The Hong Kong Polytechnic University
School of Accounting and Finance

Essays on Stock Return Comovement and Corporate Investment

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

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Certificate of Originality

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(Signed)

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"**Essays on Stock Return Comovement and Corporate Investment"**

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Abstract

This thesis contains three separate essays related to stock return comovement and corporate investment. The first essay examines the role of corporate insiders' incentives in affecting stock return comovement and tests the empirical implications of Jin and Myers (2006) ["R^2 around the World: New Theory and New Tests," Journal of Financial Economics 79, 257-292]: Corporate insiders capture a firm's cash flow beyond outside investors' expectation by withholding good news and end up absorbing more firm-specific risk, thereby increasing stock return comovement. Using a total of 2,016 firms from 21 countries in East Asia and Western Europe, I show that the wedge between voting rights and cash flow rights is an important factor influencing the price formation process in which firm-specific good or bad news is *differentially* incorporated into stock price. Stock returns for high-wedge firms comove less with the market than for low-wedge firms, and control-ownership wedge is significantly and negatively related to the likelihood of positive return jumps but insignificantly related to crash risk. In addition, absolute abnormal returns cumulated over three- and five-day earnings announcement windows increase significantly with the wedge for the good-news subsample but not for the bad-news one. Overall, my evidence supports Jin and Myers (2006) intuition that corporate

insiders tend to withhold good news and their incentives for Private control benefits contribute to stock return comovement.

The second essay examines the role of institutional investors in influencing stock return comovement and tests the empirical implications of Veldkamp (2006) ["Information Markets and the Comovement of Asset Prices," Review of Economic Studies 73, 823-845] information-driven comovement theory. In presence of complementarities in information demand and high fixed costs for information production, investors rely on high-demand low-cost aggregate information and their information choices induce excess stock return comovement. Using institutional ownership (for 7,859 non-U.S. firms from 43 countries) as a proxy for the ability to produce firm-specific information, I find that different types of institutional investors affect stock return comovement differently. In particular, foreign (especially U.S.) institutional investors with high stakeholdings or with frequent trading are more effective in reducing stock return comovement. The evidence on the U.S. institutional investors is consistent with Albuquerque, Bauer and Schneider (2009) notion of global private information. Overall, my findings suggest that characteristics of information markets and information choices by investors contribute to stock return comovement, and institutional investors play an important role in enhancing stock price informativeness.

The third essay examines the role of corporate insiders' incentives for private control benefits in affecting investment sensitivity to stock price. While prior studies (e.g., Chen, Goldstein and Jiang, 2007) find that stock price informativeness improves firms' learning from the stock market, I offer an alternative agency-cost

based explanation for investment sensitivity to stock price. Using a total of 2,861 firms from 22 countries in East Asia and Western Europe, I document a strong negative association between control-ownership wedge and investment sensitivity to stock price, suggesting that controlling shareholders' incentives for private control benefits reduce their propensity to listen to the market. By examining additional factors known to affect the intensity of agency problem, I provide further evidence that control-ownership wedge is an important factor that determines the extent to which corporate investment decisions follow stock prices. In addition, the negative relation between the wedge and investment sensitivity to stock price is concentrated in firms with high stock price informativeness and the wedge reduces the contribution of investment to firm valuation. Overall, my evidence suggests that conflicts between controlling and minority shareholders weaken the importance of the stock market in capital allocation.

Keywords: Ownership Structure, Agency Problem, Institutional Investors, Information markets, Stock Return Comovement, Investment Sensitivity to Stock Price

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Chapter 1

Overview

1.1. Introduction

My thesis consists of three essays that address two related themes on stock return comovement (stock price informativeness) and the role of stock price in guiding corporate investment. In this chapter, I briefly discuss the motivations, research questions, research design and main findings for the three essays. While I leave detailed discussion in each of the following chapters, I aim to provide an overview of my thesis with an emphasis on the research questions.

The first two essays explore stock return comovement from two perspectives: Essay one (Chapter 2) focuses on insiders' incentives for private control benefits, whereas essay two (Chapter 3) focuses on outside investors' information choices. Both essays attempt to shed lights on the determinants of stock return comovement. Essay three (Chapter 4) explores how informative stock prices help capital allocation in the presence of agency problems of concentrated control.

In a nutshell, essay one investigates the role of corporate insiders' asymmetric disclosure incentives in affecting stock return comovement and tests the empirical implications of Jin and Myers (2006). Essay two examines the role of institutional investors in influencing stock return comovement and tests the empirical implications of Veldkamp (2006) information-induced comovement

theory. Essay three examines the role of corporate insiders' incentives for private control benefits in affecting investment sensitivity to stock price.

1.2. Motivations and research questions

Essay one is motivated by the recent development in the studies on stock return comovement: In contrast to Morck, Yeung and Yu (2000) who focus on the trading of informed risk arbitrageurs, Jin and Myers (2006) propose an alternative explanation for stock return comovement by focusing on corporate insiders' incentives for private control benefits. Although Hutton, Marcus and Tehranian (2009) and Haggard, Martin and Pereira (2008) have attempted to test Jin and Myers model by establishing the link between opaqueness and stock return synchronicity, they have not addressed Jin and Myers' intuition properly, because at the heart of Jin and Myers' argument are corporate insiders' incentives for private control benefits. I intend to fill the gap by testing the distinctive features of Jin and Myers model.

Thus, the research questions for the first essay are as follows: Do insiders' incentives for private control benefits (proxied by control-ownership wedge) affect stock price informativeness? Do insiders of high-wedge firms have more incentives to withhold good news? Do outside investors react more to the announcements of good news for high-wedge firms?

Essay two is motivated by the following literature: Veldkamp (2006) models information choices in a competitive information markets and provides a rich set of predictions on stock return comovement. In particular, complementarities in information demand imply that investors can economize on the cost of information

production by using common/aggregate information such as industry- or market-wide information. The high fixed cost for information production is a hurdle for investors to produce low-demand firm-specific information. Although Hameed, Morck, Shen and Yeung (2008) offers a test of Veldkamp (2006), they focus on the role of analysts rather than investors. Given that Veldkamp's theoretical framework focuses on investors' information choices, it is more desirable to investigate investors themselves. Thus, different types of institutional investors in the competitive information markets would offer a good setting for testing Veldkamp (2006) information-induced comovement theory. The detailed institutional ownership data also improves upon prior studies (e.g., Piotroski and Roulstone, 2004) that use aggregate institutional ownership and find mixed results on the informational role of institutional investors.

Thus, the research questions for the second essay are as follows: Do investors' information choices (based on their ability to overcome the fixed costs for information production) drive stock return comovement? In particular, do foreign institutional investors contribute more to the impounding of firm-specific information into stock prices than domestic institutional investors? Does the size of stakeholding of institutional investors matter for stock return comovement? Does the Trading frequency of institutional investors matter?

Essay three is motivated by a lack of studies into the agency-based explanation for investment sensitivity to stock price. While information asymmetry and agency costs are two important considerations for determining the efficiency of capital allocation, the information-based perspective on the link between stock

prices and investment (the *learning* hypothesis) has been established for the U.S. market (e.g., Chen, Goldstein and Jiang, 2007), the role of stock market in resource allocation has not been sufficiently addressed from an agency-based perspective.[1] Since numerous studies have established that corporate insiders pursue sub-optimal investments in order to extract private control benefits, it is worthwhile to investigate the role of stock market in guiding corporate investments in presence of agency problems.

Thus, the research questions for the third essay are as follows: Do insiders' incentives for private control benefits reduce investment sensitivity to stock price? In another word, even if stock price is informative about growth opportunities, will firms with agency problems follow the stock market in making the right capital allocation?

1.3. Research design and main findings

In the first essay, I take advantage of the unique ultimate ownership and control data to proxy for insiders' incentives for private control benefits and to examine their impact on the characteristics of return distribution. Thus, I focus on the contrast between two perspectives: the "trading of informed risk arbitrageurs" perspective (Morck, Yeung and Yu, 2000) implies that the impact of informed traders would be symmetric towards both good and bad news,[2] whereas the "insiders withholding good news" perspective of Jin and Myers (2006) implies an *asymmetri*c

[1] The agency-based explanation for the learning from the stock market has not been addressed with an exception of Kau, Linck and Rubin (2008) in the context of M&As.
[2] If short-sales constraints are considered, there would be even a delay in the impounding of bad firm-specific information into stock price, under the informed risk arbitrageurs perspective.

disclosure incentive to withhold good news. Specifically, Jin and Myers (2006) argue that insiders capture a firm's cash flow when it exceeds outside investors' expectations and absorb more bad news.

The main findings of the first essay are as follows. I find that control-ownership wedge is positively related to stock return comovement, suggesting that insiders with greater incentives for private control benefits tend to make stock price less informative. I observe that high-wedge firms exhibit a lower likelihood of positive jump risk, confirming that insiders with greater incentives for private control benefits would capture more positive unexpected cash flows. I also find that market reacts to positive earnings surprises more strongly than to negative earnings surprises, suggesting that good news is more credible and informative, and is more likely to be withheld than bad news. Overall, my evidence supports Jin and Myers (2006) intuition.

In the second essay, I take advantage of detailed institutional ownership data in the international markets from *Thomson Financial* and examine the empirical implications of Veldkamp (2006). Whether institutional investors choose to produce firm-specific information depends on their ability to bear the high fixed costs for information production. Institutional ownership provides a unique opportunity to test the implications of Veldkamp's information-driven comovement theory. Thus, I examine the following aspects of institutional ownership: (1) Domicile of institutional investors; (2) Size of institutional investors' stakeholdings; and (3) Trading frequency of institutional investors.

The main findings of the second essay are as follows. I find a positive relation between foreign institutional holdings and stock price informativeness. In particular, U.S. institutional holdings have a stronger result, confirming the notion of global private information of Albuquerque, Bauer and Schneider (2009). I also find that the fraction of institutional ownership with large stakeholdings or frequent trading is positively related to stock price informativeness. Overall, Veldkamp's (2006) information-induced comovement theory is proven to be useful in explaining the role institutional investors' impact on stock return comovement.

In the third essay, I take advantage of control-ownership wedge data. Similar to the first essay, the control-ownership wedge is used to proxy for insiders' incentives for private control benefits. Thus, the wedge represents both motives and capabilities of corporate insiders in pursuing their own agenda. Even if stock prices are informative about growth opportunities, corporate insiders of high-wedge firms may not follow the signals conveyed by stock prices in making investment decisions.

The main findings of the third essay are as follows. I find that investment sensitivity to stock price is weakened by the wedge, confirming that agency-costs of concentrated control reduce the learning from the stock market. Using factors known to capture the extent of wedge-related agency problems, I find that firms with low dividends, or high cash holdings, or high R&D intensity tend to have lower investment sensitivity to stock price. This further confirms my main finding. In addition, the negative relation between the wedge and investment sensitivity to stock price is concentrated in firms with high stock price informativeness and the wedge reduces the contribution of investment to firm valuation. Thus, agency-cost based

explanation goes beyond the information-based explanation for investment sensitivity to stock price. Overall, stock market would play a less important role in capital allocation when the conflict between majority and minority shareholders is severe.

1.4. Organization of the thesis

The remainder of the thesis is organized as follows. Chapter two presents the first essay on the role of corporate insiders' incentives in affecting stock return comovement. Chapter three includes the second essay on the role of institutional investors in influencing stock return comovement. Chapter four contains the third essay on the role of agency problems of concentrated control in determining investment sensitivity to stock price. Chapter five offers concluding remarks.

Chapter 2

Control-Ownership Wedge, Asymmetric Disclosure Incentives and Stock Return Comovement: International Evidence

"The firm is partly opaque. If good (bad) news arrives that investors cannot see, inside managers capture more (less) cash flows than if the firms were completely transparent." (Jin and Myers 2006; p.262)

2.1. Introduction

This chapter investigates the firm-level relation between corporate ownership structure and firm-specific information flows in the market, using cross-country data from East Asian and Western European capital markets. Specifically, my analysis focuses on whether and how a particular aspect of ownership structure, namely, the wedge between voting rights (control) and cash flow rights (ownership), influences the firm's return distribution, as reflected in firm-specific return variations and likelihoods of positive and negative jumps of firm-specific return.

A growing body of research has investigated cross-country and cross-sectional determinants of firm-specific information flows in the market. For example, Morck, Yeung and Yu (2000) and Fernandes and Ferreira (2009) provide country-level evidence that strong property rights protection and the enforcement of insider trading laws, respectively, encourage informed risk arbitrage, which in turn facilitates the incorporation of firm-specific information into stock prices. Fernandes and Ferreira (2008), Ferreira and Laux (2007), and Hutton, Marcus and Tehranian (2009) document firm-level evidence that higher-quality disclosures resulting from cross-listing on the U.S. organized exchanges, openness to takeover threats, and

reporting transparency, respectively, facilitate the flow of firm-specific information to the market, thereby leading to greater firm-specific return variation or more informative stock prices. However, these studies have paid little attention to the role of ownership structure in facilitating or deterring firm-specific information inflows into the market, although the ownership structure is known to be a crucial factor influencing insiders' incentives to withhold or selectively disclose firm-specific information for their private control benefits (e.g., Fan and Wong, 2002; Lang, Lins and Miller, 2004; Haw, Hu, Hwang and Wu, 2004; and Kim and Yi, 2006).

