INSTITUTIONAL OWNERSHIP STRUCTURE AND FIRM-SPECIFIC INFORMATION: A CROSS-SECTIONAL AND TREND ANALYSIS

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Ph.D

The Hong Kong
Polytechnic University

2015

The Hong Kong Polytechnic University
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Institutional Ownership Structure and Firm-Specific Information: A Cross-Sectional and Trend Analysis

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A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

May 2014

Certificate of Originality

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Submitted by Ngai Ying Chu

for the Degree of Doctor of Philosophy

at the Hong Kong Polytechnic University

Abstract

This thesis investigates the effects of ownership distribution across institutional investors on the information environment of U.S. listed stocks in cross-sections and over time. I hypothesize and show that the concentration of shareholdings by an institutional investor and multiple large institutional owners has non-linear impacts on the capitalization of firm-specific information into share prices. The three main findings in this study strongly support the proposition that institutional ownership structure is an important determinant of the firm's information environment in cross-sections and through time.

First, I find a concave relation between firm-specific information and institutional ownership concentration: as concentration increases, firm-level information increases at a declining rate until it reaches the maximum level, consistent with the interplay of effective monitoring and monopolistic trading hypotheses. Second, I show that firm-specific information is a cubic function of concentration by multiple large institutional owners: when concentration rises,

firm-level information decreases initially, but it reverses direction and goes up, until it reaches the peak level, supporting the theoretical predictions of the free-rider problem and the competitive disciplinary trading effect in a multiple large shareholder structure. Finally, my time-series analyses unfold a downward trend in both institutional ownership concentration and firm-specific information during the period from 1980 to 2010. My trend analyses indicate that institutional ownership concentration and firm-specific information are positively related across time and that the downward trend in firm-specific information is accounted for by the downward trend in institutional ownership concentration. These empirical findings are robust to multiple variable measures and alternative models including panel and cross-sectional regressions based on lagged concentration variables, firm fixed effects, as well as changes in concentration and subsequent changes in firm-specific information.

This study contributes to the literature by enhancing our understanding of large institutional owners' influence on the pricing of firm-level information. My findings highlight the importance of considering the non-monotonic incentives of a large institutional investor, the interaction among multiple large owners in a firm, as well as the evolving nature of institutional ownership structure over time in assessing large shareholders' impact on the firm's information environment in future research.

Acknowledgements

First and foremost, I would like to express my sincere gratitude to both my supervisors, Prof. Li Jiang and Prof. Steven Wang, for their illuminating guidance, enlightenment, and constant support throughout the years. Their valuable supervision and care have enabled me to move ahead in this lengthy and tough journey.

I am also grateful to Prof. Wilson Tong, Prof. Steven Wei, and Prof. Mujtaba Mian for their encouragement and insightful comments in my confirmation and internal oral examination. Furthermore, I am indebted to Prof. Peter Cheng for taking care of my supervision in the early stage of my study.

I would also like to show my deep appreciation to Prof. Ferdinand A. Gul for his inspiring teaching, nurturing and unwavering support. I remember he said the most important advice for a researcher to be successful is “Struggle”.

My heartfelt thank you goes to Prof. Agnes Cheng for broadening my horizon by providing various learning and training opportunities. Being equipped for future challenges is the most precious gift a PhD student could ever have!

I have also greatly benefited from the stimulating research environment of our School, which builds on the contributions of many talented and enthusiastic scholars and their influential publications. I would not name them as it is

impossible to exhaust the list here. Their inspirations have indeed made my PhD journey enjoyable and fulfilling.

Also, I wish to give a big thanks to many colleagues and friends for their warm concern and generous help throughout the process.

Last but not least, a special thank you goes to my family for their endless love and support.

Table of Contents

List of Tables

List of Figures

Chapter 1 Introduction

Institutional investors have been playing an increasingly significant role in U.S. equity markets in the last few decades. The average proportion of institutional ownership in public equities has increased from 28% in 1980 to 67% in 2010 (Tonello and Rabimov, 2010; Blume and Keim, 2012). However, their ownership concentration at stock level, measured by Herfindahl-Hirschman Index, has declined from 45% in 1980 to 15% in 2010. The significant stakes of institutional owners and their evolving ownership distribution may have important implications for corporate governance and the information environment of the stock market. A large body of literature has explored the monitoring and informational roles of institutional investors, but the empirical results are somewhat inconclusive.[1] In this study, I investigate the influence of large institutional investors on the firm's information environment through the lens of corporate ownership structure in the U.S. In particular, I ask three questions. Does a large institutional owner affect the pricing of firm-specific information in a non-linear manner, reflecting his potentially diverging incentives? In a multiple large institutional owner structure, whether and how do these multiple shareholders influence the incorporation of firm-specific information into share prices? Whether and how does institutional ownership structure affect firm-specific information over time?

Corporate ownership research has been motivated to a great extent by Berle and Means' seminal work entitled *The Modern Corporation and Private Property*

[1] See Gillan and Starks (2003) and Johnson, Schnatterly, Johnson, and Chiu (2010) for reviews.

(Berle and Means, 1932) and by Jensen and Meckling's pivotal paper on agency problem (Jensen and Meckling, 1976).[2] Berle and Means (1932) explore the evolution of the corporate system from economic and legal perspectives. They argue that the separation of ownership from control and the diffuse ownership structure of modern corporations destroy the economic foundation of private property of the past centuries. They warn that this shifting in economic power leads to a divergence of interests between ownership and control, and changes the profit-seeking nature of the enterprise. Jensen and Meckling (1976) build on these ideas and introduce the agency theory of the firm. They focus on the agency relationship between the owners (i.e. the principal) and the management (i.e. the agent) of the firm and analyze the agency costs incurred as a result of the conflicting objectives of the principal and the agent. The authors integrate their concepts about agency costs and propose a theory of corporate ownership structure by suggesting that the interests of shareholders and managers can be aligned by management ownership of the firm.[3] Early studies on large or concentrated ownership typically deal with managerial holdings, but then a line of literature began to posit a monitoring role for large shareholders in general.

Some theoretical articles suggest that large shareholders can potentially address the agency problem between managers and owners. They reason that in a dispersed

[2] Berle and Means' study has stimulated a stream of literature, both supporting and opposing the importance of ownership structure for the firm; examples are Monsen and Downs (1965) and Fama (1980). See Short (1994) for a review.

[3] After Jensen and Meckling (1976), researchers soon discovered that managers and directors held large shareholdings in some public corporations, examples include Holderness and Sheehan (1988), Mikkelson and Partch (1989), and Holderness, Kroszner, and Sheehan (1999).

ownership structure, there is little incentive for individual owners to monitor management. This is because the individual monitoring owner will bear all monitoring costs, but will receive only a small fraction of the resulted benefits; while a large portion of the benefits accrues to all shareholders. This free-rider problem faced by individual owners makes it economically inefficient to govern a diffusely held firm. However, when ownership concentration increases, or when shareholders have substantial cash flow stakes involved, these large shareholders will then have the incentives and resources to acquire firm-specific information and to engage in value-enhancing activities (Grossman and Hart, 1980; Grossman and Stiglitz, 1980; Shleifer and Vishny, 1986; Huddart, 1993; Admati, Pfleiderer, and Zechner, 1994; Shleifer and Vishny, 1997). In this strong governance environment, managers are constrained from capturing a firm's cash flows or from managing earnings, the information environment is more transparent, and the cost of information is low. All these facilitate informed trading and the impounding of firm-specific information into stock prices (Jin and Myers, 2006; Ferreira and Laux, 2007). Hence, under the effective monitoring hypothesis, concentrating ownership has a positive effect on the capitalization of firm-specific information into share prices.

However, monitoring is not the only issue; a large institutional investor also has an incentive to capitalize on his intervention efforts by exploiting his information advantage and trading strategically to maximize his profits. Building on the seminal work of Kyle (1985), information-based market microstructure models suggest that

the distribution of information is an important factor in determining trading behaviors and market efficiency. Based on the predictions of these models, ownership concentration can adversely affect stock price informativeness. As a large institutional investor has more information due to better access to a firm and greater incentives to generate private information about it; institutional ownership pattern indicates, with noise, the distribution of private information among institutional investors. High ownership concentration implies an uneven distribution of information and less competition over information among traders. When there is less competition, the degree of private information exploitation is higher. In a non-competitive information structure, a single informed trader can best exploit his private information to maximize profits. He has an incentive to act strategically by choosing smaller orders to camouflage his trades. Private information is therefore incorporated into prices only slowly. In addition, the information advantage of a large owner may discourage other investors from acquiring information and trading. As a result, prices are less informative about fundamental value (Kyle, 1985; Fishman and Hagerty, 1992; Akins, Ng, and Verdi, 2012). Thus, under the monopolistic trading hypothesis, concentrating ownership has a negative effect on the incorporation of firm-specific information into share prices.

While the previous literature analyzes the monitoring and informational roles of individual large shareholders, a recent strand of literature focuses on the structure of multiple large owners and investigates the interaction among large shareholders.

Some theories conjecture that multiple large shareholders may collude to extract private benefits and divert firm profits. Other studies recommend that a structure with multiple large shareholders, or simply shared ownership, could be a solution to governance problems because multiple large shareholders can monitor each other and maintain the balance of power (Zwiebel, 1995; Pagano and Röell, 1998; Bennedsen and Wolfenzon, 2000; Maury and Pajuste, 2005; Dhillon and Rossetto, 2010). Linking ownership to microstructure literature, Edmans and Manso (2011) show that multiple blockholders can affect corporate governance and the information environment in both positive and negative ways. On the one hand, splitting equity among several large shareholders may generate free-rider problems and impair their direct monitoring efforts. This can have an adverse effect on price informativeness. On the other hand, since multiple blockholders engage in disciplinary trading in a competitive manner, their trading increases the amount of firm-specific information incorporated into share prices.

Hence, corporate ownership and market microstructure literatures have pointed to forces that work in opposite directions with concentrated ownership and multiple large owner structure. The presence of a large shareholder may alleviate the agency problem between managers and shareholders, contribute to a transparent information environment, and thus improve firm-specific information in share prices. However, a large shareholder may also aggravate the exploitation of private information, crowd out information acquisition, and thus reduce firm-specific information in prices. The structure of multiple large shareholders may affect firm-

specific information both positively and negatively as well. On the one hand, it may lead to free-rider problems, and thus weaken intervention governance and the information environment. On the other hand, it may increase competition over information, strengthen competitive disciplinary trading and enhance price informativeness. To date there is little empirical evidence and understanding on how these different forces work. One of the objectives of this study is therefore to take into account these diverging forces and to examine large institutional investors' influence on corporate information environment by analyzing these potential non-monotonic incentives under their ownership structure in cross-sections. The other objective of this paper is to explore the time-series relation between institutional ownership structure and the firm's information environment by conducting a trend analysis.

The ownership landscape in the United States has undergone tremendous changes over the last century. Before and during the early 20th century, wealth was concentrated in the hands of a few industrialists who owned and managed most production organizations. With the advent of the industrial revolution, the scale of production had expanded to a point that firms increasingly sought to raise capital from the public, this led to the dispersion of ownership among individual investors in large public companies.[4] In the 1930's, as a result of growing awareness of the need to deal with problems of unemployment and social insecurity, institutions such as social security funds and pension funds emerged. Since the end of the 1950's, the

[4] However, Holderness (2009) and Fairfax (2011) noted that blockholdings accompanied by smaller shareholdings were prevalent in small and medium sized public companies.

development of corporate ownership was marked by the decline of retail investors and the rise of institutional investors. As individuals increasingly shifted their funds from direct share ownership to bank deposits and institutional investments; institutional investors began to play a greater role in the equity market. In 1950, institutional investors held only 6% of the equity market. In 1970, institutional ownership accounted for 18% of the market. By 1990, the ownership level had climbed to 37% and it reached 50% in 2009. Other figures reflect even higher institutional ownership levels (Holderness, 2009; Pichhadze, 2010; Fairfax, 2011). Nevertheless, in sharp contrast to the rapidly rising ownership level, I find that the ownership concentration of institutional investors has declined steadily from 1980 to 2010. For instance, the Herfindahl-Hirschman Index fell from 45% in 1980 to 32% in 1990. It further declined to 28% in 2000 and even further to 15% in 2010. As the concentration of ownership rights can affect a firm's incentive structure and information environment; in this study, I further examine whether and how the declining trend in institutional ownership concentration is related to the evolving information environment of the firm over time.

Prior literature on the informational roles of institutional investors in stock markets has been extensive, but the results are not conclusive. Gompers and Metrick (2001) find that the level of institutional ownership in a stock predicts its future return. They interpret the finding as evidence of institutional investors' demand shocks rather than their informed trading. Nofsinger and Sias (1999) document a positive relation between institutional ownership changes and

contemporaneous returns and they find no evidence of return mean-reversion in the following year, implying that institutions engage in information-based herding. Sias, Starks, and Titman (2006) also suggest that institutional investors are informed and their information is incorporated into share prices through trading. In contrast, Cai and Zheng (2004) show that institutional investors indulge in positive feedback trading that is negatively related to future returns. The literature on mutual fund performance comes to different conclusions as well. While some studies provide evidence that mutual fund managers are informed and skilled in picking stocks (Grinblatt and Titman, 1993; Kent, Grinblatt, Titman, and Wermers, 1997; Chen, Narasimhan Jegadeesh, and Wermers, 2000; Baker, Litov, Wachter, and Wurgler, 2010), other studies find that they underperform the market (Malkiel, 1995; Gruber, 1996; Carhart, 1997).

A strand of literature emphasizes the heterogeneity in institutional investors and suggests that certain types of institutional investors have an information advantage over others. For example, similar to Bushee (2001), Ke and Petroni (2004) classify institutions into transient, dedicated and quasi-indexing and show that transient institutions have the information to predict a break in a string of consecutive quarterly earnings increases, while there is no evidence that dedicated or quasi-indexing institutions have this foreknowledge. Yan and Zhang (2009) also show that the trading of short-term institutions forecasts future returns and is positively correlated with future earnings surprises; whereas the trading of long-term institutions cannot forecast future returns and is unrelated to future earnings. On the

contrary, An and Zhang (2013) find that transient (dedicated) institutional ownership is positively (negatively) related to the firm's stock price synchronicity and crash risk, which implies that transient institutions have an adverse effect on the informational efficiency of stock prices. In this study, I suggest that an important source of heterogeneity in institutional investors lies in the non-monotonic incentives under their ownership structure. Hence, I investigate the impact of institutional investors on the information environment by examining the non-linear influence under their concentrated and multiple large shareholder ownership structure.

I point out three primary findings in this study. First, firm-specific information is a concave function of institutional ownership concentration. As the concentration of institutional ownership increases, firm-level information initially increases at a decreasing rate until it reaches a maximum when the ownership concentration level goes beyond a certain point, indicating the opposing forces of effective monitoring and monopolistic trading at work. Second, firm-specific information is a cubic function of ownership concentration by multiple large institutional investors. At low levels of concentration by multiple large owners, firm-specific information declines initially; after a certain threshold, it reverses direction and increases at a decreasing rate until it reaches a maximum. This is consistent with the theoretical propositions of the free-rider problem and competitive trading effect in a multiple large shareholder structure. Lastly, I find that there is a downward trend in both institutional ownership concentration and firm-specific information from 1980 to

2010. More importantly, I show that the declining trend in firm-specific information is attributable to the downward trend in institutional ownership concentration during the period.

This study is related to Piotroski and Roulstone (2004), Brockman and Yan (2009), and Gul, Kim, and Qiu (2010). Piotroski and Roulstone (2004) explore the influences of insiders, analysts, and institutional investors on the incorporation of firm-level, industry-level, and market-level information into stock prices, but they do not document a consistent relation between institutional shareholdings and stock price synchronicity, which is an inverse measure of stock price informativeness. Brockman and Yan (2009) conjecture and find that block ownership in general is positively associated with firm-specific information. Gul et al. (2010) examine the effects of largest-shareholder ownership concentration on the impounding of firm-specific information into share prices of Chinese-listed firms. My study complements and extends previous literature. It is conducted in the unique institutional context of the United States, and it focuses on an increasingly important investor group in the U.S. market – institutional investors. Unlike prior studies, I hypothesize and show that large institutional investors have a non-linear influence on the firm's information environment and I delve into the relation from the perspective of their non-monotonic incentives under their concentrated and multiple large owner structures. In addition, I explore and affirm the time-series relation between institutional ownership structure and firm-specific information in the U.S. from 1980 to 2010.

The rest of this dissertation proceeds as follows. Chapter 2 reviews related literature and develops research hypotheses. Chapter 3 explains variable measurement and model specification. Chapter 4 describes the data, samples, and summary statistics. Chapter 5 reports results of cross-sectional analyses and robustness tests. Chapter 6 presents graphical analyses. Chapter 7 performs trend analyses. Chapter 8 summarizes and concludes.

Chapter 2 Related Literature and Hypothesis Development

2.1. Measures of Firm-specific Information

Previous literature suggests that firm-specific information in stock prices can affect real economic activities. For example, Durnev, Morck, and Yeung (2004) find that more informative stock prices facilitate efficient corporate investment. Chen, Goldstein, and Jiang (2007) suggest that managers learn from the private information in share prices about the prospects of their own firms and incorporate the information in their investment decisions. Hence, a better understanding of the capitalization of firm-specific information into share prices matters to the functional efficiency of the financial market and the real economy.

In this thesis, I study the impact of institutional investors' ownership structure on the pricing of firm-specific information. To perform the analysis, I employ two measures to gauge the amount of firm-specific information in share prices – the probability of informed trading (*PIN*) and firm-specific return variation, or alternatively named stock price informativeness (*SPI*). I justify the use of these two measures as proxies for firm-specific information on both conceptual and empirical grounds.

The *PIN* measure has strong theoretical foundation and growing empirical support as a measure of firm-specific private information. It is developed and used in a series of articles by Easley, Kiefer, O'Hara, and Paperman (1996), Easley, Kiefer, and O'Hara (1996), Easley, Kiefer, and O'Hara (1997), Easley, O'Hara, and

Paperman (1998), Easley, O'Hara, and Srinivas (1998), and Easley, Hvidkjaer, and O'Hara (2002). *PIN* is constructed on the basis of a structural market microstructure model. It is inferred from the imbalance between buy and sell orders and is estimated as the proportion of trades that is likely to be motivated by private information of a stock. Consistent with this intuition, Easley and O'Hara (2004), Easley, Hvidkjaer, and O'Hara (2010) and Aslan, Easley, Hvidkjaer, and O'Hara (2011) show that the probability of informed trading affects asset returns: stocks with high *PIN*s earn higher expected returns. They explain that uninformed traders require a premium to compensate them for holding stocks with greater information risk which cannot be diversified away.

An increasing number of studies relate the *PIN* measure to informational efficiency of stock prices. For instance, Vega (2006) shows that high *PIN* stocks experience smaller or insignificant post-earnings announcement drifts. She attributes this quicker price adjustment to the higher arrival rate of informed trading of high *PIN* stocks. Chen et al. (2007) find that *PIN* and stock nonsynchronicity are positively associated with investment sensitivity to stock price, suggesting that they serve as a guide to managerial decisions. Kang and Liu (2008) demonstrate that *PIN* increases with CEO pay-performance sensitivity, indicating that an informational efficient stock market encourages the use of equity-based incentive contracts. This growing literature presents evidence that *PIN* is a sound measure of firm-specific private information.

The R^2 literature is inspired by Roll's (1988) observation of low R^2 statistics for conventional asset pricing models, which implies that a large proportion of stock return variation in his U.S. sample cannot be explained by market-wide factors or public information. He interprets this high firm-specific return variation as indication of either private information incorporated into share prices or simply noise without concrete information. Since then, a large body of research provides evidence consistent with Roll's informational interpretation of firm-specific return variation. For example, Durnev, Morck, Yeung, and Zarowin (2003) find that firms with low R^2 exhibit high association between current returns and future earnings, indicating more informative prices. Morck, Yeung, and Yu (2000) show that stock return synchronicity is higher in low-income economies than in developed economies. They explain that poor respect for private property rights and weak investor protection could render arbitrage and informed trading unattractive. Jin and Myers (2006) argue that countries with more opaque firms have higher average R^2s because opaqueness allows managers to capture corporate cash flows and thus absorb firm-specific return variance. Haggard, Martin, and Pereira (2008) and Hutton, Marcus, and Tehranian (2009) test Jin and Myers' opacity model on firm level using US data. Haggard et al. (2008) provide evidence that voluntary disclosure improves stock price informativeness. Hutton et al. (2009) demonstrate that earnings management is associated with higher R^2, which indicates less revelation of firm-level information. In addition, Ferreira and Laux (2007) show that firms with fewer anti-takeover provisions exhibit higher levels of idiosyncratic volatility, private information flow, trading activities, and earnings information in

share prices. This suggests that more open governance policies encourage information collection and informed trading, which in turn contributes to more informative prices.

The informational interpretation of firm-specific return variation is also supported by theories of the stock price comovement literature. For example, Veldkamp (2006) models a competitive information market where information production entails high fixed costs. Investors tend to use high-demand and low-cost common information, which leads to asset price comovement. This indicates that comovement is associated with less revelation of firm-specific private information.[5] These findings support the proposition that firm-specific return variation reflects more private information than noise and thus justify the use of firm-specific return variation or stock price informativeness as a measure of firm-specific private information.

