions with different types of CEO human capital in Table 4. Models (1) and (2) in Table 3.4 document the dynamic institutional ownership change due to CEO turnover events without and with CEO human capital controlled, respectively. Model (3) includes three interactions between CEO turnover and human capital to test the moderating effect by CEO turnover. Table 3.5 summarizes the regression results depending on institutional investors' investment horizon. The

dependent variable for Models (1) – (4) is the long institutional ownership and the dependent variable for Models (5) – (8) is the short institutional ownership.

<Insert Tables 3.3, 3.4 and 3.5 about here>

The focus of our research is to assess whether and how institutional investors value competitive advantage by different types of CEO human capital. In Hypothesis 1, we propose that CEO business ties are a source of competitive advantage to the firm. The positive and significant coefficients of business ties in Models (1) and (4) of Table 3.3 provide strong support for Hypothesis 1, suggesting that institutional investors do value the CEO's business ties and CEOs with more business ties can attract more institutional investors. The moderating effect by CEO turnover[34] is not significant in terms of business ties in Model (3) (Table 3.4). Given that the significantly positive coefficient of business ties still exists in Model (3) (Table 3.4), this indicates that institutional investors' preference for CEO business ties is consistent regardless of the dynamic moderating effect of CEO turnover.

Consistent with Hypothesis 2, we find that institutional investors tilt their portfolios toward CEOs with industry experience, inferred by the significantly positive coefficients in Model (2) and Model (4) (Table 3.3). Also, there is no moderating effect of CEO turnover on industry experience in Model (3) (Table 3.4). Thus, Hypothesis 2 is strongly supported, which suggests that CEO industry experience is a source of competitive advantage for a firm.

The results are more mixed with respect to Hypothesis 3. Overall, there is no impact of political ties on institutional ownership across the models in Table 3.3 (none of the coefficients of political ties is significant). We know that panel data regression captures

[34] The negative effect of CEO turnover on institutional ownership is consistent with the previous literature (Parrino et al., 2003; Helwege et al., 2012).

the long-term effect of CEO human capital on institutional holding so the results suggest that political capital is not valued by mutual fund institutional investors over the long run. However, combined with the significantly negative magnitude of turnover effect and the positive magnitude of its moderating effect on political ties in Model (3) (Table 3.4), we note that institutional investors tend to increase their portfolio when facing a new CEO with political ties. Therefore, the valuation for political ties is not conclusive and depends on investors' investment horizon.

With respect to whether institutional investors' horizon matters, we document that only long-term institutional investors value the CEO's business ties and industry experience positively. In Model (1) (Table 3.5), the coefficients of business ties and industry experience are both economically and statistically significant, but neither is significant in Model (5) (Table 3.5). This suggests that institutional investors with a longer investment horizon prefer CEOs with more business ties and industry experience. As for political ties, first, the insignificant coefficients of political ties across all models (Table 3.5) indicate that neither long-term institutional investors nor short-term institutional investors show any interest in CEO political ties over the long run. Interestingly, after comparing the moderating effect of CEO turnover on political ties in Model (4) and Model (8) (Table 3.5), we find that short-term institutional ownership levels rise as the newly appointed CEO's political ties increase, but this is not the case for long-term institutional ownership. Thus, short-term institutional investors tend to tilt their investment toward CEOs with political ties in the short run but exhibit a similar preference for political ties as long-term institutional investors in the long run.

The pattern of control variables in all models also largely corresponds to our expectations. The preference of institutional investors is widely studied, focusing on a firm's financial performance and corporate governance (Hartzell and Starks, 2003;

Parrino et al., 2003; Aggarwal et al., 2011; Chung and Zhang, 2011; Edelen et al., 2016). Not surprisingly, all institutional investors across the world have a strong preference for firms with high performance. The positive and significant coefficient return is consistent with Gompers and Metrick (2001). They record a positive relation between institutional ownership and future stock returns. Also, the positively documented market-to-book value suggests that institutional investors prefer firms with higher firm valuation. Similarly, Woidtke (2002) documents a positive relationship between a firm's Tobin Q and the shareholding percentage of private pension funds. All this empirical evidence helps explain why institutional investors consistently prefer firms with higher ROA, return, and market-to-book value but lower volatility in our results.

3.5 Conclusion and Discussion

The study was motivated by a desire to understand the role of CEO human capital in creating a firm's sustainable competitive advantage. Drawing from the perspectives of resource-based view and transaction cost economics, we make a theoretical contribution by developing an integrated framework to analyze how CEO human capital helps a firm obtain competitive advantage in exchanges with business and political counterparts in emerging markets.

In developed economies where formal institutions are strong, the governance mechanism of exchanges primarily relies on laws and regulations. However, this study highlights the importance of CEO human capital as an informal mechanism for governance of exchanges in emerging markets characterized by distorted information and weak institutional support (Pfeffer and Salancik, 1978; Powell, 1990). In the context of emerging markets, CEOs often have to perform some basic functions in obtaining market information, interpreting regulations and enforcing contracts (Khanna

and Palepu, 1997; Peng and Luo, 2000; Peng et al., 2015). Manager's on-going interactions and collaborations among them cultivate trust, and such relationship norms constrain exchange partners' opportunistic behaviors and reduce transaction costs. CEO's political connections with the government provides firms with critical access to policy and industrial sector information (Hillman et al., 1999) in the emerging markets where governments guide economic activities by setting regulatory policies.

Empirically, we innovatively measure the competitive advantage brought by CEO human capital in the financial market. Among all investors, we focus on institutional investors in particular and examine whether they capture the value of CEO human capital. For a sample of Chinese listed companies, we find that institutional investors prefer firms whose CEOs have more business ties and industry experience in the long run, while their preference for political capital is more likely to be short term. In particular, this preference heterogeneity for different types of CEO human capital is more pronounced for short-term institutional investors. Compared to long-term investors, short-term investors do not value the competitive advantage brought by CEO business ties and industry experience. The increase in short-term investors' dynamic marginal holdings due to political capital change around CEO turnover represents their compliance with a short investment horizon.

In the Chinese context, despite decades of market-based reforms, officials at various levels of the government still have some power to allocate resources (e.g., land, bank loans, subsidies). The conventional wisdom states that CEOs should build connections with business partners and government officials. Therefore, in many Chinese firms, political ties are regarded as a firm's strategic asset as it can help the firm overcome market and institutional barriers, seek political favors, and thus manage resources more efficiently. However, our findings suggest that business ties and industry experience

exhibit bigger and longer capabilities. We reason that with a long-term orientation, CEO business ties and industry experience should have a stronger impact than political ties. CEO political ties lack an effective mechanism to ensure sustainable competitive advantage. For example, government officials often rotate their positions across different departments and geographic locations, which weakens the firm's political connections. In such cases, political ties can even become a liability if incoming government officials represent a rival political group (Siegel, 2007). Therefore, sophisticated institutional investors are less interested in political connections. While the role of government has been changed from guiding (e.g, setting regulatory policies) to facilitating economics activities in China's transition into market economy, our suggestions is that Chinese firms and managers now should reply more on building ties among themselves and develop more tacit knowledge and experience.

Although a large body of literature has documented the performance impact of CEO human capital, the reluctance of accountants to extend the boundaries of balance sheets beyond tangible assets partly reflects the difficulties of valuation. The heterogeneity and imperfect transferability of intangible resources also precludes the use of market prices. Our study offers valuable implications for policy makers and financial market investors at larger. Intangible resources such as CEO human capital provide shareholder value and should be integrated in financial reporting.

Our study has its limitations. This research provides an incomplete test of the role of human capital in building a firm's competitive advantage in governance of exchange relationships. In particular, we only focus on the CEO attributes and capabilities embedded in their human capital. There are many different groups of employees inside organizations that can create competitive advantage (Lepak and Snell, 1999; Collins and Clark, 2003). Firms need the talent, efforts and resources, not only from the CEO, but

also from non-CEO executives and other employees. Further research should examine how other firm-specific intangible recourses that are developed around other employees besides CEOs.

Chapter 4

Do Institutional Investors Use their "Voice"? Evidence from their Impact on Product Differentiation

4.1 Introduction

The classic industrial organisation literature (Hotelling, 1929; Shaked and Sutton, 1987; Nevo, 2000; Gowrisankaran and Rysman, 2012; Hoberg and Phillips, 2015) suggests that vertical product differentiation is a key determinant of a firm's industrial competitiveness and profitability. Vertical product differentiation increases consumer's willingness to pay by creating unique products that appeal to consumers. To enhance consumers' willingness to pay for their respective products, firms incur sunk costs including R&D expenditures devoted to product development or improvement, and advertising outlays aimed at increasing perceived quality (Sutton, 1991). The main idea of product differentiation is that R&D and advertising activities are effective in reducing ex-post product similarity.

However, it is possible that two firms within one industry may have the same intensity of R&D and/or advertising expenditures, yet be different in their product innovation outcomes and then industry position. In certain situations, higher R&D expenditures would probably indicate a greater level of agency costs, and not necessarily better product innovation. [35] While prior literature has studied the effect of R&D and advertising expenditure on a firm's industrial position (Gabszewicz and Thisse, 1979; Shaked and Sutton, 1987; Sutton, 1991; Motta, 1992; Ofek and Sarvary, 2003), the

[35] Approximately three-fourths of R&D investments by firms in the United States are devoted to product R&D (Scherer and Ross, 1990). Firms choose their investments in product R&D and these innovation investments determine the degree of differentiation between their products (Dixit, 1979; Singh and Vives, 1984; Lin and Saggi, 2002).

governance issue on these expenditures has received little attention. We aim to investigate whether the governance of the sunk costs, R&D and advertising expenses in particular, affects the outcome of product differentiation, focusing on the role of institutional investors.

A key factor in global capital markets is the fast growing dominance of institutional investors. Institutional activism is by no means as a new phenomenon as institutions have become the majority of owners of most large US corporations. [36]Institutional investors' involvement in corporate management can range from voice to exit (Hirschman, 1970; Parrino et al., 2003; Gillan and Starks, 2007; Ferreira and Matos, 2008; McCahery, 2016). Although the effect of institutional investors on firm's performance is widely recognized in the literature (e.g., Kochhar and David, 1996; Edmans, 2009; Hall and Lerner, 2010), less well-studied is the role played by institutional investors in the governance of innovation of publicly traded firms. If incentive contracts for managers cannot fully overcome the adverse selection and moral hazard problems, increased monitoring by institutional investors can improve incentives to innovate by "insulating" the manager against the consequences of bad income realizations. However, monitoring is costly and therefore the influence of institutional shareholders on firm strategy is an open empirical question.

Although previous literature does not distinguish the effects of R&D and advertising expenditures on corporate outcomes such as market value, systematic risk and the success of products (Shaked and Sutton, 1987; Sutton, 1991; Motta, 1992; Chauvin and Hirschey, 1993; Ofek and Sarvary, 2003; McAlister et al., 2007; Fosfuri and Giarratana, 2009), the monitoring influence of institutional investors on R&D and advertising can

[36] For example, the proportion of U.S. public equities managed by institutions has risen steadily over the past six decades, from about 7% or 8% of market capitalization in 1950, to about 67 % in 2010. See https://www.sec.gov/news/speech/2013-spch041913laahtm#P18_1663

be different. Firstly, the monitoring of R&D activity is inherently more difficult than advertising. Advertising is usually more specifically targeted and its outcome is less uncertain and easier to be expected. While the outcome of R&D is more difficult to define, measure or expect and depends on the relative movement in innovation strategies of other firms in the industry, resulting the incomplete contract for managers. The lack of accurate measurement of objective or target in R&D makes the monitoring of institutional investors more difficult. Also, compared to advertising, R&D activities can also cause higher information asymmetry between managers and shareholders which makes the monitoring more challenge. For example, the evaluation of R&D projects involves more technical or scientific skills which are difficult for average investors (Mina et al., 2013).

Secondly, the possibility to induce subsequent managerial actions to reflect institutional monitoring of R&D is lower compared to advertising. As the periodical progress and outcome is easy to observe and evaluate, the monitoring of institutional investors can motivate the managers to refocus and improve their advertising plan or strategy during the advertising campaign. In contrast, it is difficult to evaluate the periodical progress of R&D unless the product is successfully developed. This makes it less capable to adjust the strategy during the R&D process. Thus, based on these, it is possible that the monitoring of institutional investors in R&D expenses is less effective than advertising expenses.

Our analysis focuses on the effect of shareholding by institutional investors on sunk costs (R&D and advertising), which is measured by ex-post product similarity (Hoberg and Phillips, 2015). This novel firm-year level measure, which is based on product descriptions from annual firm 10-K filings with the Securities and Exchange Commission (SEC) (Hoberg and Phillips, 2015), allows us to overcome the drawbacks

that traditional measures of market structure could bear. Our analysis distinguishes between R&D expenditures and advertising expenditures, as well as between active and passive institutional shareholders who arguably make different choices between voice and exit. Overall, there are reasons to expect that not all institutional investors share the same preference for activism due to the monitoring cost. Independent and foreign institutions are credited more with taking a more active stance (lower monitoring cost), while other institutions that have business relations with local companies may feel compelled to be loyal to management (higher monitoring cost). The active institutional investors are more likely to collect information and face less regulatory restrictions or have fewer potential business relationships with the focal firm they invest in. While institutions like banks, insurance companies, pension fund and other institutions (e.g., trust, endowments) are more likely to be passive (Brickley et al.,1988; Almazan et al., 2005). Their existing or potential business relationship of these institutions with the firms they invest in tend to make these groups more pressure-sensitive with respect to corporate governance. By examining evidence regarding the effects of these investors on corporate innovation outcomes, and by including differences among institutions in their ability to influence these outcomes, we are able to investigate competing hypothesis about the role of institutional investors in promoting firm's industry competitiveness.

Consistent with our conjecture that institutional investors' monitoring can promote product innovation, we find that given certain expenditures, the presence of institutional ownership can help improve firm's industry position by decreasing product similarity. However, this relationship only holds for advertising but not for R&D as the monitoring effect of institutions on R&D projects is very limited. After classifying institutional investors into active and passive groups, we find that the monitoring effect of

advertising is mainly contributed by active institutional investors, rather than passive institutional investors. Interestingly, in addition to their monitoring role on R&D and advertising expenses, we also find institutional investors, especially active institutional investors tend to discourage product differentiation overall. This evidence draws further implications on how the presence of institutions affects corporate strategies, in particular industry competitiveness.

Our study makes three important contributions to the literature. Firstly, we extend the industrial organisation literature (Hotelling, 1929; Shaked and Sutton, 1987; Nevo, 2000; Gowrisankaran and Rysman, 2012; Hoberg and Phillips, 2015) by interacting industrial competitiveness with corporate governance. Under Sutton's (1991) framework, R&D and advertising expenditure as sunk costs can create unique products that appeal to quality-sensitive consumers, thus creating endogenous barriers to entry. However, they and the following researchers fail to consider that the governance of these expenditures after they are incurred can affect the productivity of product innovation and thus firm's industry position. Our study improves previous research by examining how firm level governance characteristics on these expenditures can affect their contribution to product differentiation.

Secondly, we highlight the influence of institutional investors on product market dynamics through their monitoring role on R&D and advertising expenditure. As a result of the growing dominance of institutional investors, their impact on corporate decisions and performance such as firm value, CEO turnover, merge and acquisition and dividend policy is widely discussed in the literature (Parrino et al., 2003; Chen et al., 2007; Ferreira et al., 2010; Aggarwal et al., 2011; Firth et al., 2016), but there is less attention on how the presence of institutional investors can affect product market performance and promote industry dynamics. To the best of our knowledge, this is the

first study focusing on the relationship between institutional ownership and product differentiation, which offers new insight on the monitoring role of institutional investors in corporate governance.

Lastly, to examine to what extent institutions monitoring works, we distinguish the effect of R&D and advertising expenditure on product differentiation. Previous literature tends to treat R&D and advertising expenditures equally on corporate outcomes such as market value, systematic risk and the success of products (Shaked and Sutton, 1987; Sutton, 1991; Motta, 1992; Chauvin and Hirschey, 1993; Ofek and Sarvary, 2003; McAlister et al., 2007; Fosfuri and Giarratana, 2009). However, given the more incomplete contract of R&D projects compared to advertising, we argue that the complexity and outcome of the monitoring by institutional investors are different across R&D and advertising.

The remainder of this paper is structured as follows. Section 4.2 presents literature review and hypothesis development. Section 4.3 describes the data, descriptive statistics and methodology. Section 4.4 discusses the empirical results and robustness checks. Section 4.5 concludes the paper.

4.2 Literature Review and Hypothesis Development

4.2.1 Product differentiation

Product differentiation is an effective way for firms to seek competitive edge in a competitive market. Hotelling (1929) and Chamberlin (1933) famously show that product differentiation is fundamental to profitability and theories of industrial organisation. Later, several theoretical models are built to permit a unified treatment of certain situations in which firms incur increased fixed costs with a view to enhancing

customers' willingness to pay for their respective products (Gabszewicz and Thisse, 1979; Shaked and Sutton, 1987; Sutton, 1991; Motta, 1992). These fixed costs include, in particular, the case of R&D expenditures devoted to product development or improvement, and the case of advertising outlays aimed at increasing perceived quality. For example, Shaked and Sutton (1987) build a theoretical model based on a two-stage process, where firms incur sunk costs choosing or developing their products at the first stage. Then, at the second stage, taking product specifications as fixed, they compete in prices. These two stages combines to promote product differentiation. The first stage is the time for firms to incur R&D or advertising costs and the second stage is to measure ex-post product market performance. Sutton (1991) also predicts that advertising and R&D can create endogenous barriers to entry through product differentiation. Overall, the extent of product differentiation is the outcome of prior R&D and advertising expenditure by the firm.

4.2.2 Institutional investors

Institutional investors could affect managers' decisions through various mechanisms such as the threat of exit, activism and voice, media use to pressure the management, direct negotiations with management and behind-the-scenes discussions with management or directors. Among these mechanisms, direct monitoring is the most prevalent ones documented in the literature (Hirschman, 1970; Parrino et al., 2003; Almazan et al., 2005; Gillan and Starks, 2007; Ferreira and Matos, 2008; Ferreira et al., 2010; Aggarwal, 2011; McCahery, 2016).