To fill this void, my analyses first focus on the role of the control-ownership wedge and the associated disclosure incentives in facilitating the flow of firm-specific information to the market in an international context. The control-ownership wedge is not only prevalent, but it is also a major source of agency problems, in most non-U.S. countries around the world (Shleifer and Vishny, 1997; La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1999). In particular, in East Asia and Western Europe, a relatively small number of controlling shareholders such as members of founding families typically exercise nearly full control over many large public firms within a business group via complicated ownership structures (e.g., multiple-class shares, ownership pyramids and cross shareholdings), albeit they possess relatively low cash flow rights (e.g., Claessens, Djankov and Lang, 2000; Faccio and Lang, 2002; Joh, 2003; and Kim and Yi, 2006).

Control rights in excess of ownership rights create the conflicts of interest between controlling shareholders and outside minority shareholders, and provide the former with incentives, abilities, opportunities, and means to divert firm resources

for their private gains at the expense of the latter (e.g., La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1999; Johnson, La Porta, Lopez-De-Silanes and Shleifer, 2000; Bertland, Mehta and Mullainathan, 2002; Haw, Hu, Hwang and Wu, 2004; and Kim and Yi, 2006). As the wedge widens, expected private control benefits increase and the associated costs decrease (Fan and Wong, 2002). As a result, controlling shareholders of high-wedge firms are more inclined to extract private control benefits than those of low-wedge firms, thereby leading to a positive relation between the wedge and the magnitude of private control benefits.

As noted by Jin and Myers (JM: 2006), corporate insiders can capture more cash flow when the firm's underlying cash flow is greater than the level perceived by outside stakeholders. JM theorize that insiders are motivated to manage outsiders' expectation downward by adopting opaque disclosure policies. They provide supporting evidence using cross-country data. In this study, my analysis goes beyond JM's analyses. I maintain that, all else being equal, high-wedge firms, who are more prone to extract private control benefits and thus have higher stakes at outsiders' expectation on firm performance, have stronger incentives to withhold good news than low-wedge firms to manage outsiders' expectation downward.

Under this maintained hypothesis, my first objective is to investigate whether and how the control-ownership wedge, as a proxy for this asymmetric disclosure incentives, influences the amount of firm-specific information incorporated into stock prices. The wedge-induced disclosure opacity causes outside investors to rely less on (opaque) firm-specific information when making their trading decisions, while it causes them to rely more on common (industry- and/or market-wide)

information. As a result, firm-specific return variation is lower, and common return variation is higher, for high-wedge firms than for low-wedge firms. I therefore predict that as the wedge increases, firm-specific return variation relative to common return variation decreases, or equivalently, stock prices become less informative.

Second, I further examine whether and how the wedge-related asymmetric disclosure incentives influence the frequency of extremely high return outliers, as reflected in the likelihoods of positive jumps in firm-specific returns. Given that high-wedge firms have greater incentives for capturing positive unexpected cash flows than low-wedge firms and that information hoarding (or opportunistic disclosure timing) is, in general, related to jump risks of firm-specific returns (JM; Hutton, Marcus and Tehranian, 2009), it is interesting to examine the impact of the wedge on the likelihood of observing positive jumps in firm-specific returns. As high-wedge firms have a higher stake at downward-managing outsiders' cash-flow expectation and eventually capturing positive unexpected cash flows than low-wedge firms, good news of high-wedge firms are less likely to be revealed to outside investors than that of low-wedge firms. This leads us to predict that high-wedge firms experience positive return jumps less frequently than low-wedge firms.

Third, I also examine whether and how the wedge has an impact on negative jump risks of firm-specific returns. Given that high-wedge firms have greater incentives to downward-manage outsiders' cash-flow expectation than low-wedge firms, high-wedge firms are more likely to accelerate the release of bad news to outside investors, compared with low-wedge firms. This means that high-wedge firms are less likely to accumulate bad new news within a firm beyond a tipping

point than low-wedge firms, and thus, that the former experience a lower likelihood of negative return jumps or stock price crashes, compared with the latter. This leads to the prediction that as the wedge increases, the negative jump risk or crash risk decreases.[3] On the other hand, the ability of high-wedge firms to convey bad news to outside investors in a credible and timely manner is severely constrained because outside investors anticipate insiders' incentives to accelerate the release of bad news, and thus, discount the credibility of bad news and the associated return implication. As a result, high-wedge firms could end up stockpiling bad news within a firm, to a greater extent, than low-wedge firms. One may therefore argue that high-wedge firms experience a higher likelihood of negative return jumps or stock price crashes, compared with low-wedge firms. This leads to the prediction that as the wedge increases, the negative jump risk or crash risk also increases. Given the two opposing predictions, it is an empirical question whether and how the wedge-related incentive for releasing bad news would impact the likelihood of negative return jumps. I aim to provide systematic evidence on this unresolved issue.

Finally, I investigate whether the market reaction to good earnings news differs systematically from that to bad earnings news. Given the wedge-induced incentive for withholding good news, good earnings news, once announced, generates a greater surprise, and thus triggers a larger reaction at the time of announcement, for high-wedge firms than it does for low-wedge firms. I therefore predict that as the wedge increases, the market reaction to good earnings news increases. On the other hand, as explained earlier, while high-wedge firms have

[3] The JM theory suggests that the accelerated release of bad news causes a shift in (bad news-related) negative jump risk from insiders to outside investors, and outsiders are forced to absorb this risk, which in turn decreases a negative jump risk of firm-specific returns.

stronger incentive to accelerate the release of bad news than low-wedge firms to downward-manage outsiders' cash flow expectation, bad news is difficult to convey to outside investors in a credible and timely manner: To the extent that outside investors correctly anticipate insiders' incentives for an accelerated release of bad news, one can predict that the wedge-related effect on short-window market reaction to bad earnings news is weaker than the same effect associated with good earnings news.

To test my predictions mentioned above, I construct a sample of 2,016 non-U.S. firms with ultimate ownership data in the single year 1996 from 21 countries in East Asia and Western Europe. Briefly, my results show the following. First, consistent with my prediction, I find that stock prices are less informative for high-wedge firms than low-wedge firms in the sense that relative amount of firm-specific information incorporated into stock returns is lower for high-wedge firms than for low-wedge firms. This finding suggests that control-ownership wedge is a significant force that impedes the flow of firm-specific information to outside investors.

Second, I find that the wedge is significantly and negatively related to the likelihood of *positive* return jumps. This supports the view that high-wedge firms tend to capture the firm's positive unexpected cash flows (beyond outside investors' expectations) to a greater extent than low-wedge firms, thereby leading me to observe a negative relation between the wedge and the likelihood of positive jumps. I find, however, that the relation between the wedge and *negative* jump risk is insignificant.

Third, using a short-window event study approach, I find that absolute abnormal returns cumulated over the three-day and five-day announcement windows increase significantly with the wedge for the subsample of firms with good earnings news, but insignificant for the subsample of firms with bad earnings news. This is consistent with my earlier finding on a significantly negative relation between the wedge and positive jump risk, but an insignificant relation between the wedge and negative jump risk.

Finally, I also provide evidence that the inverse relation between the wedge and price informativeness becomes weakened as the percentage of shares held by large-stake institutional investors increases. This evidence suggests that the wedge-induced, asymmetric disclosure incentives are constrained when external monitoring by institutional investors is effective.

My study contributes to extant literature in the following ways. To my knowledge, this is the first study to provide systematic evidence on an inverse relation between control-ownership wedge and the amount of firm-specific information incorporated into stock prices. The wedge data provide a unique setting in which to investigate whether insiders' incentives for extracting private control benefits is the underlying determinant of firm-specific information flows in the market. My results show that wedge-induced incentives for private control benefits and the associated disclosure incentives are significant determinants of the amount of firm-specific information incorporated in stock prices, even after controlling for all other factors that are known to affect the firm's information environment.

My findings suggest that, for firms with high wedge (and thus high agency costs), the dominant controlling shareholder tends to withhold (or selectively disclose) good news. My evidence is in line with the JM view that controlling shareholders attempt to downward-manage outsiders' expectation on firm performance so that she can extract private control benefits without attracting much attention from outside stakeholders. My evidence is consistent with the finding of Aboody and Kasznik (2000) that managers tend to withhold good news and release bad news at the time when they are awarded stock option contracts.[4] My results suggest that the wedge-induced asymmetric disclosure incentives with respect to the release or withholding of good versus bad news differentially influence the timing of the firm-specific information revelation to the market, which in turn affect firm-specific return variables and likelihoods of stock return jump risks. Given the scarcity of evidence on the issue, my evidence helps better understand a possible channel through which the agency problems associated with the ownership structure influences corporate disclosure policies and the price formation process in which favorable or unfavorable information is differently incorporated into stock returns.

Finally, my study also contributes to earning announcement studies. I provide new evidence that the wedge-induced disclosure opaqueness is a key factor determining the information content of public disclosures: the wedge-induced disclosure incentive plays an important role in determining the differential timing of revealing good versus bad news to the market in general and the information content of annual earnings announcement in particular.

[4] However, our evidence is in sharp contrast with extant evidence that a variety of factors, including career concerns, compensation contracts, and empire building, motivate managers to withhold bad news and to accelerate the release of good news (e.g., Kothari, Shu and Wysocki, 2009).

The essay proceeds as follows: In the next section, I review the literature that are related to the tenor of this study, and develop research hypotheses. Section 3 describes measurements of key variables. Section 4 explains the data and descriptive statistics. Section 5 presents results of hypothesis tests. Section 6 conducts further analysis. The final section concludes the essay.

2.2. Background and hypotheses

2.2.1. Control-ownership wedge and firm-specific information flows

As mentioned earlier, control-ownership wedge is a common characteristic of corporate ownership structure in most non-U.S. countries around the world, and it is a major source of agency problems (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1999; Claessens, Djankov and Lang, 2000; Faccio and Lang, 2002; and Lins, 2003). The wedge allows controlling shareholders to exercise nearly full control over major corporate decisions, including disclosure policies, while maintaining low cash flow rights relative to voting rights. This creates incentives and opportunities for controlling shareholders to extract private control benefits or to 'tunnel' corporate resources for their private gains, because in the presence of wedge, expected control benefits are likely to be greater than the associated costs (e.g., Johnson, La Porta, Lopez-De-Silanes and Shleifer, 2000; Fan and Wong, 2002). Further, concentrated control power allows them to be less subject to external disciplinary forces such as the market for corporate control, which in turn facilitates controlling shareholders being entrenched.

To mask their rent-seeking behaviors, controlling shareholders are motivated to adopt opaque (less transparent) disclosure policies by withholding value-relevant, firm-specific information from outside investors or opportunistically timing its release to the market. There is another reason why entrenched controlling shareholders prefer to control firm-specific information flows: insofar as control power is concentrated with controlling shareholders with specialized knowledge, expertise or skill, they have incentives to protect their human capital by adopting selective disclosures or controlling the flow of their proprietary information to outside stakeholders such as analysts and minority shareholders (Fan and Wong, 2002). In short, the wedge-induced disclosure opacity deters firm-specific information flows to outside investors.

In a different context, the Veldkamp (2006) model of information markets also implies that the wedge could lead to a decrease in firm-specific information flows to the market. In her model, price co-movement is driven by the characteristics of information markets: Facing the high fixed costs for acquiring firm-specific information, investors rely more on common information. Common information is cheaper to acquire than firm-specific information, because it typically has a higher demand or a broader user base in the information markets.[5] Firm-specific (common) information is more (less) subject to opportunistic manipulation and thus is less (more) reliable. Also, firm returns driven by common factors are not as easy for controlling shareholders to hide and appropriate as those driven by firm-specific factors. Further, insiders of high-wedge firms may have greater incentives to make it

[5] In Veldkamp's model, information production involves a large amount of fixed cost with a low marginal cost, and high-demand information has a lower per unit cost of production and thus is available to information users at a lower cost, compared with low-demand information.

costly for outside investors to acquire firm-specific information, compared with those of low-wedge firms. The wedge-induced disclosure incentives thus contribute to firm-specific information being more opaque, less credible or reliable, and more expensive than common information. In the context of the Veldkamp model, outside investors of high-wedge firms are thus likely to rely more (less) on common (firm-specific) information than those of low-wedge firms, when making their trading decisions. As a result, high-wedge firms have a lower firm-specific return variation, but they have a higher common return variation, compared with low-wedge firms.

The implication from the above discussions is that firm-specific return variation relative to common return variation is lower for high-wedge firms than for low-wedge firms. I therefore hypothesize in alternative form:

> ***H2.1*: *Firm-specific return variation relative to common return variation decreases with the extent to which voting rights deviate from cash flow rights, all else being equal.***

2.2.2. Control-ownership wedge and positive jump risk

I further examine whether and how the wedge-related disclosure incentives influence the probability that extreme return outliers occur, as reflected in the likelihoods of positive and negative jumps of firm-specific returns. Controlling shareholders of high-wedge firms prefer opacity to transparency because the opaque information environment helps them extract private control benefits with a relatively lower risk of attracting outside investors' attention. As noted by JM, insiders' ability to extract private control benefits or to capture positive unexpected cash flows depends critically on outsiders' expectation about firm performance or cash flows:

Insiders are able to capture more (less) cash flows with lower risk of being detected, when outsiders' expectation about cash flow is lower (higher) than what the underlying cash flow would really be. To manage outsiders' expectation on cash flow downward, high-wedge firms (that are more prone to extract private control benefits) are motivated to withhold good news and/or to accelerate the release of bad news, to a greater extent, than low-wedge firms (that are less prone to extract private control benefits). As alluded in the opening quote, insiders can capture more (less) cash flows when the hidden good (bad) news arrives in the future. Further, all else being equal, insiders are better able to capture more (less) cash flow when the wedge is high (low).