2.2. Large Institutional Owners and Firm-specific Information

The pattern of ownership rights among competing shareholders is potentially an important determinant of the incentive structure and thus the information environment of a firm. In principle, ownership concentration can have two opposing effects on firm-specific information, based on the effective monitoring hypothesis and the monopolistic trading hypothesis. Under the effective monitoring hypothesis, concentrated ownership can alleviate agency conflicts between

[5] Stock return comovement is associated with financial contagion (Kyle and Xiong, 2001; Kodres and Pritsker, 2002), style investing (Barberis and Shleifer, 2003) and investor sentiment (Barberis, Shleifer, and Wurgler, 2005).

managers and owners, facilitate the flow of information, and increase the amount of firm-specific information capitalized into share prices. With improved cost-benefit tradeoff on information collection and monitoring efforts, large shareholders have the motives and capabilities to acquire firm-specific private information, to limit managerial discretion, and to improve corporate transparency. These in turn assist informed trading and the pricing of firm-level information (Grossman and Hart, 1980; Grossman and Stiglitz, 1980; Shleifer and Vishny, 1986; Huddart, 1993; Admati et al., 1994; Shleifer and Vishny, 1997; Jin and Myers, 2006; Ferreira and Laux, 2007).

There has been empirical support for large institutional owners' contributions to corporate governance and information flow. For example, Shleifer and Vishny (1986) observe that large shareholders, including pension plans, banks, insurance companies and investment funds, play an active role in takeovers or third-party takeovers. Agrawal and Mandelker (1990) find that firms with more institutional shareholdings experience greater stock price reactions to antitakeover charter amendments proposals, supporting the idea of active monitoring. Chung, Firth, and Kim (2002) suggest that large institutional shareholders discourage managers from using discretionary accruals to manage earnings. Hartzell and Starks (2003) show that institutional ownership concentration is negatively related to executive compensation level and positively related to pay-for-performance sensitivity, consistent with the notion that institutions serve a monitoring role. Schnatterly, Shaw, and Jennings (2008) find that the percentage of shares held by the largest

institutional investor in a firm is positively associated with the firm's information risk, implying that the largest institutional owner has an information advantage. One can thus expect that under the effective monitoring hypothesis, concentrated ownership is positively associated with firm-specific information, ceteris paribus.

Conversely, under the monopolistic trading hypothesis, concentrated ownership can intensify private information exploitation and have a negative impact on the incorporation of firm-specific information into share prices. When ownership concentration increases, with an uneven distribution of information and less competition over information among traders, there is more exploitation of private information. As the distribution of information skews toward one owner, the single informed trader can best exploit his private information by splitting his orders strategically to disguise his trades and to reduce information revelation. Consequently, information revelation to the market slows down, the order flow is less sensitive to traders' information and stock price is less informative. Moreover, the existence of a better informed trader may deter other investors from acquiring information and trading. Hence, both the effects of unequal access to information and fewer informed traders lead to less competitive trading and less informative prices (Kyle, 1985; Fishman and Hagerty, 1992; Akins et al., 2012).

There has been empirical evidence of strategic trading by large institutional investors to exploit their private information. For instance, Barclay and Warner (1993) show that most of the cumulative price changes on the New York Stock

Exchange (NYSE) result from medium size trades (500 to 9,900 shares), consistent with the notion of "stealth trading" that informed traders seek to fragment their orders to conceal their trades. Chakravarty (2001) confirms that the cumulative price changes are disproportionately associated with medium size trades (500 to 9,999 shares) and finds that these stealth trades are almost entirely initiated by institutions. Using institutional transaction data, Keim and Madhavan (1995) provide empirical support that larger trades are spread over a longer time period and are associated with longer trade durations. In a more recent study, Campbell, Ramadorai, and Schwartz (2009) suggest that institutions execute larger or smaller transactions (under $2,000 or over $30,000), rather than medium size transactions. The significantly reduced transaction costs have made smaller transactions less costly, possibly leading institutions to execute more small trades to conceal their information and intentions. Campbell et al. (2009) also find that when liquidity is high, institutions engage in stealth trading more; however, when volatility is high, they prefer larger size trades, which move prices more. As strategic order fragmentation delays information revelation to the market by large informed traders and impedes price adjustments to such information, one can expect that under the monopolistic trading hypothesis, concentrated ownership is inversely related to firm-specific information, ceteris paribus.

Given the theoretical and empirical evidence of large institutional owners' opposing influences of effective monitoring and monopolistic trading on corporate information environment, I predict that firm-specific information is a non-linear

function of institutional ownership concentration. In view of the relatively strong investor protection in the U.S., the rise of corporate control market to discipline boards and managements in the 1980's, and the relaxation of legal and regulatory impediments to institutional shareholder activism since the 1990's,[6] I expect the effective monitoring influence to dominate initially; however, the effect of monopolistic trading becomes increasingly salient when institutional concentration extends beyond a certain level. In other words, I conjecture that firm-specific information is a concave function of institutional ownership concentration. I thus hypothesize in alternative form as follows:

> Firm-specific information initially increases at a decreasing rate as institutional ownership concentration increases, but it reaches a maximum as institutional concentration level goes beyond a certain point, ceteris paribus.

2.3. Multiple Large Institutional Owners and Firm-specific Information

Recent empirical facts reveal that concentrated ownership in the form of multiple large shareholders is common in the U.S. and Europe (Faccio and Lang, 2002; Maury and Pajuste, 2005; Laeven and Levine, 2008; Holderness, 2009; Edmans and Manso, 2011). For instance, Edmans and Manso (2011) find that 70% of U.S. firms have multiple blockholders; while Laeven and Levine (2008) document that 34% of publicly listed firms in Europe have multiple large shareholders. Hence, a growing body of literature examines the interaction and

[6] For example, the Securities and Exchange Commission (SEC) enhanced the abilities of shareholders in communicating with each other and in submitting shareholder proposals in 1992 and 1997 respectively. In 1999, the Congress repealed the Glass-Steagall Act, lifting restrictions on direct equity ownership by U.S. banks. In 2003, the SEC adopts disclosure requirements regarding the process of director nomination (Gillan and Starks, 2003, 2007).

influence of multiple large owners or blockholders in a firm.

One line of theoretical articles conceptualizes multiple large shareholders as participants in control contests. For example, in Zwiebel (1995), multiple blockholders join together and form a controlling coalition to divide private benefits from control. Assuming that multiple large shareholders may accept bribes and collude with the controlling shareholder, Pagano and Röell (1998) specify some favorable conditions for cross-monitoring between large shareholders. In Bennedsen and Wolfenzon (2000), several large shareholders form a coalition to control the firm, which prevents any single shareholder from taking unilateral actions that might hurt other investors. In Dhillon and Rossetto (2010), multiple large shareholders can mitigate the endogenous conflicts of interest over the choice of risk between the entrepreneur owner and small owners. Maury and Pajuste (2005) present a model in which multiple blockholders have the incentives and abilities to monitor the largest shareholder and restrain funds diversion on the one hand; they may also form a coalition to share private benefits on the other hand. They posit that the presence of multiple blocks can affect firm value both positively or negatively, depending on the relative size of the blocks and the identity of the blockholders.

Blockholders and market microstructure theories suggest that multiple large owner structure may affect firm-specific information in both positive and negative ways, depending on the monitoring and trading behaviors of multiple large

shareholders. On the one hand, splitting equity among several shareholders may create free-rider problems and weaken their direct monitoring or intervention efforts. This can have a negative effect on firm-specific information. On the other hand, multiple blockholders trade on private information competitively for profits and thus reveal their information rapidly. This can have a positive effect on price efficiency (Holden and Subrahmanyam, 1992; Edmans and Manso, 2011). Nevertheless, competition between traders with identical information is different from that with disparate information. With identical information, informed traders compete aggressively in a "rat race", and information is revealed almost instantly, approximating a strong-form efficient market where prices fully reflect all private information. By contrast, with differential information, each trader has some monopoly power over his own information; he tends to play the "waiting game" by postponing trades and learn about other traders' signals. As a result, competition is less intense, information revelation slows down and prices become less informative (Foster and Viswanathan, 1994, 1996; Back, Cao, and Willard, 2000).

Empirical studies on the governance role of multiple large shareholders have been limited for the U.S., compared to those for Europe and Asia. Investigating the bank-based German system, Lehmann and Weigand (2000) and Boehmer (2000) find that the presence of a second large shareholder improves firm performance. Faccio, Lang, and Young (2001) show that the existence of multiple large owners increases dividend rates in Western Europe but it decreases dividends in Asia. Using Italian data, Volpin (2002) finds that top executive turnover is more sensitive

to performance when control is not locked in the hands of a single large shareholder, but shared by a voting syndicate. In a study of Finnish listed firms, Maury and Pajuste (2005) show that a more even distribution of votes across large shareholders has a positive influence on firm value. Using data from 13 countries in Western Europe, Laeven and Levine (2008) find a negative relation between cash-flow rights dispersion across the largest two owners and firm valuation. By contrast, in a U.S. study, Konijn, Kräussl, and Lucas (2011) document a negative correlation between firm value and the presence of blockholders, as well as blockholder dispersion, as inversely measured by the Herfindahl Index of the five largest blockholders. They suggest that the relation between multiple blockholder structure and firm value may "depend on regional and institutional features" and is thus different in the U.S. from that in Europe.

Empirical evidence indicates that multiple large shareholders play an active role in the trading and pricing process. Lebedeva, Maug, and Schneider (2012) find that information-based trades are completed faster than liquidity-based trades in the presence of multiple competitive traders. Using a dataset on Australian equity funds, Gallagher, Gardner, and Swan (2013) show that price efficiency, as measured by lower bid-ask spread, is positively related to the number of multiple institutional investors trading simultaneously. In a U.S. study on the limitations of stock market efficiency, Gorton, Huang, and Kang (2009) show that price informativeness increases with the number of institutional blockholders. Cho (2007) finds that multiple informed traders with heterogeneous private information

tend to trade close to earnings announcements. As the time of announcements approaches, the number of informed traders increases, the adverse selection problem aggravates, while liquidity trading decreases.

Given the theoretical and empirical evidence on the effects of multiple large owners on corporate governance and the information environment, I expect that firm-specific information is a non-monotonic function of ownership concentration by multiple large institutional owners. With stockholdings split among multiple large owners, it is likely that there are free-riding problems especially in the initial levels of concentration. In view of the regulatory constraints on collective actions and communication among multiple large shareholders in the U.S.,[7] one can expect the competitive trading effect to be strong. However, whether multiple large institutional owners possess common or differential information is an open empirical question which can have different impacts on the impounding of firm-level information; I therefore adopt an exploratory approach in the analysis of the second research question in examining the effects of multiple large institutional owners on firm-specific information.

2.4. Institutional Ownership Structure and Firm-specific Information Over Time

[7] The SEC rules governing stock ownership disclosure, controlling shareholder liabilities, and proxy solicitations have long deterred collective actions and communication among shareholders. For instance, in 1935, the SEC established the rules on the proxy process which required any party soliciting proxies from other shareholders to register and disclose certain information. The subsequent amendments to the rules created major barriers to communication among shareholders throughout the proxy process. In 1992, the SEC revised the rules to enhance shareholder communication, but major obstacles to communication remain (Bainbridge, 1995; Bradley, Brav, Goldstein, and Jiang, 2006).

Institutional investors have been increasing their equity holdings significantly in the U.S. since the 1950's. Their equity ownership level increased from 6% in 1950 to 18% in 1970, to 37% in 1990, and further to 50% in 2009 (Holderness, 2009; Pichhadze, 2010; Fairfax, 2011). In contrast to the rising ownership level, I find that the concentration of institutional ownership has declined steadily as gauged by four different measures. For example, the average proportion of institutional blockholdings at stock level declined from 84% in 1980 to 78% in 1990, to 72% in 2000, and further to 58% in 2010. As ownership pattern is potentially an important factor in determining the incentive structure and the information environment of a firm, I ask whether and how institutional ownership concentration is related to the changes in firm-specific information through time.

The first measure of firm-specific information in this study is the probability of informed trading (*PIN*). I find that *PIN* has shown a downward trend from 1993 to 2010. The average *PIN* of a firm fell from 0.271 in 1995 to 0.244 in 2000, to 0.213 in 2005, and further to 0.192 in 2010. The second proxy of firm-specific information is stock price informativeness (*SPI*), which is firm-specific return variation relative to systematic variation. Morck et al. (2000) and Campbell, Lettau, Malkiel and Xu (2001) document a positive trend in firm-level return volatility relative to market volatility in U.S. stocks from the 1920's (or 1960's) to the 1990's. Their findings have stimulated a stream of studies attempting to explain the phenomenon of rising idiosyncratic volatility.[8] However, I find that stock price

[8] Subsequent studies focus on absolute idiosyncratic volatility and propose explanations for its observed patterns, such as increased prominence of NASDAQ firms (Schwert, 2002); increased

informativeness exhibits a downward trend from 1980 to 2010, despite the ebbs and flows in the first half of the period.[9] Given that the concentration of institutions can play an important role in shaping the firm's information environment, I conjecture that the declining concentration of institutional ownership may explain the downward trend in firm-specific information over time. In view of the sophisticated institutional environment in the U.S., I further posit that institutional ownership concentration is positively related to firm-specific information through time.

ownership of institutions (Xu and Malkiel, 2003); heavier market weights of risky industries (Bennett and Sias, 2006); increased variance of profitability (Wei and Zhang, 2006); riskier fundamentals of newly listed firms (Brown and Kapadia, 2007); higher level and volatility of growth options (Cao, Simin, and Zhao, 2008); more intense product market competition (Irvine and Pontiff, 2009); retail trading in low-priced stocks (Brandt, Brav, Graham, and Kumar, 2010) and deteriorating earnings quality (Rajgopal and Venkatachalam, 2011).

[9] Zhang (2010) has shown that idiosyncratic volatility reversed its increasing pattern and fell sharply from 2001 to 2006; it then rebounded before and during the financial crisis in 2008. I find that stock price informativeness exhibits a very different trend in my sample period. The two measures may capture different dimensions of firm-level information.

Chapter 3 Measurement of Variables and Model Specification

3.1. Measurement of Firm-specific Information

I employ two dependent variables to proxy for the amount of firm-specific information in stock prices of the firm: the probability of informed trading (*PIN*) and stock price informativeness (*SPI*). Both *PIN* and *SPI* have been developed and used in a growing literature.[10] The basic concepts of these two measures are briefly described as follows.

PIN is the probability of information-based trading in a stock. It is the fraction of orders that arises from informed traders relative to the total order flow. The *PIN* measure is constructed on the basis of a structural microstructure model discussed in Easley et al. (2002) in which trades come from informed or uninformed traders. In this model, the probability of an information event is α, the probability of having bad information is δ and the probability of having good information is $(1-\delta)$. In case an information event occurs, the arrival rate of informed traders is μ. If an information event does not occur, which happens with a probability of $(1-\alpha)$, the arrival rate of buy orders is ε_b while the arrival rate of sell orders is ε_s. On a day with bad information, which happens with a probability of $\alpha\delta$, the arrival rate of buy orders is ε_b while the arrival rate of sell orders is $\varepsilon_s + \mu$. On a day with good information, which happens with a probability of $\alpha(1-\delta)$, the arrival rate of buy orders is $\varepsilon_b + \mu$ while the arrival rate of sell orders is ε_s. Traders arrive according to Poisson processes during the day. The likelihood function for a single trading

[10] See literature review in chapter 2.

day is:

$$L(\theta \mid B,S) = (1-\alpha)e^{-\varepsilon_b}\frac{\varepsilon_b^B}{B!}e^{-\varepsilon_s}\frac{\varepsilon_s^S}{S!}$$

$$+\alpha\delta e^{-\varepsilon_b}\frac{\varepsilon_b^B}{B!}e^{-(\mu+\varepsilon_s)}\frac{(\mu+\varepsilon_s)^S}{S!}$$

$$+\alpha(1-\delta)e^{-(\mu+\varepsilon_b)}\frac{(\mu+\varepsilon_b)^B}{B!}e^{-\varepsilon_s}\frac{\varepsilon_s^S}{S!}, \quad (1)$$

where $\theta = \{\alpha, \mu, \varepsilon_b, \varepsilon_s, \delta\}$, B denotes total buy trades and S denotes total sell trades for the day.

Assuming independence across trading days gives the likelihood function over I days:

$$V = L(\theta \mid M) = \prod_{i=1}^{I} L(\theta \mid B_i, S_i) \quad (2)$$

where (B_i, S_i) [11] is trade data for day $i = 1,...,I$ and $M = ((B_1, S_1),...,(B_I, S_I))$. Maximizing Eq. (2) over θ given the data set M, one can estimate the parameters of the model $(\alpha, \mu, \varepsilon_b, \varepsilon_s, \delta)$. The estimates can be used to construct the probability of information-based trading (*PIN*) for a stock in a period, which is given by:

$$PIN = \frac{\alpha\mu}{\alpha\mu + \varepsilon_s + \varepsilon_b} \quad (3)$$

where $\alpha\mu$ is the arrival rate of information-based orders and $\alpha\mu + \varepsilon_s + \varepsilon_b$ is the arrival rate of total orders.

The second dependent variable is stock price informativeness (*SPI*). It is

[11] Trades are classified as buys if the prices are above the midpoint of the bid-ask spreads, and are classified as sells if they are below the midpoint (Lee and Ready, 1991).

defined as the ratio of firm-specific return variation to systematic return variation. To measure *SPI*, I decompose total stock return variation into two components: variation related to systematic factors (market-wide factors and industry factors) and variation tied to firm-specific factors. The first component gauges systematic return variation and the second component measures firm-specific return variation. For all the firms in my sample, I estimate the following expanded market model for each calendar-year:

$$RET_{i,t} = \alpha + \beta_1 MKTRET_t + \beta_2 MKTRET_{t-1} + \beta_3 INDRET_t + \beta_4 INDRET_{t-1} + \varepsilon_{i,t,} \quad (4)$$

where $RET_{i,t}$ represents the daily return for firm i on day t; $MKTRET$ and $INDRET$ denote value-weighted market and industry return respectively; and ε refers to unspecified random factors. The industry categories are based on Fama and French's (1997) 48 industry classification. Lagged market and industry returns are included in Eq. (4) to mitigate concerns about potential non-synchronous trading biases that may arise from using daily returns in estimating the market model (Scholes and Williams, 1977; French, Schwert, and Stambaugh, 1987). As in other related studies, stock price informativeness is defined as the ratio of firm-specific return variation to systematic return variation:

$$SPI_i = \ln\left(\frac{1-R_i^2}{R_i^2}\right), \quad (5)$$

where R_i^2 is the coefficient of determination from firm-year estimation of Eq.(4). The logistic transformation changes the R_i^2 variable, originally bounded by zero and one, into an unbounded continuous variable with a more normal distribution.

3.2. Empirical Models for Hypothesis Testing

To examine the effects of institutional ownership concentration on firm-specific information, I estimate the following regression:

$$\begin{aligned} FirmSpecificInformation_{i,t+1} = {} & \gamma_0 + \gamma_1 InstOwnConcentration_{i,t} + \gamma_2 InstOwnConcentration_{i,t}^2 \\ & + \sum_j \gamma_j FirmLevelControls_{i,t}^j \\ & + \sum_k \gamma_k IndustryLevelControls_{i,t}^k \\ & + (YearDummies) + \varepsilon_{i,t+1,} \end{aligned} \tag{6}$$

where, for firm i and year t, $InstOwnConcentration$ denotes institutional ownership concentration. The quadratic term of institutional ownership concentration, $InstOwnConcentration^2$, is included in Eq. (6) to test if the relation between firm-specific information and institutional ownership concentration is concave as hypothesized. If the relation is concave, then $\gamma_1 > 0$ and $\gamma_2 < 0$. Institutional ownership concentration is assessed by two measures: *HHI* and *LIOR*. *HHI* is the Herfindahl-Hirschman Index for ownership concentration based on all institutional holdings in a firm at the end of the year and *LIOR* is the ratio of institutional holdings owned by the largest institutional investor in the firm at the end of the year. HHI^2 and $LIOR^2$ are included in the regressions to test for the predicted non-linear relation between firm-specific information and the ownership concentration of institutions. For firm i in year $t+1$, $FirmSpecificInformation$ refers to firm-specific information, which is empirically measured by the probability of informed trading (*PIN*) and stock price informativeness (*SPI*).

To isolate the influence of institutional ownership concentration on firm-specific information, I follow prior literature and include a total of nine firm and industry-level control variables that are considered to affect the firm's information environment (Morck et al., 2000; Piotroski and Roulstone, 2004; Brockman and Yan, 2009). They include: market capitalization (*MKTCAP*), trading volume turnover (*TURN*), S&P 500 membership dummy (*SP500*), the number of analysts following (*ANALYST*), standard deviation of return on assets (*STDROA*), regulated industry membership dummy (*REG*), the number of firms in the industry (*NIND*), the correlation of the firm's return on assets with industry return on assets (*ROACORR*), and the Herfindhl Index for the firm's primary business (*HINDEX*). Appendix A provides the definitions of all variables used in this study. All independent variables are lagged a year relative to the dependent variable to reflect the information provided in the preceding period.