Compared to small and atomistic investors, shareholders with large shareholdings like large institutions are better motivated to monitor managers because the benefits that large shareholders obtain from active monitoring are more likely to exceed the costs that

they bear (Grossman and Hart, 1980; Shleifer and Vishny, 1986). Also, with a large ownership position of institutional investors over the firm, the management should care more how trading by these institutions affects their overall stock price and firm valuation if they are not happy with the corporate management (Hotchkiss and Strickland, 2003; Parrino et al., 2003). Therefore, large holdings enable institutional investors to be more capable of exerting greater influence on managerial decisions. Furthermore, sophistication of institutional investors allows them to collect firm information which can facilitate their monitoring more easily than average investors.

But there are reasons to expect that not all institutional investors share the same preference for activism due to the monitoring cost. Independent and foreign institutions are credited more with taking a more active stance, while other institutions that have business relations with local companies may feel compelled to be loyal to management. The empirical studies indicate that mutual funds and independent investment advisors are more likely to active or pressure-resistant monitors (Brickley et al.,1988; Almazan et al., 2005; Chen et al., 2007; Ferreira and Matos, 2008). The active institutional investors are more likely to collect information and face less regulatory restrictions or have fewer potential business relationships with the focal firm they invest in. While institutions like banks, insurance companies, pension fund and other institutions (e.g., trust, endowments) are more likely to be passive (Brickley et al.,1988; Almazan et al., 2005). Their existing or potential business relationship of these institutions with the firms they invest in tend to make these groups more pressure-sensitive with respect to corporate governance. Alternatively, the business connections between the institutions and the portfolio firms incur higher monitoring cost for these institutions.

4.2.3 R&D and advertising expenditure

Prior literature tends to treat R&D and advertising as the same type of expenditure in terms of investment productivity. For example, Chauvin and Hirschey (1993) provide evidence that advertising and R&D expenditures have large, positive and consistent influences on the market value of the firm. Ofek and Sarvary (2003) find that firms invest in R&D and marketing in an attempt to attain industry leadership, thus securing high profits and benefiting from advantages relevant for the success of future product generations. McAlister et al. (2007) hypothesize that a firm's advertising and R&D expenditures create intangible assets that insulate it from stock market changes, lowering its systematic risk. Fosfuri and Giarratana (2009) investigate the impact of rivals' product innovation and new advertising on a firm's financial market value in mature product markets. Although R&D and advertising expenditure can both contribute to product differentiation, they are different in the nature of inducing CEO efforts and corporate governance.

Firstly, the monitoring of R&D activity is inherently more difficult than advertising. Advertising is usually more specifically targeted and its outcome is less uncertain and easier to be expected. While the outcome of R&D is more difficult to define, measure or expect and depends on the relative movement in innovation strategies of other firms in the industry, resulting the incomplete contract for managers. The lack of accurate measurement of objective or target in R&D makes the monitoring of institutional investors more difficult. Also, compared to advertising, R&D activities can also cause higher information asymmetry between managers and shareholders which makes the monitoring more challenge. For example, the evaluation of R&D projects involves more technical or scientific skills which are difficult for average investors (Mina et al., 2013).

Secondly, the possibility to induce subsequent managerial actions to reflect institutional monitoring of R&D is lower compared to advertising. As the periodical progress and

outcome is easy to observe and evaluate, the monitoring of institutional investors can motivate the managers to refocus and improve their advertising plan or strategy. In contrast, it is difficult to evaluate the periodical progress of R&D unless the product is successfully developed. This makes it less capable to adjust the strategy during the R&D process. Thus, based on this, it is possible that the monitoring of institutional investors in R&D expenses is less effective than advertising expenses.

4.2.4 Hypothesis development

Based on above literature, we build our argument about the role of institutional investors in the governance of R&D and advertising expenditure and then the outcome of product development.

Given certain R&D and/or advertising investment, the productivity in facilitating product differentiation can depend on whether institutional investors monitor the firm by taking an active stance or just vote with their feet when unhappy with the corporate management. If institutional investors play an active monitoring role in the governance of R&D and advertising expenditure, they are more likely to exert a positive impact on the productivity of such investment as managers should induce more efforts if they are heavily monitored. In this sense, if incentive contracts for managers cannot fully overcome their adverse selection and moral hazard problems, increased monitoring by institutional investors acts as additional mechanism to enforce managerial efforts.

However, the effectiveness of institutional monitoring can vary across R&D and advertising activities. Advertising is naturally easier to monitor as the proposals are more fully developed and the outcome is less uncertain. In contrast, the monitoring of R&D process is more complicated and difficult. Thus, it is possible that institutional investors are less effective in monitoring R&D expenditure compared to advertising.

The willingness of institutional investors to monitor R&D and advertising can also depend on their type. Compared to passive institutional investors, the activism of active institutional investors can help better induce managerial efforts and reduce information asymmetry thus improving the efficiency of R&D and advertising investment.

4.3 Data and Methodology

4.3.1 Sample and data sources

We use firm-year level data on product differentiation, institutional ownership, R&D and advertising between 2000 and 2015. We start with Bloomberg, which covers accounting information for all US public firms listed on NYSE, NASDAQ and AMEX. Our primary measure for R&D and advertising for firm i in year t is firm i's annual R&D and advertising expenditure. The R&D and advertising expenses are also obtained from Bloomberg. It is worth noting that through our sample period some firms report missing R&D expenses. Following the literature (Chan et al., 2001; Hou et al., 2016), we only include firm-year observations with non-negative expenditures in the sample. We then match these data with measures for product similarity (Hoberg and Phillips Library) and institutional ownership (Thomson). Finally, we obtain 7,106 firm-year observations.

4.3.1.1 Dependent variables

Hoberg and Phillips (2015) develop a new algorithm to study how firms differ from their competitors using new time-varying measures of product similarity (Text-based Network Industry Classification, TNIC). This data is based on web-crawling and text parsing algorithms that process the text in the business descriptions of 10-K annual filings on the SEC Edgar website. These product descriptions are legally required to be

accurate, as Item 101 of Regulation S-K legally requires that firms describe the significant products they offer to the market. These descriptions help form new industry classifications based on the cluster of product market vocabulary among firms operating in the same market. Because the new time-varying measures of product similarity are a function of 10-K business descriptions, their classifications are based on the products that firms supply to the market, rather than production processes (as is the case for existing industry classification schemes). Therefore, their measure is an ex-post descriptions, which must also be updated and representative of the current fiscal year of the 10-K. The resulting database is based on all publicly traded firms (domestic firms traded on either NYSE, NASDAQ, or AMEX).

Hoberg and Phillips (2015) calculate firm-by-firm pairwise similarity scores by parsing the product descriptions from the firm 10Ks and forming word vectors for each firm to compute continuous measures of product similarity for every pair of firms in each year (a pairwise similarity matrix). For any two firms i and j, this algorithm generates a product similarity, which is a real number in the interval [0, 1] describing similarity between the words used by firms i and j. Based on this, TNIC3TSIMM is a total similarity score which describes the total product similarity of a firm within the industry. It is a valid measure of market structure and market power. A higher score of TNIC3TSIMM indicates that the text of the firms' business descriptions has more common vocabulary than a firm with a lower score and is negatively related to pricing power.

Hoberg and Phillips (2015) use this new classification and show that it is better at explaining the cross-section of firm characteristics. Their research also reveals that firms and industries move considerably within the product space over time, and they view TNIC industries to be far more informative and useful than Fixed Industry

Classifications, including SIC, NAICS. Compared to traditional industry classifications, TNIC are more likely to capture continuous measures of product market similarity and relatedness both within and across industries. The TNIC database is a non-transitive network and every firm has a unique industry. As such, the concentration index created from the TNIC has advantages in measuring product market characteristics than other traditional market competition measures like HHI, which is calculated from COMPUSTAT. Most importantly, it is at the firm-year level rather than industry-year level. According to the summary statistics in Table 2, the average product similarity index across our sample is 3.236 and the standard deviation is 3.927.

4.3.1.2 Main explanatory variables

For institutional ownership, we obtain the quarterly holding data on 13-F filings from Thomson. According to the Securities and Exchange Commission (SEC), all institutions that investment discretion over $100 million in equity assets are required to file a Form 13-F on a quarterly basis. Also, all common stock holdings of 10,000 or more shares or having a value of $200,000 or more must be reported. The institutional ownership data includes the name of each institutional investor, the number of shares owned and the number of shares outstanding. We calculate the percentage of outstanding shared held by each institution by taking the number of shares owned as the number of shares outstanding. As the institutional holdings are reported quarterly, we take the holding at the fourth quarter as the annual institutional holding for each investor. Then, we aggregate the annual shareholding for all institutional investors in a firm as the firm level annual institutional ownership, denoted as Inst_Own.

Thomson records all institutions into five types: banks (type code = 1, narrowly defined as financial institutions that accept and manage deposits and make loans, or loosely

"commercial banks"), insurance companies (type code = 2), investment companies (type code = 3, mostly mutual fund management companies), independent investment advisors (type code = 4, including asset management companies, investment banks, brokers, private wealth management companies, etc.), and others (type code = 5, including pension funds, endowment funds, most of the hedge funds, financial arms of corporations, and others). Following the literature (Brickley et al.,1988; Almazan et al., 2005; Chen et al., 2007; Ferreira and Matos, 2008), we classify investment companies and independent investment advisors (type code= 3 and 4) as active/pressure-resistant institutional investors and all other types as passive/pressure-sensitive institutional investors. We aggregate the holding by all passive institutional investors as passive institutional ownership denoted as Inst_Own_Passive and aggregate the holding by all active institutional investors as active institutional ownership denoted as Inst_Own_Active. In Table 2, we find the average institutional ownership for all sample firms over 2000 and 2015 is 53.4%. Among them, active institutional ownership accounts for 43.1% and passive institutional ownership accounts for 10.2%. This suggests that the dominance of active institutional investors is more prevalent.

We obtain firm level R&D expenses and advertising expenses from Bloomberg. The Positive R&D Dummy is a dummy variable, which equals one for firms having non-zero R&D expenditures, and zero otherwise. Similarly, the Positive Advertising Dummy is a dummy variable, which equals one for firms having non-zero advertising expenditures, and zero otherwise. This allows us to examine the effects of having R&D and advertising projects on product similarity without the influence from accounting standards regarding entering R&D and adverting expenses.

4.3.1.3 Control variables

We also control for a series of firm characteristics that can affect product similarity. According to the industry organisation literature mentioned above (e.g., Ofek and Sarvary, 2003), the firm's position in the industry is a key determinant of market power and product differentiation. We measure a firm's industry position as Ind_Position, which is a dummy variable that equals one when the sales of a firm are is above the median sales within the industry (Standard Industry Classification). Log Assets is the logarithm of total assets. Log PPE is the logarithm of net plant, property and equipment. Log Market value is the logarithm of market capitalization.

All variable definitions are summarized in Table 4.1. Table 4.2 provides descriptive statistics and pairwise correlations of the variables used in the regression analysis. The magnitude of VIF is generally small, indicating that the probability of multicollinearity is relatively low.

<Insert Tables 4.1 and 4.2 about here>

4.4 Models

We apply regression models to explore the role of institutional investors in promoting product differentiation through monitoring R&D and advertising expenses. The regression models include product similarity index (TNIC3TSIMM) as the dependent variable and institutional ownership (Inst_Own), R&D (Positive R&D Dummy) and advertising (Positive Advertising Dummy) as the main explanatory variables. These variables (Inst_Own, Positive R&D Dummy and Positive Advertising Dummy) measure the direct effects of institutional ownership, R&D and advertising projects on product differentiation. As our main focus is whether the presence of institutional investors can improve the innovation outcomes given certain R&D and advertising expenditure, we interact the institutional ownership with R&D and advertising, respectively. The

interaction terms capture the indirect and moderating effect of institutional holding on product differentiation given certain level of innovation expenses. Ofek and Sarvary (2003) discuss how being a leader impacts a firm's investment productivity, defined as the marginal change in the probability of winning the next round of product success. This suggests that a firm's industry position can also affect its innovation productivity. Thus, we also interact industry position with R&D dummy and advertising dummy separately to investigate the indirect and moderating effect of industry position on product differentiation after controlling R&D and advertising expenses.

In all models, standard errors are heteroskedasticity-robust and clustered at the firm level. All explanatory and control variables are lagged for one year to mitigate the endogeneity problem. Year dummies and industry dummies (Standard Industry Classification) are added to control for possible year-specific and industry-specific effects. To reduce the influence of outliners, each of these continuous variables is winsorized at the 1st and 99th percentiles.

4.5 Empirical Results

4.5.1 Aggregated institutional ownership, R&D, Advertising and product differentiation

Table 4.3 reports the regression results of product similarity on aggregated institutional ownership, R&D dummy, advertising dummy and the interactions of institutional ownership with two dummies respectively. The coefficient of institutional ownership in Model (1) is 1.246 (significant at the 1% level). This shows the direct effect of institutional ownership on product similarity without any controls. Overall, the presence of institutional investors increases firm-level product similarity. The result is similar

(with the coefficient 0.964 for Inst_Own) after controlling other firm characteristics like assets value, property, plant and equipment and market value in Model (2).

Following Sutton (1991) and Hoberg and Phillips (2015), we introduce positive R&D dummy and positive advertising dummy in Model (3), which measures the direct effects of R&D and advertising on product differentiation. Sutton (1991) predicts that firm's industry similarity and profitability changes over time as they incur sunk costs such as R&D and advertising and these costs can create endogenous barriers to entry. A key assumption of his framework is that R&D and advertising (which might be geared toward improving product appeal), are effective in reducing ex-post product similarity. In Model (3), the coefficient of Positive R&D Dummy is -0.600. Thus, we document a significantly negative relationship between R&D and product similarity, which suggests that the firms with non-zero R&D are more competitive within the industry as they display a lower product similarity. However, we do not find advertising is significantly associated with a decrease in ex-post product similarity.

To test our main hypotheses, we construct the interaction of institutional ownership with R&D dummy and then with advertising dummy, respectively. Given certain R&D expenses, the coefficient of the interaction between institutional investors and R&D dummy should be significantly negative if the monitoring of institutional investors can improve the productivity of R&D expenses by reducing product similarity. Similarly, given certain advertising expenses, the coefficient of the interaction between institutional investors and advertising should be significantly negative if the monitoring of institutional investors can improve the productivity of advertising expenses by reducing product similarity. Interestingly, in Model (4), we find that the coefficient of interaction between institutional ownership and advertising is significantly negative, suggesting that the presence of institutional investors is effective in reducing product

similarity through monitoring advertising expenses. However, we do not document any significant relationship for the monitoring of institutional investors on R&D.

As the firm's industry position largely determines its product characteristics, we later include a firm's industry position in Model (5). The coefficient of industry position is -0.502 and significant at the 1% level. In line with the intuition, we document that firms with higher industry position, i.e., industry leaders, exhibit lower product similarity than firms with lower industry position, i.e., industry followers. As mentioned above, firm's industry position can affect their innovation outcomes. Therefore, in Model (6), we also introduce the interaction of industry position with R&D and advertising, separately. The coefficient of the interaction between industry position and R&D is -0.729, which is significantly negative, indicating that given certain R&D expenses, the productivity of R&D in reducing product similarity is higher for industry leaders in contrast with industry followers. However, the coefficient 2.370 of the interaction between institutional ownership and advertising is not significant.

Consistent with previous literature (Aghion et al, 2013; Hoberg and Phillips, 2015), we find that firm size (Log Assets, Log Market Value) is negatively correlated with product innovation outcome and capital (Log PPE) is positively correlated with product innovation outcome.

<Insert Table 4.3 about here>

4.5.2 Passive and active institutional ownership, R&D, advertising and product differentiation

In Table 4.3, we document that the direct effect of the presence of institutional investors on product differentiation is negative. To test whether the type of institutional investors

matters for their role in product differentiation, we then classify institutional investors depending on whether they are active or passive. In Table 4, we find the negative effect of institutional investors on product differentiation is largely due to the active institutional investors. The coefficients of Inst_Own_Active in Model (1) and Model (2) (1.448 and 1.153, respectively) are positively significant at the 1% level, while the coefficient of Inst_Own_Passive is not significant. This suggests that it is mainly active institutional investors that discourage firm's product differentiation.

After interacting passive institutional ownership with R&D and advertising separately, we find neither of them are significant. This proves that the monitoring effect of passive institutional investors on product innovation process is limited. As we hypothesize, the existing or potential business relationships of these institutions with the firms make this group more pressure-sensitive with respect to corporate governance. Alternatively, the business connections between the institutions and portfolio firms incur higher monitoring cost for these institutional investors who tend to take a passive monitoring position.

In contrast, active institutional investors play a more active role in inducing managerial efforts but their monitoring effect is only effective towards advertising rather than R&D. The coefficient of the interaction between Inst_Own_Active and Positive Advertising Dummy in Model (4) is -8.554 (significant at the 5% level). However, the coefficient of the interaction between Inst_Own_Active and Positive R&D Dummy in Model (4) is not significant. The different results between R&D and advertising in the interactions with institutional ownership show that the monitoring effectiveness is different in financing projects with different degrees of uncertainty and information asymmetry.

<Insert Table 4.4 about here>

4.6 Conclusion

This study investigates the extent to which institutional investors can shape a firm's industrial competitiveness through their effect on the governance of R&D and advertising expenditures. Our evidence suggests that institutional investors can promote product differentiation by monitoring managers and mitigating the problems associated with the incomplete contracts. We also find the monitoring role of institutional investors is effective in the governance of advertising, but does not affect the firm's industry competitiveness through the governance of R&D. Finally, we classify institutional investors into active and passive groups and show that the monitoring role is dominated by the active group.

We highlight the influence of institutional investors on product market dynamics through their monitoring role on R&D and advertising expenditures. As a result of the growing dominance of institutional investors, their impact on corporate decisions and performance, such as firm value, CEO turnover, merge and acquisition and dividend policy, is widely discussed in the literature (Parrino et al., 2003; Chen et al., 2007; Ferreira et al., 2010; Aggarwal et al., 2011; Firth et al., 2016). However, less attention has been paid to whether institutional investors' activism can increase a firm's industrial competitiveness. To the best of our knowledge, this is the first study to focus on the relationship between institutional ownership and product differentiation, which offers new insights on the monitoring role of institutional investors in corporate governance.