In a broad sense, positive (negative) jumps occur when positive (negative) news is stockpiled beyond a certain level, and a large amount of the hidden good (bad) news comes out at once (JM; Hutton, Marcus and Tehranian, 2009; and Kothari, Shu and Wysocki, 2009). According to JM, information opaqueness allows insiders to capture cash flows without attracting much attention from outsiders, especially when outcomes are above the level perceived by outside investors. Their theory also suggests that insiders of high-wedge firms (who have stronger incentives and greater abilities to appropriate resources) would capture the extreme good outcome, to a greater extent, than those of low-wedge firms. As high-wedge firms have a higher stake at downward-managing outsiders' cash-flow expectation than low-wedge firms, they are more likely to withhold good news. Eventually, insiders of high-wedge firms are more likely to capture positive unexpected cash flows and thus good news will not accumulate over time. As a result, good news of high-

wedge firms is less likely to be revealed to outside investors than that of low-wedge firms.

The implication from the above discussions is that extreme positive returns are less likely to occur for high-wedge firms than for low-wedge firms.[6] This leads me to predict that the wedge is inversely related to positive jump risk, all else being equal. To provide empirical evidence on the issue, I hypothesize in alternative form.

> ***H2.2*: *The likelihood of positive jumps in firm-specific returns decreases with the extent to which voting rights deviate from cash flow rights, all else being equal.***

2.2.3. Control-ownership wedge and crash risk

Given that high-wedge firms have greater incentives to manage outsiders' cash-flow expectation downward, one may argue that high-wedge firms tend to release bad news excessively to outside investors, compared with low-wedge firms. As a result, high-wedge firms are, on average, less likely to accumulate bad news within a firm beyond a tipping point than low-wedge firms. One can therefore expect that extreme negative returns or crashes occur less frequently for high-wedge firms than for low-wedge firms. This leads us to predict that negative jump risk or crash risk is lower for high-wedge firms than for low-wedge firms or it decreases with the wedge.[7]

On the other hand, the ability of high-wedge firms to convey bad news to outside investors in a credible and timely manner is severely limited: Anticipating

[6] Bris, Goetzmann and Zhu (2007) make a similar argument for the effect of removing short sales restrictions. Refer to their footnote 28 (p.1063).

[7] The JM theory suggests that the accelerated release of bad news causes a shift in (bad news-related) negative jump risk from insiders to outside investors, and outsiders are forced to absorb this risk, which in turn decreases a negative jump risk of firm-specific returns.

insiders' incentives to accelerate the release of bad news, outside investors discount the credibility of bad news released by high-wedge firms and the associated valuation implication. It is possible that high-wedge firms have greater difficulties in conveying bad news credibly, and thus end up accumulating bad news, to a greater extent, than low-wedge firms. This leads us to a completely different prediction that crash risk is higher for high-wedge firms than for low-wedge firms or it increases with the wedge.

Insofar as high-wedge firms are more opaque than low-wedge firms, it is also likely that differences of opinion among investors with respect to a firm's future prospect are initially large for high-wedge firms than low-wedge firms. As noted by Hong and Stein (2003), under this circumstance, bearish investors with unfavorable news who are subject to short-sale constraints would be forced to sell all their shares and sit out the market. As a result, their unfavorable information is not fully incorporated into stock prices, which in turn creates bubbles or increases a crash risk, particularly for (more opaque) high-wedge firms. This implies that the crash risk could be relatively higher for high-wedge firms than for low-wedge firms or it increases with the wedge.

Moreover, Bae, Lim and Wei (2006) post a different point of view with respect to the impact of bad news on crash risk in international markets where large business groups play on a dominant role in many aspects of the economies: Business groups often use cross-subsidization and bail out losers, particularly, at the times of financial crisis. In my sample, the control-ownership wedge stems typically from pyramidal ownership structure and/or cross-shareholdings among affiliated

companies within the same business group (Claessens, Djankov and Lang, 2000; Faccio and Lang, 2002). This suggests that, for high-wedge firms, business group affiliation could be an important factor influencing the price formation process in which bad news is incorporated into stock returns. To the extent that an (exogenous) negative shock would not be fully incorporated into stock returns of group-affiliated firms because of internal subsidization or bail-outs, the impact of bad news on crash risk would be attenuated, particularly for high-wedge firms affiliated with a business group. This implies that crash risk decreases with the wedge.

Given the four different perspectives on the impact of the wedge on crash risk, unclear is not only whether outside investors rely more on firm-specific (less credible) bad news released by high-wedge firms, when making their trading decisions, but also the extent to which the wedge influences the accumulation of bad news within a firm. It is therefore an empirical question whether and how the wedge-related incentive for releasing bad news would impact the likelihood of negative return jumps. As such, I do not make any directional prediction on the relation between the wedge and negative jump risk, though I expect to observe that the wedge is more strongly associated with positive jump risk than it is with negative jump risk (or crash risk), or that the wedge-crash risk relation is relatively weak due to a possible cancellation effect associated with the two opposing forces mentioned above. To provide empirical evidence on this under-researched issue, I test the following hypothesis with no directional prediction.

> ***H2.3*: *The likelihood of negative jumps in firm-specific returns has no association with the extent to which voting rights deviate from cash flow rights, all else being equal.***

2.2.4. Control-ownership wedge and market reactions to good versus bad earnings news

To provide further evidence on the impact of the wedge-related asymmetric incentives on the return distribution, I also investigate whether the market reaction to earnings announcements differs systematically between firms with good and bad news announcements. A key intuition underlying the JM theory is that, in an effort to downward-manage outsiders' cash flow expectation, insiders have incentives to withhold good earnings news until they find their ways to extract private control benefits, while they have incentives to accelerate the release of bad earnings news even before the formal announcement date. In this circumstance, the releases of good earnings news are likely to be perceived as more credible and informative, and to contain larger surprise components, than those of bad earnings news. To the extent that high-wedge firms delay the release of good earning news to a greater extent than low-wedge firms, one can predict that the market reaction to the announcement of good earnings news is stronger for high-wedge firms than for low-wedge firms. This leads to the fourth hypothesis in alternative form:

> ***H2.4a*: *The market reaction to positive earnings news announcements increases with the extent to which voting rights deviate from cash flow rights, all else being equal.***

On the contrary, to the extent that outside investors correctly anticipate insiders' incentives to accelerate the release of bad news to the market, insiders may find it difficult to credibly convey bad news to outside investors. Therefore, the releases of bad earnings news are less credible and thus less informative than those of good earnings news. Further, to the extent that short-sale constraints force bearish

traders (who anticipate bad news) to sell their shares during the pre-announcement period, and then, to sit out the market before the announcement date, bad news is likely to flow into the market prior to the formal announcement date. One can therefore predict that, at the time of announcement, the market reacts less intensely to bad earnings news than it does to good earnings news, and that the impact of the wedge on the market reaction to bad news announcements is unlikely to be as significant as the same impact associated with good news announcements. This leads to the final hypothesis:

> ***H2.4b*: *The impact of control-ownership wedge on the market reaction to the announcement of negative earnings news is weaker than the same impact associated with the announcement of good earnings news, all else being equal.***

2.3. Measurement of key research variables

2.3.1. Measuring stock price informativeness

One of the dependent variables in this study is stock price informativeness (*SPI*) which captures the amount of firm-specific information incorporated into stock prices. Similar to previous research (e.g., Piotroski and Roulstone, 2004; Jin and Myers, 2006), I measure *SPI* using the R^2 statistics for an augmented market model. Specifically, I estimate the following model using weekly return data for each stock:

$$r_{i,t} = \alpha_i + \beta_{1,t} r_{m,j,t-1} + \beta_{2,t}(r_{us,t-1} + e_{j,t-1}) + \beta_{3,t} r_{m,j,t} + \beta_{4,t}(r_{us,t} + e_{j,t}) + \beta_{5,t} r_{m,j,t+1} + \beta_{6,t}(r_{us,t+1} + e_{j,t+1}) + \varepsilon_{i,t} \quad (2.1)$$

where, for stock i in week t during 1996, $r_{i,t}$ refers to weekly return; $r_{m,j,t}$ represents value-weighted domestic, weekly market index return in country j; $r_{us,t}$ is U.S. value-weighted, weekly market index return (a proxy for the global market factor); $e_{j,t}$ denotes the weekly change in country j's exchange rate per U.S. dollar; and $\varepsilon_{i,t}$ represents unspecified factors. The expression $r_{us,t} + e_{j,t}$ translates U.S. market returns into local currency units. I allow for nonsynchronous trading by including lead and lag terms for the market index returns (Dimson, 1979).

In estimating Eq. (2.1), I exclude stocks that trade for less than 26 weeks during the sample year of 1996. For the sample year, I compute the relative firm-specific return variation for each stock using the ratio of firm-specific return variation (σ_{ie}^2) to total return variation (σ_i^2), i.e., $\sigma_{ie}^2 / \sigma_i^2$. Note here that $1 - R_i^2$ of Eq. (2.1) is equal to this ratio, while R_i^2 of Eq. (2.1) is equal to the relative common return variation for each stock, i.e., $(\sigma_i^2 - \sigma_{ie}^2)/ \sigma_i^2$. Similar to other R^2-based studies, I define stock price informativeness, denoted by SPI_i, for firm i in the sample year as below:

$$SPI_i = ln\ [(1 - R_i^2)/R_i^2] = ln\ [\sigma_{ie}^2 /(\sigma_i^2 - \sigma_{ie}^2)] \qquad (2.2)$$

The logistic transformation is applied to circumvent the bounded nature of R_i^2 within (0, 1). By construction, high values of *SPI* mean a higher level of firm-specific return variation relative to common return variation (which equals total variation net of firm-specific variation), and are considered to reflect relatively more firm-specific information incorporated into stock prices.

2.3.2. Measuring positive versus negative return jumps

For the sample year of 1996, I first compute the *firm-specific weekly return*, denoted by W, which is defined as the natural log of 1 plus the residual return from the augmented market model in Eq. (2.1), i.e., $W_i = ln\ (1 + \varepsilon_i)$. To assess positive versus negative jumps in firm-specific returns, I evaluate the right and left tails, respectively, of the W-distribution for each stock. I construct measures of the likelihood of positive jumps or negative jumps (i.e., crashes) based on the number of W exceeding 3 standard deviations above or below of its mean value, respectively, for each firm in the sample year of 1996. Specifically, the likelihood of positive jump (negative jump) for stock i, denoted by $JUMP_i$ ($CRASH_i$), is measured by an indicator variable that equals 1 for a firm that experiences one or more positive (negative) jumps as defined above, and 0 otherwise.

As will be further explained later, while examining the relation between the likelihood of positive or negative return jump and the control-ownership wedge, I control for firm-specific return skewness or conditional return skewness (*CSKEW*). For this purpose, I measure *CSKEW* for a given firm i in the sample year of 1996 by taking the third moment of weekly firm-specific return W, and dividing it by the standard deviation of W, raised to the third power. Specifically, for each firm, I obtain *CSKEW* as follows:

$$CSKEW_i = [n(n-1)^{3/2}\sum W_i^3]/[(n-1)(n-2)(\sum W_i^2)^{3/2}] \qquad (2.3)$$

Note in Eq. (2.3) that a larger positive (negative) value is associated with a more right-skewed (left-skewed) firm-specific return distribution.

2.3.3. Measuring market reactions to earnings announcements

Similar to Kothari, Shu and Wysocki (2009), I calculated daily abnormal return, denoted by *AR*, by taking the difference between actual return on day *t* during the earnings announcement window and the predicted return on the same date. To obtain the predicted return, I first estimate the single-factor market model using daily raw returns over the estimation windows (-120, -10) and value-weighted market index returns over the same window. I then obtain the predicted return on day *t* during the announcement window, using the estimated market model parameters. Finally, I compute cumulative absolute abnormal daily returns, denoted by *CAAR*, over the 3-day window (-1, +1) or the 5-day window (-2, +2), relative to the annual earnings announcement date as reported in the I/B/E/S Summary database. Higher values of *CAAR* are consistent with stronger market reactions to earnings announcements.

2.3.4. Measuring control-ownership wedge

The key test variable in my study is the extent to which voting rights are detached from cash flow rights, which I call control-ownership wedge. I measure the wedge using voting rights (V) of the largest ultimate owner over his or her cash flow rights (C), namely V/C. As the control-ownership wedge increases, the ultimate owner or the dominant controlling shareholder has higher incentives and greater abilities to exploit corporate wealth for her private gains at the expense of non-controlling minority shareholders. As in Claessens, Djankov and Lang (2000), Faccio and Lang (2002), the ultimate owner is defined as the shareholder who holds

at least 5% of the voting rights of the firm and who is not controlled by anybody else. My analysis focuses on the largest dominant shareholder, although there could be multiple ultimate shareholders in a firm. The cash flow rights of the ultimate shareholder equal the sum of the ownership stakes of affiliated firms from each control chain identified. As will be further explained later, I also consider the ultimate owner's cash flow rights in the baseline regressions to control for the degree of incentive alignments between controlling and minority shareholders.