To test for the effects of concentration by multiple large institutional owners on firm-specific information, I specify the following regression:

$$\begin{aligned} &FirmSpecificInformation_{i,t+1} \\ &= \phi_0 + \phi_1 MultiOwnConcentration_{i,t} + \phi_2 MultiOwnConcentration_{i,t}^2 + \phi_3 MultiOwnConcentration_{i,t}^3 \\ &\quad + \sum_j \phi_j FirmLevelControls_{i,t}^j \\ &\quad + \sum_k \phi_k IndustryLevelControls_{i,t}^k \\ &\quad + (YearDummies) + \varepsilon_{i,t+1,} \end{aligned} \tag{7}$$

where, for firm i and year t, $MultiOwnConcentration$ represents institutional

ownership concentration by multiple large investors. The quadratic and cubic terms, $MultiOwnConcentration^2$ and $MultiOwnConcentration^3$, are included in Eq. (7) to allow for non-linearity as expected. I employ two variables to gauge institutional concentration with multiple large institutions: *TOP5* and *BLK*. The former is the percentage of institutional holdings owned by the top five institutional investors in the firm, whereas the latter is the proportion of institutional ownership accounted for by all institutional blockholders of the firm. The squared and cubic terms of these variables are added in the regressions accordingly to examine the potential non-linearity in the relation between institutional ownership concentration by multiple large owners and firm-specific information as conjectured.

Chapter 4 Data, Sample, and Descriptive Statistics

4.1. Data and Sample

I extract institutional ownership data from the Thompson-Reuters Institutional Holdings (13F) database to construct my initial sample which comprises firm-year observations for the period 1980 – 2010. Estimates of the probability of informed trading (*PIN*) are obtained from Stephen Brown's website, while the Fama / French 48 industry returns are from Kenneth R. French's website. Stock market data are obtained from the Center for Research in Security Prices (CRSP) database and accounting data are from Compustat. I also use the I/B/E/S database for analysts following data. After merging institutional ownership concentration information with *PIN*, CRSP, Compustat, and I/B/E/S data sets, I obtain two final samples. The first sample has *PIN* as the dependent variable, whereas the second sample uses stock price informativeness (*SPI*) as the dependent variable. The *PIN* sample covers the period from 1993 to 2010 and consists of 70,133 firm-year observations. The stock price informativeness (*SPI*) sample covers the 1983 – 2010 period with 102,721 firm-year observations.

4.2. Descriptive Statistics

Table 1 presents descriptive statistics on the firm-specific information, institutional ownership concentration and control variables of two samples. Panel A reports on the sample with *PIN* as the measure of firm-specific information for the 1993 – 2010 period and Panel B reports on the sample with *SPI* as the measure of firm-specific information for the period from 1983 to 2010. The mean (median)

PIN is 0.23 (0.20), implying that there is a 23% (20%) probability that the trade of a firm on a given day is information-based. The mean (median) *SPI* is 2.50 (2.62). This is comparable to the reported mean (median) logistic relative idiosyncratic volatility of 2.73 (2.26) in Ferreira and Laux (2007). The mean (median) institutional ownership ratios (*IOR*) for the *PIN* and *SPI* samples are 0.40 (0.37) and 0.35 (0.31) respectively, comparable to the reported mean (median) institutional ownership level of 0.38 (0.33) in An and Zhang's (2013) sample. These statistics show that there is substantial institutional interest in equity ownership. Moreover, there is significant concentration in institutional investors' holdings. The mean (median) values of *LIOR* for the *PIN* and *SPI* samples are 0.31 (0.23) and 0.33 (0.24) respectively, indicating that the average holdings of the largest institutional owner in a firm is around 30% of total institutional holdings. The mean (median) values of *TOP5* for the *PIN* and *SPI* samples are 0.62 (0.59) and 0.62 (0.60), suggesting that the average holdings of the five largest institutional owners in a firm is about 60% of aggregate institutional holdings. The mean (median) values of *BLK* for the two samples are 0.65 (0.69) and 0.66 (0.73), indicating that the total institutional blockholdings in a firm account for more than 65% of aggregate institutional holdings on average.

[INSERT TABLE 1 ABOUT HERE]

Table 2 provides the Pearson correlations matrix for the variables used in the regression models. Panel A covers the *PIN* sample and Panel B covers the *SPI*

sample. The institutional ownership concentration measures are highly correlated with each other. In particular, *HHI* is highly correlated with *LIOR* (r = 0.98) and *TOP5* is highly correlated with *BLK* (r = 0.95). These results suggest that they pick up much the same information. The correlation coefficient between the firm-specific information variables, *PIN* and *SPI*, is 0.61 at 1% significance level. While institutional ownership ratio, *IOR*, is negatively correlated with *PIN* and *SPI*; the institutional concentration variables, *HHI*, *LIOR*, *TOP5* and *BLK* are all positively correlated with *PIN* and *SPI*.

[INSERT TABLE 2 ABOUT HERE]

Chapter 5 Cross-sectional Analysis

5.1. Panel Regression Results

Table 3 presents panel regression results for the effect of institutional ownership concentration on firm-specific information. Reported t-values are adjusted by robust standard errors corrected for firm-level clustering to address possible biases arising from serial dependency in financial panel data. Year dummies are included in the regressions (Petersen, 2009).

Panel A of table 3 contains results for the probability of informed trading (*PIN*) as a function of institutional ownership concentration and control variables. Column 3 shows that the coefficient on *HHI* is significantly positive (0.168, t = 12.22) while the coefficient on HHI^2 is significantly negative (-0.132, t = -10.97). Column 2 shows that the results are similar after controlling for *IOR*. I re-estimate the regression after replacing *HHI* with *LIOR* as an alternative measure of institutional ownership concentration. The results in column 5 show that the coefficient on *LIOR* is significantly positive (0.141, t = 12.43) and the coefficient on $LIOR^2$ is significantly negative (-0.099, t = -9.66). Column 4 shows that the results are qualitatively equivalent after controlling for *IOR*. These results indicate that *PIN* is a concave function of ownership concentration as hypothesized.

As shown in column 7, the coefficients on *TOP5* and $TOP5^3$ are significantly negative, they are -0.464 (t = -10.10) and -0.483 (t = -10.26) respectively. At the same time, the coefficient on $TOP5^2$ is significantly positive (0.939, t = 11.26).

These results are qualitatively the same after controlling for *IOR*, as shown in column 6. *BLK* is then used as an alternative measure of ownership concentration by multiple large institutional investors. The results shown in column 8 are persistent after controlling for *IOR*. The coefficients on *BLK* and BLK^3 are significantly negative, they are -0.170 (t = -8.40) and -0.165 (t = -5.64) respectively, while the coefficient on BLK^2 is significantly positive (0.411, t = 9.23). These results suggest that *PIN* is a cubic function of ownership concentration by multiple large owners as conjectured.

Panel B of table 3 presents the regression results using *SPI* as a second proxy for firm-specific information. As seen in the table, the results in panel B are qualitatively identical to those reported in panel A, which provide additional support for my hypothesis and conjecture. In column 2, the coefficient on *HHI* is significantly positive (1.936, t = 21.50) while the coefficient on HHI^2 is significantly negative (-1.959, t = -25.83). In column 4, the coefficient on *LIOR* is significantly positive (2.061, t = 23.26) and the coefficient on $LIOR^2$ is significantly negative (-1.881, t = -25.93). In column 6, the coefficients on *TOP5* and $TOP5^3$ are significantly negative, they are -3.569 (t = -6.42) and -4.844 (t = -10.08) respectively. In addition, the coefficient on $TOP5^2$ is significantly positive (8.597, t = 9.32). In column 8, the coefficients on *BLK* and BLK^3 are significantly negative, they are -2.415 (t = -9.02) and -4.307 (t = -15.46) respectively, and the coefficient on BLK^2 is significantly positive (7.427, t = 14.96). The panel regression results confirm that institutional ownership concentration is related to firm-specific

information in a non-linear way. Specifically, firm-specific information is a concave function of institutional ownership concentration; while it is a cubic function of concentration by multiple large owners. These results are robust to two different measures for both firm-specific information and institutional ownership concentration.

To get a sense of the economic significance of the effect of institutional ownership concentration on firm-specific information, I look at the magnitude of the change in firm-specific information and compare it with its median value. From panel A of tables 1 and 3, a one-standard-deviation increase in *LIOR* (0.235) increases *PIN* by 0.030 (0.127*0.235), corresponding to 14.78% of the median *PIN* (0.203). From panel B of tables 1 and 3, a one-standard-deviation increase in *LIOR* (0.247) increases *SPI* by 0.509 (2.061*0.247), corresponding to 19.46% of the median *PIN* (2.615).

[INSERT TABLE 3 ABOUT HERE]

5.2. Fama-Macbeth Cross-sectional Regression Results

Table 4 presents Fama-Macbeth (1973) cross-sectional regression results for the effect of institutional ownership concentration on firm-specific information. Reported t-statistics are based on standard errors corrected for Newey-West (1987) autocorrelation.

Panel A of table 4 reports results for the probability of informed trading (*PIN*) as a function of institutional ownership concentration and control variables. Column 2 shows that the coefficient on *HHI* is positive and significant (0.197, t = 5.77) while the coefficient on HHI^2 is negative and significant (-0.163, t = -4.65). I re-estimate the regression using *LIOR* as an alternative measure of institutional ownership concentration. The results in column 4 indicate that the coefficient on *LIOR* is significantly positive (0.143, t = 6.47) and the coefficient on $LIOR^2$ is significantly negative (-0.100, t = -4.89). These results buttress the inferences in my hypothesis that *PIN* is a concave function of ownership concentration.

In column 6, the coefficients on *TOP5* and $TOP5^3$ are significantly negative, they are -0.468 (t = -3.23) and -0.470 (t = -4.01) respectively; while the coefficient on $TOP5^2$ is significantly positive (0.942, t = 3.89). *TOP5* is then substituted with *BLK* as an alternative measure of ownership concentration by multiple institutional investors. The results as shown in column 8 are consistent, although at relatively lower significance levels. The coefficients on *BLK* and BLK^3 are negative, they are -0.146 (t = -2.33) and -0.106 (t = -1.81) respectively, while the coefficient on BLK^2 is positive (0.342, t = 2.89). These results are consistent with the speculation that *PIN* is a cubic function of ownership concentration by multiple large institutional owners.

Panel B of table 4 shows the results using *SPI* as a second proxy for firm-specific information. The results reported in panel B are qualitatively equivalent to

those reported in panel A, which support my hypothesis and conjecture. In column 2, the coefficient on *HHI* is significantly positive (2.180, t = 6.34) while the coefficient on HHI^2 is significantly negative (-2.089, t = -8.02). In column 4, the coefficient on *LIOR* is significantly positive (1.992, t = 13.34) and the coefficient on $LIOR^2$ is significantly negative (-1.696, t = -15.01). In column 6, the coefficients on *TOP5* and $TOP5^3$ are significantly negative, they are -4.040 (t = -2.07) and -5.004 (t = -3.68) respectively. In addition, the coefficient on $TOP5^2$ is significantly positive (9.188, t = 3.05). In column 8, the coefficients on *BLK* and BLK^3 are significantly negative, they are -1.860 (t = -2.61) and -3.107 (t = -5.50) respectively, and the coefficient on BLK^2 is significantly positive (5.850, t = 5.37). Taken together, the Fama-Macbeth (1973) cross-sectional regression results show that there is a persistent non-linear relation between institutional ownership concentration and firm-specific information over the sample period. Firm-level information is a concave function of institutional ownership concentration; whereas it is a cubic function of concentration in the form of multiple large institutional owners.

[INSERT TABLE 4 ABOUT HERE]

5.3. Fixed Effects Model

The following two subsections address potential concerns about endogeneity issues. It is possible that there is an unidentified variable that could drive both institutional investors' ownership concentration and firm-specific information. In

other words, institutional ownership concentration and firm-specific information could be simultaneously determined by this unobserved missing variable. Another common concern is reverse causality. One may argue that the direction of causality is the opposite of what is hypothesized: instead of institutional concentration influencing firm-level information as posited, it might be argued that institutional investors learn from firm-specific information and adjust their ownership concentration accordingly. Although the rationale behind this argument is not obvious for these non-linear relations; I mitigate the potential concern by regressing firm-specific information variables on lagged institutional concentration variables in the estimations as reported in tables 3 and 4. The results are consistent with my inferences and it is unlikely that current firm-level information in stock price (*PIN* and *SPI*) would affect past institutional ownership concentration (*HHI*, *LIOR*, *TOP5* and *BLK*). Nevertheless, I implement two additional procedures, fixed effects model and first-differencing model, to further allay the above concerns.

To partial out unobserved stable variables, I employ the fixed effects model in regression analysis. Table 5 provides the results of these regressions for the effect of institutional ownership concentration on firm-specific information. Panel A reports results for the probability of informed trading (*PIN*) as the dependent variable and panel B reports results for stock price informativeness (*SPI*) as the dependent variable. As seen in the table, the coefficients on *HHI* and *LIOR* are significantly positive and the coefficients on HHI^2 and $LIOR^2$ are significantly negative. These results provide additional support for the hypothesis that both *PIN*

and *SPI* are a concave function of ownership concentration. In addition, the coefficients on *TOP5* and $TOP5^3$, as well as *BLK* and BLK^3, are significantly negative; while the coefficients on $TOP5^2$ and BLK^2 are significantly positive. These findings provide confirmatory evidence that *PIN* and *SPI* are a cubic function of ownership concentration by multiple large institutional owners. After eliminating unidentified time-invariant missing variables by implementing fixed effects model, the results persist and confirm that there is a non-linear relationship between institutional ownership concentration and firm-specific information.

[INSERT TABLE 5 ABOUT HERE]

5.4. Change Model

If institutional ownership concentration indeed drives firm-specific information, we should observe that the change in ownership concentration lead to subsequent change in firm-specific information. To test this proposition, I regress the changes in *PIN* and *SPI* from year *t* to *t*+1 on the changes in *HHI*, *LIOR*, *TOP5* and *BLK* from year *t*-1 to *t*. Panel A of table 6 reports regression results for one year ahead changes in the probability of informed trading (ΔPIN_{t+1}) on changes in institutional ownership concentration. Reported t-values are adjusted using robust standard errors corrected for firm-level clustering. Year dummies are included. In column 2, the coefficient on ΔHHI_t is positive and significant (0.045, t = 3.62) while the coefficient on ΔHHI_t^2 is negative and significant (-0.042, t = -3.36). In column 4, the coefficient on $\Delta LIOR_t$ is significantly positive (0.049, t = 4.94) and the

coefficient on $\Delta LIOR_t^2$ is significantly negative (-0.041, t = -3.96). These results further buttress the inferences in my hypothesis.

In column 6, the coefficients on $\Delta TOP5_t$ and $\Delta TOP5_t^3$ are significantly negative, they are -0.196 (t = -5.01) and -0.271 (t = -6.40) respectively; while the coefficient on $\Delta TOP5_t^2$ is significantly positive (0.462, t = 6.29). In column 8, the coefficients on ΔBLK_t and ΔBLK_t^3 are negative, they are -0.076 (t = -5.14) and -0.135 (t = -5.54) respectively, while the coefficient on ΔBLK_t^2 is positive (0.229, t = 6.45). These results provide consistent evidence for the inferences in my conjecture.

Panel B of table 6 shows the results using ΔSPI_{t+1} as the dependent variable. As I expect, the results in panel B are qualitatively identical to those reported in panel A. Consistent with the implications of my hypothesis and proposition: changes in institutional ownership concentration lead to subsequent non-linear changes in the level of firm-specific information reflected in stock returns.

[INSERT TABLE 6 ABOUT HERE]

Chapter 6 Graphical Analysis

6.1. The Relation between Institutional Ownership Concentration and Firm-specific Information

To provide insight into the relation between institutional ownership concentration and firm-specific information, I illustrate the association graphically and compare the mean *PIN* and *SPI* on different levels of *HHI* and *LIOR*. The top two panels of Figures 1 and 2 depict how *PIN* and *SPI* change with *HHI* and *LIOR*. As *HHI* or *LIOR* increases, both *PIN* and *SPI* increase at a decreasing rate, up to around 50% – 60%. Beyond this range, however, the rising momentum ceases and *PIN* and *SPI* drift around the same attained level.

Now, we turn to the relation between ownership concentration by multiple large owners and firm-specific information. The bottom two panels of Figures 1 and 2 depict how *PIN* and *SPI* change with *TOP5* and *BLK* respectively. The observed relation seems to be convex or close to linear. As *TOP5* or *BLK* increases, *PIN* decreases initially until it reaches a bottom, after which *PIN* reverses direction and increases at a slightly increasing rate; whereas *SPI* seems to increase at a somewhat constant rate. It appears that the documented cubic function (two bends) in my cross-sectional analyses does not occur within the meaningful range of ownership concentration. One explanation for this will be provided in section 6.2.

[INSERT FIGURES 1 & 2 ABOUT HERE]

6.2. The Five Largest Institutional Owners and Firm-specific Information

To better understand how multiple large owners affect the incorporation of firm-specific information into share prices, I disentangle the impact of the largest institutional owner from that of the second to the fifth largest institutional investors in a firm. The middle panel in figures 3 and 4 display how *PIN* and *SPI* change with ownership concentration of the second to the fifth largest institutional owners, denoted *S_to_FF*. As shown in the graph, both *PIN* and *SPI* decline sharply initially as the concentration ratio increases; however, when the concentration ratio reaches around 20%, both *PIN* and *SPI* reverse direction and increase at a decreasing rate. At high concentration levels, *SPI* exhibits another turning point and decreases again, but the declining tendency is less obvious for *PIN*. In this bivariate analysis, both *PIN* and *SPI* are a cubic function of *S_to_FF*. I test and confirm this cubic relation by running multivariate regressions. The regression results are reported in table 7. Descriptive statistics of *S_to_FF* are included in tables 1 and 2.

Note in Eq. (7),

$$\partial FirmSpecificInformation / \partial MultiOwnConcentration$$

$$= 3\phi_3 MultiOwnConcentration^2 + 2\phi_2 MultiOwnConcentration + \phi_1 = 0$$

Solving the quadratic function with coefficient estimates on *S_to_FF* and its squared and cubic terms from the Fama-Macbeth cross-sectional regressions in table 7, I find the information minimizing-level of *S_to_FF* to be about 0.23 for *PIN* and 0.16 for *SPI*, while the information maximizing-level of *S_to_FF* to be about 0.72 for *PIN* and 0.68 for *SPI*. This implies that on average, firm-specific

information reaches its minimum when ownership concentration by the second to the fifth largest owners is around 20%, and it reaches its peak when the concentration ratio is around 70%, having other factors accounted for. This provides confirmatory evidence for my conjecture and indicates that firm-specific information decreases when the concentration ratio is below 20%, consistent with the theoretical prediction of the free-rider problem; however, firm-specific information rebounds afterwards, coherent with the competitive trading effect with common information. Finally, firm-specific information falls again when multiple owner concentration ratio reaches 70%, suggestive of the possible consequences of "waiting game" trading with differential information.

By comparing the top and the middle panels in figures 3 and 4, one can observe that the largest institution (top panel) and the second to the fifth largest institutions (middle panel) in a firm behave very differently at least in affecting firm-specific information, reflecting their diverging incentives and actions depending upon their ownership distribution and position in a firm. Specifically, the impact of the largest institutional owner is the trade-off between effective monitoring and monopolistic trading; whereas the impact of the second to the fifth largest institution is the result of the interplay between the free-riding problem and competitive trading effect. The bottom panel in figures 3 and 4 shows the combined influence of the top five institutional owners on a firm's information environment which is by and large positive and is suggestive of the positive effect with their interaction. The results show that analyzing the top five institutional owners as a group could mask the

different impacts of these large owners.

[INSERT FIGURES 3 & 4 ABOUT HERE]

[INSERT TABLE 7 ABOUT HERE]

6.3. The Trends of Institutional Ownership and Concentration Levels Over Time

I now present a graphical analysis on institutional ownership and concentration levels through time. In contrast to the common knowledge that institutional investors are holding an increasing amount of securities, I find that their ownership concentration is on a steady decline. Figure 5 plots the time-series of the cross-sectional means of *IOR*, *HHI*, *LIOR*, *TOP5*, and *BLK* from 1980 to 2010. In the top panel, the average ownership level, *IOR*, shows an obvious upward trend. This is consistent with the well-known phenomenon that institutional investors are increasingly involved in the equity market. However, contrary to the rising ownership level, I observe a steadily downward trend in institutional concentration as shown in the bottom panel. The lines representing the average *HHI*, *LIOR*, *TOP5*, and *BLK* all exhibit a declining trend during the period. *HHI*, *LIOR*, and *BLK* move in parallel with each other while the distance between *TOP5* and *BLK* narrows over time. This indicates that *HHI*, *LIOR*, and *BLK* all decline at a similar rate, whereas *TOP5* decreases at a relatively slower rate through time.