We also extend the industrial organisation literature (Hotelling, 1929; Shaked and Sutton, 1987; Nevo, 2000; Gowrisankaran and Rysman, 2012; Hoberg and Phillips, 2015) by interacting industrial competitiveness with corporate governance. Under Sutton's (1991) framework, R&D and advertising expenditures as sunk costs can create

unique products that appeal to quality-sensitive consumers, thus creating endogenous barriers to entry. However, existing studies do not consider the investigate the impact of the governance issue relating to R&D and advertising expenditures on the productivity of product differentiation and a firm's industry competitiveness. Our study takes a step further by examining how the governance of such expenditures affects product differentiation.

Lastly, we distinguish the effect of R&D from advertising expenditures on product differentiation. This distinction provides a unique opportunity to examine the effectiveness of institutional investor activism. We argue that because R&D projects are riskier and more complex than advertising, institutional investors will be less effective in monitoring R&D than advertising.

Our study has limitations. As we take the product differentiation as the outcome of product innovation and a better outcome of innovation is induced by the managerial efforts. However, managerial efforts cannot be observed directly, the results can only suggest the role of managerial efforts.

Chapter 5

Conclusion and Discussion

Firstly, we study potential information leakage from corporate insiders to short sellers by examining abnormal short sales around insider transactions. Our results suggest that short sellers initiate their short positions before insider sales are publicly reported (i.e., ahead of average investors), indicating the potential for information leakage. Interestingly, in family controlled firms, the intensity of short selling exhibits a non-monotonic function of family control rights: it increases with family control in general, but weakens for firms with higher levels of family control. After distinguishing insider sales placed by family members from those placed by non-family insiders, we find that transactions by non-family insiders trigger larger abnormal short sales than those by family insiders. Furthermore, following Cohen *et al*. (2012), we conduct a sub-sample analysis by distinguishing between routine and opportunistic insider trades, as opportunistic ones are more likely to result from private information. We find greater abnormal short selling volume for opportunistic trades for weakly controlled family firms and by non-family insiders.

The main argument in favor of informed trading by insiders and short sellers is that it conveys private information to the capital market, thus allowing better price discovery and improving market efficiency (Jaffe, 1974; Seyhun, 1986; Leland, 1992; Chang *et al*., 2007; Boehmer and Wu, 2012). However, the superior return predictability of informed trading can undermine the confidence of average investors and further limit capital market development. Our empirical evidence suggests that even without the involvement of the market makers who are largely alleged to be the source of information leakage in the US, short sellers can still respond and move faster than other

market participants. Our research also provides additional evidence related to information leakage due to the potential conflict of interests in family firms.

Secondly, we find evidence that institutional investors prefer firms whose CEOs have more business ties and industry experience in the long run, while their preference for political capital is more likely to be short term. In particular, this preference heterogeneity for different types of CEO human capital is more pronounced for short-term institutional investors. Compared to long-term investors, short-term investors do not value the competitive advantage brought by CEO business ties and industry experience. That their dynamic marginal holdings increase due to political capital change around CEO turnover represents their compliance with a short investment horizon.

Although a large body of literature has studied whether CEO human capital can help firms increase performance, the reluctance of accountants to extend the boundaries of corporate balance sheets beyond tangible assets partly reflects the difficulties of valuation. The heterogeneity and imperfect transferability of most intangible resources also precludes the use of market prices. We measure the value of intangible resources such as CEO human capital from the shareholder perspective on value, which contributes to the literature of firm valuation. We also show that institutional investors are heterogeneous in their actions and strategies and demonstrate that the investment horizon explains some of the differences in investor decisions.

Thirdly, consistent with our conjecture that institutional investors' monitoring can promote product innovation, we find that given certain expenditures, the presence of institutional ownership can help improve firm's industry position by decreasing product similarity. However, this relationship only holds for advertising but not for R&D as the

monitoring effect of institutions on R&D projects is very limited. After classifying institutional investors into active and passive groups, we find that the monitoring effect of advertising is mainly contributed by active institutional investors, rather than passive institutional investors.

Interestingly, in addition to their monitoring role on R&D and advertising expenses, we also find institutional investors, especially active institutional investors tend to discourage product differentiation overall. This evidence draws further implications on how the presence of institutions affects corporate strategies, in particular industry competitiveness. Also, we find the product outcome of R&D depends on firm's initial industry position. The R&D investment productivity measured by product differentiation tends to be greater for industry leaders but lower for followers within the industry. Thus, given certain R&D expenditure, the leaders can make better use of it to innovate than the followers. However, we do not document significant difference in the innovation productivity between industry leaders and followers with respect to advertising expenditure.

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Table 1.1
CEO, Insider and Institutional Stock Holdings as Percent of Total Shares Outstanding Worldwide

Industry Name	Number of Firms	CEO Holding	Institutional Holdings	Insider Holdings
Advertising	251	14.52%	23.49%	27.45%
Aerospace/Defense	222	6.37%	35.11%	15.61%
Air Transport	158	3.96%	25.65%	11.85%
Apparel	1171	14.02%	14.60%	33.88%
Auto & Truck	128	6.04%	21.00%	9.53%
Auto Parts	642	9.22%	19.38%	21.77%
Bank (Money Center)	623	1.15%	20.57%	8.35%
Banks (Regional)	889	1.51%	28.82%	10.63%
Beverage (Alcoholic)	223	10.24%	19.63%	17.79%
Beverage (Soft)	103	4.94%	19.30%	21.27%
Broadcasting	142	9.80%	27.63%	18.04%
Brokerage & Investment Banking	569	12.03%	18.15%	28.92%
Building Materials	434	8.29%	23.05%	22.75%
Business & Consumer Services	772	9.95%	30.53%	26.46%
Cable TV	63	4.12%	28.25%	11.03%
Chemical (Basic)	774	9.48%	14.28%	22.84%
Chemical (Diversified)	81	1.24%	27.77%	9.05%
Chemical (Specialty)	731	8.09%	21.29%	19.54%
Coal & Related Energy	278	5.34%	15.25%	16.70%
Computer Services	929	11.06%	21.29%	25.62%
Computers/Peripherals	327	8.96%	22.09%	18.57%
Construction Supplies	757	6.36%	20.08%	17.00%
Diversified	356	6.56%	22.44%	19.17%
Drugs (Biotechnology)	884	5.05%	26.12%	15.21%
Drugs (Pharmaceutical)	971	8.68%	19.93%	20.22%
Education	174	11.31%	24.37%	24.72%
Electrical Equipment	856	9.11%	16.05%	22.47%

Electronics (Consumer & Office)	153	9.65%	18.71%	21.33%
Electronics (General)	1239	8.74%	19.86%	20.78%
Engineering/Construction	1118	8.93%	20.01%	21.20%
Entertainment	353	12.73%	16.85%	26.82%
Environmental & Waste Services	306	9.74%	21.83%	24.77%
Farming/Agriculture	388	9.62%	17.31%	21.09%
Financial Svcs. (Non-bank & Insurance)	1016	7.06%	24.68%	20.64%
Food Processing	1275	10.29%	18.28%	23.52%
Food Wholesalers	128	9.13%	19.01%	22.89%
Furn/Home Furnishings	307	12.39%	20.33%	28.53%
Green & Renewable Energy	179	7.33%	17.01%	16.63%
Healthcare Products	677	6.71%	28.66%	20.09%
Healthcare Support Services	334	10.37%	28.55%	23.61%
Heathcare Information and Technology	322	9.87%	28.19%	22.79%
Homebuilding	173	10.98%	34.41%	20.44%
Hospitals/Healthcare Facilities	192	8.85%	32.18%	24.15%
Hotel/Gaming	658	9.73%	22.23%	21.40%
Household Products	494	13.70%	20.24%	28.65%
Information Services	186	5.62%	37.78%	17.68%
Insurance (General)	233	7.17%	28.99%	15.19%
Insurance (Life)	123	1.38%	34.09%	8.21%
Insurance (Prop/Cas.)	227	2.91%	38.35%	14.77%
Investments & Asset Management	1013	9.95%	27.02%	22.90%
Machinery	1270	9.03%	21.03%	22.29%
Metals & Mining	1517	5.36%	11.97%	17.42%
Office Equipment & Services	159	11.36%	21.39%	26.56%
Oil/Gas (Integrated)	49	1.28%	25.55%	3.49%
Oil/Gas (Production and Exploration)	964	5.57%	24.37%	15.12%

Oil/Gas Distribution	210	3.88%	31.59%	7.71%
Oilfield Svcs/Equip.	544	7.04%	26.95%	15.27%
Packaging & Container	395	12.74%	20.10%	29.85%
Paper/Forest Products	296	7.32%	19.70%	21.21%
Power	569	3.19%	22.26%	8.48%
Precious Metals	961	4.69%	16.69%	15.82%
Publishing & Newspapers	364	7.52%	23.70%	22.85%
R.E.I.T.	527	2.01%	53.23%	6.74%
Real Estate (Development)	746	14.83%	14.79%	28.45%
Real Estate (General/Diversified)	420	10.78%	17.36%	19.14%
Real Estate (Operations & Services)	606	9.32%	23.25%	22.27%
Recreation	307	10.41%	22.75%	21.28%
Reinsurance	38	2.34%	44.78%	6.20%
Restaurant/Dining	346	10.20%	30.52%	20.57%
Retail (Automotive)	163	11.31%	27.34%	24.17%
Retail (Building Supply)	50	4.48%	32.24%	16.76%
Retail (Distributors)	929	10.22%	21.76%	25.40%
Retail (General)	220	6.70%	24.93%	13.25%
Retail (Grocery and Food)	163	6.56%	22.27%	17.18%
Retail (Online)	190	12.88%	28.15%	26.33%
Retail (Special Lines)	505	10.71%	29.99%	24.71%
Rubber& Tires	87	9.69%	16.48%	19.66%
Semiconductor	535	6.83%	22.81%	15.05%
Semiconductor Equip	258	10.60%	23.15%	18.90%
Shipbuilding & Marine	326	6.37%	17.29%	14.23%
Shoe	89	9.45%	20.90%	28.89%
Software (Entertainment)	120	13.15%	16.79%	26.86%
Software (Internet)	830	13.79%	22.88%	28.15%
Software (System & Application)	1026	11.34%	23.51%	25.75%

Steel	737	9.50%	15.40%	22.96%
Telecom (Wireless)	106	5.05%	23.90%	12.23%
Telecom. Equipment	480	8.45%	22.50%	19.14%
Telecom. Services	297	8.45%	25.17%	17.17%
Tobacco	59	10.38%	26.11%	13.48%
Transportation	221	11.13%	22.03%	18.16%
Transportation (Railroads)	49	0.24%	31.33%	3.07%
Trucking	195	7.71%	28.31%	19.39%
Utility (General)	57	2.45%	40.82%	5.59%
Utility (Water)	96	2.21%	24.32%	8.92%
Total Market	**42678**	**8.55%**	**22.50%**	**20.83%**
Total Market (without financials)	**37762**	**8.90%**	**22.23%**	**21.33%**

Source: Date updated: 05-Jan-17; Created by: Aswath Damodaran
Data website:http://www.stern.nyu.edu/~adamodar/New_Home_Page/data.html
Companies in each industry:http://www.stern.nyu.edu/~adamodar/pc/datasets/indname.xls
Variable definitions: http://www.stern.nyu.edu/~adamodar/New_Home_Page/datafile/variable.htm

Table 1.2
CEO, Insider and Institutional Stock Holdings as Percent of Total Shares Outstanding in the US

Industry Name	Number of Firms	CEO Holding	Institutional Holdings	Insider Holdings
Advertising	41	10.75%	24.11%	27.18%
Aerospace/Defense	96	3.44%	53.40%	12.64%
Air Transport	18	1.97%	63.98%	5.62%
Apparel	58	11.64%	53.00%	22.34%
Auto & Truck	15	16.27%	68.51%	22.27%
Auto Parts	63	7.92%	55.91%	16.76%
Bank (Money Center)	10	0.22%	55.06%	6.96%
Banks (Regional)	645	1.86%	32.24%	12.50%
Beverage (Alcoholic)	25	16.46%	37.90%	33.76%
Beverage (Soft)	36	5.72%	19.84%	22.93%
Broadcasting	30	8.97%	55.09%	25.09%
Brokerage & Investment Banking	45	7.29%	61.31%	16.09%
Building Materials	41	4.44%	64.60%	9.63%
Business & Consumer Services	165	6.44%	54.01%	18.73%
Cable TV	14	6.62%	46.94%	15.42%
Chemical (Basic)	45	7.89%	31.03%	21.39%
Chemical (Diversified)	8	0.70%	78.60%	2.17%
Chemical (Specialty)	100	2.33%	54.20%	10.28%
Coal & Related Energy	38	2.27%	18.85%	10.93%
Computer Services	117	7.71%	47.65%	19.86%
Computers/Peripherals	55	5.96%	41.49%	11.71%
Construction Supplies	51	5.55%	70.78%	9.42%
Diversified	24	6.60%	56.25%	8.72%
Drugs (Biotechnology)	426	3.79%	35.88%	11.66%
Drugs (Pharmaceutical)	164	5.66%	36.10%	15.42%
Education	36	8.48%	52.64%	19.23%

Electrical Equipment	119	7.79%	32.26%	19.81%
Electronics (Consumer & Office)	24	12.74%	24.46%	26.67%
Electronics (General)	164	5.40%	42.52%	15.56%
Engineering/Construction	48	4.27%	62.72%	10.94%
Entertainment	79	10.69%	33.74%	24.71%
Environmental & Waste Services	89	6.25%	34.94%	21.81%
Farming/Agriculture	37	7.12%	42.88%	18.50%
Financial Svcs. (Non-bank & Insurance)	258	3.89%	37.39%	12.32%
Food Processing	87	7.04%	53.16%	18.00%
Food Wholesalers	16	5.10%	54.66%	11.40%
Furn/Home Furnishings	30	10.50%	52.65%	28.16%
Green & Renewable Energy	25	5.64%	34.70%	14.42%
Healthcare Products	254	4.45%	41.34%	14.14%
Healthcare Support Services	121	8.95%	50.26%	21.04%
Heathcare Information and Technology	125	8.67%	43.44%	18.50%
Homebuilding	33	5.03%	73.94%	9.99%
Hospitals/Healthcare Facilities	38	7.16%	63.76%	15.92%
Hotel/Gaming	69	7.27%	47.11%	20.99%
Household Products	129	13.05%	32.73%	25.38%
Information Services	64	5.64%	62.98%	14.57%
Insurance (General)	19	4.87%	60.93%	15.64%
Insurance (Life)	22	2.14%	63.97%	6.44%
Insurance (Prop/Cas.)	50	3.22%	60.49%	12.78%
Investments & Asset Management	156	10.73%	45.70%	18.80%
Machinery	127	4.21%	63.60%	11.48%
Metals & Mining	97	7.00%	19.55%	17.39%
Office Equipment & Services	24	3.45%	56.32%	9.91%
Oil/Gas (Integrated)	7	0.07%	52.94%	0.48%

Oil/Gas (Production and Exploration)	330	7.03%	33.21%	15.17%
Oil/Gas Distribution	78	0.39%	43.11%	2.81%
Oilfield Svcs/Equip.	148	6.79%	50.16%	12.76%
Packaging & Container	26	4.68%	74.40%	11.53%
Paper/Forest Products	23	1.79%	68.92%	6.37%
Power	68	1.84%	59.95%	5.21%
Precious Metals	109	6.57%	18.60%	18.16%
Publishing & Newspapers	37	2.63%	57.58%	15.27%
R.E.I.T.	238	1.57%	73.67%	4.42%
Real Estate (Development)	18	7.52%	45.15%	46.85%
Real Estate (General/Diversified)	11	6.79%	46.20%	19.23%
Real Estate (Operations & Services)	54	14.28%	32.73%	27.15%
Recreation	66	8.79%	56.49%	18.02%
Reinsurance	3	0.53%	74.71%	2.50%
Restaurant/Dining	86	4.52%	64.68%	11.63%
Retail (Automotive)	25	1.31%	72.05%	8.82%
Retail (Building Supply)	6	0.08%	66.83%	13.19%
Retail (Distributors)	88	12.51%	56.33%	21.76%
Retail (General)	19	5.79%	79.07%	12.09%
Retail (Grocery and Food)	14	9.94%	52.70%	23.68%
Retail (Online)	57	10.11%	54.29%	23.77%
Retail (Special Lines)	108	4.26%	67.40%	14.34%
Rubber& Tires	4	0.52%	63.86%	1.33%
Semiconductor	80	2.76%	62.35%	7.20%
Semiconductor Equip	45	1.99%	58.18%	10.24%
Shipbuilding & Marine	11	10.28%	40.47%	22.52%
Shoe	10	1.52%	64.55%	8.35%
Software (Entertainment)	13	14.59%	43.46%	18.29%

Software (Internet)	297	10.50%	37.63%	24.32%
Software (System & Application)	236	7.77%	47.49%	19.90%
Steel	38	4.03%	55.57%	7.14%
Telecom (Wireless)	17	7.26%	41.11%	12.88%
Telecom. Equipment	107	4.84%	48.49%	11.55%
Telecom. Services	67	6.32%	42.45%	16.98%
Tobacco	22	14.67%	41.13%	19.87%
Transportation	17	3.49%	70.76%	11.29%
Transportation (Railroads)	7	0.18%	58.29%	0.75%
Trucking	30	8.19%	68.38%	26.53%
Utility (General)	18	0.14%	74.89%	0.55%
Utility (Water)	22	1.12%	34.99%	7.32%
Total Market	**7330**	**5.69%**	**46.70%**	**15.10%**
Total Market (without financials)	**6100**	**6.10%**	**48.50%**	**15.51%**

Source: Date updated: 05-Jan-17; Created by: Aswath Damodaran
Data website:http://www.stern.nyu.edu/~adamodar/New_Home_Page/data.html
Companies in each industry:http://www.stern.nyu.edu/~adamodar/pc/datasets/indname.xls
Variable definitions: http://www.stern.nyu.edu/~adamodar/New_Home_Page/datafile/variable.htm