For 266 firms in my sample, both cash flow rights and voting rights for controlling shareholders are above 50%. These firms form a special group of firms with a divergence between control and ownership. To capture the true nature of the absolute control, I set voting rights to be equal to 100% for these firms, because even with less than 100% of cash flow rights, controlling shareholders of such firms have absolute control over corporate decisions.[8]

2.3.5. Measuring firm-specific fundamental correlation

In theory, firm-specific return variations reflect variations in firm fundamentals. In an attempt to isolate the wedge effect from the fundamental variation effect, I control for the fundamental variation when examining the effect of the wedge on firm-specific return variation or *SPI*. Similar to Morck, Yeung and Yu (2000), Hameed, Morck, Shen and Yeung (2008), I construct a variable analogous to firm-specific return variation, using return on asset (*ROA*), instead of stock returns. For each stock in my sample, I compute *ROA* as the ratio of earnings before

[8] For example, a firm with 51% of voting rights and 51% of cash flow rights should not be considered as having a wedge of one. Thus, we set voting rights equal to 100% when voting rights is larger than 50%.

extraordinary items to total assets. I then estimate the following regression using annual accounting data for the 9-year period of 1992-2001 (which includes year 1996, four years before 1996, and four year after 1996):

$$ROA_{i,t} = \alpha_j + \beta_{1,i} ROA_{m,t} + \varepsilon_{i,t} \quad (2.4)$$

where $ROA_{i,t}$ is return on asset for firm i in year t, $ROA_{m,t}$ is a value-weighted average return on asset for all firms in the market in year t. In so doing, I drop firms for which fewer than 6 years of data are available.

Using the approach that is similar in spirit to Eq. (2.2), I then compute the relative firm-specific fundamental variation for each stock using the ratio of firm-specific fundamental variation ($_{ROA}\sigma_{ie}^2$) to total fundamental variation ($_{ROA}\sigma_i^2$), i.e., $_{ROA}\sigma_{ie}^2/_{ROA}\sigma_i^2$. Note here that $1 - {}_{ROA}R_i^2$ of Eq. (2.4) is equal to this ratio, while ${}_{ROA}R_i^2$ of Eq. (2.4) is equal to $(_{ROA}\sigma_i^2 - {}_{ROA}\sigma_{ie}^2)/_{ROA}\sigma_i^2$. I then apply a logarithmic transformation to obtain firm-specific fundamentals variation for firm i in year 1996, denoted by $VARROA_i$:

$$VARROA_i = ln[(1 - {}_{ROA}R_i^2)/ {}_{ROA}R_i^2] = ln\,[{}_{ROA}\sigma_{ie}^2 /({}_{ROA}\sigma_i^2 - {}_{ROA}\sigma_{ie}^2)] \quad (2.5)$$

2.4. Data and descriptive statistics

2.4.1. Sample and data sources

The initial list of my sample consists of all firms that have data on the control and ownership structures of the largest ultimate owner or the dominant controlling shareholder from two sources: Claessens, Djankov and Lang (2000) and Faccio and Lang (2002). Claessens, Djankov and Lang provide the ultimate ownership data for 2,998 listed companies in 9 East Asian countries for year 1996

(Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand), while Faccio and Lang provide the same data for 5,232 listed companies in 13 Western European countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom) for the period of 1996-1999.

Due to the limited availability of the ultimate ownership data, my analyses are performed only for the single sample year, i.e., 1996. Similar to Leuz, Lins and Warnock (2009), for the Western European firm (from Austria, Belgium, Finland, Norway, Portugal, Spain, and Sweden) with ownership data available for one of three years 1997-1999, but not for year 1996, I assume that the ownership structure is stable over years and take the ownership data for years 1997-1999 as that for year 1996. In an attempt to maintain homogeneous interpretations of financial statement variables across sample firms, I exclude firms in the financial service industry from my sample, though they are included in the databases constructed by Claessens, Djankov and Lang (2000) and Faccio and Lang (2002). I then require that all financial data used for my study be available from *Worldscope*, and that weekly stock return data be available for at least 26 weeks from *DataStream*. Similar to other studies (e.g., Khan and Watts, 2009), I require that total asset and book value of equity for each firm be greater than zero.

After applying the above selection criteria, I obtain a final sample of 2,016 firms from 9 East Asian and 12 Western European countries in my sample year of 1996. When testing the fourth hypothesis on asymmetric market reaction to positive versus negative earnings announcements, I impose an additional data requirement

that information about analyst forecast dispersion and earnings announcement dates must be available from *IBES International*. All continuous variables used in the regression analyses are winsorized at the 1% and 99% cutoffs to alleviate a concern about potential problems of outliers. Appendix A.2 provides the distribution of the sample firms by each country.

2.4.2. Descriptive statistics

Table 2.1 presents descriptive statistics for the test and control variables. As shown in Panel A of Table 2.1, the mean values of voting rights and cash flow rights are about 31% and 23%, respectively, suggesting that ownership is highly concentrated with the largest ultimate shareholder. The mean wedge ratio (V/C) is about 2.13, indicating that voting rights held by the largest ultimate owner is significantly greater than cash flow rights. As shown in Panel B of the table, the mean and median of *SPI* are 1.3863 and 1.3712, respectively, with a relatively large standard deviation of 0.8649, suggesting that *SPI* is reasonably distributed with a wide variation across firms. The mean *SPI* of 1.3863 for my international sample is smaller than the mean of 2.7310 for the U.S. sample of Ferreira and Laux (2007). This indicates that that stock prices are less informative for non-U.S. firms in my sample than for U.S. firms. Given my definition of *JUMP*, a mean of 0.3031 indicates that about 30% of the firms in my sample experience at least one positive return jump in the sample year of 1996; similarly, a mean of 0.2103 indicates that about 21% of the firms in my sample experience at least one return crash.

With respect to distributional properties of the control variables, the following are noteworthy. My sample firms have, on average, more than 4 different business segments. For my sample, the amount of absolute total accruals is about 136% of absolute operating cash flows. About 16% of firms experienced a negative profit or loss in the sample year of 1996. A representative firm in my sample is followed by more than 6 analysts. I note that the mean value of *CSKEW* for my sample firms is 0.0624, smaller than the mean of 0.2600 for the firms from 38 stock markets (Bae, Lim and Wei, 2006), suggesting that my sample firms with relatively high control-ownership wedge present less positive returns on average. A representative firm in my sample announces their earnings on about 90 days after the fiscal-year end.

To have a first look at the association of *Wedge* with *SPI*, *JUMP*, or *CRASH*, I first partition the total sample into the above-median-wedge and below-median-wedge subsamples, and then test for differences in *SPI*, *JUMP* and *CRASH* between the two subsamples. As shown in Panel D of Table 2.1, the mean *SPI* is significantly higher for the below-median-wedge subsample, compared with the above-median-wedge subsample, suggesting that stock prices are less for high-wedge firms than for low-wedge firms. On average, firms in the above-median-wedge sample exhibit a smaller chance for positive return jumps than in those in the below-median-wedge sample, suggesting a positive relation between the wedge and positive jump risk. I observe no significant difference in the crash likelihood between the two wedge-based subsamples.

(INSERT TABLE 2.1 HERE)

Table 2.2 presents the Pearson correlation matrix. With respect to the correlation structure among the research variables, the following are apparent. First, *SPI* is significantly negatively correlated with *Wedge*, which is consistent with hypothesis *H2.1*. Second, I find that *SPI* is significantly positively correlated with cash flow rights. This is consistent with the notion that as cash flow rights held by the largest ultimate owner increase, agency problems decrease and more information is incorporated into stock prices. I find no obvious association of *Wedge* with *JUMP* or *CRASH*. Consistent with my expectation, the skewness of firm-specific return distribution (*CSKEW*) is positively correlated with *JUMP*, while it is negatively correlated with *CRASH*.

(INSERT TABLE 2.2 HERE)

2.5. Regression results

2.5.1. The impact of wedge on firm-specific return variation: Tests of hypothesis H2.1

To test whether the amount of firm-specific information incorporated into stock prices decreases with control-ownership wedge (*H2.1*), I estimate the following regression:

$$\begin{aligned} SPI = {} & \alpha_0 + \alpha_1 Wedge + \alpha_2 DIVERS + \alpha_3 VARROA + \alpha_4 HERF \\ & + \alpha_5 NIND + \alpha_6 STDROA + \alpha_7 ACCR + \alpha_8 LOSS \\ & + \alpha_9 MKTCAP + \alpha_{10} NAF + \alpha_{11} VOL + \alpha_{12} ANTISELF \\ & + (Country\ Dummies) + \varepsilon \end{aligned} \tag{2.6}$$

where, for each firm in the sample year of 1996, *SPI* denotes the measure of stock price informativeness as defined in Eq. (2.2); *Wedge* represents the ratio of voting rights (V) of the largest ultimate owner to his or her cash flow rights (C), i.e., V/C.[9] Throughout the study, I report t-values that are adjusted using robust standard errors corrected for clustering at the country level. I include in Eq. (2.6) a total of 10 firm-specific control variables to isolate the effect of the test variables on *SPI* from that of other variables which are known to influence *SPI* (e.g., Piotroski and Roulstone, 2004; Fernandes and Ferreira, 2009; and Ferreira and Laux, 2007), that is: firm-level diversification measured by the number of business segments (*DIVERS*); firm-specific fundamental variations (*VARROA*); the revenue-based Herfindahl index (*HERF*); the natural log of the number of firms in each industry (*NIND*); earnings volatility measured by the standard deviation of return on asset over the past three years (*STDROA*); the ratio of absolute total accruals to absolute operating cash flows (*ACCR*); the indicator variable for the presence of losses (*LOSS*); firm size measured by the natural log of market capitalization (*MKTCAP*); and the number of analyst issuing forecasts for a firm (*NAF*); trading volume measured by the average of monthly trading turnover (*VOL*). As an additional control, I also include the anti-self dealing index (*ANTISELF*), a newly constructed country-level measure of minority shareholder protection against expropriations by corporate insiders (Dajnkov, La Porta, Lopez-de-Silanes and Shleifer, 2008). *Country Dummies* are included to

[9] For empirical tests, we have also used: (1) the wedge (V - C) relative to voting rights (V), i.e., 1 - C/V; (2) the absolute wedge (V - C); and (3) the wedge relative to cash flow rights, i.e., 1-V/C. We find that the results using these alternative measures of Wedge are qualitatively similar to those reported in the paper. For brevity, we therefore report only the results using the ratio of voting rights to cash flow rights as the wedge measure.

control for country fixed effects. Appendix A.1 provides detailed definitions of all the variables included in Eq. (2.6).

Table 2.3 reports the results of regressions in Eq. (2.6). Note that in column 1, I include country dummies but exclude the country-level control variable, i.e., *ANTISELF*. As shown in column 1 of Table 2.3, the coefficient on *Wedge* is highly significant with an expected negative sign (-0.0119 with t = -4.36) even after controlling for all other firm-specific variables and country fixed effects. In column 2, I include the cash flow rights variable as an additional control. I find that the coefficient on *Wedge* remains significantly negative in both columns 1 and 2, while the coefficient on *Cash Flow Rights* is insignificant in column 2. This is consistent with my hypothesis *H2.1*, suggesting that it is the wedge between voting rights and cash flow rights, not the level of cash flow rights, that deters the flow of firm-specific information to the market, and thus reduces the amount of firm-specific information incorporated into stock prices.

In column 3, I include *ANTISELF* in lieu of country dummies.[10] This newly constructed legal protection index largely captures the extent to which minority shareholders are protected against expropriation by the dominant controlling shareholders (Djankov, La Porta, Lopez-de-Silanes and Shleifer, 2008). As shown in column 3, I find that the coefficient on *Wedge* is again significant with an expected negative sign, though the coefficient on *ANTISELF* is insignificant. This result indicates that what does matter more for determining price informativeness is the lack of firm-level disclosure transparency associated with high control-ownership

[10] In column 3, we exclude country dummies because there is no within-country variation in anti-self dealing index.

wedge rather than the lack of country-level transparency associated with low anti-self dealings or poor corporate governance.

As mentioned earlier, my full sample of 2,016 observations includes 266 Western European firms that have the wedge data only for one of three years 1997-1999, but not for 1996. When estimating regressions in columns 1 to 3, I assume that, for these 266 firms, the wedge in 1996 is the same with that in 1997-1999. To check whether my results are sensitive to this assumption, I construct a reduced sample of 1,760 firms after excluding these firms, and re-estimate the regression in column 3. As reported in column 4, the regression result using this restricted sample are qualitatively identical with that reported in column 2 with the coefficient on *Wedge* remaining highly significant with an expected negative sign (-0.0092 with t = -3.30), suggesting that my results are robust to the inclusion or exclusion of these 266 Western European firms.

With respect to control variables, my results are, overall, in line with the findings of previous research. Consistent with U.S. evidence reported in Piotroski and Roulstone (2004), Ferreira and Laux (2007) and international evidence reported in Fernandes and Ferreira (2008) and Kim and Shi (2010), I find that the coefficients on *DIVERS*, *STDROA*, *MKTCAP* and *NAF* are significantly negative at less than the 5% level and the coefficient on *LOSS* is significantly negative at less than the 10% level. I find that the coefficients on *VARROA*, *HERF*, *NIND*, *ACCR*, and *VOL* are insignificant across all columns.

Collectively, the regression results reported in Table 2.3 strongly supports my first hypothesis, *H2.1*, and is consistent with the following view: as the wedge

increases, controlling shareholders become more entrenched, and are more likely to engage in extracting private control benefits. To hide their rent-seeking activities, entrenched controlling shareholders are likely to manipulate the flow of firm-specific information to outside minority shareholders by withholding or selectively disclosing value-relevant information that is idiosyncratic to them. As a result, stock prices incorporate less firm-specific information relative to common (market- or industry-wide) information, which in turn decreases price informativeness.