[INSERT FIGURE 5 ABOUT HERE]

6.4. The Trend of Firm-specific Information Over Time

I find that firm-specific information exhibits a downward trend in the sample period 1980 – 2010, despite the apparently increasing pattern of *SPI* in the first half of the period. The top and bottom panels of figure 6 plot the time-series of the cross-sectional means of *PIN* from 1993 to 2010 and *SPI* from 1980 to 2010. It is interesting to note that there is a downslide in firm-specific information, for *PIN* and *SPI*, before the stock market crash in 1987, the internet bubble in 2000 and the financial crisis in 2008, reflecting the deteriorating market quality prior to these market crashes. As displayed in the bottom panel, there seems to be a positive trend in *SPI* from 1980 to 1995, consistent with Morck et al.'s (2000) and Campbell et al.'s (2001) findings. However, I document that *SPI* has reversed direction since 1995 and it clearly falls back during the period 1995 – 2010 to levels below those of the 1980's. I find that *PIN* also exhibits an obvious downward trend from 1993 to 2010 as shown in the top panel.

[INSERT FIGURE 6 ABOUT HERE]

Chapter 7 Trend Analysis

Having established the cross-sectional relationship between institutional ownership concentration and firm-specific information in sections 5 and 6, I now examine their relation over time by trend analyses. Over the period of 1980 – 2010, institutional ownership level has increased substantially while institutional concentration has declined steadily; at the same time, firm-specific information shows a downward trend during the period. The trends in institutional ownership characteristics may have contributed to the changes in firm-specific information. Hence, I follow Wei and Zhang (2006) and perform trend analyses based on cross-sectional means to relate the trends in institutional ownership characteristics to the trend in firm-specific information.

To substantiate the link, I estimate time-series regressions as follows:

$$\overline{FirmSpecificInformation_{t+1}} = \lambda_0 + \lambda_1 t + \lambda_2 \overline{InstOwnConcentration_t} + \varepsilon_{t+1} \quad (8)$$

$$\overline{FirmSpecificInformation_{t+1}} = \theta_0 + \theta_1 t + \theta_2 \overline{MultiOwnConcentration_t} + \varepsilon_{t+1} \quad (9)$$

where $\overline{FirmSpecificInformation_{t+1}}$ is the cross-sectional mean of *PIN* or *SPI* in quarter t+1, denoted $\overline{PIN_{t+1}}$ and $\overline{SPI_{t+1}}$. $\overline{InstOwnConcentration_t}$ refers to the cross-sectional average of *HHI* or *LIOR* in quarter t, indicated by $\overline{HHI_t}$ and $\overline{LIOR_t}$, and $\overline{MultiOwnConcentration_t}$ refers to the cross-sectional average of *TOP5* or *BLK* in quarter t, denoted $\overline{TOP5_t}$ and $\overline{BLK_t}$. I also replace institutional ownership concentration variables with $\overline{IOR}$, the cross-sectional mean of *IOR*, to see if institutional ownership level can explain firm-specific information over time. If

PIN or *SPI* exhibits a downward trend, it should be captured by the time variable *t*. To be able to explain the potential downward trend in *PIN* or *SPI*, an explanatory variable has to fit in one of the following two cases. Either it is a downward trending variable, and is positively correlated with firm-specific information; or it is an upward trending variable, and is negatively associated with firm-specific information.

Table 8 presents the results for the trend analyses of *PIN* from 1993 to 2010 (panel A) and *SPI* from 1980 to 2010 (panel B) using the generalized method of moments (GMM). The reported t-ratios are based on standard errors adjusted with the Newey-West (1987) autocorrelation and heteroscedasticity. The results in panel A demonstrate that there is a downward trend in *PIN* and it is explained by the trending variables *HHI*, *LIOR*, *TOP5*, *BLK* and *IOR*. In column 1, the time trend is the only explanatory variable. The coefficient is highly significant and negative (-0.126, t = -13.43), indicating there is indeed a downward trend in *PIN* and that *PIN* is decreasing at a quarterly rate of 0.126×10^{-2} over the period 1993 – 2010. In columns 3 and 4, when I include $\overline{HHI_t}$ and $\overline{LIOR_t}$ as trending variables in the regressions, the coefficients on $\overline{HHI_t}$ (0.361, t = 4.21) and $\overline{LIOR_t}$ (0.338, t = 4.01) are positive and significant. At the same time, the coefficient on the time variable is more than halved in magnitude to -0.051 and -0.052 with the t-statistics reduced by more than 80%. Similarly, in columns 5 and 6, I use $\overline{TOP5_t}$ and $\overline{BLK_t}$ as explanatory trending variables, the coefficients on $\overline{TOP5_t}$ (0.287, t = 2.17) and $\overline{BLK_t}$ (0.232, t = 2.18) are again significantly positive. The coefficient on the time

variable is attenuated by about 40% and 50% to -0.072 and -0.059 respectively with t-statistic reduced by 70% or becomes marginally significant. The evidence here shows that about half of the downward trend in *PIN* is explained by the downward trend in institutional ownership concentration. It is also interesting to note in column 2 that the inclusion of $\overline{IOR_t}$ in the model renders the time variable insignificant while the coefficient on $\overline{IOR_t}$ is significantly negative (-0.242, t = -2.82), implying that the rising institutional ownership level explains the declining trend in *PIN*. This shows the important role of institutional investors in affecting the firm's information environment over time.

I repeat the trend analysis using *SPI* as an alternative proxy for firm-specific information. The results reported in panel B show that there is a downward trend in *SPI*, which is explained by the trending variables *TOP5*, *BLK* and *IOR*. In column 1, the coefficient estimate on time trend variable is negative and significant (-0.749, t = -3.96), indicating there is a downward trend in *SPI* over the period 1980 – 2010. In columns 5 and 6, when $\overline{TOP5_t}$ and $\overline{BLK_t}$ are added as explanatory trending variables to the regressions, the coefficient estimate on t becomes insignificant or even reverses to positive respectively. The coefficients on $\overline{TOP5_t}$ (10.109, t = 5.89) and $\overline{BLK_t}$ (7.835, t = 4.35) are significantly positive. The evidence suggests that after controlling institutional concentration by multiple large owners, *SPI* actually increases over time. In column 2, the presence of $\overline{IOR_t}$ in the model also renders the trend coefficient significantly positive (1.797, t =3.14), while the coefficient on

$\overline{IOR_t}$ is significantly negative (-7.508, t = -4.69), implying that rising institutional ownership level explains the declining trend in *SPI*. However, $\overline{HHI_t}$ and $\overline{LIOR_t}$ are not helpful in explaining the trend as seen in columns 3 and 4. In sum, the downward trend in *SPI* is explained by declining concentrated ownership with a multiple large owner structure.

[INSERT TABLE 8 ABOUT HERE]

Chapter 8 Post-SOX Analysis

The Sarbanes-Oxley Act of 2002 (SOX) was enacted with a view to strengthen corporate governance and to improve the reliability and accuracy of corporate disclosures. It has thus been argued that the SOX can affect the firm's information environment and investors' incentives to acquire private information. To check the robustness of my main findings after the passage of the SOX, I extend my specification by adding a dummy variable (*DSOX*) and an interaction term between the dummy variable and institutional ownership concentration variables ($D \times HHI_t$, $D \times LIOR_t$, $D \times TOP5_t$, $D \times BLK_t$ and $D \times S\_to\_FF_t$) in equations 6 and 7. *DSOX* is an indicator that takes the value of one for post-SOX years (2003 and after) and zero otherwise.

Table 9 presents the panel regression results after including the SOX dummy and interaction variables. The results are similar to those of my main analysis – indicating the persistence of a concave relation between institutional ownership concentration and firm-specific information and a cubic relation between multiple large institutional owner concentration and firm-specific information.

[INSERT TABLE 9 ABOUT HERE]

Chapter 9 Limitation, Summary and Concluding Remarks

Large institutional owners can affect the information environment of a firm by exerting direct monitoring efforts or by trading its shares. They may influence corporate decisions through voting, submitting shareholder proposals, communicating privately with management, or by threatening to exit. To empirically isolate large owners' influence could be challenging as the effects of their actions could be confounded by other corporate governance mechanisms at work, such as executive compensation schemes, board of directors, and corporate control market. As a consequence, there is a potential omitted variables problem which could be a source of endogeneity bias, particularly when a missing variable is correlated with an explanatory variable. I implement two procedures, fixed effects and first-differencing models, to mitigate the concern for potential endogeneity issue. It should, however, be noted that while these procedures partial out time-invariant missing variables, they by no means eliminate the possibility of omitted variables bias.

In spite of this limitation, this dissertation investigates the influence of institutional investors on the information environment of U.S. listed stocks through the lens of corporate ownership structure in cross-sections and over time. I hypothesize and demonstrate that large institutional owners have a non-linear influence on the level of firm-specific information incorporated into share prices, reflecting the non-monotonic incentives under their ownership structure. The results of this study buttress the proposition that institutional ownership structure is

an important factor in determining the firm's information environment both in cross-sections and through time.

First, I show that firm-specific information is a concave function of institutional ownership concentration: as concentration increases, firm-specific information rises at a decreasing rate until it reaches the maximum level, consistent with the interplay of the effective monitoring and the monopolistic trading hypotheses. Second, I find that firm-level information is a cubic function of concentration by multiple large institutional owners: when concentration increases, firm-specific information declines initially, but it reverses direction and increases, until it reaches the maximum level, consistent with the theoretical predictions of the free-rider problem and the competitive trading effect in a multiple large shareholder ownership structure. Finally, I document a downward trend in both institutional ownership concentration and firm-specific information over the 1980 to 2010 period. More importantly, my trend analyses reveal that institutional ownership concentration is positively related to firm-specific information through time and that the downward trend in firm-specific information is attributable to the downward trend in institutional ownership concentration. These empirical findings hold for alternative variable measures and various specifications and models including panel and cross-sectional regressions, firm fixed effects, as well as changes in concentration and subsequent changes in firm-specific information.

The governance and informational roles of large institutional investors have

received considerable research attention, but the results remain mixed. While some studies suggest that institutional investors are informed and active; other studies perceive them as suspicious and passive. I posit and confirm that large institutional owners have non-linear influences in shaping the firm's information environment depending on their ownership distribution. My findings highlight the importance of considering the non-monotonic incentives of a large institutional investor, the interaction among multiple large owners in a firm, as well as the evolving nature of institutional ownership structure over time in future research. These could be one key to unravel the inconclusive findings in past research. In addition, this study provides policy implications to regulators for achieving informational efficiency of the stock market. The results suggest that under the relatively sophisticated U.S. institutional environment, increasing the ownership concentration of a large institutional owner in a firm could facilitate the incorporation of firm-specific information into share prices; but the positive effect diminishes after a certain threshold. While increasing the concentration of multiple large institutional owners could enhance the capitalization of firm-level information, but this also creates a free-rider problem particularly at low levels of concentration.

Appendix A: Variable Definitions

A.1. Firm-specific Information Variables

PIN is the probability that opening trade is information-based. It is the fraction of orders that arises from informed traders relative to the total order flow and is given by:

$$PIN = \frac{\alpha\mu}{\alpha\mu + \varepsilon_s + \varepsilon_b}$$

where $\alpha\mu$ is the arrival rate of information-based orders and $\alpha\mu + \varepsilon_s + \varepsilon_b$ is the arrival rate of total orders.

SPI is logistic transformed relative firm-specific return variation. It captures the ratio of firm-specific return variation to market-wide and industry return variation and is given by:

$$SPI_i = \ln\left(\frac{1 - R_i^2}{R_i^2}\right)$$

where R_i^2 is the coefficient of determination from the firm-year estimation of the market and industry factors model.

$\overline{PIN}$ is the cross-sectional mean of ***PIN***.

$\overline{SPI}$ is the cross-sectional mean of ***SPI***.

A.2. Institutional Ownership and Concentration Variables

IOR is the number of shares held by all 13F institutional investors in a firm divided by the total number of shares outstanding at the end of year.

HHI is the Herfindahl-Hirschman Index for institutional concentration computed based on all 13F institutional holdings of the firm at the end of year.

LIOR is the proportion of institutional holdings owned by the largest institutional investor in the firm at the end of year.

TOP5 is the proportion of institutional holdings owned by the five largest institutional investors in the firm at the end of year.

BLK is the proportion of institutional holdings owned by all institutional blockholders in the firm at the end of year. A blockholder is defined as an entity holding at least 5% of a firm's common stock.

S_to_FF is the proportion of institutional holdings owned by the second to the fifth largest institutional investors in the firm at the end of year.

$\overline{IOR}$ is the cross-sectional mean of ***IOR***.

$\overline{HHI}$ is the cross-sectional mean of ***HHI***.

$\overline{LIOR}$ is the cross-sectional mean of ***LIOR***.

$\overline{TOP5}$ is the cross-sectional mean of ***TOP5***.

$\overline{BLK}$ is the cross-sectional mean of ***BLK***.

A.3. Control Variables

MKTCAP is the log of the market value of equity.

TURN is the log of the traded share volume divided by the number of shares outstanding.

SP500 is an indicator variable for S&P 500 Index membership. It takes the value of 1 if a firm is included in the S&P 500, 0 otherwise.

ANALYST is the log of one plus the number of analysts following the firm.

STDROA is the log of the standard deviation of return on assets over the past twelve quarters.

REG is an indicator variable for regulated industry membership. It takes the value of 1 if a firm's two-digit SIC code is 49 or 62, 0 otherwise.

NIND is the log of the number of firms in an industry by the Fama / French 48 industry classification.

ROACORR is the correlation between the firm's return on assets and the industry average return on assets over the past twelve quarters. It is the R^2 from a regression of a firm's quarterly ROA on its value-weighted industry average ROA estimated over the past twelve quarters.

HINDEX is the log of the Herfindahl-Hirschman Index for industry concentration computed based on sales.

A.4. SOX Variables

DSOX is an indicator that takes the value of one for post-SOX years (2003 and after) and zero otherwise.

$D \times HHI$ is an interaction variable between ***DSOX*** and ***HHI***.

$D \times LIOR$ is an interaction variable between ***DSOX*** and ***LIOR***.

$D \times TOP5$ is an interaction variable between ***DSOX*** and ***TOP5***.

$D \times BLK$ is an interaction variable between ***DSOX*** and ***BLK***.

$D \times S\_to\_FF$ is an interaction variable between ***DSOX*** and ***S_to_FF***.

Table 1
Descriptive Statistics

This table presents descriptive statistics on firm-specific information, institutional concentration, and control variables of two samples. Panel A reports on the sample with PIN_{t+1} as the measure of firm-specific information for the 1993 – 2010 period. Panel B reports on the sample with SPI_{t+1} as the measure of firm-specific information for the 1983 – 2010 period. All variables are as defined in Appendix A.

Panel A: Sample with PIN_{t+1} as measure of firm-specific information

Variable	N	Mean	Std	5%	25%	Median	75%	95%
PIN_{t+1}	70,133	0.234	0.136	0.074	0.132	0.203	0.305	0.499
IOR_t	70,133	0.396	0.287	0.010	0.131	0.365	0.637	0.887
HHI_t	69,199	0.205	0.225	0.029	0.053	0.113	0.270	0.739
$LIOR_t$	69,199	0.312	0.235	0.080	0.137	0.226	0.421	0.852
$TOP5_t$	62,985	0.620	0.240	0.282	0.407	0.586	0.850	0.996
BLK_t	69,199	0.645	0.274	0.185	0.405	0.689	0.902	1.000
$S\_to\_FF_t$	68,772	0.342	0.141	0.134	0.242	0.330	0.447	0.581
$MKTCAP_t$	70,133	2.452	12.997	0.007	0.043	0.186	0.900	8.820
$TURN_t$	70,133	1.378	1.897	0.115	0.375	0.813	1.709	4.449
$SP500_t$	70,133	0.070	0.255	0.000	0.000	0.000	0.000	1.000
$ANALYST_t$	70,133	5.160	7.450	0.000	0.000	2.000	7.000	21.000
$STDROA_t$	70,133	0.033	0.095	0.001	0.005	0.012	0.032	0.120
REG_t	70,133	0.047	0.212	0.000	0.000	0.000	0.000	0.000
$NIND_t$	70,133	403.766	387.484	58.000	144.000	256.000	442.000	1333.000
$ROACORR_t$	70,133	0.159	0.190	0.001	0.019	0.083	0.235	0.580
$HINDEX_t$	70,133	0.250	0.244	0.039	0.086	0.152	0.328	0.883

Panel B: Sample with SPI_{t+1} as measure of firm-specific information

Variable	N	Mean	Std	5%	25%	Median	75%	95%
SPI_{t+1}	102,721	2.503	1.597	-0.152	1.316	2.615	3.688	4.943
IOR_t	102,721	0.354	0.276	0.005	0.105	0.307	0.568	0.857
HHI_t	100,091	0.223	0.241	0.028	0.057	0.125	0.294	0.830
$LIOR_t$	100,091	0.329	0.247	0.079	0.142	0.242	0.447	0.909
$TOP5_t$	88,040	0.624	0.240	0.275	0.412	0.602	0.851	0.996
BLK_t	100,091	0.663	0.277	0.178	0.427	0.725	0.917	1.000
$S\_to\_FF_t$	99,454	0.341	0.147	0.091	0.240	0.334	0.450	0.582
$MKTCAP_t$	102,721	1.970	11.381	0.005	0.031	0.141	0.712	6.638
$TURN_t$	102,721	1.157	1.665	0.101	0.316	0.658	1.371	3.856
$SP500_t$	102,721	0.071	0.256	0.000	0.000	0.000	0.000	1.000
$ANALYST_t$	102,721	5.023	7.851	0.000	0.000	1.000	7.000	22.000
$STDROA_t$	102,721	0.031	0.093	0.001	0.005	0.012	0.030	0.113
REG_t	102,721	0.054	0.226	0.000	0.000	0.000	0.000	1.000
$NIND_t$	102,721	364.787	354.649	57.000	135.000	232.000	399.000	1179.000
$ROACORR_t$	102,721	0.165	0.194	0.001	0.020	0.087	0.243	0.596
$HINDEX_t$	102,721	0.264	0.246	0.042	0.095	0.172	0.345	0.904

Table 2
Correlations

This table presents correlations for firm-specific information, institutional concentration, and control variables of two samples. Panel A displays correlation matrix of the sample with PIN_{t+1} as the measure of firm-specific information for the 1993 – 2010 period. Panel B displays correlation matrix of the sample with SPI_{t+1} as the measure of firm-specific information for the 1983 – 2010 period. The p-values are reported under the correlation coefficients. All variables are as defined in Appendix A.

Panel A: Sample with PIN_{t+1} as measure of firm-specific information

	PIN_{t+1}	IOR_t	HHI_t	$LIOR_t$	$TOP5_t$	BLK_t	$S\_to\_FF_t$	$MKTCAP_t$
PIN_{t+1}	1.000	-0.553	0.510	0.529	0.649	0.652	0.294	-0.622
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IOR_t		1.000	-0.621	-0.654	-0.733	-0.762	-0.311	0.680
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI_t			1.000	0.978	0.831	0.706	-0.192	-0.662
				(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$LIOR_t$				1.000	0.850	0.751	-0.136	-0.682
					(0.000)	(0.000)	(0.000)	(0.000)
$TOP5_t$					1.000	0.955	0.677	-0.810
						(0.000)	(0.000)	(0.000)
BLK_t						1.000	0.499	-0.852
							(0.000)	(0.000)
$S\_to\_FF_t$							1.000	-0.372
								(0.000)
$MKTCAP_t$								1.000

	$TURN_t$	$SP500_t$	$ANALYST_t$	$STDROA_t$	REG_t	$NIND_t$	$ROACORR_t$	$HINDEX_t$
PIN_{t+1}	-0.556	-0.256	-0.517	-0.071	-0.056	0.085	-0.085	-0.014
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IOR_t	0.491	0.230	0.622	-0.115	-0.023	-0.129	0.112	0.089
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI_t	-0.389	-0.196	-0.538	0.172	-0.074	0.050	-0.084	-0.003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.408)
$LIOR_t$	-0.412	-0.217	-0.565	0.177	-0.080	0.055	-0.090	-0.009
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.014)
$TOP5_t$	-0.459	-0.319	-0.649	0.191	-0.096	0.066	-0.116	-0.036
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BLK_t	-0.466	-0.369	-0.689	0.199	-0.098	0.071	-0.127	-0.032
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$S\_to\_FF_t$	-0.178	-0.223	-0.301	0.067	-0.047	0.035	-0/065	-0.031
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$MKTCAP_t$	0.340	0.460	0.678	-0.295	0.112	-0.044	0.139	0.009
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.013)
$TURN_t$	1.000	0.081	0.425	0.270	-0.052	-0.014	0.067	-0.044
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$SP500_t$		1.000	0.326	-0.102	0.053	-0.071	0.090	0.054
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$ANALYST_t$			1.000	-0.169	0.019	-0.024	0.127	-0.011
				(0.000)	(0.000)	(0.000)	(0.000)	(0.003)
$STDROA_t$				1.000	-0.072	-0.185	-0.007	0.055
					(0.000)	(0.000)	(0.060)	(0.000)
REG_t					1.000	0.005	-0.013	-0.016
						(0.203)	(0.001)	(0.000)
$NIND_t$						1.000	-0.037	-0.387
							(0.000)	(0.000)
$ROACORR_t$							1.000	0.021
								(0.000)
$HINDEX_t$								1.000

Table 2 (Cont'd)
Correlations

This table presents correlations for firm-specific information, institutional concentration, and control variables of two samples. Panel A displays correlation matrix of the sample with PIN_{t+1} as the measure of firm-specific information for the 1993 – 2010 period. Panel B displays correlation matrix of the sample with SPI_{t+1} as the measure of firm-specific information for the 1983 – 2010 period. The p-values are reported under the correlation coefficients. All variables are as defined in Appendix A.