Table 1.3
CEO, Insider and Institutional Stock Holdings as Percent of Total Shares Outstanding in China

Industry Name	Number of Firms	CEO Holding	Institutional Holdings	Insider Holdings
Advertising	30	22.57%	12.75%	30.15%
Aerospace/Defense	18	4.69%	15.65%	10.54%
Air Transport	17	7.08%	14.42%	9.63%
Apparel	194	18.39%	11.85%	27.07%
Auto & Truck	31	3.04%	11.22%	9.42%
Auto Parts	103	13.83%	11.37%	22.65%
Bank (Money Center)	22	1.20%	16.50%	3.97%
Banks (Regional)	20	0.02%	11.76%	1.35%
Beverage (Alcoholic)	42	16.71%	14.13%	9.97%
Beverage (Soft)	4	6.95%	17.52%	37.74%
Broadcasting	7	21.81%	12.91%	25.02%
Brokerage & Investment Banking	71	17.34%	10.10%	19.60%
Building Materials	43	9.75%	10.11%	24.49%
Business & Consumer Services	63	17.95%	9.94%	33.19%
Cable TV	11	0.03%	8.49%	7.36%
Chemical (Basic)	174	12.00%	9.19%	20.99%
Chemical (Diversified)	8	0.65%	12.97%	19.61%
Chemical (Specialty)	141	14.58%	11.26%	22.77%
Coal & Related Energy	48	14.01%	11.23%	17.93%
Computer Services	100	16.10%	13.43%	29.30%
Computers/Peripherals	42	13.68%	9.97%	28.14%
Construction Supplies	126	4.46%	11.70%	14.03%
Diversified	24	1.95%	14.08%	16.48%
Drugs (Biotechnology)	35	13.05%	15.12%	22.07%
Drugs (Pharmaceutical)	197	11.34%	12.87%	19.25%
Education	13	16.14%	14.22%	30.12%
Electrical Equipment	207	12.90%	10.93%	24.23%
Electronics (Consumer & Office)	34	14.09%	11.01%	22.93%
Electronics (General)	212	12.53%	13.26%	25.48%
Engineering/Construction	142	17.88%	13.20%	23.07%
Entertainment	48	8.64%	7.82%	28.08%
Environmental & Waste Services	48	15.87%	11.23%	27.45%
Farming/Agriculture	53	10.93%	15.63%	18.12%
Financial Svcs. (Non-bank & Insurance)	56	16.48%	8.47%	33.78%
Food Processing	152	17.29%	13.26%	22.25%
Food Wholesalers	9	3.76%	17.11%	22.40%
Furn/Home Furnishings	68	13.31%	15.54%	25.00%
Green & Renewable Energy	25	6.27%	9.60%	9.74%
Healthcare Products	40	11.63%	12.51%	28.73%
Healthcare Support Services	44	20.88%	12.98%	24.55%

Heathcare Information and Technology	11	29.07%	12.94%	41.18%
Homebuilding	5	0.05%	3.62%	27.64%
Hospitals/Healthcare Facilities	8	13.17%	24.86%	33.37%
Hotel/Gaming	86	13.32%	11.19%	16.97%
Household Products	60	19.72%	10.56%	32.36%
Information Services	9	8.15%	6.28%	27.51%
Insurance (General)	4	0.00%	14.92%	8.01%
Insurance (Life)	5	0.03%	26.63%	0.53%
Insurance (Prop/Cas.)	3	0.07%	10.03%	58.12%
Investments & Asset Management	34	21.10%	23.23%	27.86%
Machinery	251	13.06%	10.86%	25.15%
Metals & Mining	99	7.21%	10.74%	19.12%
Office Equipment & Services	12	15.62%	12.39%	44.29%
Oil/Gas (Integrated)	5	2.18%	11.42%	1.52%
Oil/Gas (Production and Exploration)	20	23.29%	10.15%	30.46%
Oil/Gas Distribution	13	43.62%	11.47%	32.79%
Oilfield Svcs/Equip.	50	14.00%	12.93%	22.74%
Packaging & Container	57	25.85%	12.99%	33.09%
Paper/Forest Products	45	9.53%	9.95%	16.76%
Power	77	2.17%	14.20%	4.30%
Precious Metals	25	6.28%	9.14%	19.16%
Publishing & Newspapers	48	1.56%	13.27%	14.31%
R.E.I.T.	2	0.09%	27.59%	0.15%
Real Estate (Development)	200	22.97%	11.72%	23.73%
Real Estate (General/Diversified)	80	10.74%	11.79%	14.75%
Real Estate (Operations & Services)	69	9.15%	8.03%	24.18%
Recreation	45	21.97%	11.02%	26.29%
Reinsurance	1	0.00%	1.98%	0.00%
Restaurant/Dining	31	19.03%	12.26%	33.13%
Retail (Automotive)	21	14.91%	11.10%	31.11%
Retail (Building Supply)	3	34.10%	0.18%	39.29%
Retail (Distributors)	130	16.86%	9.77%	24.15%
Retail (General)	66	13.93%	10.22%	13.17%
Retail (Grocery and Food)	17	13.73%	13.17%	22.09%
Retail (Online)	3	47.25%	7.29%	21.44%
Retail (Special Lines)	56	20.80%	11.97%	30.71%
Rubber& Tires	12	18.93%	12.59%	12.10%
Semiconductor	62	8.51%	12.53%	21.26%
Semiconductor Equip	10	5.74%	17.05%	16.45%
Shipbuilding & Marine	47	2.97%	12.04%	7.41%
Shoe	25	17.23%	13.54%	33.54%
Software (Entertainment)	16	17.20%	7.70%	41.70%

Software (Internet)	50	14.96%	15.71%	34.82%
Software (System & Application)	91	10.12%	12.49%	26.00%
Steel	95	11.83%	9.69%	16.56%
Telecom (Wireless)	6	17.40%	12.12%	35.62%
Telecom. Equipment	93	11.93%	11.88%	23.83%
Telecom. Services	18	4.44%	16.09%	16.56%
Tobacco	0	0.00%	0.00%	0.00%
Transportation	51	12.19%	12.21%	13.61%
Transportation (Railroads)	6	0.02%	14.25%	4.84%
Trucking	18	6.07%	12.19%	12.50%
Utility (General)	4	0.00%	9.64%	9.92%
Utility (Water)	31	3.82%	11.67%	10.52%
Total Market	**5008**	**13.86%**	**11.86%**	**22.53%**
Total Market (without financials)	**4751**	**14.00%**	**11.91%**	**22.79%**

Source: Date updated: 05-Jan-17; Created by: Aswath Damodaran
Data website:http://www.stern.nyu.edu/~adamodar/New_Home_Page/data.html
Companies in each industry:http://www.stern.nyu.edu/~adamodar/pc/datasets/indname.xls
Variable definitions: http://www.stern.nyu.edu/~adamodar/New_Home_Page/datafile/variable.htm

Table 2.1
Dataset Selection Procedure

Multiple transactions executed by the same person on one day are recorded as one transaction and the transaction size is consolidated. Insider sales within 20 days of earnings and dividend announcements are eliminated. When multiple transactions are made by one insider within 30 consecutive days, only the first transaction is retained. Stocks that are ineligible for short selling are excluded. Financial firms such as banks, insurance companies, investment funds, and real estates are also excluded. A sample of 1,148 observations for 254 firms is finally obtained.

Sample selection procedure	Obs.	Firms
Open market sale transactions for all insiders	7,921	726
Consolidated transactions for each insider on the same day	7,736	726
Excluding sales within 20 days of dividend and earnings announcements	5,915	671
Excluding multiple sales executed within 30 consecutive days for each insider	2,546	667
Excluding stocks that could not be short sold during the sample period	1,341	320
Excluding financial firms (banks, insurance, investment funds and real estates)	1,148	254

Table 2.2

Summary Statistics for Directors' Trades, Large Controlling Shareholders, and Family Control

Panel A reports the summary statistics for transaction size by category of director from January 2009 to December 2014. The transaction size is measured by the number of shares traded as a percentage of the number of shares outstanding. Other senior executives include the chief financial officer, chief operating officer, chief investment officer, and managers. Panel B records the summary statistics for the controlling power of large controlling shareholders. For family-controlled firms, this is measured as the voting rights by all family shareholders; for state-controlled firms, it is measured as the voting rights by the state; for non-controlled firms, it is measured as the voting rights held by the largest substantial shareholder. Panel C shows the summary statistics for family control in family firms. *Family board seats* is the number of family members sitting on the board. *Family board presence (%)* is the number of family members sitting on the board as a percentage of the total number of board members.

Panel A: Summary statistics for transaction size by category of director (%)						
	Obs.	Mean	Median	1%	99%	Std.Dev.
Chairman	231	1.474	0.063	0.001	13.658	3.066
Chief executives	115	0.980	0.044	0.000	19.500	3.203
Other senior executives	92	0.057	0.023	0.000	0.621	0.102
Executive directors	414	0.327	0.021	0.000	6.944	1.757
Non-executive directors	118	0.383	0.030	0.000	6.307	1.227
Independent directors	178	0.018	0.006	0.000	0.197	0.045
All insiders	1,148	0.509	0.022	0.000	11.326	2.023
Panel B: Summary statistics for the controlling power of large controlling shareholders (%)						
	Obs.	Mean	Median	1%	99%	Std.Dev.
Family-controlled firms	141	51.186	50.320	30.690	79.140	13.494
Non-controlled firms	72	20.785	21.580	1.477	29.880	6.447
State-controlled firms	41	51.549	51.990	21.000	77.900	14.855
Panel C: Summary statistics for family control in family firms						
	Obs.	Mean	Median	1%	99%	Std.Dev.
Family board seats	141	1.766	1.000	0.000	6.000	1.340
Family board presence (%)	141	19.904	14.286	0.000	60.000	14.431

Table 2.3
Summary Statistics for Event and Firm Characteristics

Panel A reports descriptive statistics from January 2009 to December 2014 for all firms, then family-controlled firms, non-controlled firms, and state-controlled firms. *Insider sale events per firm* stands for the number of insider sales per firm over the sample period. *Insider transaction size (%)* is measured by the number of shares traded as a percentage of the number of shares outstanding. *Short selling volume per day (%)* refers to the daily short selling volume per firm as a percentage of the number of shares outstanding across the sample period. *Event day short selling volume (%)* is the daily short selling on the insider sale date as a percentage of the number of shares outstanding. *Average short selling volume (%)* is the average daily short selling volume in the [-30, -11] window before the insider sale date as a percentage of the number of shares outstanding. Panel B reports the summary statistics and correlation matrix for firm characteristics. *Firm size* is the natural logarithm of the daily market value. *Book to market* is the quarter-end book value of equity divided by the daily market value of equity. *Turnover* is the natural logarithm of the daily number of shares traded. *Bid-ask spread* is measured as the daily bid price minus the daily ask price, divided by the average of the daily bid and ask prices. $Short_{(t-5;t-1)}$ is the cumulative daily short selling volume during the five days prior to the insider sale date as a percentage of firm's shares outstanding. $CAR_{(t-5;t-1)}$ measures the cumulative daily abnormal size-adjusted returns during the five days prior to the insider sale date. AR_t is the size-adjusted abnormal returns on the insider sale date. * The correlation coefficient is statistically significant at the 1 percent level.

Panel A: Summary statistics for event characteristics

						Family-controlled (No. of firms=141)	Non-controlled (No. of firms=72)	State-controlled (No. of firms=41)
	Mean	Median	1%	99%	Std.Dev.			
Insider sale events per firm	4.520	2.000	1.000	25.000	5.032	4.326	5.042	4.269
Insider transaction size (%)	0.509	0.022	0.000	11.326	2.023	0.561	0.579	0.184
Short selling volume per day (%)	0.022	0.009	0.000	0.202	0.046	0.023	0.024	0.021
Short selling volume on the event day (%)	0.024	0.006	0.000	0.262	0.060	0.020	0.026	0.035
Average short selling volume [-30,-11] (%)	0.018	0.009	0.000	0.118	0.027	0.016	0.019	0.021

Panel B: Summary statistics and correlation matrix for firm characteristics

	Mean	Median	1%	99%	Std.Dev.	Firm size	Turnover	Bid-ask spread	Book-to-market	$Short_{(t-5;t-1)}$	AR_t
Firm size	22.488	22.488	18.300	26.774	1.684						
Turnover	14.880	15.047	9.852	18.584	1.770	0.126*					
Bid-ask spread	0.006	0.003	0.000	0.047	0.011	-0.333*	-0.156*				
Book-to-market	0.907	0.679	0.008	4.376	0.876	0.003	0.169*	0.001			

$Short_{(t-5;t-1)}$	0.157	0.069	0.000	1.350	0.339	-0.011	0.209*	-0.090*	-0.002		
$CAR_{(t-5;t-1)}$	0.013	0.001	-0.214	0.426	0.107	-0.009	0.150*	0.008	0.096*	0.039*	
AR_t	0.096	-0.121	-5.932	8.767	2.800	0.005	0.096*	0.006	0.032*	-0.036*	-0.006

Table 2.4
Abnormal Short Sales Volume around Insider Sales

Panel A reports the daily abnormal short sales in the [-10, +10] event window for insider trades for all firms, family-controlled firms, non-controlled firms, and state-controlled firms. The insider sale day is defined as day 0. Abnormal short sales (%) is measured by daily short sales minus average short sales in the [-30, -11] estimation window as a percentage of the number of shares outstanding. Panel B reports the cumulative daily abnormal short sales for all firms, family-controlled firms, non-controlled firms, and state-controlled firms in the [0,1], [0,2], [0,3], [1,2], and [1,3] event windows. The t-test tests whether daily abnormal short sales and cumulative ones are different from zero. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Daily abnormal short sales volume around insider sales								
	All firms		Family-controlled		Non-controlled		State-controlled	
	No. of events=946		No. of events=494		No. of events=300		No. of events=152	
Day	Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat
-10	-0.0007	-0.69	0.0016	1.23	-0.0047***	-2.77	-0.0001	-0.05
-9	-0.0000	-0.02	0.0014	0.78	-0.0022	-1.01	-0.0002	-0.09
-8	-0.0009	-0.71	-0.0004	-0.23	-0.0032*	-1.68	0.0019	0.45
-7	-0.0028***	-2.99	-0.0024*	-1.69	-0.0043***	-2.82	-0.0014	-0.65
-6	-0.0008	-0.73	-0.0007	-0.49	-0.0019	-1.07	0.0008	0.20
-5	-0.0014	-1.09	-0.0020	-1.21	-0.0023	-1.07	0.0020	0.45
-4	-0.0002	-0.14	0.0007	0.34	-0.0001	-0.06	-0.0030	-1.43
-3	-0.0016	-1.47	-0.0014	-1.01	-0.0013	-0.59	-0.0029	-1.11
-2	0.0015	1.08	0.0020	1.08	0.0025	0.86	-0.0021	-0.96
-1	0.0041**	1.99	0.0024	1.54	0.0078	1.36	0.0020	0.82
0	0.0083***	4.07	0.0065***	3.10	0.0086**	2.16	0.0135*	1.86
1	0.0060**	2.23	0.0045**	2.11	0.0021	0.99	0.0183	1.25
2	0.0017	1.10	0.0030	1.27	-0.0002	-0.11	0.0010	0.33
3	0.0019	0.96	0.0001	0.07	0.0036	0.67	0.0043	1.28
4	0.0030	1.63	0.0046*	1.78	0.0013	0.40	0.0013	0.28
5	0.0023	1.64	0.0028	1.45	0.0006	0.22	0.0040	1.19
6	0.0029*	1.81	0.0027	1.48	0.0009	0.28	0.0072	1.55
7	0.0034	1.62	0.0022	1.18	0.0062	1.12	0.0013	0.48
8	0.0031*	1.91	0.0056**	2.52	-0.0004	-0.12	0.0019	0.58
9	0.0033**	2.07	0.0046**	2.21	0.0022	0.67	0.0013	0.40
10	0.0020	1.20	0.0029*	1.71	0.0030	0.72	-0.0032	-1.55
Panel B: Cumulative daily abnormal short sales volume within three business days								
	All firms		Family-controlled		Non-controlled		State-controlled	
Day	Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat
[0, 1]	0.0143***	3.50	0.0110***	2.95	0.0107*	1.92	0.0318	1.61
[0, 2]	0.0159***	3.20	0.0141***	2.64	0.0105	1.46	0.0327	1.52
[0, 3]	0.0178***	2.89	0.0142**	2.20	0.0141	1.30	0.0370	1.54
[1, 2]	0.0077**	2.12	0.0076*	1.94	0.0019	0.48	0.0192	1.14
[1, 3]	0.0096**	2.01	0.0077	1.53	0.0055	0.71	0.0236	1.21

Table 2. 5
Insider Event, Large Controlling Shareholders, and Abnormal Short Sales