The last column of Table 2.3 reports the estimates of economic impact of each explanatory variable included in column 2. Each number in the last column of Table 2.3 is the expected impact on R^2 resulting from an increase in the explanatory variable from the 50th percentile value to the 95th percentile value of the sample distribution with all other variables being held constant at their mean values. As in previous studies (e.g., Hutton, Marcus and Tehranian, 2009; Kim and Shi, 2010), firm size and analyst coverage have strong positive impact on R^2. The economic impact of *Wedge* is about 1%. This magnitude of the wedge impact is not trivial, considering that the size effect is about 3%.

(INSERT TABLE 2.3 HERE)

2.5.2. The impact of wedge on positive versus negative jumps: Tests of hypothesis H2.2 and H2.3

The significantly negative coefficients on *Wedge*, as seen in Table 2.3, lend strong support to my first hypothesis, *H2.1*, suggesting that high control-ownership wedge allows the largest ultimate owner to create the opaque environment by deterring the flow of firm-specific news to outside investors, and thus, stock prices

become less informative. However, *H2.1* is silent about whether and how this wedge-induced disclosure opacity is associated with her asymmetric incentives with respect to good versus bad news disclosures or withholding. I now address this unexplored issue by examining the effect of the wedge on the likelihood of positive return jump (*JUMP*) versus that on negative return jump (*CRASH*).

To test whether the wedge effect on *JUMP* differs systematically from the same effect on *CRASH*, I estimate the following regression using the logistic regression procedure:

$$\begin{aligned} JUMP\ (CRASH) = {} & \alpha_0 + \alpha_1 Wedge + \alpha_2 CSKEW + \alpha_3 DTURN \\ & + \alpha_4 SIGMA + \alpha_5 RET + \alpha_6 ACCR + \alpha_7 ROA \\ & + \alpha_8 MKTCAP + \alpha_9 MB + \alpha_{10} ANTISELF \\ & + (Country\ dummies) + \varepsilon \end{aligned} \tag{2.7}$$

where *JUMP (CRASH)* represents the likelihood of positive jump (negative jump or crash) and is ex post coded as 1 if a firm experiences one or more positive jump (negative jump or crash) event in the sample year of 1996, and 0 otherwise; and the test variable, *Wedge,* is as defined earlier.

To isolate the effect of *Wedge* on *JUMP* or *CRASH* from the effect of other variables that are known to influence jump risk*,* I include in the regression a total of 8 firm-specific control variables. Following Hutton, Marcus and Tehranian (2009), the skewness of firm-specific weekly returns over the year (*CSKEW*) is included to control for potential effects of asymmetric return distribution on extreme tail events, i.e., positive jumps and crashes. Following Chen, Hong and Stein (2001), I control for investor heterogeneity or differences of belief among investors, proxied by

average monthly share turnover over the current year minus the average monthly share turnover over the previous year (*DTURN*), and return volatility proxied by the standard deviation of the firm-specific weekly return over the sample year (*SIGMA*). I include absolute total accruals deflated by absolute operating cash flows (*ACCR*) to control for information opaqueness (Hutton, Marcus and Tehranian, 2009).[11] The inclusion of average firm-specific weekly return over the year (*RET*), return on asset (*ROA*), firm size (*MKTCAP*) and market-to-book ratio (*MB*) in Eq. (2.7) is in line with previous research that examines tail events (e.g., Chen, Hong and Stein, 2001; Hutton, Marcus and Tehranian, 2009; and Kim and Zhang, 2010). Similar to Eq. (2.6), the anti-self dealing index (*ANTISELF*) is included as an additional control. *Country Dummies* are included to control for country fixed effects. Appendix A.1 provides detailed definitions of all the variables included in Eq. (2.7).

Table 2.4 reports the results of logistic regressions in Eq. (2.7) using *JUMP* or *CRASH* as the dependent variable. In columns 1 to 3 (4 to 6), *JUMP* (*CRASH*) is used as the dependent variable. Note here that the regressions in columns 1 and 3 include country dummies, while those in columns 2 and 5 include the anti-self dealing index in lieu of country dummies. In columns 3 and 6, I report the regression results using the restrictive sample of 1,760 firms that exclude 266 Western European firms with the wedge data being available only for 1997-1999, not for 1996.

As shown in columns 1 to 3, I find that the coefficients on *Wedge* is highly significant with an expected negative sign (-0.0237 with $\chi^2 = 4.48$; -0.0309 with $\chi^2 =$

[11] Hutton, Marcus and Tehranian (2009) use three-year moving sum of discretionary accruals as a proxy for information opaqueness. To preserve observations as many as possible, we use a simple, annual measure.

3.49; -0.0185 with χ^2 = 3.89, respectively) even after controlling for all other variables. This finding is consistent with my hypothesis, *H2.2*, suggesting that high-wedge firms engage more intensely in good news hoarding than low-wedge firms, and the associated information opaqueness bring about the lower likelihood of positive jumps in firm-specific return for high-wedge firms, compared with the same effect for low-wedge firms.

As shown in columns 4 to 6 of Table 2.4, however, I find the coefficients on *Wedge* to be insignificant at conventional levels across all three columns, which is consistent with my hypothesis, *H2.4*. I interpret the insignificant coefficient on *Wedge* as follows: To downward-manage outsiders' expectation on future cash flow, high-wedge firms have stronger incentives to accelerate the release of bad news to outside investors than low-wedge firms, which in turn leads to an inverse relation between the wedge and crash risk. However, the inverse relation between the wedge and crash risk become attenuated because: (i) high-wedge firms may encounter greater difficulties in conveying bad news to outside investors in a credible and timely manner, compared with low-wedge firms; and (ii) the wedge effect on crash risk would be further weakened for high-wide firms that are typically affiliated with a business group given that group-affiliated firms are more likely to be bailed out at times of financial difficulties. As a result, the crash risk-reducing effect of the wedge is cancelled out by the crash-risk increasing effect of the wedge, which leads us to observe an insignificant relation between the wedge and the likelihood of negative jumps in firm-specific return.

To check economic significance of the wedge, I also compute the extent to which positive jump risk (*JUMP*) changes when control-ownership (*Wedge*) increases from the 50th percentile to the 95th percentile with all other variables set equal to their mean values. Using the regression result reported in column 1 of Table 2.4, I find that jump risk decreases by 8.4% when *Wedge* changes from the 50th percentile to the 95th percentile. This magnitude of the change in jump risk is economically significant, considering, for example, that the jump risk increases by 2.59% and 11.55% in response to the corresponding changes in investor heterogeneity (*DTURN*) and growth potential (*MB*), respectively. I do not consider economic impact of the wedge on crash risk (*CRASH*) because the regression coefficient on *Wedge* and most control variables (except *SKEW, MKTCAP* and *MB*) are insignificant.

In summary, the results presented in Table 2.4 show that the control-ownership wedge, which is commonly observed for firms affiliated with a business group in non-U.S. markets around the world, is associated with positive return jumps because the dominant controlling shareholder tends to create information opacity, primarily, by withholding good news. This good news hoarding imparts the inverse relation between the wedge and positive return jumps. However, the impact of the wedge on negative return jumps or crashes is less clear or insignificant. I view this insignificant relation between the two as an indication that outside investors discount the return implications of a negative shock created by the release of bad news due to the lack of signal credibility associated with bad news releases and the

possibility of better-performing firms 'bailing out' losers within the same business group at the time of financial difficulty.

(INSERT TABLE 2.4 HERE)

2.5.3. Asymmetric reactions to good versus bad news announcements: Test of hypothesis H2.4

To test hypothesis *H2.4* on the impact of the wedge on the market reaction to good versus bad earnings news, I estimate the following regression:

$$CAAR = \alpha_0 + \alpha_1 Wedge + \alpha_2 DISP + \alpha_3 REPLAG + \alpha_4 NAF + \alpha_5 MKTCAP + \alpha_8 MB + \alpha_9 LEV + \alpha_{10} LOSS + (Country\ dummies) + \varepsilon \quad (2.8)$$

In the above, *CAAR* represents cumulative absolute abnormal returns over short test windows, either (-1, +1) or (-2, +2). In Eq. (2.8), I include seven firm-specific controls that are known to influence cross-sectional variations in the market reaction that is: forecast dispersion (*DISP*); earnings reporting lags (*REPLAG*); number of analysts following a firm (*NAF*); firm size (*MKTCAP*); market-to-book ratio (*MB*); financial leverage (*LEV*); loss indicator (*LOSS*). *Country Dummies* are included to control for country fixed effects. Appendix A.1 provides the detailed definitions of all the variables included in Eq. (2.8).

To estimate Eq. (2.8), I construct a reduced sample of 1,520 firms for which annual earnings announcement dates are available from *I/B/E/S International*. I then partition the sample into two subsamples: the bad news (negative earnings) subsample of 674 firms; and the good news (positive earnings) subsample of 846 firms. As shown in Table 2.5, when Eq. (2.8) is estimated for the full sample of both

good and bad news firms, the coefficient on *Wedge* is significantly positive. As shown in columns 5 and 6, I also find that the market reaction is significant and positive for the good news subsample, which is consistent with hypothesis *H2.4a*. I find, however, that the coefficient on *Wedge* is insignificant for the bad news subsample, which is in line with hypothesis *H2.4b*. The above results hold, irrespective of whether three-day or five-day window is used for measuring *CAAR*.

I interpret the above results as follows: For high-wedge firms that are more prone to engage in rent-seeing activities, the dominant controlling shareholder tends to withhold good news to downward-manage outside investors' expectation on firm performance. As a result, good earnings news is more credible and has greater information content at the time of announcement, compared with bad earnings news, which leads us to observe a positive relation between *Wedge* and *CAAR*. On the contrary, given that the dominant controlling shareholder has an incentive to accelerate the release of bad news, bad news is not only less credible than good news, but also it is more likely to be released to the market prior to actual earnings announcement. This makes actual earnings announcements less informative with a smaller surprise. As a result, I observe an insignificant relation between *Wedge* and *CAAR* at the time when bad earnings news is formally announced.

(INSERT TABLE 2.5 HERE)

2.6. Further analyses

2.6.1. Does institutional shareholding matter?

Voluminous research has investigated the behavior of institutional investors and their impact on the information environment, corporate decisions and performance in the U.S. market.[12] For example, Ferreira and Matos (2008) find that institutional investors around the world have a strong preference over large stocks and firms with good governance in non-U.S. countries. Further, Leuz, Lins and Warnock (2009), using a similar sample, show that institutional investors invest less in firms with ownership structures that are conducive to weak governance. Poorly governed firms tend to hide their governance problems and the associated 'tunneling' activities by adopting opaque financial reporting choices or engaging in opportunistic earnings management. As a result, the cost of monitoring these firms is relatively high, and thus they are less attractive, to institutional investors.

Once institutional investors make their decision to invest in poorly governed firms such as high-wedge firms, they are likely to play an active role in monitoring and influencing corporate disclosure policies and other decisions, especially when institutional investors hold a large stake in a stock. Large-stake institutional investors hold stocks for long-term profits, and thus, do not tend to trade frequently; they have resources and incentives to monitor and influence corporate disclosure policies and other decisions (Ali, Klasa and Zhen, 2008). Moreover, the per-share fixed monitoring cost is relatively low to these large-stake institutional investors. As a result, large-stake institutional investors are more likely to engage in monitoring

[12] For recent research, see Ali, Klasa and Zhen (2008), Cronquist and Hahlenbach (2008), Ferreira and Matos (2008), and Leuz, Lins and Warnock (2009) and references therein.

activities than small-stake institutional investors. In contrast, small-stake institutional investors are unlikely to play a monitoring role because the fixed cost associated with external monitoring is prohibitively high for them to bear.

To the extent that external monitoring by large-stake institutional investors are effective, one can predict that the negative impact of control-ownership wedge on price informativeness (*SPI*) is attenuated (accentuated) for firms with high (low) institutional stakes. To test this prediction, I estimate an augmented model of Eq. (2.6) as given below:

$$SPI = \alpha_0 + \alpha_1 Wedge + \alpha_2 IO + \alpha_3 Wedge*IO + \alpha_4 FSCONTROL + (Country\ Dummies) + \varepsilon \quad (2.9)$$

where *IO* represents a measure of institutional stake in a stock; *FSCONTROL* refers to the same set of firm-specific controls used in Eq. (2.6); and others are as defined earlier.

To evaluate whether and how the *Wedge*-*SPI* relation, captured by α_1, is differentially influenced by the level of institutional stake in a stock, I estimate Eq. (2.9) using five different measures of *IO*, that is: *IO_TOTAL, IO_HIGH, IO_MEDIUM, IO_LOW,* and *IO_LARGE*: *IO_TOTAL* refers to the percentage of a firm's shares held by all types of institutional investors. To identify firms with high institutional stakes, I use the 5% cutoff point for the high-level stake, which is similar to the approach used in Ali, Klasa and Zhen (2008). Bushee (1998) classifies institutional investors with at least 5% stakes as long-term dedicated investors (who are interested more in monitoring); and those with less than 1% stakes as short-term transient investors (who are interested more in short-term trading profits). Similar in

spirit to his approach, I identify the high, medium and low institutional stakes in a stock, when the percentage of shares held by an institutional investor (α) is: 5% ≤ α, 1% ≤ α < 5%, and α <1%, respectively.

For each stock, I compute *IO_HIGH, IO_MEDIUM,* and *IO_LOW* that are defined as the percentages of shares held by high-stake, medium-stake, and low-stake institutional investors, respectively, at the end of the first quarter of 1997. The data required for computing these three percentage measures are obtained from the 2005 *Thomson Financial Worldwide Equity Ownership* database.[13] I also compute *IO_TOTAL* and *IO_LARGE* that are defined as the percentages of shares held by all types of institutional investors and the institutional investor with the *largest* stake in a stock, respectively. Table 2.6 presents the regression results for Eq. (2.9) using each of the five IO measures.