Panel B: Sample with SPI_{t+1} as measure of firm-specific information

	SPI_{t+1}	IOR_t	HHI_t	$LIOR_t$	$TOP5_t$	BLK_t	$S\_to\_FF_t$	$MKTCAP_t$
SPI_{t+1}	1.000	-0.598	0.522	0.552	0.680	0.715	0.307	-0.734
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IOR_t		1.000	-0.606	-0.637	-0.704	-0.751	-0.264	0.697
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI_t			1.000	0.978	0.828	0.697	-0.266	-0.677
				(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$LIOR_t$				1.000	0.846	0.745	-0.206	-0.696
					(0.000)	(0.000)	(0.000)	(0.000)
$TOP5_t$					1.000	0.953	0.688	-0.809
						(0.000)	(0.000)	(0.000)
BLK_t						1.000	0.447	-0.855
							(0.000)	(0.000)
$S\_to\_FF_t$							1.000	-0.304
								(0.000)
$MKTCAP_t$								1.000

	$TURN_t$	$SP500_t$	$ANALYST_t$	$STDROA_t$	REG_t	$NIND_t$	$ROACORR_t$	$HINDEX_t$
SPI_{t+1}	-0.431	-0.326	-0.541	0.217	-0.097	0.047	-0.159	0.043
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IOR_t	0.510	0.236	0.603	-0.162	-0.033	-0.074	0.102	0.031
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI_t	-0.402	-0.201	-0.515	0.219	-0.078	0.025	-0.095	0.024
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$LIOR_t$	-0.422	-0.224	-0.541	0.221	-0.082	0.031	-0.102	0.018
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$TOP5_t$	-0.434	-0.339	-0.605	0.213	-0.092	0.054	-0.128	-0.016
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BLK_t	-0.454	-0.393	-0.658	0.244	-0.097	0.045	-0.141	0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.511)
$S\_to\_FF_t$	-0.119	-0.228	-0.245	0.061	-0.038	0.026	-0.062	-0.020
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$MKTCAP_t$	0.381	0.434	0.647	-0.343	0.117	-0.012	0.147	-0.043
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$TURN_t$	1.000	0.082	0.415	0.192	-0.054	0.027	0.050	-0.083
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$SP500_t$		1.000	0.298	-0.110	0.042	-0.074	0.108	0.049
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$ANALYST_t$			1.000	-0.195	-0.001	0.003	0.120	-0.028
				(0.000)	(0.872)	(0.346)	(0.000)	(0.000)
$STDROA_t$				1.000	-0.082	-0.168	-0.019	0.068
					(0.000)	(0.000)	(0.000)	(0.000)
REG_t					1.000	0.015	0.005	-0.068
						(0.000)	(0.141)	(0.000)
$NIND_t$						1.000	-0.040	-0.364
							(0.000)	(0.000)
$ROACORR_t$							1.000	0.014
								(0.000)
$HINDEX_t$								1.000

Table 3
Panel Regression: The Effect of Institutional Ownership Concentration on Firm-specific Information

This table presents results for regressions of probability of informed trading (panel A) and stock price informativeness (panel B) on institutional ownership concentration. The t-statistics reported in parentheses are based on standard errors adjusted for clustering at the firm level. Year dummies are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel A. Dependent Variable: PIN_{t+1}

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Test variables									
IOR_t	-0.027***	-0.011***		-0.013***		0.004		0.011***	
	(-8.13)	(-3.57)		(-4.20)		(1.18)		(3.53)	
HHI_t		0.156***	0.168***						
		(11.31)	(12.22)						
HHI_t^2		-0.123***	-0.132***						
		(-10.14)	(-10.97)						
$LIOR_t$				0.127***	0.141***				
				(11.41)	(12.43)				
$LIOR_t^2$				-0.089***	-0.099***				
				(-8.78)	(-9.66)				
$TOP5_t$						-0.468***	-0.464***		
						(-10.04)	(-10.10)		
$TOP5_t^2$						0.950***	0.939***		
						(11.15)	(11.26)		
$TOP5_t^3$						-0.488***	-0.483***		
						(-10.18)	(-10.26)		
BLK_t								-0.170***	-0.166***
								(-8.40)	(-8.23)
BLK_t^2								0.411***	0.398***
								(9.23)	(9.02)
BLK_t^3								-0.165***	-0.161***
								(-5.64)	(-5.51)
Control variables									
$MKTCAP_t$	-0.031***	-0.028***	-0.029***	-0.029***	-0.030***	-0.026***	-0.026***	-0.022***	-0.022***
	(-54.67)	(-38.04)	(-39.36)	(-41.46)	(-43.84)	(-39.76)	(-40.01)	(-25.48)	(-25.48)
$TURN_t$	-0.038***	-0.036***	-0.037***	-0.037***	-0.037***	-0.034***	-0.034***	-0.034***	-0.034***
	(-54.89)	(-49.83)	(-52.51)	(-50.64)	(-53.62)	(-47.86)	(-49.46)	(-46.80)	(-47.61)
$SP500_t$	0.007***	0.003*	0.004**	0.005***	0.006***	0.003*	0.002	-0.002	-0.002
	(3.97)	(1.79)	(2.07)	(2.88)	(3.31)	(1.65)	(1.58)	(-0.96)	(-1.15)
$ANALYST_t$	-0.005***	-0.004***	-0.004***	-0.004***	-0.004***	-0.002***	-0.002***	-0.002***	-0.002***
	(-7.00)	(-5.82)	(-6.35)	(-6.06)	(-6.65)	(-3.36)	(-3.21)	(-3.67)	(-3.17)
$STDROA_t$	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***	-0.012***	-0.012***	-0.013***	-0.013***
	(-26.32)	(-27.15)	(-27.17)	(-26.90)	(-26.91)	(-25.61)	(-25.60)	(-28.87)	(-28.85)
REG_t	-0.016***	-0.013***	-0.012***	-0.014***	-0.012***	-0.009***	-0.009***	-0.008***	-0.009***
	(-5.85)	(-5.09)	(-4.76)	(-5.12)	(-4.73)	(-3.66)	(-3.84)	(-3.24)	(-3.74)
$NIND_t$	0.003***	0.002***	0.003***	0.002***	0.003***	0.002***	0.002***	0.002***	0.002***
	(3.79)	(3.62)	(3.92)	(3.65)	(3.99)	(3.98)	(3.88)	(3.50)	(3.25)
$ROACORR_t$	0.009***	0.008***	0.009***	0.009***	0.009***	0.007***	0.007***	0.008***	0.008***
	(4.30)	(4.01)	(4.02)	(4.12)	(4.14)	(3.32)	(3.32)	(3.65)	(3.65)
$HINDEX_t$	-0.000	-0.000	-0.001	-0.000	-0.001	-0.000	-0.000	-0.000	-0.000
	(-0.25)	(-0.45)	(-0.88)	(-0.34)	(-0.83)	(-0.17)	(-0.02)	(-0.53)	(-0.13)
Intercept	0.333***	0.287***	0.281***	0.288***	0.280***	0.331***	0.333***	0.240***	0.248***
	(77.91)	(45.82)	(45.24)	(47.16)	(45.59)	(31.96)	(31.88)	(26.95)	(29.04)
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	70,133	69,199	69,199	69,199	69,199	62,985	62,985	69,199	69,199
Adj. R^2	0.546	0.553	0.553	0.553	0.552	0.572	0.572	0.562	0.562

Table 3 (Cont'd)
Panel Regression: The Effect of Institutional Ownership Concentration on Firm-specific Information

This table presents results for regressions of probability of informed trading (panel A) and stock price informativeness (panel B) on institutional ownership concentration. The t-statistics reported in parentheses are based on standard errors adjusted for clustering at the firm level. Year dummies are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel B. Dependent Variable: SPI_{t+1}

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Test variables									
IOR_t	-0.397***	-0.219***		-0.219***		-0.016		0.013	
	(-12.81)	(-6.82)		(-6.83)		(-0.47)		(0.39)	
HHI_t		1.936***	2.152***						
		(21.50)	(25.13)						
HHI_t^2		-1.959***	-2.128***						
		(-25.83)	(-29.38)						
$LIOR_t$				2.061***	2.264***				
				(23.26)	(26.83)				
$LIOR_t^2$				-1.881***	-2.022***				
				(-25.93)	(-29.01)				
$TOP5_t$						-3.569***	-3.589***		
						(-6.42)	(-6.48)		
$TOP5_t^2$						8.597***	8.643***		
						(9.32)	(9.43)		
$TOP5_t^3$						-4.844***	-4.867***		
						(-10.08)	(-10.20)		
BLK_t								-2.415***	-2.409***
								(-9.02)	(-9.00)
BLK_t^2								7.427***	7.410***
								(14.96)	(14.95)
BLK_t^3								-4.307***	-4.302***
								(-15.46)	(-15.43)
Control variables									
$MKTCAP_t$	-0.401***	-0.395***	-0.402***	-0.399***	-0.407***	-0.396***	-0.396***	-0.330***	-0.330***
	(-82.03)	(-73.22)	(-78.67)	(-76.46)	(-83.51)	(-64.57)	(-65.48)	(-56.73)	(-57.05)
$TURN_t$	-0.223***	-0.223***	-0.232***	-0.225***	-0.234***	-0.224***	-0.225***	-0.198***	-0.197***
	(-41.11)	(-41.20)	(-42.19)	(-41.41)	(-42.40)	(-37.49)	(-37.14)	(-37.37)	(-36.99)
$SP500_t$	-0.280***	-0.240***	-0.233***	-0.218***	-0.209***	-0.164***	-0.163***	-0.211***	-0.211***
	(-10.69)	(-9.30)	(-9.10)	(-8.43)	(-8.13)	(-6.39)	(-6.39)	(-8.01)	(-8.04)
$ANALYST_t$	-0.052***	-0.030***	-0.037***	-0.032***	-0.039***	-0.004	-0.005	-0.015**	-0.014**
	(-7.80)	(-4.69)	(-5.80)	(-5.03)	(-6.19)	(-0.72)	(-0.78)	(-2.37)	(-2.33)
$STDROA_t$	0.029***	0.033***	0.034***	0.034***	0.034***	0.044***	0.044***	0.029***	0.029***
	(7.10)	(8.28)	(8.44)	(8.35)	(8.52)	(10.24)	(10.26)	(7.36)	(7.35)
REG_t	-0.261***	-0.224***	-0.204***	-0.226***	-0.205***	-0.194***	-0.192***	-0.177***	-0.178***
	(-7.87)	(-6.99)	(-6.46)	(-7.06)	(-6.54)	(-6.19)	(-6.23)	(-5.83)	(-5.95)
$NIND_t$	0.045***	0.048***	0.051***	0.048***	0.051***	0.051***	0.052***	0.046***	0.045***
	(6.34)	(6.72)	(7.23)	(6.70)	(7.21)	(6.77)	(6.85)	(6.53)	(6.53)
$ROACORR_t$	-0.228***	-0.228***	-0.226***	-0.224***	-0.222***	-0.244***	-0.244***	-0.219***	-0.219***
	(-10.04)	(-10.14)	(-10.08)	(-10.03)	(-9.95)	(-10.38)	(-10.37)	(-9.83)	(-9.83)
$HINDEX_t$	0.022***	0.025***	0.020***	0.025***	0.021***	0.026***	0.026***	0.024***	0.025***
	(3.81)	(4.29)	(3.52)	(4.34)	(3.58)	(4.25)	(4.17)	(4.28)	(4.30)
Intercept	4.050***	3.772***	3.690***	3.655***	3.565***	4.107***	4.101***	3.209***	3.216***
	(97.09)	(76.97)	(75.75)	(72.09)	(70.91)	(33.43)	(33.50)	(44.57)	(46.10)
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	102,721	100,091	100,091	100,091	100,091	88,040	88,040	100,091	100,091
Adj. R^2	0.658	0.665	0.665	0.665	0.664	0.667	0.667	0.672	0.672

Table 4
Cross-Sectional Regression: The Effect of Institutional Ownership Concentration on Firm-specific Information

This table presents results for Fama-MacBeth (1973) cross-sectional regressions of probability of informed trading (panel A) and stock price informativeness (panel B) on institutional ownership concentration. The t-statistics reported in parentheses are based on standard errors adjusted for Newey-West (1987) autocorrelation. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel A. Dependent Variable: PIN_{t+1}

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Test variables									
IOR_t	-0.022*	-0.003		-0.006		0.011		0.018*	
	(-1.75)	(-0.26)		(-0.55)		(1.30)		(1.99)	
HHI_t		0.197***	0.209***						
		(5.77)	(4.51)						
HHI_t^2		-0.163***	-0.175***						
		(-4.65)	(-3.85)						
$LIOR_t$				0.143***	0.158***				
				(6.47)	(4.84)				
$LIOR_t^2$				-0.100***	-0.112***				
				(-4.89)	(-4.02)				
$TOP5_t$						-0.468***	-0.459***		
						(-3.23)	(-2.97)		
$TOP5_t^2$						0.942***	0.925***		
						(3.89)	(3.50)		
$TOP5_t^3$						-0.470***	-0.463***		
						(-4.01)	(-3.62)		
BLK_t								-0.146**	-0.144**
								(-2.33)	(-2.22)
BLK_t^2								0.342**	0.339**
								(2.89)	(2.72)
BLK_t^3								-0.106*	-0.111*
								(-1.81)	(-1.89)
Control variables									
$MKTCAP_t$	-0.031***	-0.027***	-0.027***	-0.028***	-0.028***	-0.024***	-0.024***	-0.021***	-0.021***
	(-19.42)	(-20.27)	(-19.23)	(-19.55)	(-17.95)	(-21.68)	(-21.43)	(-32.83)	(-34.22)
$TURN_t$	-0.037***	-0.034***	-0.035***	-0.035***	-0.036***	-0.031***	-0.031***	-0.031***	-0.031***
	(-25.83)	(-19.45)	(-24.13)	(-21.65)	(-27.78)	(-16.49)	(-18.15)	(-13.90)	(-14.83)
$SP500_t$	0.006	-0.001	-0.002	0.002	0.001	-0.003	-0.003	-0.007***	-0.008***
	(1.31)	(-0.13)	(-0.42)	(0.45)	(0.12)	(-0.93)	(-1.26)	(-3.63)	(-4.20)
$ANALYST_t$	-0.007***	-0.005***	-0.005***	-0.005***	-0.006***	-0.003***	-0.003***	-0.003***	-0.003***
	(-5.55)	(-5.55)	(-4.32)	(-5.44)	(-4.26)	(-4.26)	(-3.22)	(-3.89)	(-2.94)
$STDROA_t$	-0.011***	-0.011***	-0.012***	-0.011***	-0.011***	-0.011***	-0.011***	-0.012***	-0.012***
	(-5.04)	(-5.48)	(-5.62)	(-5.42)	(-5.60)	(-5.72)	(-5.90)	(-5.66)	(-5.81)
REG_t	-0.016***	-0.012***	-0.012***	-0.012***	-0.012***	-0.008***	-0.009***	-0.007***	-0.010***
	(-5.28)	(-4.47)	(-5.45)	(-4.58)	(-5.54)	(-3.25)	(-4.34)	(-2.84)	(-4.34)
$NIND_t$	0.002*	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001
	(2.05)	(1.57)	(1.56)	(1.63)	(1.65)	(1.30)	(1.14)	(1.27)	(1.05)
$ROACORR_t$	0.008***	0.007***	0.007**	0.008***	0.008***	0.006**	0.006**	0.006***	0.006**
	(3.29)	(3.01)	(2.88)	(3.25)	(3.11)	(2.52)	(2.46)	(2.92)	(2.81)
$HINDEX_t$	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000	-0.000	-0.001	-0.001
	(-0.49)	(-0.52)	(-0.59)	(-0.49)	(-0.60)	(-0.22)	(-0.12)	(-0.48)	(-0.30)
Intercept	0.345***	0.291***	0.286***	0.295***	0.287***	0.333***	0.336***	0.243***	0.252***
	(33.71)	(30.16)	(27.59)	(29.81)	(28.36)	(12.04)	(13.61)	(17.42)	(21.90)
N	70,133	69,199	69,199	69,199	69,199	62,985	62,985	69,199	69,199
Adj. R^2	0.551	0.558	0.557	0.556	0.554	0.575	0.573	0.570	0.568

Table 4 (Cont'd)
Cross-Sectional Regression: The Effect of Institutional Ownership Concentration on Firm-specific Information

This table presents results for Fama-MacBeth (1973) cross-sectional regressions of probability of informed trading (panel A) and stock price informativeness (panel B) on institutional ownership concentration. The t-statistics reported in parentheses are based on standard errors adjusted for Newey-West (1987) autocorrelation. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel B. Dependent Variable: SPI_{t+1}									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Test variables									
IOR_t	-0.344***	-0.157***		-0.171***		0.001		0.044	
	(-5.51)	(-3.12)		(-3.52)		(0.02)		(0.87)	
HHI_t		2.180***	2.298***						
		(6.34)	(6.52)						
HHI_t^2		-2.089***	-2.182***						
		(-8.02)	(-8.16)						
$LIOR_t$				1.992***	2.121***				
				(13.34)	(12.58)				
$LIOR_t^2$				-1.696***	-1.787***				
				(-15.01)	(-15.72)				
$TOP5_t$						-4.040**	-4.015**		
						(-2.07)	(-2.08)		
$TOP5_t^2$						9.188***	9.119***		
						(3.05)	(3.09)		
$TOP5_t^3$						-5.004***	-4.966***		
						(-3.68)	(-3.74)		
BLK_t								-1.860**	-1.829**
								(-2.61)	(-2.60)
BLK_t^2								5.850***	5.764***
								(5.37)	(5.47)
BLK_t^3								-3.107***	-3.074***
								(-5.50)	(-5.54)
Control variables									
$MKTCAP_t$	-0.412***	-0.399***	-0.404***	-0.405***	-0.410***	-0.397***	-0.397***	-0.330***	-0.329***
	(-28.67)	(-42.74)	(-47.64)	(-36.42)	(-39.67)	(-55.19)	(-57.70)	(-29.87)	(-30.28)
$TURN_t$	-0.220***	-0.207***	-0.211***	-0.213***	-0.219***	-0.206***	-0.206***	-0.179***	-0.177***
	(-11.40)	(-13.33)	(-13.81)	(-12.99)	(-13.26)	(-11.91)	(-11.85)	(-10.97)	(-10.72)
$SP500_t$	-0.224*	-0.214***	-0.219**	-0.186*	-0.191**	-0.123*	-0.126*	-0.173***	-0.178***
	(-2.00)	(-2.32)	(-2.40)	(-1.98)	(-2.07)	(-1.96)	(-2.05)	(-2.98)	(-3.15)
$ANALYST_t$	-0.046***	-0.026***	-0.030***	-0.029***	-0.034***	-0.003	-0.002	-0.011	-0.009
	(-4.72)	(-2.77)	(-3.38)	(-3.29)	(-4.14)	(-0.36)	(-0.24)	(-1.39)	(-1.16)
$STDROA_t$	0.027*	0.027**	0.028**	0.028**	0.030**	0.034**	0.034***	0.026**	0.026**
	(1.88)	(2.08)	(2.26)	(2.19)	(2.35)	(2.76)	(2.81)	(2.09)	(2.10)
REG_t	-0.264***	-0.227***	-0.213***	-0.229***	-0.215***	-0.208***	-0.209***	-0.193***	-0.198***
	(-3.79)	(-3.28)	(-3.00)	(-3.30)	(-3.04)	(-3.21)	(-3.15)	(-3.01)	(-2.97)
$NIND_t$	0.042***	0.044***	0.045***	0.044***	0.045***	0.048***	0.048***	0.041***	0.040***
	(3.38)	(3.63)	(3.72)	(3.64)	(3.73)	(3.79)	(3.76)	(3.38)	(3.30)
$ROACORR_t$	-0.231***	-0.233***	-0.232***	-0.228***	-0.226***	-0.244***	-0.245***	-0.228***	-0.229***
	(-10.73)	(-10.26)	(-10.22)	(-9.96)	(-9.86)	(-9.44)	(-9.55)	(-9.17)	(-9.27)
$HINDEX_t$	0.027**	0.028**	0.026**	0.029**	0.026**	0.027**	0.028**	0.026**	0.028**
	(2.59)	(2.62)	(2.44)	(2.73)	(2.47)	(2.24)	(2.33)	(2.30)	(2.43)
Intercept	4.668***	4.242***	4.198***	4.180***	4.119***	4.564***	4.579***	3.647***	3.683***
	(30.48)	(23.90)	(22.65)	(26.33)	(24.01)	(12.98)	(12.61)	(19.84)	(18.09)
N	102,721	100,091	100,091	100,091	100,091	88,040	88,040	100,091	100,091
Adj. R^2	0.608	0.616	0.616	0.615	0.615	0.619	0.618	0.629	0.629