This table reports OLS regression results for abnormal short sales around insider transactions for all firms, family-controlled firms, non-controlled firms, and state-controlled firms. The dependent variable is daily abnormal short sales. $Insider_{[0]}$ equals one when the day is day 0, and zero otherwise. $Insider_{[0,1]}$ equals one when the day is day 0 or day 1, and zero otherwise. $Insider_{[0,2]}$ equals one when the day is day 0, day 1, or day 2, and zero otherwise. *Firm size* is the natural logarithm of the daily market value. *Turnover* is the natural logarithm of the daily number of shares traded. *Bid-ask spread* is measured as the bid price minus the ask price, divided by the average of the daily bid and ask prices. *Book-to-market* is the quarter-end book value of equity divided by the daily market value of equity. $Short_{(t-5;t-1)}$ represents the cumulative short selling volume during the five days prior to day t as a percentage of number of shares outstanding. AR_t is the size-adjusted abnormal returns on day t. $CAR_{(t-5;t-1)}$ measures the cumulative abnormal size-adjusted returns during the five days prior to day t. All models include year and industry dummies. All standard errors are clustered by event. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	All firms			Family-controlled			Non-controlled			State-controlled		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$Insider_{[0]}$	0.006***			0.005**			0.004*			0.008		
	(3.461)			(2.401)			(1.708)			(1.246)		
$Insider_{[0,1]}$		0.005***			0.004**			0.001			0.013	
		(2.793)			(2.210)			(0.521)			(1.575)	
$Insider_{[0,2]}$			0.003**			0.003*			-0.001			0.008
			(2.140)			(1.864)			(-0.726)			(1.463)
Firm size	-0.001	-0.001	-0.001	-0.004***	-0.004***	-0.004***	0.003*	0.003*	0.003*	-0.001	-0.001	-0.001
	(-0.809)	(-0.806)	(-0.809)	(-3.461)	(-3.466)	(-3.464)	(1.885)	(1.887)	(1.887)	(-0.417)	(-0.412)	(-0.403)
Turnover	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.004***	0.004***	0.004***	0.014***	0.014***	0.014***
	(4.963)	(4.974)	(4.991)	(4.401)	(4.397)	(4.422)	(3.040)	(3.043)	(3.058)	(2.917)	(2.969)	(2.954)
Bid-ask spread	0.296	0.295	0.294	0.004	-0.001	0.004	0.834	0.830	0.825	-1.203	-1.194	-1.181
	(0.756)	(0.752)	(0.748)	(0.019)	(-0.002)	(0.017)	(1.154)	(1.146)	(1.139)	(-1.212)	(-1.203)	(-1.185)
Book-to-market	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001**	-0.001**	-0.001**	-0.004**	-0.004**	-0.004**
	(-1.407)	(-1.405)	(-1.412)	(-0.918)	(-0.914)	(-0.922)	(-2.456)	(-2.460)	(-2.462)	(-2.410)	(-2.419)	(-2.427)
$Short_{(t-5;t-1)}$	0.046***	0.046***	0.046***	0.036***	0.036***	0.036***	0.056***	0.056***	0.057***	0.037**	0.037*	0.037*
	(8.487)	(8.489)	(8.477)	(5.312)	(5.313)	(5.314)	(11.945)	(11.929)	(11.908)	(1.987)	(1.973)	(1.976)
$CAR_{(t-5;t-1)}$	0.029***	0.029***	0.029***	0.015*	0.015*	0.015*	0.066***	0.066***	0.066***	0.037	0.036	0.036
	(3.959)	(3.961)	(3.969)	(1.794)	(1.790)	(1.793)	(5.887)	(5.882)	(5.876)	(1.216)	(1.215)	(1.214)

AR_t	0.001**	0.001**	0.001**	-0.000	-0.000	-0.000	0.001*	0.001*	0.001*	0.002	0.002*	0.002*
	(2.173)	(2.209)	(2.224)	(-0.060)	(-0.044)	(-0.032)	(1.816)	(1.834)	(1.826)	(1.649)	(1.681)	(1.672)
Intercept	-0.030	-0.030	-0.030	0.040	0.040	0.039	-0.103***	-0.104***	-0.104***	-0.193**	-0.191**	-0.193**
	(-1.147)	(-1.151)	(-1.156)	(1.552)	(1.554)	(1.543)	(-2.762)	(-2.769)	(-2.772)	(-2.049)	(-2.066)	(-2.062)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,310	16,310	16,310	8,299	8,299	8,299	5,048	5,048	5,048	2,963	2,963	2,963
Adjusted R^2	0.126	0.126	0.126	0.089	0.089	0.089	0.227	0.227	0.227	0.111	0.115	0.113

Table 2.6
Insider Event, Family Control, and Abnormal Short Sales

This table reports OLS regression results for abnormal short sales around insider transactions, across different level of family control, in family-controlled firms. *Family voting rights* refers to the voting rights held by all family members. *Family board seats* is the number of family members sitting on the board. The dependent variable is daily abnormal short sales. $Insider_{[0]}$ equals one when the day is day 0, and zero otherwise. $Insider_{[0,1]}$ equals one when the day is day 0 or day 1, and zero otherwise. $Insider_{[0,2]}$ equals one when the day is day 0, day 1, or day 2, and zero otherwise. *Firm size* is the natural logarithm of the daily market value. *Turnover* is the natural logarithm of the daily number of shares traded. *Bid-ask spread* is measured as the bid price minus the ask price, divided by the average of the daily bid and ask prices. *Book-to-market* is the quarter-end book value of equity divided by the daily market value of equity. $Short_{(t-5;t-1)}$ represents the cumulative short selling volume during the five days prior to day t as a percentage of number of shares outstanding. AR_t is the size-adjusted abnormal returns on day t. $CAR_{(t-5;t-1)}$ measures the cumulative abnormal size-adjusted returns during the five days prior to day t. All models include year and industry dummies. All standard errors are clustered by event. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Family voting rights<50%			Family voting rights>=50%			Family board seats<2			Family board seats>=2		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$Insider_{[0]}$	0.007**			0.001			0.008**			-0.000		
	(2.151)			(0.524)			(2.405)			(-0.162)		
$Insider_{[0,1]}$		0.006**			0.000			0.007**			-0.000	
		(2.060)			(0.181)			(2.301)			(-0.263)	
$Insider_{[0,2]}$			0.004*			0.000			0.005**			-0.001
			(1.689)			(0.277)			(2.100)			(-0.489)
Firm size	-0.009***	-0.009***	-0.009***	-0.000	-0.000	-0.000	-0.006***	-0.006***	-0.006***	-0.003**	-0.003**	-0.003**
	(-4.132)	(-4.131)	(-4.129)	(-0.329)	(-0.331)	(-0.330)	(-3.305)	(-3.305)	(-3.302)	(-2.385)	(-2.386)	(-2.386)
Turnover	0.005***	0.005***	0.005***	0.003***	0.003***	0.003***	0.004***	0.004***	0.004***	0.005***	0.005***	0.005***
	(4.299)	(4.289)	(4.319)	(3.650)	(3.656)	(3.654)	(3.449)	(3.439)	(3.461)	(4.512)	(4.508)	(4.513)
Bid-ask spread	-0.377	-0.375	-0.370	0.058	0.057	0.057	-0.087	-0.086	-0.077	0.094	0.095	0.094
	(-0.935)	(-0.933)	(-0.922)	(0.274)	(0.267)	(0.269)	(-0.204)	(-0.200)	(-0.181)	(0.326)	(0.329)	(0.329)
Book-to-market	0.000	0.000	0.000	-0.001***	-0.001***	-0.001***	0.000	0.000	0.000	-0.001***	-0.001***	-0.001***
	(0.917)	(0.919)	(0.916)	(-4.820)	(-4.831)	(-4.828)	(1.200)	(1.204)	(1.200)	(-4.031)	(-4.031)	(-4.031)
$Short_{(t-5;t-1)}$	0.038***	0.038***	0.038***	0.033***	0.033***	0.033***	0.040***	0.040***	0.039***	0.003	0.003	0.003
	(5.105)	(5.107)	(5.109)	(3.351)	(3.345)	(3.349)	(5.382)	(5.385)	(5.389)	(0.290)	(0.290)	(0.291)
$CAR_{(t-5;t-1)}$	0.026*	0.025*	0.025*	0.017***	0.017***	0.017***	0.018	0.018	0.018	0.035***	0.035***	0.035***

	(1.951)	(1.934)	(1.941)	(3.868)	(3.872)	(3.876)	(1.221)	(1.208)	(1.218)	(4.053)	(4.051)	(4.051)
AR_t	-0.000	-0.000	-0.000	0.000**	0.000**	0.000**	-0.000	0.000	0.000	0.000	0.000	0.000
	(-0.411)	(-0.386)	(-0.371)	(2.022)	(2.029)	(2.026)	(-0.004)	(0.032)	(0.043)	(0.509)	(0.511)	(0.510)
Intercept	0.103**	0.103**	0.103**	-0.037	-0.037	-0.037	0.079**	0.079**	0.078**	0.011	0.011	0.011
	(2.219)	(2.216)	(2.206)	(-1.262)	(-1.262)	(-1.264)	(2.025)	(2.022)	(2.010)	(0.334)	(0.333)	(0.335)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,359	5,359	5,359	2,940	2,940	2,940	4,905	4,905	4,905	3,394	3,394	3,394
Adjusted R^2	0.106	0.106	0.106	0.111	0.111	0.111	0.105	0.106	0.106	0.091	0.091	0.091

Table 2.7
Insider Event, Family Affiliation, and Abnormal Short Sales

This table reports OLS regression results for abnormal short sales around insider transactions, split by whether or not the insider is affiliated with the family in the family-controlled firms. The *family group* includes those trades executed by family insiders, and the *non-family group* refers to those trades executed by insiders who do not belong to the family. $Insider_{[0]}$ equals one when the day is day 0, and zero otherwise. $Insider_{[0,1]}$ equals one when the day is day 0 or day 1, and zero otherwise. $Insider_{[0,2]}$ equals one when the day is day 0, day 1 or day 2, and zero otherwise. *Firm size* is the natural logarithm of the daily market value. *Turnover* is the natural logarithm of the daily number of shares traded. *Bid-ask spread* is measured as the bid price minus the ask price, divided by the average of the daily bid and ask prices. *Book-to-market* is the quarter-end book value of equity divided by the daily market value of equity. $Short_{(t-5;t-1)}$ represents the cumulative short selling volume during the five days prior to day t as a percentage of number of shares outstanding. AR_t is the size-adjusted abnormal returns on day t. $CAR_{(t-5;t-1)}$ measures the cumulative abnormal size-adjusted returns during the five days prior to day t. All models include year and industry dummies. All standard errors are clustered by event. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Non-family group			Family group		
	(1)	(2)	(3)	(4)	(5)	(6)
$Insider_{[0]}$	0.006**			0.000		
	(2.402)			(0.073)		
$Insider_{[0,1]}$		0.005**			-0.001	
		(2.344)			(-0.572)	
$Insider_{[0,2]}$			0.004**			-0.002
			(2.190)			(-1.099)
Firm size	-0.006***	-0.006***	-0.006***	0.000	0.000	0.000
	(-4.375)	(-4.384)	(-4.379)	(0.041)	(0.039)	(0.039)
Turnover	0.004***	0.004***	0.004***	0.006***	0.006***	0.006***
	(4.176)	(4.178)	(4.196)	(3.025)	(3.012)	(3.027)
Bid-ask spread	0.144	0.133	0.142	-0.616	-0.617	-0.618
	(0.504)	(0.464)	(0.499)	(-1.478)	(-1.475)	(-1.473)
Book-to-market	0.000	0.000	0.000	-0.001**	-0.001**	-0.001**
	(0.392)	(0.395)	(0.388)	(-2.447)	(-2.449)	(-2.458)
$Short_{(t-5;t-1)}$	0.037***	0.037***	0.037***	0.021**	0.021**	0.021**
	(5.136)	(5.138)	(5.140)	(2.002)	(1.999)	(2.002)
$CAR_{(t-5;t-1)}$	0.016	0.016	0.016	0.020**	0.020**	0.020**
	(1.405)	(1.396)	(1.398)	(2.081)	(2.079)	(2.077)
AR_t	0.000	0.000	0.000	-0.000	-0.000	-0.000
	(0.334)	(0.333)	(0.359)	(-0.603)	(-0.611)	(-0.615)
Intercept	0.071**	0.071**	0.070**	-0.061	-0.061	-0.061
	(2.530)	(2.534)	(2.516)	(-1.074)	(-1.077)	(-1.081)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,492	6,492	6,492	1,807	1,807	1,807
Adjusted R^2	0.094	0.095	0.095	0.119	0.119	0.119

Table 2.8
Abnormal Stock Returns around Insider Sales

This table reports cumulative abnormal returns (CARs) in the [-5, -1], [-10, -1], [0, +3], [0, +5], and [0, +10] event windows around insider sales. Abnormal returns are measured as size-adjusted returns. Panel A describes CARs around insider sales for all firms, family-controlled firms, non-controlled firms, and state-controlled firms. Panel B records CARs around insider sales for different level of family control in family-controlled firms. *Family voting rights* refers to the voting rights held by all family members. *Family board seats* is the number of family members sitting on the board. *Family board presence* is the family members sitting on the board as a percentage of the total number of board members. Panel C reports CARs around insider sales split by whether or not the insider belongs to the family in the family-controlled firms. The *family group* includes those trades executed in family-controlled firms by family insiders, and *non-family group* refers to those trades executed by insiders who do not belong to the family. ***, ** and * indicate significance at the 1%, 5% and 10% levels respectively.

Panel A: Abnormal stock returns and large controlling shareholders

	All firms		Family-controlled firms		Non-controlled firms		State-controlled firms	
Day	Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat
[-5, -1]	0.0161***	7.96	0.0146***	5.37	0.0226***	5.64	0.0101***	2.90
[-10, -1]	0.0266***	8.90	0.0229***	5.98	0.0368***	5.92	0.0207***	3.86
[0, +3]	0.0028	1.51	0.0018	0.70	0.0045	1.32	0.0023	0.54
[0, +5]	0.0006	0.28	0.0010	0.33	0.0005	0.12	0.0006	0.14
[0, +10]	-0.0033	-1.12	-0.0056	-1.37	-0.0018	-0.32	0.0019	0.34

Panel B: Abnormal stock returns and family control

	Family voting rights <50%		Family voting rights >=50%		Family board seats<2		Family board seats>=2		Family board presence<2		Family board presence>=2	
Day	Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat
[-5, -1]	0.0119***	3.66	0.0189***	3.95	0.0147***	3.86	0.0145***	3.96	0.0136***	3.55	0.0162***	3.95
[-10, -1]	0.0185***	4.12	0.0301***	4.35	0.0233***	4.67	0.0224***	3.75	0.0211***	4.41	0.0259***	4.03
[0, +3]	-0.0022	-0.73	0.0080*	1.84	-0.0014	-0.42	0.0059	1.64	-0.0003	-0.10	0.0050	1.32
[0, +5]	-0.0054	-1.52	0.0112**	2.04	-0.0049	-1.28	0.0086*	1.74	-0.0033	-0.91	0.0078	1.48
[0, +10]	-0.0131***	-2.76	0.0062	0.85	-0.0154***	-3.00	0.0072	1.10	-0.0115**	-2.32	0.0037	0.53

Panel C: Abnormal stock returns and insider's membership (or not) of family

Non-family group	Family group

Day	Mean	t-stat	Mean	t-stat
[-5, -1]	0.0169***	5.31	0.0072	1.41
[-10, -1]	0.0259***	5.69	0.0137*	1.97
[0, +3]	0.0028	1.04	-0.0015	-0.24
[0, +5]	0.0002	0.05	0.0037	0.48
[0, +10]	-0.0077*	-1.84	0.0011	0.10

Table 2.9
Routine Insider Trades, Opportunistic Insider Trades, and Abnormal Short Sales

This table reports OLS regression results for abnormal short sales around routine and opportunistic insider trades separately. The dependent variable is daily abnormal short sales. Panel A displays the regression results across different groups when the main regressor is $Insider_{[0]}$. Panel B shows the regression results across different groups when the main regressor is $Insider_{[0,1]}$. Panel C shows the regression results across different groups when the main regressor is $Insider_{[0,2]}$. $Insider\_r$ refers to routine insider trades, and $Insider\_o$ refers to opportunistic insider trades. Weak family control group refers to firms with family voting rights less than 50%, and strong family control group refers to firms with family voting rights more than 50%. All models include year and industry dummies. The other control variables are all included in the regressions, but are not reported in this table. All standard errors are clustered by event. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Panel A: Regressions across different groups on day 0														
	Family-controlled		Non-controlled		State-controlled		Weak family control		Strong family control		Non-family group		Family group	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
$Insider_{[0]}\_r$	-0.002		0.008		0.000		-0.002		-0.002		-0.001		-0.004	
	(-0.703)		(1.394)		(0.057)		(-0.509)		(-0.273)		(-0.261)		(-0.396)	
$Insider_{[0]}\_o$		0.006**		0.003		0.008		0.008**		0.001		0.007**		0.001
		(2.495)		(1.095)		(1.169)		(2.266)		(0.546)		(2.430)		(0.408)
Panel B: Regressions across different groups in event window [0,1]														
	Family-controlled		Non-controlled		State-controlled		Weak family control		Strong family control		Non-family group		Family group	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
$Insider_{[0,1]}\_r$	0.005		0.006		0.003		0.007		-0.001		0.011			
	(0.588)		(1.531)		(0.499)		(0.645)		(-0.271)		(0.874)			
$Insider_{[0,1]}\_o$		0.004**		-0.001		0.014		0.006**		0.000		0.005**	-0.007	-0.000
		(2.155)		(-0.270)		(1.546)		(2.005)		(0.201)		(2.178)	(-0.775)	(-0.023)
Panel C: Regressions across different groups in event window [0,2]														
	Family-controlled		Non-controlled		State-controlled		Weak family control		Strong family control		Non-family group		Family group	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
$Insider_{[0,2]}\_r$	0.003		0.005		0.000		0.003		0.000		0.007		-0.007	
	(0.432)		(1.560)		(0.048)		(0.414)		(0.068)		(0.781)		(-0.848)	
$Insider_{[0,2]}\_o$		0.003*		-0.003		0.009		0.004*		0.000		0.004**		-0.001
		(1.851)		(-1.410)		(1.464)		(1.695)		(0.262)		(2.030)		(-0.557)

Table 2.10
Insiders' Rank and Abnormal Short Sales

This table reports OLS regression results for abnormal short sales around insider sales by insiders' rank. Other senior executives include the chief financial officer, chief operating officer, chief investment officer and managers, while the chairman is the chairman of the board. The dependent variable is daily abnormal short sales. Panel A displays the regression results across different ranks when the main regressor is $Insider_{[0]}$. Panel B shows the regression results across different ranks when the main regressor is $Insider_{[0,1]}$. Panel C shows the regression results across different ranks when the main regressor is $Insider_{[0,2]}$. All models include year and industry dummies. The other control variables are all included in the regressions, but are not reported in this table. All standard errors are clustered by event. Robust t-statistics are reported in parentheses. ***,** and * indicate significance at the 1% ,5% and 10% levels, respectively.