As shown in column 1 of the table, when *IO_TOTAL* is used for as a measure of institutional stakes, the coefficient on *Wedge* remains significantly negative. Moreover, the coefficient on the key variable of interest, i.e., *Wedge*IO*, is significantly positive, suggesting that the *SPI*-reducing effect of control-ownership wedge is attenuated as total institutional stakes in a stock increase. More importantly, as shown in columns 2 to 5, when institutional stakes are classified into four different categories, i.e., high-, medium-, low-, and the largest-stakes, and then, *IO* is proxied by *IO_HIGH, IO_MEDIUM*, *IO_LOW*, and *IO_LARGE*, respectively, the coefficients on *Wedge* and *Wedge*IO* is significant with expected negative and positive signs, respectively, *only* when *IO* is proxied by *IO_HIGH* and *IO_LARGE*.

[13] This database includes the worldwide institutional holding data starting 1997. As our sample period is for year 1996, we implicitly assume that there is no significant change in institutional holdings in our sample from year 1996 to the first quarter of 1997.

These results suggest that effective monitoring by high-stake institutional investors constrains the ability of high-wedge firms to create information opaqueness. As a result, the *SPI*-deteriorating effect of control-ownership wedge is weakened for firms with high institutional stakes. The results in Table 2.6 thus lend further credence to my earlier results reported in Table 2.3.

(INSERT TABLE 2.6 HERE)

2.6.2. Robustness checks

As shown in Appendix A.2, the number of firms for each country sample varies from 623 for Japan to 21 for Finland for my sample. The results of the OLS regressions presented in Tables 2.3 could thus be affected by a large number of sample firms from a few countries such as Japan and U.K.. To check whether my results are unduly influenced by the unequal size of sample firms across different countries, I re-estimate the main regression in Eq. (2.6), using the weighted least squares (WLS) procedure with the following weighting schemes: (1/the number of observation in each country) x the number of countries in my sample (which is 21). Column 1 of Table 2.7 reports the WLS result. As shown in column 1, the WLS result is qualitatively identical to the corresponding OLS results that are reported in Table 2.3, suggesting that my results are unlikely to be driven by the unequal distribution of sample firms across different countries.

As a further check, I construct three reduced samples: the sample of firms from East Asian countries; the sample of firms from Western European countries; and the sample of firms after excluding those from Japan and the U.K. Columns 2 to

4 of Table 2.7 present the results of the full-model regression in Eq. (2.6) using one of the three reduced samples. As shown in columns 2 to 4, the coefficients on *Wedge* remain highly significant with expected negative signs across all three columns, suggesting that my regression results reported in Tables 2.3 are unlikely to be driven by East Asian firms or Western European firms and by a few countries with large observations such as Japan and U.K. Columns 5 and 6 of Table 2.7 report the re-estimated results of regression in column 1 of Table 2.3, using *firm-level* clustering and *double* (industry and country) clustering procedures, respectively. As shown, I find that the re-estimated results are qualitatively identical to those reported in column 1 of Table 2.3 where *country-level* clustering is applied, suggesting that my regression results are robust to the use of different clustering approaches.

(INSERT TABLE 2.7 HERE)

2.6.3. Ownership data

Through out this study, I use only one year data to do cross-sectional regression. Previous studies use the same ownership database and run panel regression with multiple years of observations (e.g., Haw, Hu, Hwang and Wu, 2004). They assume that the ultimate ownership structure remains stable over time. However, this assumption is plainly not acceptable given the vast change in Asia post and Asian financial crisis. Moreover, assuming that the wedge data is stable does not change the fact that they do not have multiple years of variations. The within firm variations in the left hand side clearly cannot be attributed to within firm variations in the key right hand side variable, which is zero. Since the significance

(using repeating wedge for multiple times) is overstated, I construct one year data as a relatively more conservative method for regression analysis.

To further check whether our results are robust to panel data regression, I use six years' observations to analyze our three main hypotheses: the stock return data are from 1994 to 1999 and the wedge data are based on 1996. The results using panel data regression are unreported but qualitatively consistent with those using one year data regression.

2.7. Conclusion

This chapter investigates whether and how control-ownership wedge influences higher moments of the firm-specific return distribution as reflected in firm-specific return variation and the frequency of extreme firm-specific return outliers. My results, using a sample of 2,016 firms from 9 East Asian and 12 Western European countries, provides systematic evidence on how this wedge-induced asymmetric disclosure incentives influence the price formation process in which firm-specific information is incorporated into stock returns. Specifically, I first find that firm-specific return variation relative to common return variation is lower, or stock prices are less informative, for high-wedge firms than for low-wedge firms, suggesting that the wedge is a significant force that impedes the flow of firm-specific information to outside investors.

Second, I find that the wedge is significantly and negatively related to the likelihood of positive return jumps. This finding is in line with the view that high-wedge firms tend to withhold good news to a greater extent than low-wedge firms,

and thus share prices of high-wedge firms are more likely to be discounted compared with those of low-wedge firms. I find, however, that the wedge is not significantly associated with the likelihood of negative jumps in firm-specific returns or the crash risk. This insignificant association between the wedge and the crash risk is in line with the following view: outside investors understand the wedge-induced asymmetric disclosure incentives: Anticipating that high-wedge firms have stronger incentives to release bad news excessively than low-wedge firms, outside investors discount the credibility of bad news released by high-wedge firms and the associated return implication. As a result, the impact of the accelerated bad news release on reducing negative jump risk is weakened, which leads us to observe an insignificant relation between the wedge and the crash risk.

Third, using a short-window event study approach, I find that absolute abnormal returns cumulated over the three-day and five-day windows surrounding the annual earnings announcement date increase significantly with the wedge for the subsample of firms with good earnings news, but insignificant for the subsample of firms with bad earnings news. This finding corroborates my earlier finding on the asymmetric relation between the wedge and the frequency of extreme return outcomes, i.e., positive and negative jumps. Finally, I also provide evidence that the inverse relation between the wedge and firm-specific return variation becomes weakened as the percentage of shares held by dedicated institutional investors increases, suggesting that the wedge-induced, asymmetric disclosure incentives are constrained when external monitoring by institutional investors is effective.

Besides institutional investors, there exist other country-and firm-level, external and internal corporate governance mechanisms that could affect the firm's information environment. The country-level institutional environments and analyst coverage can play a potentially important role in monitoring and restricting controlling shareholders. The negative impact of the wedge on firm-specific information incorporation into stock prices would be smaller once a country's institutional environment protects shareholders' rights better. The negative impact of the wedge might appear to be attenuated by more analyst coverage.

On the one hand, my results are consistent with the Jin and Myers (2006) theory that insiders are motivated to manage outsiders' expectation downward by adopting opaque disclosure policies. On the other hand, it should be pointed out that my analysis goes beyond the JM theory by taking into account asymmetric disclosure incentives: insiders have incentives to withhold good news and to accelerate the release of bad news in an effort to manage outsiders' expectation on firm performance downward. In conclusion, my results strongly suggest that insiders' incentives for private control benefits and the associated asymmetric disclosure incentives are key determinants of firm-specific information flows to the market in a certain period (as captured by firm-specific return variation or second-moment effect) and over multiple periods (as captured by the likelihood of extreme return outliers or third-moment effect). In this study, these incentives are proxied by control-ownership wedge. Given the scarcity of evidence on the issue, I recommend further research in this direction, using different proxies for asymmetric disclosure incentives.

(INSERT APPENDIX A.1 and A.2 HERE)

Chapter 3

Information Markets, Institutional Investors and Stock Return Comovement around the World

3.1. Introduction

Stock return comovement or synchronicity is often linked to information inefficiency. In their seminal paper, Morck, Yeung and Yu (2000) show that stock return comovement or synchronicity is negatively related to the impounding of firm-specific information in stock price. Their argument centers on investor rights protection that affects the action taken by informed risk arbitrageurs. Jin and Myers (2006) link insiders' incentives for private control benefits to a firm's opaqueness and stock return comovement. They argue that insiders absorb some firm-specific risk so as to capture the firm's (positive unexpected) cash flow. Barberis, Shleifer and Wurgler (2005) provide evidence supporting a friction- or sentiment-based comovement theory, which focuses on frictions due to limits to arbitrage and correlated sentiments among irrational investors.

In this study, I examine a *rational* explanation for stock return comovement by focusing on the characteristics of information markets and test the empirical implications of Veldkamp (2006) information-driven comovement theory. In the information markets, information is expensive to produce and cheap to replicate. Veldkamp shows that there exist complementarities in information demand. As such, investors can economize on the cost of information production by increasing the demand, for example, producing market- or industry-wide information useful for

multiple assets. Even though such common or aggregate information is less valuable, investors may still choose it because the high demand reduces its cost. However, investors consider not only the cost, but also the benefit of information production. Investors prefer to learn about information others know less about, as the benefit of acquiring a signal diminishes as more investors acquire it (Grossman and Stiglitz, 1980). As more investors rely on common information to evaluate individual stocks, the lack of firm-specific information causes mispricing and thus generates rewards for correcting the mispricing. Given the high fixed costs for information production, whether investors can manage to produce firm-specific information depends on the types of investors.

Thus, a detailed institutional ownership provides a unique opportunity to test the implications of information-based view of stock return comovement. First, institutions/mutual funds serve as an indirect way to capitalize on private information, rather than selling information directly to investors (Admati and Pfleiderer, 1988). Investors in funds do not observe the information directly and therefore institutional investors can effectively control the competition among these indirectly informed traders. Second, different types of institutional investors are endowed with different information. In particular, U.S. institutional investors have access to *global private information* (Albuquerque, Bauer and Schneider, 2009), which gives them cost advantage in processing public information into firm-specific information, especially for those stocks with more transparency and global visibility. Third, a high stake held by institutional investors is more likely to be linked to the capability to produce more firm-specific information, as the fixed costs for

information production can be spread over more units of the entire holding. Similarly, frequent trading is more likely to be linked to the production of more firm-specific information, as the fixed costs can be spread over more units traded, or the number of trades.

Prior research has not fully explored the complexity of institutional investors and the effect on stock price informativeness, even though institutional investors play an important role in the information markets, Piotroski and Roulstone (2004) find an ambiguous relation between institutional ownership and stock price informativeness. They conclude from their mixed findings that institutional investors sometimes facilitate intra-industry information transfers across similar stocks (inducing stock return comovement) or trade on private firm-specific information (reducing stock return comovement).

In this study, I investigate the role of institutional investors in affecting stock return comovement and use detailed institutional ownership data to test the empirical implications of Veldkamp (2006) information-driven comovement theory. I obtain quarterly firm-level institutional ownership data from *Thomson Financial Equity Ownership & Contact* for the period from 1997 to 2007, and my sample covers 7,859 non-U.S. firms from 43 countries. Whether institutional investors choose to produce firm-specific information depends on their ability to bear the high fixed costs for information production. Thus, I focus on those characteristics of institutional ownership that may have differential impact on information choices: (1) Domicile; (2) Size of stakeholdings; and (3) Trading frequency.

The investigation into institutional investors of different domiciles allows me to evaluate the relative information advantage of foreign institutional investors over domestic institutional investors. The issue is important in its own right and so far the evidence is mixed. On the one hand, Brennan and Cao (1997), Dvorak (2005), and Choe, Kho, and Stulz (2005) find domestic investors outperform foreign investors, suggesting that foreign institutional investors are at an informational disadvantage. On the other hand, Grinblatt and Keloharju (2000) and Seasholes (2000) find that foreign institutional investors perform better than domestic institutional investors, indicating that foreign institutional investors are better informed than domestic institutional investors. Furthermore, Bailey, Mao and Sirodom (2007) find that foreign investors have superior information-processing skills whereas local investors have pre-announcement private information.

I investigate whether foreign institutional holdings improve relatively more the impounding of firm-specific information into stock price than domestic institutional investors. Since domestic investors tend to hold a diversified portfolio of local stocks, they can economize on the trading cost through using aggregate information for evaluating related stocks in their portfolio, whereas foreign institutional investors tend to hold a selective subset of local stocks and thus rely less on aggregate information. Furthermore, relative to domestic institutional investors, foreign institutional investors can effectively reduce the average per-unit cost for information as they are endowed with global private information in the U.S. stock market. I posit that foreign (especially U.S.) institutional investors enhance stock price informativeness more than domestic institutional investors. Consistent

with my prediction, I find a positive relation between foreign institutional holdings and stock price informativeness. In particular, U.S. institutional holdings have a stronger result, confirming the notion of global private information of Albuquerque, Bauer and Schneider (2009).

I investigate whether the size of institutional investors' stakeholdings influences the incorporation of firm-specific information into stock price. Relative to ordinary investors, institutional investors with large stakeholdings can effectively reduce per-unit cost for information as fixed costs for information production are spread over more units. I posit that the size of their stakeholdings in an individual stock is positively related to the ability to cover the fixed costs for information production and therefore reduce stock return comovement. To capture the possible informed trading, I follow Ali, Klasa and Zhen (2008) that use 5% and 1% as the cutoff points for high- and low-level institutional stakeholdings. Consistent with my hypothesis, I find a positive and significant relation between the fraction of institutional investors with large stakeholdings and stock price informativeness.