Table 5
Fixed Effects Model

This table presents results for regressions of probability of informed trading (panel A) and stock price informativeness (panel B) on institutional ownership concentration using fixed effects models. Stock and year dummies are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel A. Dependent Variable: PIN_{t+1}

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Test variables									
IOR_t	-0.022***	-0.016***		-0.015***		-0.005*		-0.003	
	(-6.95)	(-5.17)		(-4.74)		(-1.76)		(-1.02)	
HHI_t		0.047***	0.057***						
		(5.47)	(6.74)						
HHI_t^2		-0.049***	-0.057***						
		(-6.22)	(-7.40)						
$LIOR_t$				0.062***	0.070***				
				(7.52)	(8.79)				
$LIOR_t^2$				-0.058***	-0.064***				
				(-7.80)	(-8.87)				
$TOP5_t$						-0.378***	-0.383***		
						(-9.09)	(-9.23)		
$TOP5_t^2$						0.808***	0.820***		
						(11.37)	(11.59)		
$TOP5_t^3$						-0.460***	-0.467***		
						(-12.15)	(-12.38)		
BLK_t								-0.183***	-0.185***
								(-9.01)	(-9.12)
BLK_t^2								0.480***	0.485***
								(11.86)	(12.04)
BLK_t^3								-0.285***	-0.287***
								(-11.82)	(-11.97)
Control variables									
$MKTCAP_t$	-0.026***	-0.026***	-0.027***	-0.026***	-0.027***	-0.025***	-0.026***	-0.024***	-0.024***
	(-48.55)	(-46.91)	(-49.60)	(-47.49)	(-50.31)	(-45.88)	(-47.02)	(-41.67)	(-42.48)
$TURN_t$	-0.022***	-0.022***	-0.022***	-0.022***	-0.022***	-0.021***	-0.021***	-0.021***	-0.021***
	(-39.31)	(-39.64)	(-40.24)	(-39.68)	(-40.27)	(-38.79)	(-38.97)	(-37.61)	(-37.75)
$SP500_t$	-0.003	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.002	-0.002
	(-1.06)	(-1.06)	(-1.05)	(-1.07)	(-1.06)	(-0.54)	(-0.53)	(-1.02)	(-1.02)
$ANALYST_t$	-0.001	-0.000	-0.001	-0.000	-0.001	0.001	0.001	0.000	0.000
	(-1.06)	(-0.36)	(-1.06)	(-0.33)	(-0.97)	(1.17)	(0.98)	(0.54)	(0.42)
$STDROA_t$	-0.003***	-0.003***	-0.003***	-0.003***	-0.002***	-0.003***	-0.003***	-0.003***	-0.003***
	(-5.79)	(-5.65)	(-5.34)	(-5.63)	(-5.34)	(-6.39)	(-6.29)	(-5.95)	(-5.90)
$NIND_t$	0.003***	0.003***	0.003***	0.003***	0.003***	0.004***	0.004***	0.003***	0.003***
	(2.76)	(2.94)	(3.04)	(2.92)	(3.01)	(4.78)	(4.81)	(3.09)	(3.11)
$ROACORR_t$	-0.002	-0.003	-0.003	-0.003	-0.003	-0.002	-0.002	-0.002	-0.002
	(-1.27)	(-1.44)	(-1.44)	(-1.43)	(-1.44)	(-1.10)	(-1.10)	(-1.31)	(-1.31)
$HINDEX_t$	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-0.65)	(-0.34)	(-0.35)	(-0.32)	(-0.33)	(-0.70)	(-0.70)	(-0.28)	(-0.28)
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included
Stock dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	70,133	69,199	69,199	69,199	69,199	62,985	62,985	69,199	69,199
R^2	0.722	0.726	0.726	0.726	0.726	0.740	0.740	0.728	0.728

Table 5 (Cont'd)
Fixed Effects Model

This table presents results for regressions of probability of informed trading (panel A) and stock price informativeness (panel B) on institutional ownership concentration using fixed effects models. Stock and year dummies are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel B. Dependent Variable: SPI_{t+1}									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Test variables									
IOR_t	-0.565***	-0.435***		-0.435***		-0.251***		-0.260***	
	(-21.49)	(-16.13)		(-16.11)		(-8.95)		(-9.35)	
HHI_t		1.328***	1.575***						
		(18.59)	(22.54)						
HHI_t^2		-1.220***	-1.419***						
		(-19.11)	(-22.63)						
$LIOR_t$				1.281***	1.514***				
				(18.66)	(22.53)				
$LIOR_t^2$				-1.085***	-1.259***				
				(-17.91)	(-21.09)				
$TOP5_t$						-1.338***	-1.545***		
						(-3.59)	(-4.16)		
$TOP5_t^2$						4.557***	5.063***		
						(7.12)	(7.94)		
$TOP5_t^3$						-2.789***	-3.063***		
						(-8.14)	(-8.97)		
BLK_t								-1.158***	-1.264***
								(-7.01)	(-7.67)
BLK_t^2								4.371***	4.670***
								(13.30)	(14.27)
BLK_t^3								-2.642***	-2.777***
								(-13.53)	(-14.25)
Control variables									
$MKTCAP_t$	-0.319***	-0.312***	-0.331***	-0.316***	-0.335***	-0.327***	-0.336***	-0.280***	-0.288***
	(-72.69)	(-67.54)	(-73.74)	(-69.14)	(-75.87)	(-64.05)	(-67.06)	(-59.07)	(-61.55)
$TURN_t$	-0.212***	-0.213***	-0.221***	-0.215***	-0.224***	-0.219***	-0.223***	-0.202***	-0.205***
	(-44.84)	(-43.68)	(-45.54)	(-44.18)	(-46.14)	(-40.71)	(-41.64)	(-41.49)	(-42.34)
$SP500_t$	-0.160***	-0.154***	-0.148***	-0.152***	-0.146***	-0.136***	-0.133***	-0.136***	-0.132***
	(-7.67)	(-7.44)	(-7.15)	(-7.37)	(-7.06)	(-6.71)	(-6.56)	(-6.56)	(-6.39)
$ANALYST_t$	-0.028***	-0.017***	-0.031***	-0.017***	-0.032***	-0.000	-0.007	-0.010**	-0.018***
	(-5.60)	(-3.39)	(-6.46)	(-3.54)	(-6.63)	(-0.01)	(-1.49)	(-2.11)	(-3.71)
$STDROA_t$	-0.003	-0.006	-0.004	-0.005	-0.003	-0.007	-0.006	-0.008**	-0.007*
	(-0.75)	(-1.39)	(-0.92)	(-1.19)	(-0.68)	(-1.60)	(-1.33)	(-1.94)	(-1.71)
$NIND_t$	0.100***	0.102***	0.107***	0.102***	0.106***	0.108***	0.111***	0.104***	0.107***
	(12.48)	(12.63)	(13.19)	(12.57)	(13.11)	(12.77)	(13.06)	(12.88)	(13.21)
$ROACORR_t$	-0.065***	-0.062***	-0.058***	-0.062***	-0.058***	-0.051***	-0.048***	-0.055***	-0.052***
	(-4.00)	(-3.81)	(-3.56)	(-3.79)	(-3.55)	(-3.05)	(-2.90)	(-3.40)	(-3.24)
$HINDEX_t$	-0.018***	-0.017***	-0.017***	-0.017***	-0.016***	-0.021***	-0.021***	-0.015***	-0.015**
	(-3.12)	(-2.90)	(-2.84)	(-2.86)	(-2.79)	(-3.42)	(-3.38)	(-2.59)	(-2.55)
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included
Stock dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	102,721	100,091	100,091	100,091	100,091	88,040	88,040	100,091	100,091
R^2	0.766	0.768	0.767	0.768	0.767	0.771	0.771	0.770	0.770

Table 6
Change Model

This table presents results for regressions of changes in probability of informed trading (panel A) and stock price informativeness (panel B) from year t to t+1 on changes in institutional ownership concentration from year t-1 to t. The t-statistics reported in parentheses are based on standard errors adjusted for clustering at the firm level. Year dummies are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel A. Dependent Variable: ΔPIN_{t+1}

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Test variables									
ΔIOR_t	-0.029***	-0.025***		-0.024***		-0.015***		-0.018***	
	(-7.59)	(-6.33)		(-6.20)		(-4.15)		(-4.44)	
ΔHHI_t		0.045***	0.057***						
		(3.62)	(4.60)						
ΔHHI_t^2		-0.042***	-0.050***						
		(-3.36)	(-4.13)						
$\Delta LIOR_t$				0.049***	0.059***				
				(4.94)	(6.03)				
$\Delta LIOR_t^2$				-0.041***	-0.048***				
				(-3.96)	(-4.71)				
$\Delta TOP5_t$						-0.196***	-0.204***		
						(-5.01)	(-5.23)		
$\Delta TOP5_t^2$						0.462***	0.483***		
						(6.29)	(6.62)		
$\Delta TOP5_t^3$						-0.271***	-0.282***		
						(-6.40)	(-6.70)		
ΔBLK_t								-0.076***	-0.079***
								(-5.14)	(-5.41)
ΔBLK_t^2								0.229***	0.241***
								(6.45)	(6.83)
ΔBLK_t^3								-0.135***	-0.141***
								(-5.54)	(-5.78)
Control variables									
$\Delta MKTCAP_t$	-0.010***	-0.010***	-0.011***	-0.010***	-0.011***	-0.011***	-0.012***	-0.009***	-0.010***
	(-13.84)	(-13.49)	(-15.15)	(-13.82)	(-15.63)	(-15.09)	(-16.06)	(-12.04)	(-13.07)
$\Delta TURN_t$	0.007***	0.007***	0.007***	0.007***	0.007***	0.006***	0.006***	0.008***	0.008***
	(8.71)	(8.88)	(8.74)	(8.86)	(8.71)	(7.54)	(7.51)	(9.29)	(9.24)
$\Delta SP500_t$	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***	0.012***
	(6.36)	(6.40)	(6.36)	(6.37)	(6.32)	(6.45)	(6.42)	(6.47)	(6.44)
$\Delta ANALYST_t$	-0.001	-0.001	-0.001	-0.001	-0.001	0.000	-0.000	-0.000	-0.001
	(-1.31)	(-0.90)	(-1.38)	(-0.96)	(-1.45)	(0.16)	(-0.06)	(-0.63)	(-0.93)
$\Delta STDROA_t$	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000
	(0.28)	(0.65)	(0.83)	(0.66)	(0.84)	(0.01)	(0.11)	(0.56)	(0.68)
$\Delta NIND_t$	0.002	0.003	0.003*	0.003	0.003	0.002	0.002	0.003*	0.003*
	(1.14)	(1.59)	(1.62)	(1.58)	(1.61)	(1.25)	(1.27)	(1.62)	(1.65)
$\Delta ROACORR_t$	0.000	-0.000	-0.000	-0.000	-0.000	-0.001	-0.001	-0.000	-0.000
	(0.13)	(-0.17)	(-0.19)	(-0.18)	(-0.20)	(-0.39)	(-0.39)	(-0.07)	(-0.07)
$\Delta HINDEX_t$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.37)	(0.45)	(0.45)	(0.46)	(0.46)	(0.65)	(0.66)	(0.51)	(0.51)
Intercept	0.007***	0.006***	0.007***	0.006***	0.007***	0.007***	0.007***	0.006***	0.006***
	(3.19)	(2.80)	(2.99)	(2.79)	(2.98)	(3.48)	(3.60)	(2.57)	(2.67)
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	57,822	56,855	56,855	56,855	56,855	51,133	51,133	56,855	56,855
Adj. R^2	0.019	0.020	0.019	0.020	0.019	0.028	0.028	0.021	0.021

Table 6 (Cont'd)
Change Model

This table presents results for regressions of changes in probability of informed trading (panel A) and stock price informativeness (panel B) from year t to t+1 on changes in institutional ownership concentration from year t-1 to t. The t-statistics reported in parentheses are based on standard errors adjusted for clustering at the firm level. Year dummies are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel B. Dependent Variable: ΔSPI_{t+1}

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Test variables									
ΔIOR_t	-0.128***	-0.071*		-0.082**		0.008		-0.010	
	(-3.08)	(-1.68)		(-1.93)		(0.19)		(-0.23)	
ΔHHI_t		0.638***	0.666***						
		(5.98)	(6.30)						
ΔHHI_t^2		-0.477***	-0.498***						
		(-5.00)	(-5.27)						
$\Delta LIOR_t$				0.432***	0.461***				
				(4.70)	(5.06)				
$\Delta LIOR_t^2$				-0.276***	-0.297***				
				(-3.26)	(-3.53)				
$\Delta TOP5_t$						-1.507***	-1.503***		
						(-3.28)	(-3.28)		
$\Delta TOP5_t^2$						2.940***	2.929***		
						(3.59)	(3.59)		
$\Delta TOP5_t^3$						-1.399***	-1.393***		
						(-3.09)	(-3.09)		
ΔBLK_t								-0.641***	-0.643***
								(-3.62)	(-3.64)
ΔBLK_t^2								1.575***	1.581***
								(4.10)	(4.13)
ΔBLK_t^3								-0.732***	-0.735***
								(-2.99)	(-3.00)
Control variables									
$\Delta MKTCAP_t$	-0.140***	-0.138***	-0.140***	-0.141***	-0.144***	-0.154***	-0.154***	-0.132***	-0.132***
	(-19.09)	(-17.64)	(-18.47)	(-18.21)	(-19.19)	(-18.46)	(-18.82)	(-16.79)	(-17.15)
$\Delta TURN_t$	-0.079***	-0.080***	-0.080***	-0.082***	-0.082***	-0.088***	-0.088***	-0.077***	-0.077***
	(-10.99)	(-10.79)	(-10.83)	(-11.10)	(-11.17)	(-10.86)	(-10.86)	(-10.43)	(-10.44)
$\Delta SP500_t$	-0.013	-0.015	-0.015	-0.015	-0.016	-0.025	-0.025	-0.016	-0.016
	(-0.44)	(-0.51)	(-0.53)	(-0.52)	(-0.53)	(-0.85)	(-0.85)	(-0.56)	(-0.56)
$\Delta ANALYST_t$	0.028***	0.032***	0.031***	0.031***	0.030***	0.041***	0.041***	0.033***	0.033***
	(3.69)	(4.19)	(4.10)	(4.08)	(3.97)	(5.34)	(5.35)	(4.37)	(4.36)
$\Delta STDROA_t$	-0.009	-0.013**	-0.012**	-0.012**	-0.012**	-0.018***	-0.018***	-0.013**	-0.013**
	(-1.56)	(-2.08)	(-2.02)	(-2.02)	(-1.94)	(-2.92)	(-2.93)	(-2.12)	(-2.12)
$\Delta NIND_t$	0.014	0.012	0.012	0.012	0.012	0.017	0.017	0.012	0.012
	(0.84)	(0.72)	(0.73)	(0.70)	(0.72)	(0.99)	(0.99)	(0.71)	(0.72)
$\Delta ROACORR_t$	-0.006	-0.003	-0.003	-0.004	-0.004	0.017	0.017	-0.002	-0.002
	(-0.35)	(-0.18)	(-0.19)	(-0.20)	(-0.20)	(0.89)	(0.89)	(-0.11)	(-0.11)
$\Delta HINDEX_t$	0.008	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
	(1.25)	(1.15)	(1.15)	(1.16)	(1.16)	(1.16)	(1.16)	(1.13)	(1.13)
Intercept	0.063***	0.065***	0.065***	0.065***	0.065***	0.002	0.002	0.064***	0.064***
	(2.71)	(2.74)	(2.73)	(2.74)	(2.73)	(0.09)	(0.09)	(2.68)	(2.68)
Year dummies	Included	Included	Included	Included	Included	Included	Included	Included	Included
N	88,202	85,661	85,661	85,661	85,661	74,817	74,817	85,661	85,661
Adj. R^2	0.186	0.193	0.193	0.193	0.193	0.209	0.209	0.193	0.193

Table 7
Multivariate Analyses: The Effect of Ownership Concentration by the Second to the Fifth Largest Institutional Owners on Firm-specific Information

This table presents results for panel regressions (column 1), Fama-MacBeth (1973) cross-sectional regressions (column 2), and fixed effects regressions (column 3) of probability of informed trading (panel A) and stock price informativeness (panel B) on ownership concentration by the second to the fifth largest institutional owners.

In column 1, the t-statistics reported in parentheses are based on standard errors adjusted for clustering at the firm level. Year dummies are included. In column 2, the t-statistics reported in parentheses are based on standard errors adjusted for Newey-West (1987) autocorrelation. In column 3, stock and year dummies are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel A. Dependent Variable: PIN_{t+1}

	(1) Panel Regression		(2) Fama-Macbeth Cross-Sectional Regression		(3) Fixed Effects Model	
Test variables						
IOR_t	-0.020***		-0.015		-0.016***	
	(-6.05)		(-1.31)		(-5.14)	
$S\_to\_FF_t$	-0.327***	-0.358***	-0.339***	-0.385***	-0.088***	-0.096***
	(-7.31)	(-7.91)	(-6.36)	(-5.28)	(-3.53)	(-3.86)
$S\_to\_FF_t^2$	0.981***	1.080***	0.984***	1.135***	0.375***	0.410***
	(7.21)	(7.86)	(7.07)	(5.94)	(4.66)	(5.11)
$S\_to\_FF_t^3$	-0.725***	-0.808***	-0.693***	-0.825***	-0.322***	-0.356***
	(-5.79)	(-6.41)	(-6.29)	(-6.30)	(-4.17)	(-4.62)
Control variables						
$MKTCAP_t$	-0.029***	-0.030***	-0.028***	-0.029***	-0.025***	-0.026***
	(-46.32)	(-53.67)	(-20.49)	(-18.32)	(-47.16)	(-50.81)
$TURN_t$	-0.038***	-0.039***	-0.036***	-0.037***	-0.022***	-0.022***
	(-53.19)	(-58.22)	(-21.95)	(-32.52)	(-39.93)	(-40.78)
$SP500_t$	0.005***	0.007***	0.003	0.002	-0.003	-0.003
	(2.98)	(3.93)	(0.70)	(0.54)	(-1.11)	(-1.12)
$ANALYST_t$	-0.004***	-0.005***	-0.006***	-0.007***	-0.000	-0.001
	(-6.33)	(-7.15)	(-5.95)	(-4.51)	(-0.33)	(-1.08)
$STDROA_t$	-0.013***	-0.012***	-0.011***	-0.011***	-0.002***	-0.002***
	(-26.49)	(-26.42)	(-5.18)	(-5.25)	(-5.28)	(-4.93)
REG_t	-0.016***	-0.014***	-0.015***	-0.014***		
	(-5.73)	(-5.23)	(-5.82)	(-6.46)		
$NIND_t$	0.003***	0.003***	0.002	0.002	0.003***	0.003***
	(3.77)	(4.36)	(1.60)	(1.74)	(2.97)	(3.05)
$ROACORR_t$	0.009***	0.009***	0.008***	0.008***	-0.002	-0.002
	(4.06)	(4.09)	(3.36)	(3.27)	(-1.04)	(-1.04)
$HINDEX_t$	-0.000	-0.001	-0.001	-0.001	-0.000	-0.000
	(-0.27)	(-1.07)	(-0.48)	(-0.72)	(-0.30)	(-0.31)
Year dummies	Included	Included			Included	Included
Stock dummies					Included	Included
Intercept	0.339***	0.336***	0.353***	0.350***		
	(65.16)	(65.19)	(27.22)	(28.86)		
N	68,772	68,772	68,772	68,772	68,772	68,772
Adj. R^2 / R^2	0.554	0.553	0.558	0.555	0.727	0.727

Table 7 (Cont'd)
Multivariate Analyses: The Effect of Ownership Concentration by the Second to the Fifth Largest Institutional Owners on Firm-specific Information

This table presents results for panel regressions (column 1), Fama-MacBeth (1973) cross-sectional regressions (column 2), and fixed effects regressions (column 3) of probability of informed trading (panel A) and stock price informativeness (panel B) on ownership concentration by the second to the fifth largest institutional owners.