Panel A: Regressions across different ranks on day 0						
	Chief executive	Chairman	Other senior executives	Executive directors	Non-executive directors	Independent directors
	(1)	(2)	(3)	(4)	(5)	(6)
$Insider_{[0]}$	0.004	0.003	0.000	0.009**	0.004	0.008*
	(0.893)	(0.871)	(0.161)	(2.348)	(1.159)	(1.656)
Panel B: Regressions across different ranks in event window [0, 1]						
	Chief executive	Chairman	Other senior executives	Executive directors	Non-executive directors	Independent directors
	(1)	(2)	(3)	(4)	(5)	(6)
$Insider_{[0,1]}$	-0.001	0.004	-0.002	0.011**	-0.000	0.006
	(-0.210)	(1.275)	(-0.832)	(2.426)	(-0.123)	(1.529)
Panel C: Regressions across different ranks in event window [0, 2]						
	Chief executive	Chairman	Other senior executives	Executive directors	Non-executive directors	Independent directors
	(1)	(2)	(3)	(4)	(5)	(6)
$Insider_{[0,2]}$	-0.003	0.003	-0.003*	0.007**	0.002	0.004
	(-1.324)	(1.168)	(-1.792)	(2.182)	(0.527)	(1.330)

Table 3.1
Variable Definitions

This table reports the variable definitions. For the original sample, we select all the Zhong-Zheng 800 Index (CSI 800) constituent companies listed at the end of 2010 as an initial sample. For the sample firms, we construct a manager-firm matched panel dataset, where we track individual CEOs across different firms from 2004 through 2010. For each CEO, we hand-collect his/her curriculum vitae from the firm's annual report and the Sina finance website (http://finance.sina.com.cn/stock/), which summarize CEO biographical information in a textual format. Finally, we obtain a sample of 467 firms with 775 individual CEOs.

Variable	Definition
Dependent variables	
Institutional ownership	Aggregated institutional ownership: number of shares owned by all mutual funds as a percentage of a firm's tradable shares.
Long institutional ownership	The aggregated institutional ownership held by long-term investors. See Appendix 1 for definition of long-term investors.
Short institutional ownership	The aggregated institutional ownership held by short-term investors. See Appendix 1 for definition of short-term investors.
Main regressors	
Business ties	A dummy variable that equals 1 when the number of connections is above its average and 0 otherwise. The number of connections is the number of organizations a CEO has worked for throughout his/her career reflected in his/her curriculum vitae, excluding government positions. Different organizations in the same business group or conglomerate are counted as the same organization. The focal firm where the individual serves as CEO and other concurrent positions are included.
Industry experience	A dummy variable that equals 1 when a CEO's prior working organizations are in the same industry as the focal firm where he/she serves and 0 otherwise. The industry classification follows the Shenwan Level I industry criteria.
Political ties	A dummy variable that equals 1 when a CEO has any central government, local government, military, or committee working experience and 0 otherwise.
Turnover	A dummy variable which equals 1 if the firm experiences CEO turnover in that year and 0 otherwise.
Control variables	
ROA	Profit before interest and tax scaled by total assets.
Return	The annual stock return.
Market to book	The market value of equity divided by the book value of equity.
Firm age	The firm age.
Volatility	One-year stock volatility calculated based on the daily closing price.
Firm size	The logarithm of total sales.
Leverage	The book value of debt divided by the book value of equity.
Controller	The type of the largest shareholder.
Independent	The number of independent directors as a percentage of the number of all members of the board of directors.
Large1shper	The percentage of the shareholding of the largest shareholder.
Duality	A dummy variable that equals 1 when CEO and chairman are dual and 0 otherwise.
Education	An ordinal variable that equals 1 when a CEO holds as his/her highest degree a bachelor's degree, 2 for a master's degree, 3 for a PhD, and 0 otherwise.

Table 3.2
Summary Statistics and Correlation Matrix

This table reports the summary statistics and correlation matrix for the variables. Institutional ownership is denoted as the aggregated institutional ownership, which is number of shares owned by all mutual funds as a percentage of a firm's tradable shares. Long institutional ownership is the aggregated institutional ownership held by long-term investors. Short institutional ownership is the aggregated institutional ownership held by short-term investors. Return on assets (ROA) is measured by the profit before interest and tax scaled by total assets. Return refers to the annual stock return. Market to book is defined as the market value of equity divided by the book value of equity. Firm age is calculated as the current year minus the start year of the firm. Volatility is the one-year stock volatility calculated based on the daily closing price. Firm size is measured by the natural logarithm of total sales. Leverage is the book value of debt divided by the book value of equity. Controller refers to the type of ultimate controller; it is defined as an ordinal variable that equals 1 when the controller is enterprises, 2 when the controller is the government, 3 for individuals, and 0 otherwise. Independent indicates the number of independent directors as a percentage of the number of all members of the board of directors. Large1per measures the percentage of the shareholding of the largest shareholder. Duality is defined as a dummy variable that equals 1 when CEO and chairman are dual and 0 otherwise. Education is defined as an ordinal variable that equals 1 when a CEO holds as his/her highest degree a bachelor's degree, 2 for a master's degree, three for a PhD, and 0 otherwise. Note: N =2,716. * Correlation coefficient is statistically significant at the 1 percent level.

		Mean	Std.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Institutional ownership	0.139	0.167																	
2	Long institutional ownership	0.036	0.051	0.811*																
3	Short institutional ownership	0.033	0.05	0.761*	0.590*															
4	Business ties (number)	2.358	1.651	-0.144*	-0.125*	-0.118*														
5	Political ties	0.229	0.420	0.003	0.002	0.000	0.126*													
6	Industry experience	0.646	0.478	0.068*	0.054*	0.056*	-0.457*	-0.320*												
7	Education	2.552	0.778	0.038	0.050*	0.034	0.022	-0.008	-0.039											
8	ROA	0.071	0.695	0.025	0.017	0.019	-0.011	-0.006	-0.016	-0.039										
9	Return	0.704	1.325	0.146*	0.075*	0.079*	0.004	0.004	-0.039	-0.010	0.023									
10	Market to Book	1.74	1.975	0.230*	0.166*	0.218*	0.056*	0.035	-0.047	0.020	0.029	0.375*								
11	Firm age	13.63	3.961	-0.101*	-0.047	0.025	0.127*	-0.015	-0.076*	0.046	0.025	-0.025	0.078*							
12	Volatility	0.548	0.667	-0.024	-0.001	0.007	0.044	0.018	-0.062*	-0.010	-0.006	0.430*	0.168*	0.014						
13	Firm size	22.33	1.206	0.122*	0.109*	0.151*	-0.138*	-0.020	0.093*	0.093*	-0.113*	-0.046	-0.329*	0.052*	-0.044					
14	Leverage	0.946	30.100	0.02	0.017	0.017	-0.019	0.009	0.027	-0.090	0.002	-0.023	-0.034	-0.001	-0.100*	0.078*				

15	Controller	0.943	1.233	-0.043	-0.014	-0.001	0.099*	0.012	-0.151*	-0.040	-0.019	0.046	0.061*	0.114*	0.055*	-0.116*	0.014			
16	Independent	3.433	0.808	0.028	0.019	0.015	-0.059*	-0.017	0.023	0.047	0.008	-0.043	-0.104*	-0.017	-0.015	0.334*	0.031	-0.142*		
17	Large1shper	39.720	16.800	0.038	0.014	0.009	-0.071*	-0.045	0.119*	0.029	-0.014	-0.033	-0.023	-0.398*	-0.031	0.155*	0.024	-0.252*	-0.038	
18	Duality	0.104	0.306	-0.011	-0.031	0.009	0.103*	0.134*	-0.119*	-0.024	-0.007	0.027	0.103*	0.050*	0.027	-0.114*	-0.064*	0.134*	-0.099*	-0.121*

Table 3.3
CEO Human Capital and Institutional Ownership

This table reports the fixed-effects panel data regression results of CEO human capital on institutional ownership. The dependent variable is the Institutional ownership. It is denoted as the aggregated institutional ownership, which is number of shares owned by all mutual funds as a percentage of a firm's tradable shares. Business ties is a dummy variable that equals 1 when the number of connections is above its average and 0 otherwise. Industry experience is a dummy variable that equals 1 when a CEO's prior working organizations are in the same industry as the focal firm where he/she serves and 0 otherwise. Political ties is a dummy variable that equals 1 when a CEO has any central government, local government, military, or committee working experience and 0 otherwise. Return on assets (ROA) is measured by the profit before interest and tax scaled by total assets. Return refers to the annual stock return. Market to book is defined as the market value of equity divided by the book value of equity. Firm age is calculated as the current year minus the start year of the firm. Volatility is the one-year stock volatility calculated based on the daily closing price. Firm size is measured by the natural logarithm of total sales. Leverage is the book value of debt divided by the book value of equity. Controller refers to the type of ultimate controller; it is defined as an ordinal variable that equals 1 when the controller is enterprises, 2 when the controller is the government, 3 for individuals, and 0 otherwise. Independent indicates the number of independent directors as a percentage of the number of all members of the board of directors. Large1per measures the percentage of the shareholding of the largest shareholder. Duality is defined as a dummy variable that equals 1 when CEO and chairman are dual and 0 otherwise. Education is defined as an ordinal variable that equals 1 when a CEO holds as his/her highest degree a bachelor's degree, 2 for a master's degree, three for a PhD, and 0 otherwise. All models include year and firm dummies. All standard errors are clustered by firm. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Dependent variable: Institutional ownership			
	(1)	(2)	(3)	(4)
Business ties	0.028***			0.035***
	(2.953)			(3.551)
Industry experience		0.018*		0.031***
		(1.838)		(2.769)
Political ties			0.007	0.012
			(0.555)	(0.964)
ROA	0.207***	0.205***	0.209***	0.204***
	(4.032)	(3.974)	(4.080)	(3.927)
Return	0.020***	0.020***	0.020***	0.020***
	(5.663)	(5.632)	(5.614)	(5.748)
Market to Book	0.006	0.005	0.005	0.005
	(1.569)	(1.480)	(1.544)	(1.491)
Firm age	0.012	0.014	0.014	0.012
	(0.646)	(0.793)	(0.776)	(0.647)
Volatility	-0.045***	-0.046***	-0.046***	-0.044***
	(-2.773)	(-2.830)	(-2.818)	(-2.750)
Firm size	-0.007	-0.009	-0.008	-0.009
	(-0.730)	(-0.926)	(-0.835)	(-0.933)
Leverage	0.007**	0.006**	0.006**	0.007***
	(2.453)	(2.452)	(2.339)	(2.757)
Controller	-0.005	-0.005	-0.005	-0.004
	(-1.037)	(-1.087)	(-1.125)	(-0.974)
Independent	-0.006	-0.006	-0.006	-0.006
	(-0.989)	(-1.086)	(-1.043)	(-1.001)
Large1shper	0.000	0.000	0.000	0.000
	(0.554)	(0.432)	(0.458)	(0.518)
Duality	-0.005	-0.005	-0.007	-0.004
	(-0.459)	(-0.407)	(-0.591)	(-0.385)
Education	-0.003	-0.003	-0.004	-0.002
	(-0.579)	(-0.501)	(-0.654)	(-0.406)
Intercept	0.202	0.229	0.224	0.212
	(0.723)	(0.833)	(0.812)	(0.763)

Year	Yes	Yes	Yes	Yes
Observations	2,716	2,716	2,716	2,716
Adjusted R^2	0.090	0.088	0.087	0.094

Table 3.4
Turnover, CEO Human Capital and Institutional Ownership

This table reports the fixed-effects panel data regression results of CEO turnover and CEO human capital on institutional ownership. The dependent variable is the Institutional ownership. It is denoted as the aggregated institutional ownership, which is number of shares owned by all mutual funds as a percentage of a firm's tradable shares. Business ties is a dummy variable that equals 1 when the number of connections is above its average and 0 otherwise. Industry experience is a dummy variable that equals 1 when a CEO's prior working organizations are in the same industry as the focal firm where he/she serves and 0 otherwise. Political ties is a dummy variable that equals 1 when a CEO has any central government, local government, military, or committee working experience and 0 otherwise. Turnover is a dummy variable, which equals 1 if a firm experiences CEO turnover in that year and 0 otherwise. Return on assets (ROA) is measured by the profit before interest and tax scaled by total assets. Return refers to the annual stock return. Market to book is defined as the market value of equity divided by the book value of equity. Firm age is calculated as the current year minus the start year of the firm. Volatility is the one-year stock volatility calculated based on the daily closing price. Firm size is measured by the natural logarithm of total sales. Leverage is the book value of debt divided by the book value of equity. Controller refers to the type of ultimate controller; it is defined as an ordinal variable that equals 1 when the controller is enterprises, 2 when the controller is the government, 3 for individuals, and 0 otherwise. Independent indicates the number of independent directors as a percentage of the number of all members of the board of directors. Large1per measures the percentage of the shareholding of the largest shareholder. Duality is defined as a dummy variable that equals 1 when CEO and chairman are dual and 0 otherwise. Education is defined as an ordinal variable that equals 1 when a CEO holds as his/her highest degree a bachelor's degree, 2 for a master's degree, three for a PhD, and 0 otherwise. All models include year and firm dummies. All standard errors are clustered by firm. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Dependent variable: Institutional ownership		
	(1)	(2)	(3)
Business ties		0.035***	0.041***
		(3.549)	(3.465)
Industry experience		0.031***	0.028**
		(2.766)	(2.100)
Political ties		0.012	-0.004
		(0.982)	(-0.302)
Turnover	-0.019***	-0.019***	-0.023*
	(-3.399)	(-3.389)	(-1.771)
Turnover*Business ties			-0.013
			(-1.147)
Turnover*Industry experience			0.004
			(0.313)
Turnover*Political ties			0.032**
			(2.464)
ROA	0.196***	0.192***	0.198***
	(3.862)	(3.733)	(3.854)
Return	0.020***	0.020***	0.020***
	(5.492)	(5.632)	(5.601)
Market to Book	0.006	0.005	0.005
	(1.601)	(1.555)	(1.511)
Firm age	0.015	0.014	0.017
	(0.841)	(0.716)	(0.910)
Volatility	-0.045***	-0.044***	-0.043***
	(-2.763)	(-2.688)	(-2.611)
Firm size	-0.008	-0.009	-0.008
	(-0.783)	(-0.902)	(-0.812)
Leverage	0.006**	0.007***	0.007***
	(2.290)	(2.742)	(2.686)
Controller	-0.004	-0.004	-0.004
	(-1.016)	(-0.874)	(-0.832)

Independent	-0.006	-0.006	-0.006
	(-1.068)	(-1.015)	(-1.063)
Large1shper	0.000	0.000	0.000
	(0.542)	(0.597)	(0.524)
Duality	-0.008	-0.006	-0.007
	(-0.719)	(-0.594)	(-0.631)
Education	-0.002	-0.001	-0.001
	(-0.417)	(-0.197)	(-0.168)
Intercept	0.222	0.213	0.164
	(0.808)	(0.769)	(0.591)
Year	Yes	Yes	Yes
Observations	2,716	2,716	2,716
Adjusted R^2	0.092	0.099	0.102

Table 3.5

Investment Horizon, CEO Human Capital and Institutional Ownership

This table reports the fixed-effects panel data regression results of CEO turnover and CEO human capital on long institutional ownership and short institutional ownership respectively. The dependent variable is the Long institutional ownership for Model (1) - (4). It is denoted as the aggregated institutional ownership by long-term institutional investors. The dependent variable is the Short institutional ownership for Model (5) - (8). It is denoted as the aggregated institutional ownership by short-term institutional investors. Business ties is a dummy variable that equals 1 when the number of connections is above its average and 0 otherwise. Industry experience is a dummy variable that equals 1 when a CEO's prior working organizations are in the same industry as the focal firm where he/she serves and 0 otherwise. Political ties is a dummy variable that equals 1 when a CEO has any central government, local government, military, or committee working experience and 0 otherwise. Turnover is a dummy variable, which equals 1 if a firm experiences CEO turnover in that year and 0 otherwise. Return on assets (ROA) is measured by the profit before interest and tax scaled by total assets. Return refers to the annual stock return. Market to book is defined as the market value of equity divided by the book value of equity. Firm age is calculated as the current year minus the start year of the firm. Volatility is the one-year stock volatility calculated based on the daily closing price. Firm size is measured by the natural logarithm of total sales. Leverage is the book value of debt divided by the book value of equity. Controller refers to the type of ultimate controller; it is defined as an ordinal variable that equals 1 when the controller is enterprises, 2 when the controller is the government, 3 for individuals, and 0 otherwise. Independent indicates the number of independent directors as a percentage of the number of all members of the board of directors. Large1per measures the percentage of the shareholding of the largest shareholder. Duality is defined as a dummy variable that equals 1 when CEO and chairman are dual and 0 otherwise. Education is defined as an ordinal variable that equals 1 when a CEO holds as his/her highest degree a bachelor's degree, 2 for a master's degree, three for a PhD, and 0 otherwise. All models include year and firm dummies. All standard errors are clustered by firm. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Dependent variable: Long institutional ownership				Dependent variable: Short institutional ownership			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Business ties	0.012***		0.012***	0.014***	0.003		0.003	0.003
	(4.083)		(4.069)	(3.725)	(0.713)		(0.681)	(0.765)
Industry experience	0.009**		0.009**	0.010**	0.003		0.003	0.002
	(2.490)		(2.483)	(2.417)	(0.691)		(0.684)	(0.523)
Political ties	0.005		0.005	0.004	0.001		0.001	-0.003
	(1.447)		(1.455)	(0.898)	(0.218)		(0.223)	(-0.525)
Turnover		-0.007***	-0.007***	-0.003		-0.005**	-0.005**	-0.006
		(-3.250)	(-3.251)	(-0.771)		(-2.555)	(-2.552)	(-1.362)
Turnover*Business ties				-0.005				-0.002
				(-1.175)				(-0.481)
Turnover*Political ties				0.002				0.007*
				(0.494)				(1.670)
Turnover*Industry				-0.003				0.000

experience								
				(-0.710)				(0.031)
ROA	0.047***	0.043***	0.042**	0.044***	0.086***	0.083***	0.083***	0.084***
	(2.790)	(2.669)	(2.572)	(2.635)	(4.552)	(4.502)	(4.433)	(4.459)
Return	0.004***	0.004***	0.004***	0.004***	0.002	0.002	0.002	0.002
	(3.348)	(3.140)	(3.250)	(3.218)	(1.340)	(1.254)	(1.270)	(1.242)
Market to Book	0.002**	0.002**	0.002**	0.002**	0.006***	0.006***	0.006***	0.006***
	(2.023)	(2.118)	(2.081)	(2.068)	(5.055)	(5.077)	(5.077)	(5.018)
Firm age	0.007	0.008	0.008	0.008	0.007	0.008	0.008	0.008
	(1.223)	(1.387)	(1.278)	(1.342)	(1.201)	(1.340)	(1.282)	(1.395)
Volatility	-0.021***	-0.021***	-0.020***	-0.020***	-0.015**	-0.015**	-0.015**	-0.014**
	(-3.417)	(-3.412)	(-3.370)	(-3.342)	(-2.471)	(-2.457)	(-2.441)	(-2.368)
Firm size	0.001	0.001	0.001	0.001	0.008**	0.008**	0.008**	0.008**
	(0.387)	(0.533)	(0.427)	(0.484)	(2.354)	(2.406)	(2.373)	(2.420)
Leverage	0.002**	0.002**	0.002**	0.002**	0.001	0.001	0.001	0.001
	(2.505)	(2.078)	(2.515)	(2.410)	(1.328)	(1.224)	(1.322)	(1.278)
Controller	0.000	0.000	0.000	0.001	-0.000	-0.000	-0.000	-0.000
	(0.184)	(0.168)	(0.312)	(0.371)	(-0.166)	(-0.115)	(-0.084)	(-0.075)
Independent	0.000	-0.000	-0.000	-0.000	-0.005**	-0.005**	-0.005**	-0.005**
	(0.004)	(-0.061)	(-0.004)	(-0.000)	(-2.172)	(-2.208)	(-2.183)	(-2.195)
Large1shper	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(0.431)	(0.457)	(0.531)	(0.535)	(-0.220)	(-0.172)	(-0.165)	(-0.187)
Duality	-0.003	-0.004	-0.004	-0.004	-0.003	-0.003	-0.003	-0.003
	(-0.899)	(-1.155)	(-1.123)	(-1.165)	(-0.710)	(-0.911)	(-0.872)	(-0.882)
Education	-0.002	-0.002	-0.001	-0.001	-0.002	-0.002	-0.002	-0.002
	(-0.865)	(-0.833)	(-0.646)	(-0.594)	(-1.173)	(-1.073)	(-1.003)	(-1.000)
Intercept	-0.121	-0.117	-0.121	-0.129	-0.236**	-0.235**	-0.236**	-0.246***
	(-1.469)	(-1.411)	(-1.461)	(-1.559)	(-2.506)	(-2.553)	(-2.525)	(-2.614)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,716	2,716	2,716	2,716	2,716	2,716	2,716	2,716
Adjusted R^2	0.116	0.115	0.120	0.121	0.174	0.176	0.176	0.178