I investigate whether trading frequency reflect the intensity of informed trading and thus affect stock return comovement. Institutional investors active trading can more effectively reduce per-unit cost for information than that of passive trading, as fixed costs for information production are spread over more units traded (or number of trades). I posit that the trading frequency of institutional investors is inversely related to their ability to bear the fixed costs and therefore increase stock return comovement. Following Yan and Zhang (2009)'s classification of trading

turnover, I find that the fraction of institutional ownership with frequent trading is positively related to stock price informativeness.

This study contributes to the literature in the four important ways. First, I examine the differential impact of various types of institutional investors on stock return comovement. Prior studies often view institutional investors as a whole, for example, Piotroski and Roulstone (2004) find a positive relation between the aggregate institutional holdings and stock return synchronicity, but a negative relation between changes in institutional holdings and stock return synchronicity. In contrast, I take into consideration the heterogeneity of institutional investors in terms of their domiciles, size of stakeholdings and trading frequency. This study complements Ferreira and Matos' (2008) study of the monitoring roles of various types of institutional investors by investigating their differential informational effect on stock return comovement.

Second, I test the empirical implications of Veldkamp (2006) information-driven comovement theory. The diversity in institutional ownership provides a unique opportunity to explore Veldkamp's predictions by focusing on institutional investors' geographic origin, stake size and trading frequency that may influence their information choices.

Third, I shed lights on the relative contributions of foreign institutional investors to the impounding of firm-specific information into stock prices. My evidence provides a possible explanation for prior study's finding that foreign investors exhibit positive feedback trading but earn superior returns, whereas domestic institutional investors act as contrarian investors but earn inferior returns.

My results suggest that U.S. institutional investors have better access to global private information, whereas domestic institutional investors tend to rely on aggregate information, which contributes to its taking an opposite position to the better informed foreign institutional investors.

Fourth, my study using institutional investors differs from Hameed, Morck, Shen and Yeung (2008) using analysts. Analysts are motivated to produce common information that is useful for as many investors as possible. They tend to follow bellwether stock within an industry so that information demand would be greater and consequently the cost would be lower. Therefore both Piotroski and Roulstone (2004) and Hameed, Morck, Shen and Yeung (2008) find that analyst following increase stock return synchronicity, consistent with the role analysts play to facilitate inter-industry information transmission. In contrast, institutional investors have incentives to produce firm-specific information. As traders, institutional investors prefer to know the information that is unknown to others (Grossman and Stiglitz, 1980), because the benefit from trading on private information is greater. As a result, institutional investors with ability to overcome the fixed cost for information would acquire firm-level information and take a full advantage of such information.

The essay proceeds as follows. The next section reviews the literature and develops research hypotheses. Section 3 introduces the key variable measurements. Section 4 describes data and research design. Section 5 presents regression analysis of the hypotheses. Section 6 conducts additional tests. Section 7 examines the endogeneity issue. Section 8 offers concluding remarks.

3.2. Extant research and hypothesis development

3.2.1. Information-driven comovement theory

Information is expensive to produce but cheap to replicate and distribute. Veldkamp (2006) shows that investors' information choices cause excess stock return comovement.[14] When investors choose to rely on correlated information, they behave similarly and stock returns comove excessively beyond the level suggested by fundamental factors.

Investors' information choices depend on both costs and benefits of information acquisition. In a competitive information market, Veldkamp (2006) shows that the cost of a piece of information is endogenously determined by its demand. Thus, an increase in demand for information causes more information to be provided at a lower price. Such complementarities in information demand make common (market-wide or industry-wide) information affordable. An effective way to ensure a high demand is to produce the type of information that is useful for evaluating multiple assets. For example, investors and analysts cluster their information production on bellwether stocks (i.e., industry leaders) to gauge industry-wide information and in turn use such information to evaluate other related stocks in the same industry. Even though such common information is less valuable (than firm-specific information), investors will still purchase it because high-demand information is cheap (Veldkamp, 2006). The clustered demand for common

[14] Veldkamp (2009) argue that information choice may bridge the gap between rational and behavioral approaches: "Rather than attacking tenets of the rational framework, information choice seeks to extend it by enlarging the set of choice variables". (p. 14).

information adds common shocks to related stocks and contributes to excess stock return comovement.

However, the benefit of firm-specific information comes from the fact that it is not already held and not reflected in stock price, as the value of a signal declines as more investors observe it (Grossman and Stiglitz, 1980). The high fixed costs for information production hinder investors from acquiring low-demand firm-specific information. I expect that institutional investors are more likely to overcome the high fixed costs for producing firm-specific information and to take advantage of any mispricing resulted from reliance on common information by other investors. As shown by Veldkamp (2006), when more signals are observed and information becomes more complete, excess stock return comovement declines.

A direct empirical test of Veldkamp (2006) is Hameed, Morck, Shen and Yeung (2008). They argue that firms covered by more analysts have returns that predict more of the variations of other firms. Analysts facilitate information transfers to related stocks and thus generate return comovement among these stocks. A recent country-level study by Brockman, Liebenberg and Schutte (2010) finds that stock return comovement decreases during periods of economic expansion and increases during period of economic contraction. The connection between economic activity and information production is that during economic expansions, the demand for information increases and the average per-unite costs for information decreases as fixed costs are spread over few units.

However, both tests are not direct on investors. In this study, I draw on Veldkamp (2006) information-driven comovement theory to provide empirical

predictions for institutional investors' impact on stock return comovement. My empirical tests focus on the characteristics of institutional investors that may affect both benefits and costs of information production. Specifically, I examine (1) Foreign versus domestic institutional ownership; (2) Institutional ownership with different stakeholdings; (3) Institutional ownership with different trading frequency.

3.2.2 Foreign versus domestic institutional ownership

Prior studies find return chasing and superior performance of the U.S. institutional investors (Ferreira and Matos, 2008).[15] The return chasing phenomenon is often used to justify the conventional belief that foreign investors are at informational disadvantage (Brennan and Cao, 1997). However, Albuquerque, Bauer and Schneider (2009) argue that the return chasing can be consistent with the fact that foreign (U.S.) institutional investors have global private information and superior information processing capability. Thus, the mixed evidence raises a relevant question on whether foreign (especially U.S.) institutional investors contribute more to the improvement of stock price informativeness than domestic institutional investors.

To the extent that the composition of their portfolio affects their information choices, domestic and foreign institutional investors differ in their preferences for information acquisition. Covrig, Lau and Ng (2006) find that domestic institutional investors tend to hold a wide array of local stocks, whereas foreign institutional investors hold only selected local stocks. I conjecture that domestic institutional

[15] Ferreira and Matos (2008) find foreign institutional investors have a positive and significant effect on firm valuation, whereas domestic institutional investors have insignificant or negative effect. They attribute the positive valuation effect for foreign institutional investors to reputational bonding.

investors may rely relatively more on aggregate (market- or industry-wide) information than foreign institutional investors, because domestic institutional investors can economize on the cost for information acquisition across different stocks. [16] Thus, domestic institutional investors, who are relatively more likely to hold related local stocks in their portfolios, facilitate intra-industry information transfers among these related stocks. [17]

More importantly, to the extent that the composition of portfolio holdings affects the fixed costs for information production, domestic and foreign institutional investors may differ in their quest for firm-specific information. First, domestic institutional investors tend to hold stocks of smaller size, less transparency, and weaker corporate governance. As Jin and Myers (2006) show that insider's incentives for private control benefits are linked to a firm's opaqueness, the poorly governed firm would have relatively high fixed costs for firm-specific information production.

In contrast, foreign institutional investors tend to focus on a smaller subset of local stocks that are relatively larger and more transparent. Kang and Stulz (1997) find that foreign institutional investors prefer to invest in firms with less information asymmetry. Leuz, Lins and Warnock (2009) find that foreign institutional investors tend to invest less in firms with weak corporate governance and the negative relation between insider control and foreign holdings is more pronounced in countries with weak investor protection. Li, Morck, Yang and Yeung (2004) show that capital

[16] Chan, Lakonishok and Swaminathan (2007) show that relative valuation and peer-group comparisons contribute to stock return comovement.

[17] Based on their finding of a positive relation between institutional ownership and stock return synchronicity, Piotroski and Roulstone (2004) suggest that institutional investors facilitate information transfer across related stocks in their portfolios.

market openness is negatively associated with stock return comovement, suggesting a positive role for foreign institutional investors in improving stock price informativeness.

In addition, foreign (especially U.S.) institutional investors are endowed with global private information from U.S. stock market (Albuquerque, Bauer and Schneider, 2009). The global private information may include information regarding U.S. economy, which gives them an edge in processing public firm-specific information for local stocks. Covrig, Lau and Ng (2006) show that foreign institutional investors prefer stocks with greater global exposure, such as export sales and ADR. With their better understanding of global (U.S.) economy, foreign (U.S.) institutional investors would have a comparative advantage in evaluating firms with greater export sales. Thus, foreign (U.S.) institutional investors can effectively lower the average per-unit cost for information of local stocks as they are endowed with global private information. Overall, I posit that foreign (U.S.) institutional investors are in a better position to overcome high fixed costs for producing firm-specific information.

H3.1: Foreign (U.S.) institutional investors enhance stock price informativeness to a greater extent than domestic institutional investors.

3.2.3. Institutional ownership based on size of stakeholdings

Prior studies argue that institutions holding small stakes cannot justify the fixed costs for developing private information (Ali, Klasa and Zhen, 2008) and informed trading is mainly present where institutional investors take a large position in a firm (Bushee and Goodman, 2007). Thus, only institutions with large stakes

choose to acquire low-demand firm-specific information, given that information acquisition costs have a fixed component (Boehmer and Kelley, 2009).

Benefit from acquiring information increases for institutional investors with large stakes, because information has an increasing return to scale.[18] As the size of stakeholdings increases, institutional investors can effectively lower the per-unit cost for information as fixed costs for information production are spread over their holding. Thus, institutional investors with sufficiently large stakeholdings can afford to cover the high fixed costs for producing firm-specific information. With more firm-specific information available, stock return comovement decreases.

In addition, a high stakeholding allow institutional investors to trade as a monopolistic trader to fully extract their trading profits from their private information. Admati and Pfleiderer (1988) examine whether an information owner sells information directly to investors or trade on the information by creating a mutual fund. The latter "can control the effects of competition among these indirectly informed traders and increase his profit". Thus, I hypothesize that the fraction of institutional investors with high stakeholdings in a stock is positively related to its stock price informativeness.

> ***H3.2: Institutional investors with high stakeholdings enhance the impounding of firm-specific information into stock price more effectively than those with low stakeholdings.***

[18] Veldkamp (2006) shows that "agents value information about a larger asset more because one piece of information can be used to evaluate every dollar of the investment" (p. 15).

3.2.4. Institutional ownership based on trading frequency

Trading frequency is associated with institutions' incentives to acquire high-value information. Yan and Zhang (2009) find that short-term institutional investors trade actively than long-term institutional investors to exploit their private information advantages.[19] It is relatively more likely that institutions with frequent trading have incentives to acquire low-demand firm-specific information. Thus, whether institutional investors pursue an active or passive trading strategy may indicate different information choices. For example, institutional investors who engage in short-term active trading strategy can effectively reduce the per-unit cost for information as fixed costs for information production are spread over more units traded (or number of trades). Thus, institutional investors with frequent trading have more incentives to acquire firm-specific information. I expect that the fraction of institutional ownership with frequent trading is positively related to stock price informativeness.

H3.3: Institutional investors with frequent trading enhance the production of firm-specific information and reduce stock return comovement.

3.3. Measurement of key research variables

3.3.1. Measuring institutional ownership

I first define total institutional ownership (*IO_TOTAL*) as the sum of the number of share holdings of all institutions in a firm's stock divided by total number

[19] Yan and Zhang (2009) partition institutional investors into short-term and long-term investors and examine the relation between institutional ownership and future stock returns. They find that short-term institutional investors are better informed and trade actively to exploit their information advantage.

of shares outstanding at the end of each calendar year. Following Gompers and Metrick (2001), I set institutional ownership variables to zero if a stock is not held by any institution in *Thomson Financial*. I also exclude the observations with total institutional ownership larger than 100%. Next I adopt three approaches to identify the possible informed institutional investors in Veldkamp's information markets model, according to geographic origin, size of stakeholdings, trading frequency of institutional investors.

3.3.1.1. Measuring institutional ownership based on geographic origin

According to geographic origin, institutions can be classified as domestic, foreign, U.S.-based and non-U.S.-based institutions. Domestic institutional ownership (*IO_DOMESTIC*) is the sum of the number of share holdings of all institutions domiciled in the same country in which the stock is issued as a percentage of total number of shares outstanding. Foreign institutional ownership (*IO_FOREIGN*) is the sum of the number of share holdings of all institutions domiciled in a country different from the country the stock is issued in as a percentage of total number of shares outstanding. Foreign institutional ownership is further divided into the percentage of shares held by U.S. institutions and non-U.S. institutions. Specifically, U.S. institutions (*IO_FOREIGN_US*) is the sum of the number of share holdings of U.S.-based institutions as a percentage of total number of shares outstanding, and non-U.S. institutions (*IO_FOREIGN_NUS*) is the sum of the number of share holdings of non-U.S.-based institutions as a percentage of total number of shares outstanding. I compute an aggregate stakeholdings of institutions for each stock at the end of each year.