In column 1, the t-statistics reported in parentheses are based on standard errors adjusted for clustering at the firm level. Year dummies are included. In column 2, the t-statistics reported in parentheses are based on standard errors adjusted for Newey-West (1987) autocorrelation. In column 3, stock and year dummies are included. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel B. Dependent Variable: SPI_{t+1}						
	(1) Panel Regression		(2) Fama-Macbeth Cross-Sectional Regression		(3) Fixed Effects Model	
Test variables						
IOR_t	-0.286***		-0.254***		-0.453***	
	(-9.25)		(-4.55)		(-16.97)	
$S\_to\_FF_t$	-1.004***	-1.371***	-1.822***	-2.187***	-0.810***	-1.090***
	(-4.32)	(-5.87)	(-3.03)	(-3.29)	(-4.08)	(-5.50)
$S\_to\_FF_t^2$	5.698***	6.900***	7.028***	8.214***	4.436***	5.514***
	(7.33)	(8.83)	(5.08)	(5.81)	(6.74)	(8.40)
$S\_to\_FF_t^3$	-5.064***	-6.067***	-5.574***	-6.579***	-4.203***	-5.176***
	(-6.71)	(-8.00)	(-4.04)	(-5.34)	(-6.59)	(-8.13)
Control variables						
$MKTCAP_t$	-0.402***	-0.417***	-0.411***	-0.422***	-0.324***	-0.347***
	(-81.16)	(-96.61)	(-37.46)	(-36.71)	(-71.87)	(-80.42)
$TURN_t$	-0.240***	-0.255***	-0.230***	-0.244***	-0.222***	-0.233***
	(-44.75)	(-47.20)	(-14.92)	(-15.05)	(-45.82)	(-48.45)
$SP500_t$	-0.198***	-0.183***	-0.156*	-0.156*	-0.149***	-0.143***
	(-7.64)	(-7.13)	(-1.75)	(-1.76)	(-7.22)	(-6.90)
$ANALYST_t$	-0.035***	-0.047***	-0.033***	-0.044***	-0.019***	-0.035***
	(-5.53)	(-7.35)	(-3.86)	(-4.93)	(-3.82)	(-7.27)
$STDROA_t$	0.039***	0.041***	0.034**	0.036***	-0.002	0.001
	(9.48)	(9.96)	(2.57)	(2.81)	(-0.53)	(0.16)
REG_t	-0.244***	-0.220***	-0.251***	-0.231***		
	(-7.69)	(-7.07)	(-3.64)	(-3.31)		
$NIND_t$	0.050***	0.055***	0.046***	0.049***	0.100***	0.105***
	(7.10)	(7.89)	(3.89)	(4.04)	(12.36)	(12.90)
$ROACORR_t$	-0.224***	-0.222***	-0.228***	-0.227***	-0.059***	-0.055***
	(-9.97)	(-9.91)	(-9.60)	(-9.49)	(-3.62)	(-3.38)
$HINDEX_t$	0.024***	0.018***	0.027**	0.022*	-0.017***	-0.016***
	(4.22)	(3.15)	(2.52)	(2.03)	(-2.80)	(-2.75)
Year dummies	Included	Included			Included	Included
Stock dummies					Included	Included
Intercept	3.910***	3.888***	4.614***	4.594***		
	(89.23)	(88.65)	(29.58)	(29.67)		
N	99,454	99,454	99,454	99,454	99,454	99,454
Adj. R^2 / R^2	0.666	0.665	0.617	0.616	0.768	0.767

Table 8
Trend Analysis: the Relation Between Institutional Ownership Concentration and Firm-specific Information Over Time

This table presents results for trend analyses of probability of informed trading from 1993 to 2010 (panel A) and stock price informativeness from 1980 to 2010 (panel B). The regression method is GMM. The t-statistics reported in parentheses are based on standard errors adjusted with the Newey-West (1987) corrected heteroskedasticity and autocorrelation of 4 lags. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel A. Dependent Variable: $\overline{PIN_{t+1}}$

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.356***	0.351***	0.207***	0.178***	0.126	0.141
	(41.83)	(42.10)	(5.66)	(3.93)	(1.20)	(1.44)
100 t	-0.126***	-0.020	-0.051**	-0.052**	-0.072***	-0.059*
	(-13.43)	(-0.51)	(-2.50)	(-2.52)	(-2.94)	(-1.96)
$\overline{IOR_t}$		-0.242***				
		(-2.82)				
$\overline{HHI_t}$			0.361***			
			(4.21)			
$\overline{LIOR_t}$				0.338***		
				(4.01)		
$\overline{TOP5_t}$					0.287**	
					(2.17)	
$\overline{BLK_t}$						0.232**
						(2.18)
N	72	72	72	72	72	72
Adj. R^2	0.791	0.830	0.853	0.851	0.820	0.815

Panel B. Dependent Variable: $\overline{SPI_{t+1}}$

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	2.477***	3.006***	5.179***	4.780***	-4.734***	-4.207***
	(18.40)	(21.71)	(6.24)	(3.98)	(-3.84)	(-2.86)
100 t	-0.749***	1.797***	-2.233***	-1.749***	0.168	0.878**
	(-3.96)	(3.14)	(-4.57)	(-3.32)	(0.84)	(1.99)
$\overline{IOR_t}$		-7.508***				
		(-4.69)				
$\overline{HHI_t}$			-6.155***			
			(-3.22)			
$\overline{LIOR_t}$				-4.286*		
				(-1.86)		
$\overline{TOP5_t}$					10.109***	
					(5.89)	
$\overline{BLK_t}$						7.835***
						(4.35)
N	124	123	123	123	123	123
Adj. R^2	0.315	0.519	0.442	0.383	0.583	0.467

Table 9
Panel Regression: The effect of institutional ownership concentration on firm-specific information after SOX

This table presents results for regressions of probability of informed trading (panel A) and stock price informativeness (panel B) on institutional ownership concentration with specification extended by adding a SOX indicator, *DSOX*, and a set of interaction terms between *DSOX* and institutional concentration variables.

The t-statistics reported in parentheses are based on standard errors adjusted for clustering at the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. All variables are as defined in Appendix A.

Panel A. Dependent Variable: PIN_{t+1}

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Test variables								
$D \times HHI_t$		0.003		0.004				
		(0.57)		(0.78)				
HHI_t	0.168***	0.167***	0.179***	0.177***				
	(12.36)	(12.30)	(13.13)	(13.07)				
HHI_t^2	-0.131***	-0.130***	-0.139***	-0.138***				
	(-10.80)	(-10.78)	(-11.49)	(-11.47)				
$D \times LIOR_t$						0.006		0.007
						(1.13)		(1.42)
$LIOR_t$					0.137***	0.134***	0.149***	0.145***
					(12.31)	(11.93)	(13.16)	(12.75)
$LIOR_t^2$					-0.093***	-0.093***	-0.102***	-0.100***
					(-9.15)	(-9.05)	(-9.90)	(-9.76)
IOR_t	-0.009***	-0.009***			-0.011***	-0.011***		
	(-3.02)	(-2.98)			(-3.69)	(-3.60)		
Control variables								
DSOX	-0.002*	-0.002*	-0.002**	-0.003***	-0.001	-0.003***	-0.002**	-0.004***
	(-1.63)	(-1.90)	(-2.28)	(-2.63)	(-1.39)	(-2.16)	(-2.16)	(-2.96)
$MKTCAP_t$	-0.028***	-0.028***	-0.028***	-0.028***	-0.029***	-0.029***	-0.029***	-0.029***
	(-38.17)	(-38.38)	(-39.49)	(-39.67)	(-41.63)	(-41.82)	(-43.99)	(-44.18)
$TURN_t$	-0.035***	-0.035***	-0.036***	-0.036***	-0.036***	-0.036***	-0.036***	-0.036***
	(-49.30)	(-47.99)	(-52.16)	(-50.40)	(-50.02)	(-48.63)	(-53.13)	(-51.24)
$SP500_t$	0.002	0.002	0.003	0.003	0.004**	0.004**	0.005***	0.005***
	(1.13)	(1.12)	(1.41)	(1.38)	(2.27)	(2.23)	(2.70)	(2.64)
$ANALYST_t$	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.005***	-0.005***
	(-6.25)	(-6.26)	(-6.71)	(-6.71)	(-6.53)	(-6.52)	(-7.04)	(-7.02)
$STDROA_t$	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***	-0.013***
	(-27.00)	(-26.96)	(-27.02)	(-26.98)	(-26.73)	(-26.72)	(-26.74)	(-26.73)
REG_t	-0.014***	-0.014***	-0.013***	-0.013***	-0.015***	-0.015***	-0.013***	-0.013***
	(-5.49)	(-5.49)	(-5.23)	(-5.23)	(-5.53)	(-5.51)	(-5.20)	(-5.19)
$NIND_t$	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(4.39)	(4.37)	(4.67)	(4.64)	(4.42)	(4.40)	(4.75)	(4.71)
$ROACORR_t$	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***
	(4.63)	(4.63)	(4.61)	(4.62)	(4.76)	(4.77)	(4.74)	(4.76)
$HINDEX_t$	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(-1.09)	(-1.09)	(-1.46)	(-1.45)	(-1.00)	(-0.99)	(-1.45)	(-1.41)
Intercept	0.282***	0.282***	0.278***	0.278***	0.282***	0.283***	0.276***	0.278***
	(45.85)	(46.29)	(45.16)	(45.79)	(46.79)	(47.18)	(45.18)	(45.83)
N	69,199	69,199	69,199	69,199	69,199	69,199	69,199	69,199
Adj. R^2	0.549	0.549	0.549	0.549	0.548	0.548	0.548	0.548

Table 9 (Cont'd)
Panel Regression: The effect of institutional ownership concentration on firm-specific information after SOX

Panel A. Dependent Variable: PIN_{t+1}								
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Test variables								
$D \times TOP5_t$		0.036***		0.034***				
		(8.22)		(7.97)				
$TOP5_t$	-0.455***	-0.476***	-0.449***	-0.466***				
	(-9.85)	(-10.37)	(-9.89)	(-10.34)				
$TOP5_t^2$	0.927***	0.933***	0.914***	0.912***				
	(10.95)	(11.08)	(11.03)	(11.07)				
$TOP5_t^3$	-0.474***	-0.472***	-0.467***	-0.461***				
	(-9.93)	(-9.94)	(-9.98)	(-9.89)				
$D \times BLK_t$						0.026***		0.024***
						(7.45)		(6.84)
BLK_t					-0.159***	-0.166***	-0.154***	-0.159***
					(-7.95)	(-8.33)	(-7.74)	(-8.05)
BLK_t^2					0.387***	0.372***	0.372***	0.356***
					(8.75)	(8.40)	(8.49)	(8.10)
BLK_t^3					-0.148***	-0.133***	-0.143***	-0.129***
					(-5.08)	(-4.57)	(-4.93)	(-4.42)
IOR_t	0.004	0.007**			0.012***	0.014***		
	(1.46)	(2.32)			(3.92)	(4.64)		
Control variables								
$DSOX$	-0.001	-0.023***	-0.001	-0.022***	-0.002**	-0.018***	-0.001	-0.016***
	(-1.35)	(-10.25)	(-1.10)	(-9.87)	(-1.93)	(-10.08)	(-1.12)	(-9.01)
$MKTCAP_t$	-0.026***	-0.026***	-0.026***	-0.025***	-0.022***	-0.022***	-0.022***	-0.022***
	(-40.32)	(-40.49)	(-40.62)	(-40.78)	(-25.63)	(-25.78)	(-25.61)	(-25.74)
$TURN_t$	-0.034***	-0.033***	-0.033***	-0.032***	-0.033***	-0.033***	-0.033***	-0.032***
	(-47.94)	(-44.97)	(-49.78)	(-46.07)	(-46.74)	(-44.25)	(-47.73)	(-44.74)
$SP500_t$	0.002	0.000	0.002	0.000	-0.002	-0.004**	-0.003*	-0.004**
	(1.20)	(0.23)	(1.09)	(0.09)	(-1.38)	(-2.16)	(-1.66)	(-2.43)
$ANALYST_t$	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(-3.65)	(-3.29)	(-3.45)	(-2.97)	(-4.14)	(-3.82)	(-3.56)	(-3.16)
$STDROA_t$	-0.012***	-0.012***	-0.012***	-0.012***	-0.013***	-0.013***	-0.013***	-0.013***
	(-25.42)	(-25.89)	(-25.42)	(-25.85)	(-28.58)	(-28.89)	(-28.56)	(-28.82)
REG_t	-0.009***	-0.009***	-0.010***	-0.010***	-0.009***	-0.009***	-0.011***	-0.010***
	(-3.91)	(-3.69)	(-4.14)	(-4.04)	(-3.70)	(-3.53)	(-4.24)	(-4.18)
$NIND_t$	0.003***	0.002***	0.002***	0.002***	0.003***	0.003***	0.003***	0.002***
	(4.37)	(4.12)	(4.25)	(3.93)	(4.27)	(4.07)	(3.98)	(3.74)
$ROACORR_t$	0.007***	0.008***	0.007***	0.008***	0.009***	0.009***	0.009***	0.009***
	(3.81)	(3.91)	(3.82)	(3.93)	(4.29)	(4.37)	(4.32)	(4.40)
$HINDEX_t$	-0.000	-0.000	-0.000	-0.000	-0.001	-0.000	-0.000	-0.000
	(-0.73)	(-0.49)	(-0.55)	(-0.20)	(-1.07)	(-0.88)	(-0.62)	(-0.37)
Intercept	0.328***	0.337***	0.330***	0.340***	0.237***	0.243***	0.244***	0.251***
	(32.42)	(33.73)	(32.30)	(33.79)	(27.37)	(28.55)	(29.14)	(30.58)
N	62,985	62,985	62,985	62,985	69,199	69,199	69,199	69,199
Adj. R^2	0.569	0.570	0.569	0.570	0.558	0.559	0.558	0.558

Table 9 (Cont'd)
Panel Regression: The effect of institutional ownership concentration on firm-specific information after SOX

Panel A. Dependent Variable: PIN_{t+1}				
	(17)	(18)	(19)	(20)
Test variables				
$D \times S\_to\_FF_t$		0.047***		0.048***
		(6.44)		(6.64)
$S\_to\_FF_t$	-0.373***	-0.375***	-0.403***	-0.404***
	(-8.87)	(-8.89)	(-9.49)	(-9.48)
$S\_to\_FF_t^2$	1.097***	1.046***	1.190***	1.135***
	(8.44)	(8.00)	(9.10)	(8.62)
$S\_to\_FF_t^3$	-0.811***	-0.759***	-0.889***	-0.833***
	(-6.72)	(-6.26)	(-7.34)	(-6.84)
IOR_t	-0.019***	-0.019***		
	(-5.95)	(-5.81)		
Control variables				
$DSOX$	-0.001	-0.017***	-0.002**	-0.018***
	(-0.89)	(-6.96)	(-2.01)	(-7.66)
$MKTCAP_t$	-0.029***	-0.029***	-0.030***	-0.030***
	(-46.78)	(-46.73)	(-54.02)	(-53.98)
$TURN_t$	-0.037***	-0.036***	-0.038***	-0.037***
	(-52.61)	(-52.01)	(-57.72)	(-56.84)
$SP500_t$	0.004**	0.004**	0.006***	0.005***
	(2.45)	(2.06)	(3.47)	(3.04)
$ANALYST_t$	-0.005***	-0.005***	-0.006***	-0.006***
	(-6.90)	(-6.73)	(-7.69)	(-7.49)
$STDROA_t$	-0.013***	-0.013***	-0.013***	-0.013***
	(-26.41)	(-26.62)	(-26.35)	(-26.58)
REG_t	-0.017***	-0.016***	-0.015***	-0.014***
	(-5.93)	(-5.89)	(-5.47)	(-5.44)
$NIND_t$	0.003***	0.003***	0.004***	0.003***
	(4.60)	(4.52)	(5.24)	(5.14)
$ROACORR_t$	0.010***	0.010***	0.010***	0.010***
	(4.72)	(4.80)	(4.70)	(4.79)
$HINDEX_t$	-0.001	-0.000	-0.001*	-0.001
	(-0.93)	(-0.78)	(-1.74)	(-1.56)
Intercept	0.342***	0.347***	0.341***	0.345***
	(67.79)	(68.50)	(67.76)	(68.49)
N	69,640	69,640	69,640	69,640
Adj. R^2	0.549	0.550	0.548	0.549

Table 9 (Cont'd)
Panel Regression: The effect of institutional ownership concentration on firm-specific information after SOX

Panel B. Dependent Variable: SPI_{t+1}								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Test variables								
$D \times HHI_t$		1.209***		1.228***				
		(27.95)		(28.82)				
HHI_t	2.266***	1.916***	2.435***	2.004***				
	(23.85)	(20.05)	(26.90)	(22.07)				
HHI_t^2	-2.309***	-2.140***	-2.440***	-2.210***				
	(-28.48)	(-26.62)	(-31.45)	(-28.85)				
$D \times LIOR_t$						1.104***		1.123***
						(26.22)		(27.04)
$LIOR_t$					2.465***	2.086***	2.620***	2.159***
					(25.94)	(21.81)	(28.87)	(23.63)
$LIOR_t^2$					-2.257***	-2.071***	-2.364***	-2.123***
					(-28.81)	(-26.75)	(-31.32)	(-28.49)
IOR_t	-0.175***	-0.098***			-0.170***	-0.089***		
	(-5.29)	(-2.96)			(-5.17)	(-2.69)		
Control variables								
$DSOX$	-0.342***	-0.577***	-0.356***	-0.588***	-0.338***	-0.671***	-0.352***	-0.683***
	(-28.70)	(-36.83)	(-30.68)	(-38.93)	(-28.45)	(-35.85)	(-30.32)	(-37.75)
$MKTCAP_t$	-0.372***	-0.378***	-0.378***	-0.381***	-0.376***	-0.382***	-0.383***	-0.386***
	(-69.22)	(-70.37)	(-74.85)	(-75.31)	(-72.09)	(-73.16)	(-79.09)	(-79.47)
$TURN_t$	-0.225***	-0.212***	-0.233***	-0.216***	-0.226***	-0.213***	-0.234***	-0.217***
	(-39.60)	(-37.75)	(-40.69)	(-38.16)	(-39.72)	(-37.73)	(-40.78)	(-38.05)
$SP500_t$	-0.193***	-0.207***	-0.186***	-0.203***	-0.169***	-0.187***	-0.161***	-0.182***
	(-7.53)	(-8.01)	(-7.32)	(-7.90)	(-6.56)	(-7.16)	(-6.27)	(-7.04)
$ANALYST_t$	-0.051***	-0.047***	-0.056***	-0.050***	-0.053***	-0.049***	-0.058***	-0.052***
	(-7.82)	(-7.26)	(-8.71)	(-7.77)	(-8.22)	(-7.61)	(-9.14)	(-8.10)
$STDROA_t$	0.047***	0.047***	0.047***	0.047***	0.048***	0.047***	0.048***	0.048***
	(11.32)	(11.63)	(11.41)	(11.68)	(11.35)	(11.54)	(11.44)	(11.59)
REG_t	-0.258***	-0.246***	-0.240***	-0.236***	-0.259***	-0.246***	-0.242***	-0.237***
	(-7.85)	(-7.49)	(-7.45)	(-7.29)	(-7.91)	(-7.51)	(-7.53)	(-7.34)
$NIND_t$	0.084***	0.080***	0.086***	0.082***	0.084***	0.080***	0.086***	0.082***
	(11.77)	(11.44)	(12.18)	(11.70)	(11.73)	(11.42)	(12.13)	(11.65)
$ROACORR_t$	-0.407***	-0.407***	-0.405***	-0.406***	-0.402***	-0.403***	-0.400***	-0.402***
	(-17.12)	(-17.16)	(-17.05)	(-17.12)	(-17.01)	(-17.03)	(-16.94)	(-16.99)
$HINDEX_t$	0.035***	0.036***	0.032***	0.035***	0.035***	0.037***	0.032***	0.035***
	(6.58)	(6.90)	(6.01)	(6.59)	(6.57)	(6.95)	(6.02)	(6.66)
Intercept	4.156***	4.251***	4.089***	4.216***	4.003***	4.130***	3.931***	4.095***
	(88.55)	(90.83)	(88.97)	(92.51)	(81.40)	(84.00)	(81.90)	(85.72)
N	100,091	100,091	100,091	100,091	100,091	100,091	100,091	100,091
Adj. R^2	0.593	0.598	0.593	0.598	0.593	0.598	0.593	0.598

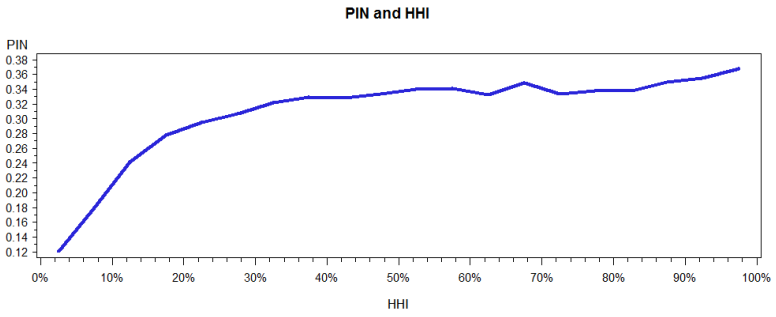
Table 9 (Cont'd)
Panel Regression: The effect of institutional ownership concentration on firm-specific information after SOX