Table 4.1
Variable Definitions

This table reports the variable definitions. We use firm-year level data on product differentiation, institutional ownership, R&D and advertising between 2000 and 2015. We start with Bloomberg, which covers accounting information for all US public firms listed on NYSE, NASDAQ and AMEX. Finally, we obtain 7,106 firm-year observations.

Variable	Definition
TNIC3TSIMM	Total product similarity index (Hoberg and Phillips Library)
Inst_Own	The aggregated institutional ownership: number of shares owned by all institutions as a percentage of a firm's outstanding shares.
Inst_Own_Passive	The aggregated institutional ownership held by passive institutional investors (banks, insurance companies and pension fund etc.).
Inst_Own_Active	The aggregated institutional ownership held by active institutional investors (mutual fund, asset management companies, investment banks, brokers, private wealth management companies).
Positive R&D Dummy	A dummy variable that equals 1 when non-zero R&D expenses are incurred and 0 otherwise.
Positive Advertising Dummy	A dummy variable that equals 1 when non-zero advertising expenses are incurred and 0 otherwise.
Ind_Position	A dummy variable that equals 1 when the sales of a firm is above the median sales within the industry (Standard Industry Classification)
Log Assets	The logarithm of total assets.
Log PPE	The logarithm of net plant, property and equipment.
Log Market Value	The logarithm of market capitalization.

Table 4.2
Summary Statistics and Correlation Matrix

This table presents the summary statistics and correlation matrix for all the variables. TNIC3TSIMM is measured by the total product similarity index from Hoberg and Phillips Library. Inst_Own is measured by the aggregate number of shares owned by all institutions as a percentage of a firm's outstanding shares. Inst_Own_Passive is measured by the aggregated institutional ownership held by passive institutional investors (banks, insurance companies and pension fund etc.). Inst_Own_Active is measured by the aggregated institutional ownership held by active institutional investors (mutual fund, asset management companies, investment banks, brokers, private wealth management companies). Positive R&D Dummy is denoted as a dummy variable that equals 1 when non-zero R&D expenses are incurred and 0 otherwise. Positive Advertising Dummy is denoted as a dummy variable that equals 1 when non-zero advertising expenses are incurred and 0 otherwise. Ind_Position is a dummy variable that equals 1 when the sales of a firm is above the median sales within the industry (Standard Industry Classification). Log Assets is measured by the logarithm of total assets. Log PPE is measured by the logarithm of net plant, property and equipment. Log Market Value is measured by the logarithm of market capitalization.

	Variable	Mean	Std.	1	2	3	4	5	6	7	8	9	10
1	TNIC3TSIMM	3.236	3.927										
2	Inst_Own	0.534	0.301	0.079*									
3	Inst_Own_Active	0.431	0.250	0.095*	0.968*								
4	Inst_Own_Passive	0.102	0.094	0.003	0.705*	0.508*							
5	Positive R&D Dummy	0.741	0.438	0.032*	-0.127*	-0.133*	-0.058*						
6	Positive Advertising Dummy	0.994	0.080	-0.075*	0.082*	0.078*	0.062*	-0.023					
7	Ind_Position	0.735	0.442	0.027	0.104*	0.113*	0.041*	0.115*	0.050*				
8	Log Assets	5.860	2.060	0.029	0.377*	0.363*	0.277*	-0.043*	0.113*	0.903*			
9	Log PPE	3.869	2.517	-0.058*	0.331*	0.323*	0.229*	-0.171*	0.118*	0.114*	0.935*		
10	Log Market Value	6.084	2.230	0.119*	0.672*	0.655*	0.442*	-0.003	0.103*	0.193*	0.077*	0.792*	

Note: Obs =7,106. * Correlation coefficient is statistically significant at the 1 percent level

Table 4.3
Aggregated Institutional Ownership, R&D, Advertising and Product differentiation

This table reports the regression results of product similarity index on aggregated institutional ownership, R&D, advertising and the interaction of institutional ownership with R&D and advertising respectively. The dependent variable is TNIC3TSIMM, which is is measured by the total product similarity index from Hoberg and Phillips Library. Inst_Own is measured by the aggregate number of shares owned by all institutions as a percentage of a firm's outstanding shares. Positive R&D Dummy is denoted as a dummy variable that equals 1 when non-zero R&D expenses are incurred and 0 otherwise. Positive Advertising Dummy is denoted as a dummy variable that equals 1 when non-zero advertising expenses are incurred and 0 otherwise. Ind_Position is a dummy variable that equals 1 when the sales of a firm is above the median sales within the industry (Standard Industry Classification). Log Assets is measured by the logarithm of total assets. Log PPE is measured by the logarithm of net plant, property and equipment. Log Market Value is measured by the logarithm of market capitalization. All models include year and industry dummies. All standard errors are clustered at the firm level. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Inst_Own	1.246***	0.964***	0.956***	12.062***	12.122***	12.191***
	(4.582)	(2.901)	(2.863)	(3.001)	(3.043)	(3.107)
Positive R&D Dummy			-0.600**	-0.887***	-1.015***	-0.586*
			(-2.363)	(-2.799)	(-3.148)	(-1.755)
Positive Advertising Dummy			-1.570	1.792*	1.870**	0.521
			(-1.217)	(1.877)	(1.962)	(0.483)
Inst_Own × Positive R&D Dummy				0.632	0.601	0.749
				(1.606)	(1.522)	(1.574)
Inst_Own × Positive Advertising Dummy				-11.642***	-11.680***	-11.862***
				(-2.928)	(-2.965)	(-3.051)
Ind_Position					-0.502***	-2.357
					(-3.716)	(-1.076)
Ind_Position × Positive R&D Dummy						-0.729***
						(-3.520)
Ind_Position × Positive Advertising Dummy						2.370
						(1.085)
Log Assets		0.628***	0.629***	0.600***	0.571***	0.580***
		(3.648)	(3.654)	(3.505)	(3.314)	(3.369)
Log PPE		-0.891***	-0.896***	-0.881***	-0.865***	-0.856***
		(-6.190)	(-6.218)	(-6.129)	(-6.001)	(-5.976)
Log Market Value		0.315***	0.328***	0.340***	0.372***	0.357***
		(4.038)	(4.267)	(4.421)	(4.778)	(4.566)

Intercept	1.343***	-0.349	1.732	-1.399	-1.128	-0.090
	(5.681)	(-0.726)	(1.259)	(-1.265)	(-1.025)	(-0.079)
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs	7,194	7,150	7,150	7,150	7,106	7,106
R2	0.436	0.457	0.459	0.463	0.466	0.468

Table 4.4

Active and Passive Institutional Ownership, R&D, Advertising and Product differentiation

This table reports the regression results of product similarity index on passive institutional ownership, active institutional ownership, R&D, advertising and the interaction of each type of institutional ownership with R&D and advertising respectively. The dependent variable is TNIC3TSIMM, which is is measured by the total product similarity index from Hoberg and Phillips Library. Inst_Own is measured by the aggregate number of shares owned by all institutions as a percentage of a firm's outstanding shares. Inst_Own_Passive is measured by the aggregated institutional ownership held by passive institutional investors (banks, insurance companies and pension fund etc.). Inst_Own_Active is measured by the aggregated institutional ownership held by active institutional investors (mutual fund, asset management companies, investment banks, brokers, private wealth management companies). Positive R&D Dummy is denoted as a dummy variable that equals 1 when non-zero R&D expenses are incurred and 0 otherwise. Positive Advertising Dummy is denoted as a dummy variable that equals 1 when non-zero advertising expenses are incurred and 0 otherwise. Ind_Position is a dummy variable that equals 1 when the sales of a firm is above the median sales within the industry (Standard Industry Classification). Log Assets is measured by the logarithm of total assets. Log PPE is measured by the logarithm of net plant, property and equipment. Log Market Value is measured by the logarithm of market capitalization. All models include year and industry dummies. All standard errors are clustered at the firm level. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Inst_Own_Passive	0.411	0.203	0.192	-0.633	-0.530	-0.389
	(0.556)	(0.283)	(0.268)	(-0.133)	(-0.111)	(-0.083)
Inst_Own_Active	1.448***	1.153***	1.146***	8.887**	8.936**	8.957**
	(4.319)	(2.960)	(2.937)	(2.198)	(2.230)	(2.321)
Positive R&D Dummy			-0.607**	-1.036***	-1.167***	-0.722**
			(-2.393)	(-3.226)	(-3.583)	(-2.166)
Positive Advertising Dummy			-1.563	0.498	0.573	-0.620
			(-1.212)	(0.509)	(0.586)	(-0.512)
Inst_Own_Passive × Positive R&D Dummy				2.035	2.195*	2.074
				(1.555)	(1.700)	(1.621)
Inst_Own_Passive × Positive Advertising Dummy				-0.249	-0.605	-0.745
				(-0.042)	(-0.102)	(-0.127)
Inst_Own_Active × Positive R&D Dummy				0.715	0.630	0.870
				(1.183)	(1.055)	(1.433)
Inst_Own_Active × Positive Advertising Dummy				-8.554**	-8.517**	-8.699**
				(-2.009)	(-2.020)	(-2.139)
Ind_Position					-0.506***	-2.085
					(-3.745)	(-0.959)
Ind_Position × Positive R&D Dummy						-0.765***

						(-3.577)
Ind_Position × Positive Advertising Dummy						2.117
						(0.975)
Log Assets		0.624***	0.624***	0.592***	0.563***	0.573***
		(3.625)	(3.631)	(3.450)	(3.254)	(3.312)
Log PPE		-0.890***	-0.895***	-0.881***	-0.864***	-0.856***
		(-6.182)	(-6.210)	(-6.106)	(-5.973)	(-5.952)
Log Market Value		0.316***	0.330***	0.348***	0.381***	0.366***
		(4.051)	(4.280)	(4.496)	(4.865)	(4.643)
Intercept	1.327***	-0.351	1.729	-0.012	0.265	1.138
	(5.702)	(-0.728)	(1.256)	(-0.010)	(0.236)	(0.903)
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs	7,194	7,150	7,150	7,150	7,106	7,106
R2	0.436	0.457	0.459	0.462	0.464	0.466

Appendix 1

Table A1.1
Insider Event, Large Controlling Shareholders and Abnormal Short Sales based on Estimation window [-60, -11]

This table reports OLS regression results for abnormal short sales around insider transactions for all firms, family controlled firms, non-controlled firms and state-controlled firms. The dependent variable is daily abnormal short sales *(Estimation window [-60, -11] is used)*. $Insider_{[0]}$ equals one when the day is day 0, and zero otherwise. $Insider_{[0,1]}$ equals one when the day is day 0 or day 1, and zero otherwise. $Insider_{[0,2]}$ equals one when the day is day 0, day 1 or day 2, and zero otherwise. *Firm size* is the natural logarithm of the daily market value. *Turnover* is the natural logarithm of the daily number of shares traded. *Bid-ask spread* is measured as the bid price minus the ask price, divided by the average of the daily bid and ask prices. *Book-to-market* is the quarter-end book value of equity divided by the daily market value of equity. $Short_{(t-5;t-1)}$ represents the cumulative short selling volume during the five days prior to day t as a percentage of number of shares outstanding. AR_t is the size-adjusted abnormal returns on day t. $CAR_{(t-5;t-1)}$ measures the cumulative abnormal size-adjusted returns during the five days prior to day t. All models include year and industry dummies. All standard errors are clustered by event. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	All firms			Family-controlled			Non-controlled			State-controlled		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$Insider_{[0]}$	0.006***			0.005**			0.004*			0.008		
	(3.451)			(2.404)			(1.678)			(1.264)		
$Insider_{[0,1]}$		0.005***			0.004**			0.001			0.014	
		(2.796)			(2.176)			(0.511)			(1.598)	
$Insider_{[0,2]}$			0.003**			0.003*			-0.001			0.008
			(2.141)			(1.800)			(-0.709)			(1.486)
Firm size	-0.001	-0.001	-0.001	-0.005***	-0.005***	-0.005***	0.001	0.001	0.001	-0.001	-0.001	-0.001
	(-1.480)	(-1.476)	(-1.478)	(-4.469)	(-4.473)	(-4.470)	(1.137)	(1.139)	(1.138)	(-0.704)	(-0.702)	(-0.690)
Turnover	0.004***	0.003***	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***	0.004***	0.014***	0.014***	0.014***
	(5.836)	(5.859)	(5.871)	(5.132)	(5.133)	(5.158)	(3.417)	(3.416)	(3.430)	(2.917)	(2.968)	(2.953)
Bid-ask spread	0.203	0.202	0.201	-0.092	-0.097	-0.092	0.760	0.756	0.751	-1.132	-1.123	-1.110
	(0.597)	(0.593)	(0.589)	(-0.451)	(-0.476)	(-0.455)	(1.183)	(1.172)	(1.165)	(-1.289)	(-1.281)	(-1.259)
Book-to-market	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001	-0.001	-0.004**	-0.004**	-0.004**
	(-1.291)	(-1.289)	(-1.297)	(-1.063)	(-1.058)	(-1.068)	(-1.473)	(-1.479)	(-1.482)	(-2.298)	(-2.309)	(-2.316)
$Short_{(t-5;t-1)}$	0.046***	0.046***	0.046***	0.034***	0.034***	0.034***	0.057***	0.057***	0.057***	0.040**	0.041**	0.040**

	(9.330)	(9.333)	(9.316)	(6.650)	(6.646)	(6.647)	(14.502)	(14.472)	(14.429)	(2.526)	(2.502)	(2.510)
$CAR_{(t-5;t-1)}$	0.025***	0.024***	0.024***	0.009	0.009	0.009	0.065***	0.065***	0.065***	0.033	0.032	0.032
	(3.499)	(3.498)	(3.507)	(1.224)	(1.219)	(1.222)	(5.913)	(5.906)	(5.893)	(1.090)	(1.086)	(1.085)
AR_t	0.000*	0.000**	0.000**	-0.000	-0.000	-0.000	0.001*	0.001*	0.001*	0.002	0.002	0.002
	(1.952)	(1.989)	(2.005)	(-0.355)	(-0.339)	(-0.329)	(1.887)	(1.906)	(1.898)	(1.620)	(1.652)	(1.643)
Intercept	-0.016	-0.016	-0.016	0.063***	0.063***	0.063***	-0.070**	-0.070**	-0.070**	-0.175*	-0.173*	-0.175*
	(-0.702)	(-0.706)	(-0.712)	(2.827)	(2.828)	(2.815)	(-2.165)	(-2.173)	(-2.176)	(-1.922)	(-1.938)	(-1.936)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,310	16,310	16,310	8,299	8,299	8,299	5,048	5,048	5,048	2,963	2,963	2,963
Adjusted R^2	0.133	0.133	0.133	0.091	0.091	0.091	0.239	0.239	0.239	0.107	0.111	0.109

Table A1.2

Insider Event, Family Control and Abnormal Short Sales based on Estimation window [-60, -11]