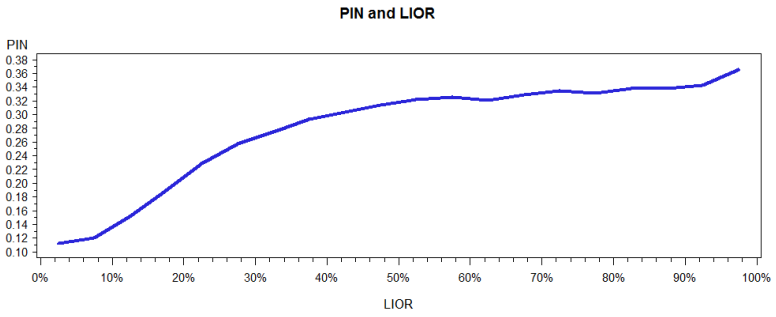
Panel B. Dependent Variable: SPI_{t+1}								
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Test variables								
$D \times TOP5_t$		0.764***		0.736***				
		(16.92)		(16.56)				
$TOP5_t$	-1.631***	-1.646***	-1.556***	-1.472**				
	(-2.72)	(-2.65)	(-2.59)	(-2.37)				
$TOP5_t^2$	5.649***	5.276***	5.479***	4.898***				
	(5.65)	(5.13)	(5.50)	(4.78)				
$TOP5_t^3$	-3.339***	-3.067***	-3.251***	-2.874***				
	(-6.41)	(-5.76)	(-6.27)	(-5.41)				
$D \times BLK_t$						0.722***		0.696***
						(18.44)		(17.96)
BLK_t					-2.079***	-1.917***	-2.052***	-1.858***
					(-7.16)	(-6.30)	(-7.04)	(-6.09)
BLK_t^2					7.215***	6.284***	7.144***	6.145***
					(13.36)	(11.32)	(13.21)	(11.05)
BLK_t^3					-4.289***	-3.600***	-4.264***	-3.564***
					(-14.14)	(-11.64)	(-14.03)	(-11.50)
IOR_t	0.052	0.122***			0.053	0.133***		
	(1.49)	(3.46)			(1.53)	(3.80)		
Control variables								
$DSOX$	-0.398***	-0.871***	-0.393***	-0.844***	-0.360***	-0.820***	-0.355***	-0.793***
	(-33.15)	(-27.57)	(-33.66)	(-27.50)	(-30.63)	(-28.66)	(-31.05)	(-28.40)
$MKTCAP_t$	-0.369***	-0.367***	-0.368***	-0.364***	-0.305***	-0.304***	-0.305***	-0.303***
	(-61.00)	(-59.88)	(-62.10)	(-60.84)	(-53.11)	(-52.68)	(-53.57)	(-53.05)
$TURN_t$	-0.235***	-0.218***	-0.232***	-0.213***	-0.202***	-0.187***	-0.200***	-0.183***
	(-37.73)	(-34.76)	(-37.35)	(-34.00)	(-36.52)	(-33.85)	(-36.23)	(-33.18)
$SP500_t$	-0.102***	-0.133***	-0.104***	-0.136***	-0.142***	-0.180***	-0.144***	-0.183***
	(-4.00)	(-5.12)	(-4.09)	(-5.24)	(-5.45)	(-6.73)	(-5.54)	(-6.85)
$ANALYST_t$	-0.024***	-0.021***	-0.023***	-0.018***	-0.034**	-0.029***	-0.032**	-0.026***
	(-3.91)	(-3.27)	(-3.74)	(-2.87)	(-5.37)	(-4.48)	(-5.18)	(-4.04)
$STDROA_t$	0.060***	0.057***	0.060***	0.057***	0.043***	0.042***	0.043***	0.042***
	(13.58)	(13.13)	(13.54)	(13.06)	(10.54)	(10.53)	(10.51)	(10.45)
REG_t	-0.225***	-0.210***	-0.231***	-0.244***	-0.209***	-0.195***	-0.215***	-0.209***
	(-7.04)	(-6.52)	(-7.31)	(-7.02)	(-6.75)	(-6.23)	(-7.01)	(-6.74)
$NIND_t$	0.085***	0.082***	0.085***	0.081***	0.080***	0.076***	0.079***	0.075***
	(11.28)	(10.90)	(11.25)	(10.75)	(11.37)	(10.94)	(11.33)	(10.76)
$ROACORR_t$	-0.419***	-0.417***	-0.419***	-0.419***	-0.392***	-0.391***	-0.392***	-0.393***
	(-16.96)	(-16.81)	(-16.97)	(-16.85)	(-16.63)	(-16.54)	(-16.64)	(-16.58)
$HINDEX_t$	0.041***	0.044***	0.042***	0.046***	0.036***	0.039***	0.037***	0.041***
	(7.41)	(8.00)	(7.56)	(8.34)	(6.88)	(7.55)	(7.02)	(7.89)
Intercept	4.019***	4.079***	4.036***	4.115***	3.494***	3.567***	3.521***	3.631***
	(31.74)	(30.97)	(32.01)	(31.33)	(48.76)	(48.05)	(51.17)	(50.76)
N	88,040	88,040	88,040	88,040	100,091	100,091	100,091	100,091
Adj. R^2	0.591	0.593	0.591	0.593	0.600	0.603	0.600	0.603

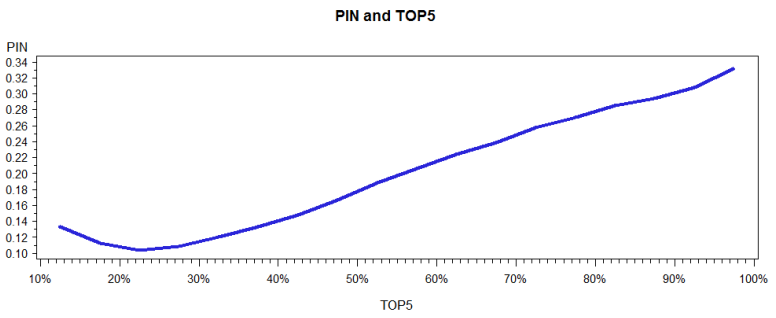
Table 9 (Cont'd)
Panel Regression: The effect of institutional ownership concentration on firm-specific information after SOX

Panel B. Dependent Variable: SPI_{t+1}				
	(17)	(18)	(19)	(20)
Test variables				
$D \times S\_to\_FF_t$		0.140**		0.164**
		(1.93)		(2.26)
$S\_to\_FF_t$	-0.625***	-0.607***	-0.968***	-0.945***
	(-2.62)	(-2.54)	(-4.04)	(-3.92)
$S\_to\_FF_t^2$	5.341***	5.171***	6.455***	6.247***
	(6.55)	(6.31)	(7.88)	(7.58)
$S\_to\_FF_t^3$	-5.002***	-4.835***	-5.926***	-5.724***
	(-6.24)	(-6.01)	(-7.37)	(-7.09)
IOR_t	-0.270***	-0.268***		
	(-8.47)	(-8.42)		
Control variables				
$DSOX$	-0.328***	-0.376***	-0.349***	-0.405***
	(-27.48)	(-13.58)	(-29.93)	(-14.60)
$MKTCAP_t$	-0.377***	-0.377***	-0.391***	-0.391***
	(-75.88)	(-75.77)	(-90.70)	(-90.45)
$TURN_t$	-0.239***	-0.239***	-0.254***	-0.253***
	(-42.84)	(-42.64)	(-45.73)	(-45.42)
$SP500_t$	-0.150***	-0.152***	-0.134***	-0.136***
	(-5.78)	(-5.85)	(-5.22)	(-5.31)
$ANALYST_t$	-0.060**	-0.060***	-0.071**	-0.071***
	(-9.35)	(-9.29)	(-11.10)	(-11.02)
$STDROA_t$	0.052***	0.052***	0.054***	0.053***
	(12.42)	(12.39)	(12.79)	(12.75)
REG_t	-0.284***	-0.284***	-0.261***	-0.260***
	(-8.77)	(-8.75)	(-8.21)	(-8.19)
$NIND_t$	0.086***	0.086***	0.091***	0.091***
	(12.32)	(12.30)	(13.08)	(13.05)
$ROACORR_t$	-0.406***	-0.406***	-0.404***	-0.403***
	(-17.22)	(-17.20)	(-17.14)	(-17.11)
$HINDEX_t$	0.034***	0.035***	0.029***	0.030***
	(6.45)	(6.51)	(5.48)	(5.55)
Intercept	4.261***	4.268***	4.236***	4.245***
	(102.52)	(102.76)	(102.06)	(102.33)
N	100,916	100,916	100,916	100,916
Adj. R^2	0.594	0.594	0.593	0.593

Figure 1
The relation between institutional ownership concentration and probability of informed trading







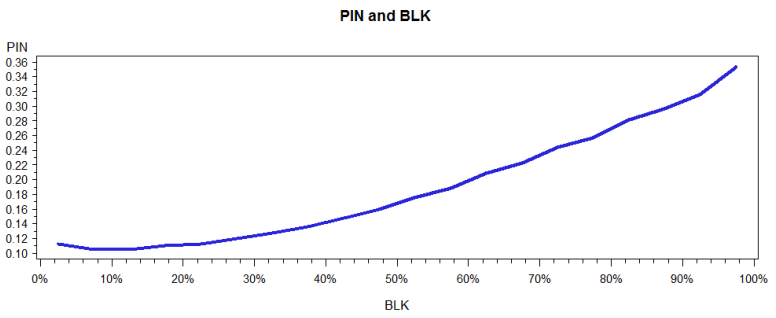
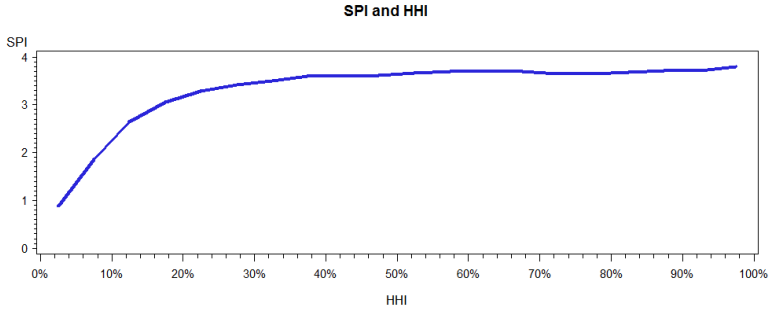
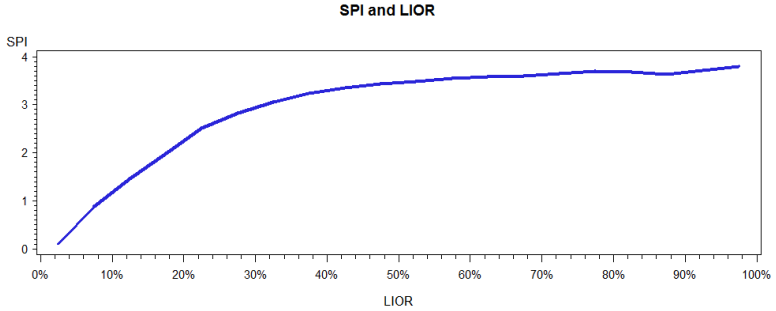
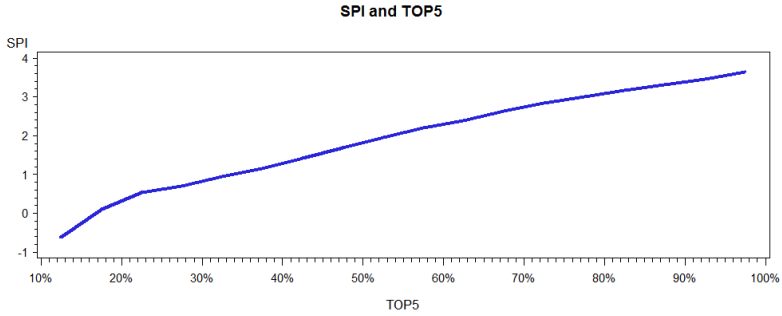


Figure 2
The relation between institutional ownership concentration and stock price informativeness







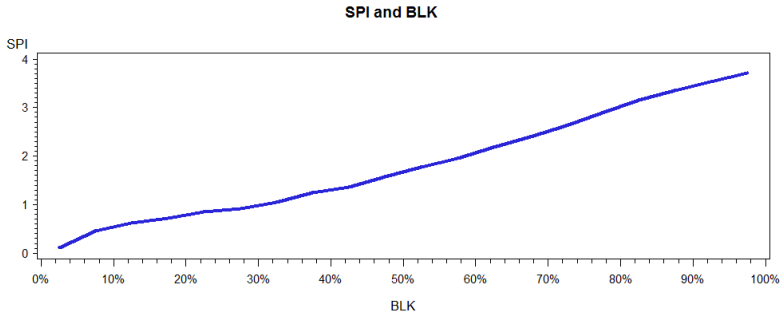
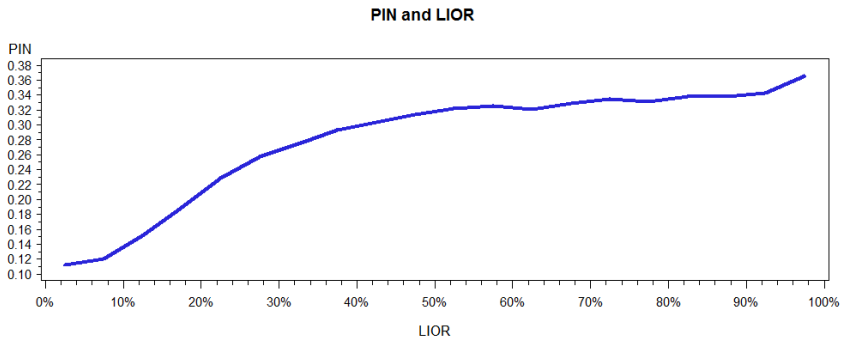
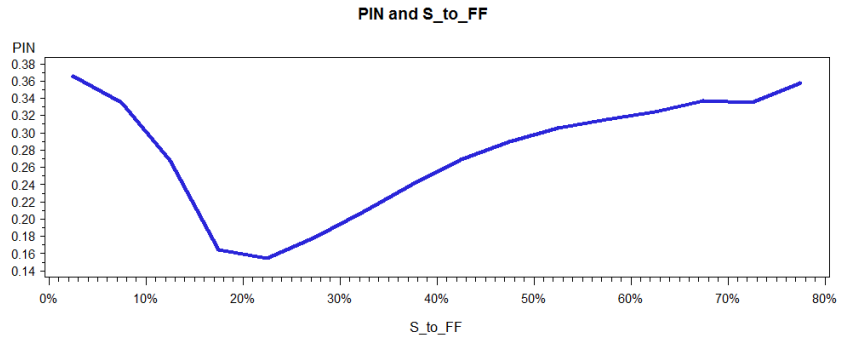


Figure 3

The five largest institutional owners and probability of informed trading





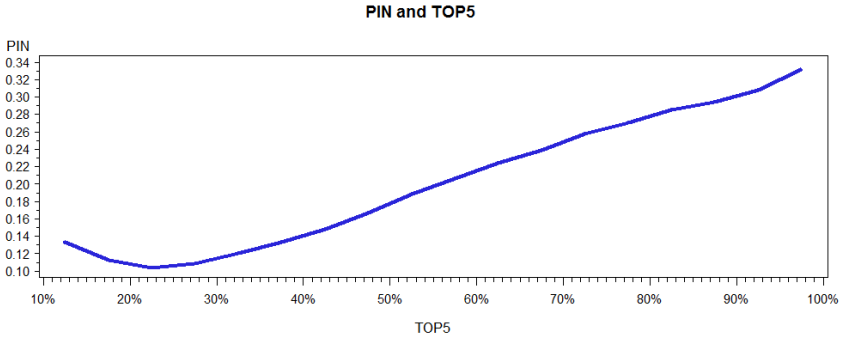
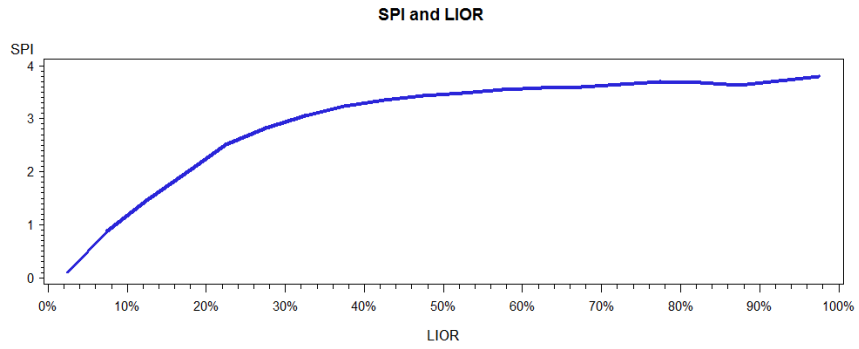
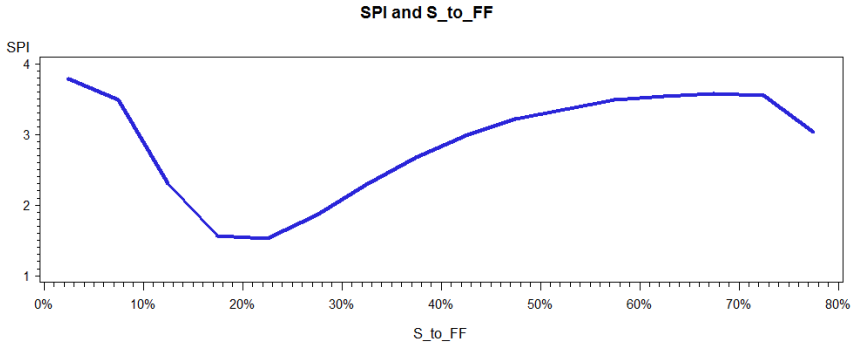


Figure 4

The five largest institutional owners and stock price informativeness





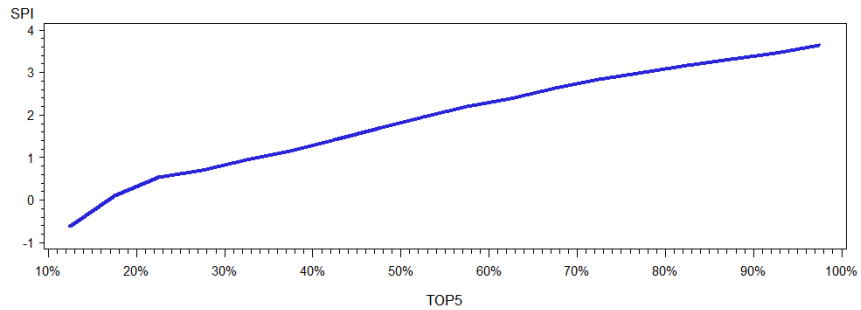
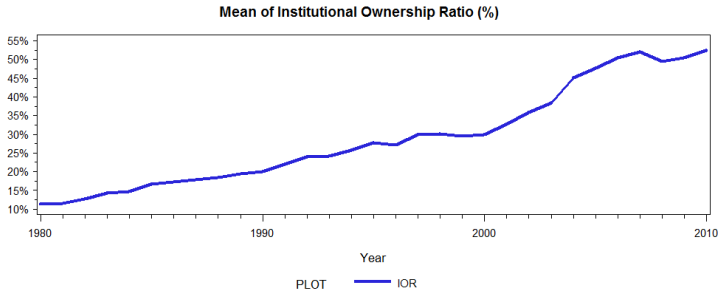


Figure 5
Time-series of institutional ownership and concentration levels



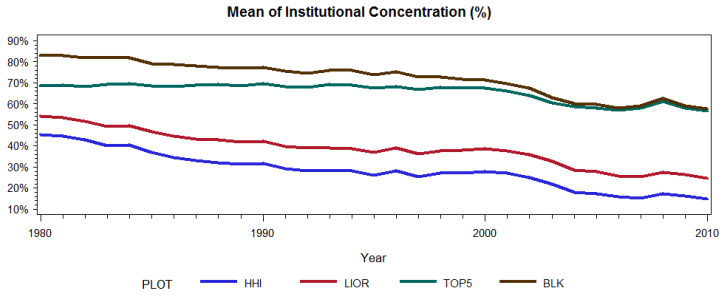
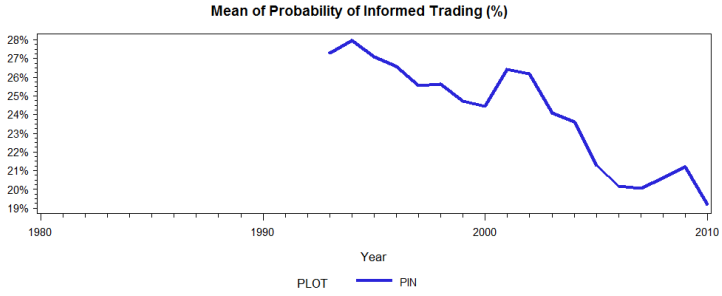
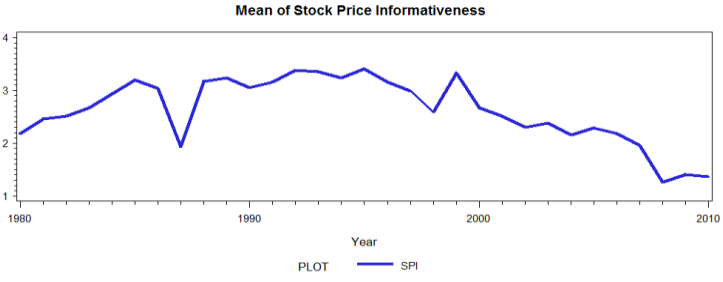


Figure 6
Time-series of firm-specific information





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