This table reports OLS regression results for abnormal short sales around insider transactions, across different level of family control, in family-controlled firms *(Estimation window [-60, -11] is used)*. *Family voting rights* refers to the voting rights held by all family members. *Family board seats* is the number of family members sitting on the board. The dependent variable is daily abnormal short sales. $Insider_{[0]}$ equals one when the day is day 0, and zero otherwise. $Insider_{[0,1]}$ equals one when the day is day 0 or day 1, and zero otherwise. $Insider_{[0,2]}$ equals one when the day is day 0, day 1 or day 2, and zero otherwise. *Firm size* is the natural logarithm of the daily market value. *Turnover* is the natural logarithm of the daily number of shares traded. *Bid-ask spread* is measured as the bid price minus the ask price, divided by the average of the daily bid and ask prices. *Book-to-market* is the quarter-end book value of equity divided by the daily market value of equity. $Short_{(t-5;t-1)}$ represents the cumulative short selling volume during the five days prior to day t as a percentage of number of shares outstanding. AR_t is the size-adjusted abnormal returns on day t. $CAR_{(t-5;t-1)}$ measures the cumulative abnormal size-adjusted returns during the five days prior to day t. All models include year and industry dummies. All standard errors are clustered by event. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Family voting rights<50%			Family voting rights>=50%			Family board seats<2			Family board seats>=2		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$Insider_{[0]}$	0.007**			0.001			0.008**			0.000		
	(2.159)			(0.641)			(2.369)			(0.027)		
$Insider_{[0,1]}$		0.006**			0.000			0.007**			-0.000	
		(2.041)			(0.294)			(2.222)			(-0.072)	
$Insider_{[0,2]}$			0.004*			0.000			0.005**			-0.000
			(1.646)			(0.350)			(1.990)			(-0.355)
Firm size	-0.009***	-0.009***	-0.009***	-0.001*	-0.001*	-0.001*	-0.007***	-0.007***	-0.007***	-0.004***	-0.004***	-0.004***
	(-4.188)	(-4.187)	(-4.184)	(-1.839)	(-1.841)	(-1.841)	(-3.635)	(-3.635)	(-3.631)	(-4.108)	(-4.110)	(-4.110)
Turnover	0.005***	0.005***	0.005***	0.003***	0.003***	0.003***	0.004***	0.004***	0.004***	0.005***	0.005***	0.005***
	(4.794)	(4.793)	(4.822)	(3.354)	(3.360)	(3.361)	(4.289)	(4.288)	(4.311)	(4.735)	(4.729)	(4.736)
Bid-ask spread	-0.405	-0.403	-0.399	-0.147	-0.150	-0.149	-0.065	-0.064	-0.056	-0.068	-0.068	-0.067
	(-1.162)	(-1.162)	(-1.153)	(-0.926)	(-0.943)	(-0.936)	(-0.185)	(-0.182)	(-0.161)	(-0.277)	(-0.276)	(-0.275)
Book-to-market	0.000	0.000	0.000	-0.001***	-0.001***	-0.001***	0.000	0.000	0.000	-0.001***	-0.001***	-0.001***
	(0.780)	(0.782)	(0.779)	(-4.354)	(-4.368)	(-4.369)	(1.145)	(1.149)	(1.145)	(-4.037)	(-4.038)	(-4.041)
$Short_{(t-5;t-1)}$	0.035***	0.035***	0.035***	0.027***	0.027***	0.027***	0.037***	0.037***	0.037***	0.008	0.008	0.008
	(6.334)	(6.332)	(6.334)	(3.155)	(3.151)	(3.153)	(6.562)	(6.557)	(6.558)	(1.037)	(1.037)	(1.037)
$CAR_{(t-5;t-1)}$	0.017	0.017	0.017	0.013***	0.013***	0.013***	0.011	0.011	0.011	0.029***	0.029***	0.029***

	(1.516)	(1.498)	(1.505)	(3.478)	(3.483)	(3.487)	(0.864)	(0.850)	(0.860)	(3.807)	(3.807)	(3.808)
AR_t	-0.000	-0.000	-0.000	0.000*	0.000*	0.000*	-0.000	-0.000	-0.000	0.000	0.000	0.000
	(-0.637)	(-0.611)	(-0.598)	(1.655)	(1.662)	(1.660)	(-0.163)	(-0.127)	(-0.118)	(0.151)	(0.152)	(0.153)
Intercept	0.117***	0.117***	0.117***	-0.006	-0.006	-0.006	0.089**	0.089**	0.089**	0.041	0.041	0.041
	(2.806)	(2.802)	(2.789)	(-0.282)	(-0.283)	(-0.285)	(2.469)	(2.466)	(2.452)	(1.631)	(1.630)	(1.631)
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,359	5,359	5,359	2,940	2,940	2,940	4,905	4,905	4,905	3,394	3,394	3,394
Adjusted R^2	0.106	0.106	0.106	0.087	0.087	0.087	0.108	0.108	0.108	0.089	0.089	0.089

Table A1.3

Insider Event, Family Affiliation and Abnormal Short Sales based on Estimation window [-60, -11]

This table reports OLS regression results for abnormal short sales around insider transactions, split by whether or not the insider is affiliated with the family, in the family-controlled firms *(Estimation window [-60, -11] is used)*. The *family group* includes those trades executed by family insiders, and the *non-family group* refers to those trades executed by insiders that do not belong to the family. $Insider_{[0]}$ equals one when the day is day 0, and zero otherwise. $Insider_{[0,1]}$ equals one when the day is day 0 or day 1, and zero otherwise. $Insider_{[0,2]}$ equals one when the day is day 0, day 1 or day 2, and zero otherwise. *Firm size* is the natural logarithm of the daily market value. *Turnover* is the natural logarithm of the daily number of shares traded. *Bid-ask spread* is measured as the bid price minus the ask price, divided by the average of the daily bid and ask prices. *Book-to-market* is the quarter-end book value of equity divided by the daily market value of equity. $Short_{(t-5;t-1)}$ represents the cumulative short selling volume during the five days prior to day t as a percentage of number of shares outstanding. AR_t is the size-adjusted abnormal returns on day t. $CAR_{(t-5;t-1)}$ measures the cumulative abnormal size-adjusted returns during the five days prior to day t. All models include year and industry dummies. All standard errors are clustered by event. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Non-family group			Family group		
	(1)	(2)	(3)	(4)	(5)	(6)
$Insider_{[0]}$	0.006**			0.000		
	(2.406)			(0.057)		
$Insider_{[0,1]}$		0.005**			-0.001	
		(2.309)			(-0.612)	
$Insider_{[0,2]}$			0.004**			-0.002
			(2.124)			(-1.176)
Firm size	-0.006***	-0.006***	-0.006***	-0.002	-0.002	-0.002
	(-5.399)	(-5.408)	(-5.400)	(-0.543)	(-0.544)	(-0.545)
Turnover	0.004***	0.004***	0.004***	0.005***	0.005***	0.005***
	(5.018)	(5.025)	(5.044)	(2.845)	(2.838)	(2.853)
Bid-ask spread	0.042	0.031	0.041	-0.506	-0.507	-0.508
	(0.170)	(0.125)	(0.164)	(-1.275)	(-1.272)	(-1.272)
Book-to-market	0.000	0.000	0.000	-0.001**	-0.001**	-0.001**
	(0.273)	(0.275)	(0.268)	(-2.561)	(-2.563)	(-2.575)
$Short_{(t-5;t-1)}$	0.036***	0.036***	0.036***	0.016**	0.016**	0.016**
	(6.595)	(6.593)	(6.595)	(2.233)	(2.229)	(2.230)
$CAR_{(t-5;t-1)}$	0.011	0.011	0.011	0.019**	0.019**	0.019**
	(1.103)	(1.093)	(1.095)	(2.302)	(2.301)	(2.300)
AR_t	0.000	0.000	0.000	-0.000	-0.000	-0.000
	(0.132)	(0.133)	(0.156)	(-0.673)	(-0.681)	(-0.686)
Intercept	0.089***	0.089***	0.088***	-0.035	-0.035	-0.035
	(3.677)	(3.681)	(3.658)	(-0.709)	(-0.714)	(-0.718)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,492	6,492	6,492	1,807	1,807	1,807
Adjusted R^2	0.102	0.103	0.102	0.081	0.081	0.081

Table A1.4
Family Control and Abnormal Short Sales

This table reports OLS regression results for abnormal short sales around insider transactions, across different level of family control, in family-controlled firms. *Family voting rights* refers to the voting rights held by all family members. $Insider_{[0]}$ equals one when the day is day 0, and zero otherwise. $Insider_{[0,1]}$ equals one when the day is day 0 or day 1, and zero otherwise. $Insider_{[0,2]}$ equals one when the day is day 0, day 1 or day 2, and zero otherwise. *Firm size* is the natural logarithm of the daily market value. *Turnover* is the natural logarithm of the daily number of shares traded. *Bid-ask spread* is measured as the bid price minus the ask price, divided by the average of the daily bid and ask prices. *Book-to-market* is the quarter-end book value of equity divided by the daily market value of equity. $Short_{(t-5;t-1)}$ represents the cumulative short selling volume during the five days prior to day t as a percentage of number of shares outstanding. AR_t is the size-adjusted abnormal returns on day t. $CAR_{(t-5;t-1)}$ measures the cumulative abnormal size-adjusted returns during the five days prior to day t. All models include year and industry dummies. All standard errors are clustered by event. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Family voting rights>=60%			Family voting rights>=70%		
	(1)	(2)	(3)	(4)	(5)	(6)
$Insider_{[0]}$	0.001			0.002		
	(0.524)			(1.004)		
$Insider_{[0,1]}$		0.000			0.002	
		(0.181)			(1.383)	
$Insider_{[0,2]}$			0.000			0.001
			(0.277)			(1.131)
Firm size	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-0.329)	(-0.331)	(-0.330)	(-0.068)	(-0.069)	(-0.069)
Turnover	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(3.650)	(3.656)	(3.654)	(4.239)	(4.273)	(4.273)
Bid-ask spread	0.058	0.057	0.057	0.217	0.215	0.218
	(0.274)	(0.267)	(0.269)	(0.999)	(0.991)	(1.006)
Book-to-market	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(-4.820)	(-4.831)	(-4.828)	(-5.228)	(-5.276)	(-5.283)
$Short_{(t-5;t-1)}$	0.033***	0.033***	0.033***	0.012	0.012	0.012
	(3.351)	(3.345)	(3.349)	(0.824)	(0.826)	(0.825)
$CAR_{(t-5;t-1)}$	0.017***	0.017***	0.017***	0.015***	0.015***	0.015***
	(3.868)	(3.872)	(3.876)	(3.729)	(3.721)	(3.736)
AR_t	0.000**	0.000**	0.000**	0.000***	0.000***	0.000***
	(2.022)	(2.029)	(2.026)	(4.023)	(4.004)	(4.002)
Intercept	-0.037	-0.037	-0.037	-0.035	-0.035	-0.036
	(-1.262)	(-1.262)	(-1.264)	(-1.341)	(-1.339)	(-1.346)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,940	2,940	2,940	1,857	1,857	1,857
Adjusted R^2	0.111	0.111	0.111	0.083	0.084	0.084

Appendix 2

A short-term investor should buy and sell his portfolio frequently, while a long-term investor should hold his positions unchanged for a considerable length of time. Following Yan and Zhang (2009) and Gaspar et al. (2005, 2012), the churn rate for each institutional investor is calculated to measure how frequently he rotates his positions on all the stocks of his portfolio over a period. They construct this measure following those commonly used to assess an investors' overall portfolio rotation. If we denote the number of companies held by investor j is S, the churn rate of investor j at quarter q is

$$CR_{j,q} = \frac{\sum_{i \in S} \left| N_{i,j,q} P_{i,q} - N_{i,j,q-1} P_{i,q-1} - N_{i,j,q-1} \Delta P_{i,q} \right|}{\sum_{i \in S} \frac{N_{i,j,q} P_{i,q} + N_{i,j,q-1} P_{i,q-1}}{2}}$$

where $P_{i,q}$ and $N_{i,j,q}$ represent the price and the number of shares, respectively, of company i at quarter q. $CR_{j,q}$ measures the the change percentage of the market value of the portfolio held by investor j in quarter q.

Based on the quarterly churn rate, the annual average churn rate of investor j in year t, $ACR_{j,t}$, is the average quarterly churn rate over four quarters in a year, which is calculated as

$$ACR_{j,t} = \frac{1}{4} \sum_{q=1}^{4} CR_{j,q}$$

Based on the annual average churn rate ($ACR_{j,t}$), each year we sort all institutional investors into three tertile portfolios. Those ranked in the top tertile (with the highest $ACR_{j,t}$) are classified as short-term institutional investors and those ranked in the bottom

tertile (with the lowest $ACR_{j,t}$) are classified as long-term institutional investors. Given the horizon classification, for each firm, we define the aggregated holding by long-term institutional investors as long institutional ownership and aggregated holding by short-term institutional investors as short institutional ownership.

Table A2.1
VIF Test for Multicollinearity

This table reports VIF test results for multicollinearity. The dependent variable is the Institutional ownership. It is denoted as the aggregated institutional ownership, which is number of shares owned by all mutual funds as a percentage of a firm's tradable shares. Business ties is a dummy variable that equals 1 when the number of connections is above its average and 0 otherwise. Industry experience is a dummy variable that equals 1 when a CEO's prior working organizations are in the same industry as the focal firm where he/she serves and 0 otherwise. Political ties is a dummy variable that equals 1 when a CEO has any central government, local government, military, or committee working experience and 0 otherwise. Return on assets (ROA) is measured by the profit before interest and tax scaled by total assets. Return refers to the annual stock return. Market to book is defined as the market value of equity divided by the book value of equity. Firm age is calculated as the current year minus the start year of the firm. Volatility is the one-year stock volatility calculated based on the daily closing price. Firm size is measured by the natural logarithm of total sales. Leverage is the book value of debt divided by the book value of equity. Controller refers to the type of ultimate controller; it is defined as an ordinal variable that equals 1 when the controller is enterprises, 2 when the controller is the government, 3 for individuals, and 0 otherwise. Independent indicates the number of independent directors as a percentage of the number of all members of the board of directors. Large1per measures the percentage of the shareholding of the largest shareholder. Duality is defined as a dummy variable that equals 1 when CEO and chairman are dual and 0 otherwise. Education is defined as an ordinal variable that equals 1 when a CEO holds as his/her highest degree a bachelor's degree, 2 for a master's degree, three for a PhD, and 0 otherwise. All models include year and firm dummies. All standard errors are clustered by firm. Robust t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Variable	VIF	1/VIF
Business ties	1.31	0.76
Industry experience	1.43	0.70
Political ties	1.14	0.88
Firm size	1.43	0.70
Return	1.42	0.71
Large1shper	1.36	0.73
Market to book	1.36	0.73
Firm age	1.28	0.78
Volatility	1.24	0.80
Independent	1.18	0.85
Controller	1.13	0.89
Duality	1.07	0.93
ROA	1.02	0.98
Leverage	1.02	0.98
Education	1.02	0.98
Mean	1.23	0.81

Table A2.2
CEO Human Capital and Institutional Ownership (GMM)

This table reports the GMM results of CEO human capital on institutional ownership. The dependent variable is the Institutional ownership. It is denoted as the aggregated institutional ownership, which is number of shares owned by all mutual funds as a percentage of a firm's tradable shares. Business ties is a dummy variable that equals 1 when the number of connections is above its average and 0 otherwise. Industry experience is a dummy variable that equals 1 when a CEO's prior working organizations are in the same industry as the focal firm where he/she serves and 0 otherwise. Political ties is a dummy variable that equals 1 when a CEO has any central government, local government, military, or committee working experience and 0 otherwise. Return on assets (ROA) is measured by the profit before interest and tax scaled by total assets. Return refers to the annual stock return. Market to book is defined as the market value of equity divided by the book value of equity. Firm age is calculated as the current year minus the start year of the firm. Volatility is the one-year stock volatility calculated based on the daily closing price. Firm size is measured by the natural logarithm of total sales. Leverage is the book value of debt divided by the book value of equity. Controller refers to the type of ultimate controller; it is defined as an ordinal variable that equals 1 when the controller is enterprises, 2 when the controller is the government, 3 for individuals, and 0 otherwise. Independent indicates the number of independent directors as a percentage of the number of all members of the board of directors. Large1per measures the percentage of the shareholding of the largest shareholder. Duality is defined as a dummy variable that equals 1 when CEO and chairman are dual and 0 otherwise. Education is defined as an ordinal variable that equals 1 when a CEO holds as his/her highest degree a bachelor's degree, 2 for a master's degree, three for a PhD, and 0 otherwise. The three main independent variables (Business ties, Political ties and Industry experience) are assumed to be endogenous variables. The lag (t-1) of dependent variables and the lag (t-1) and first difference of endogenous variables are instrumental variables. All models include year dummies. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	(1) Institutional ownership	(2) Long Institutional ownership	(3) Short Institutional ownership
Lag Dependent Variable	0.279*	0.118***	0.042
	(1.857)	(3.232)	(0.737)
Business ties	0.030**	0.009*	0.002
	(1.980)	(1.724)	(0.245)
Political ties	0.009	0.002	0.006
	(0.326)	(0.267)	(0.702)
Industry experience	0.041*	0.008**	0.002
	(1.879)	(2.040)	(0.179)
ROA	-0.184	-0.080	-0.001
	(-0.665)	(-1.245)	(-0.017)
Return	-0.004	-0.003	0.005
	(-0.215)	(-0.378)	(0.821)
Market to Book	-0.001	0.000	-0.002
	(-0.072)	(0.019)	(-0.285)
Firm age	-0.001	0.000	0.002
	(-0.087)	(0.146)	(0.508)
Volatility	-0.070	-0.005	-0.046
	(-0.815)	(-0.162)	(-1.097)
Firm size	0.030	0.006	0.011
	(1.153)	(0.886)	(1.382)
Leverage	0.003	0.000	-0.002
	(0.343)	(0.102)	(-0.780)
Controller	-0.009	0.001	0.001
	(-0.549)	(0.309)	(0.102)
Independent	-0.006	0.005	0.003
	(-0.266)	(0.677)	(0.269)
Large1shper	0.000	0.000	0.000
	(0.293)	(0.736)	(0.054)
Duality	0.004	-0.000	-0.011

	(0.053)	(-0.020)	(-0.404)
Education	0.020	0.009	-0.005
	(0.891)	(1.237)	(-0.528)
Intercept	-0.556	-0.157	-0.208
	(-1.078)	(-1.234)	(-1.281)
Year	Yes	Yes	Yes
Observations	2,109	2,109	2,109
AR(1)	0.002	0.066	0.000
AR(2)	0.157	0.603	0.606
Sargan test	0.008	0.070	0.099
Hansen test	0.714	0.469	0.528