3.3.1.2. Measuring institutional ownership based on size of stakeholdings

The size of stakeholdings of institutional investors matters for their information choices. Bushee and Goodman (2007) find that informed trading is concentrated mainly in situations where institutional investors take a large stake of a firm and are more likely to have information-processing advantage. Thus, they would have greater incentives to incur the costs for information gathering. Following Ali, Klasa and Zhen (2008), I use 5% as the cutoff point for high-level institutional stake, as Bushee (1998) classifies above 5% institutional investors as dedicated investors; 1% as the cutoff point for low-level institutional stake; 1%-5% for the median-level institutional stake. Specifically, for each stock, I define high-level institutional holdings (*IO_HIGH*) as the sum of the number of share holdings of institutions with more than 5% stake in a stock divided by total number of shares outstanding, medium-level institutional holdings (*IO_MEDIUM*) as the sum of the number of share holdings of institutions with a stake between 1% and 5% in a stock divided by total number of shares outstanding, and low-level institutional holdings (*IO_LOW*) as the sum of the number of shares holdings of institutions with less than 1% stake in a stock divided by total number of shares outstanding. Meanwhile, I consider geographic origin and stake size of institutions together to make detail analysis of various types of institutional investment. I compute an aggregate stakeholdings of institutions for each stock at the end of each year.

3.3.1.3. Measuring institutional ownership based on trading frequency

According to trading frequency, institutional investors can be classified as short-term and long-term investors. Yan and Zhang (2009) classify institutional

investors into short- and long-term investors on the basis of their portfolio turnover (churn rate) over the past four quarters. For each quarter, they sort all institutional investors into three tertile portfolios based on average churn rate over the past four quarters. Those ranked in the top tertile with highest average churn rate are classified as short-term institutional investors, and those ranked in the bottom tertile with lowest average churn rate are classified as long-term institutional investors. See Appendix B.2 for details. I define short-term institutional holdings (*IO_SHORT*) as the sum of the number of share holdings of short-term institutions in a stock divided by total number of shares outstanding, and long-term institutional holdings (*IO_LONG*) as the sum of the number of share holdings of long-term institutions in a stock divided by total number of shares outstanding. Meanwhile, I consider geographic origin and trading frequency of institutions together to make detail analysis of various types of institutional investment. I compute an aggregate stakeholdings of institutions for each stock at the end of each year.

3.3.2. Measurement of stock price informativeness

For each calendar year, I estimate firm-specific measure of return variations using the methodology in previous research (e.g., Piotroski and Roulstone, 2004; Jin and Myers, 2006). I measure stock price informativeness, *SPI*, using the R^2 statistics for an augmented market model. Specifically, I estimate the following model using weekly return data for each stock:

$$r_{i,t} = \alpha_i + \beta_{1,t} r_{m,j,t-1} + \beta_{2,t}(r_{us,t-1} + e_{j,t-1}) + \beta_{3,t} r_{m,j,t} + \beta_{4,t}(r_{us,t} + e_{j,t}) + \beta_{5,t} r_{m,j,t+1} + \beta_{6,t}(r_{us,t+1} + e_{j,t+1}) + \varepsilon_{i,t} \quad (3.1)$$

where, for stock i and year t, $r_{i,t}$ refers to weekly return; $r_{m,j,t}$ represents value-weighted domestic, weekly market index return in country j; $r_{US,t}$ is value-weighted U.S. weekly market index return (a proxy for the global market factor); $e_{j,t}$ denotes the weekly change in country j's exchange rate per U.S. dollar; and ε_{it} represents unspecified factors. The expression $r_{US,t} + e_{j,t}$ translates U.S. stock market returns into local currency unites. I allow for nonsynchronous trading by including lead and lag terms for the market index returns (Dimson, 1979).[20]

In estimating Eq. (3.1), I exclude stocks that trade for less than 26 weeks during a year. For each sample year, I compute the relative firm-specific return variation for each stock using the ratio of firm-specific return variation (σ_{ie}^2) to total return variation (σ_i^2), i.e., $\sigma_{ie}^2 / \sigma_i^2$. Note here that $1 - R_i^2$ of Eq. (3.1) is equal to this ratio, while R_i^2 of Eq. (3.1) is equal to $(\sigma_i^2 - \sigma_{ie}^2)/ \sigma_i^2$. Similar to other R^2-based studies, I define stock price informativeness, denoted by SPI_i, for firm i in the sample year as below:

$$SPI_i = ln[(1-R_i^2)/R_i^2] = ln\,[\sigma_{ie}^2 /(\sigma_i^2 - \sigma_{ie}^2)] \qquad (3.2)$$

The logistic transformation is applied to circumvent the bounded nature of R_{it}^2 within (0, 1). By construction, high values of *SPI* indicates firms whose stock returns are tied weakly to common (market-wide) variation which equals total

[20] The inclusion of U.S. stock market return in the model is important for the following reasons. U.S. market index returns reflect the global factors, liquidity change or informational shocks that might affect U.S. investors' trading abroad (Wongswan, 2006). The inclusion of U.S. market return accounts for the possibility that U.S. investors transmit liquidity or informational shocks from U.S. market to foreign markets, thus causing excess return comovement among foreign stocks.

variation net of firm-specific variation, and are considered to reflect relatively more firm-specific information.

3.4. Data, descriptive statistics and research design

3.4.1. Sample and data sources

The data for this study mainly come from three databases. I obtain global institutional holdings data from *Thomson Financial Equity Ownership & Contact* database. The data set covers stocks located in 62 countries and their institutional holdings for the period from the first quarter of 1997 to the second quarter of 2007. Institutional ownership (hereafter *IO*) for each stock is defined as the number of shares held by institutional investors divided by the total number of shares outstanding.

I use *Worldscope* database for financial and market value data, and *Datastream* database for weekly return index (*RI*), market return index (*MI*), exchange rate, share price (*P*; in local currency), the number of shares outstanding (*NOSH*; expressed in 1,000 shares) and trading volume (*VO*; expressed in 1,000 shares) to compute firm-specific return variation, trading turnover and future return for individual stocks. I combine *Worldscope*/*Datastream* sample with the institutional holdings data from *Thomson Financial* at the end of each year using SEDOL codes (only for non-U.S. firms). I first exclude financial firms (SIC code 6000-6999). I then require that all financial data used for this study be available from *Worldscope*, and that weekly stock return data be available for at least 26 weeks from *Datastream*. Similar to other studies (e.g., Khan and Watts, 2009), I

require that total asset and book value of equity for each firm be greater then zero. I also exclude observations with the number of observations within a country less than 10.

After applying the above selection criteria, I obtain a final sample of 7,859 unique non-U.S. firms, for a total of 39,956 firm-year observations from 43 countries over the sample year 1997-2006. All continuous variables used in the regression analyses are winsorized at the 1% and 99% cutoffs to eliminate the effects of outliers. Appendix B.3 provides the distribution of my sample firms by each country and year.

3.4.2. Research design

To empirically test the hypotheses, I estimate the following baseline cross-country regression model:

$$\begin{aligned} SPI = {} & \alpha_0 + \alpha_1 IO_{i,t} + \alpha_2 DIVERS_{i,t} + \alpha_3 HERF_{i,t} + \alpha_4 NIND_{i,t} \\ & + \alpha_5 STDROA_{i,t} + \alpha_6 ACCR_{i,t} + \alpha_7 LOSS_{i,t} + \alpha_8 MKTCAP_{i,t} \\ & + \alpha_9 VOL_{i,t} + \alpha_{10} NAF_{i,t} + (Year,\ Industry,\ Country\ Dummies) \\ & + \varepsilon \end{aligned} \tag{3.3}$$

where *SPI* denotes stock price informativeness as defined in Eq. (3.2); *IO* represents different classifications of institutional holdings. Throughout the study, to alleviate a concern about potential serial correlation in the data, I report *t*-values that are adjusted using robust standard errors corrected for clustering at the country and year level. As stock price informativeness is mainly affected by underlying firm-level and industry-level factors, I include in Eq. (3.3) a total of 9 firm-specific control

variables, that is: firm-level diversification measured by the number of business segments (*DIVERS*); the revenue-based Herfindahl index of industry-level concentration (*HERF*); the natural log of the number of firms in each industry (*NIND*); earnings volatility measured by the standard deviation of return on assets over past five years (*STDROA*); the ratio of absolute total accruals to beginning-of-year total assets (*ACCR*); the indicator variables for the presence of losses (*LOSS*); firm size measured by the natural log of market capitalization (*MKTCAP*); trading volume measured by the average of monthly trading turnover (*VOL*); the number of analyst following a firm per year (*NAF*). *Year, Industry* and *Country dummies* are included to control for year, industry, and country fixed effects, respectively. Appendix B.1 provides detailed definitions of all the variables included in Eq. (3.3).

3.4.3. Descriptive statistics and correlations

Table 3.1 presents descriptive statistics for the test and control variables. As shown in Panel A of Table 3.1, the mean of total institutional ownership is 6.31%; the mean of U.S. institutional ownership is 1.01%. Given the fact that ownership is highly concentrated in non-U.S. markets, the free float for international stocks is lower (55.53%, untabulated). In this sense, 1.01% of U.S. institutional ownership still exerts a significant influence on domestic stocks. As shown in Panel B of the table, the mean and median of *SPI* are 1.1434 and 1.1241, respectively, with a relatively large standard deviation of 0.8912, suggesting that *SPI* is reasonably distributed with a wide variation across firms. The mean *SPI* of 1.1434 for my international sample is smaller that the mean of 2.7310 for the U.S. sample of

Ferreira and Laux (2007), consistent with fact that stock prices are less informative for non-U.S. firms in my sample than for U.S. firms.

With respect to distributional properties of the control variables, the following are noteworthy. My sample firms have, on average, more than 4 different business segments. For my sample, the amount of total accruals is about 128% of operating cash flows. On average, 19% of firms experienced a negative profit or loss over the sample year. A representative firm in the sample is followed by more than 5 analysts.

(INSERT TABLE 3.1 HERE)

Table 3.2 presents the Pearson correlations matrix. It illustrates the following facts. First, there is no significant association of total institutional ownership with stock price informativeness (*SPI*). Second, *SPI* is significantly positively correlated with domestic institutional ownership, but significantly negatively correlated with foreign institutional ownership. Third, *SPI* is significantly positively correlated with U.S. institutional ownership while negatively correlated with non-U.S. institutional ownership. Lastly, *SPI* is significantly positively correlated with *IO_HIGH* and *IO_SHORT*, but significantly negatively correlated with *IO_LOW* and *IO_LONG*. This is consistent with hypothesis *H3.2* and *H3.3*. These correlations are statistically significant at the 1% level.

(INSERT TABLE 3.2 HERE)

3.5. Empirical analysis

In this section, I conduct cross-country regression analysis to examine the relation between institutional holdings and stock return comovement.

3.5.1. Foreign versus domestic institutional holdings

I first test my first hypothesis, *H3.1*, the relation between stock price informativeness (*SPI*) and institutional ownership based on their domiciles. Table 3.3 reports the regression results in Eq. (3.3) controlling for all other firm-specific variables, year, industry and country fixed effects. As shown in Column 1 of Table 3.3, the coefficient on the aggregate institutional holding, *IO_TOTAL*, is insignificant. This is in line with the finding of Piotroski and Roulstone (2004) in the U.S. market that the relation between institutional ownership and stock price informativeness appears to be ambiguous. In Column 2, I run alternative specifications, replacing *IO_TOTAL* with *IO_DOMESTIC* and *IO_FOREIGN* in Eq. (3.3). I find that the coefficient on *IO_DOMESTIC* is significantly negative, whereas the coefficient on *IO_FOERIGN* is significantly positive. This result is consistent with hypothesis *H3.1* that foreign institutional investors are more effective in improving stock price informativeness than domestic institutional investors. Domestic and foreign institutional investors differ in their quest for firm-specific information: Domestic institutional investors rely relatively more on aggregate (market- or industry-wide) information to economize on the costs for information acquisition across their portfolio stocks, while foreign institutional investors rely relatively less on aggregate information as they tend to hold selective subset of foreign stocks.

Next, I partition foreign institutional ownership into U.S. and non-U.S. institutional ownership and re-estimate the baseline regression. As shown in Column 3, the coefficient on *IO_FOERIGN_US* is highly significant with an expected positive sign (0.7565 with t = 4.47), consistent with hypothesis *H3.1* that the presence of U.S. institutional investors reduces stock return comovement; whereas the coefficient on *IO_FOERIGN_NUS* is insignificant with a negative sign (-0.2394 with t = -1.53). This indicates that U.S. institutional investors differ significantly from non-U.S. institutional investors in their capability to produce firm-specific information. Endowed with global private information, U.S. institutional investors are in a better position to lower the average cost for producing firm-specific information. In Column 4 of Table 3.3, I add *IO_DOMESTIC* to the regression model and find that the results are qualitatively identical with Column 3, suggesting that positive effect of U.S. institutional holdings on stock price informativeness is robust to the inclusion of domestic institutional holdings in the regression.

With respect to control variables, my results are in line with the findings of previous research. Consistent with U.S. evidence of Piotroski and Roulstone (2004), Ferreira and Laux (2007) and non-U.S. evidence of Fernandes and Ferreira (2008), I find the coefficients on *DIVERS*, *MKTCAP*, *NAF* and *VOL* are significantly negative at the less than 1% level and the coefficient on *LOSS* is significantly negative at the less than 10% level, and the coefficient on *NIND* is significantly positive at the less than 5% level. The coefficients on *HERF*, *STDROA* and *ACCR* are insignificant across all columns.

Collectively, the results reported in Table 3.3 strongly support my first hypothesis, *H3.1*. Institutional investors are different in their quest and capability to acquire rich information set in global markets. U.S. institutional investors, endowed with global private information and superior information processing skills, are most effective in reducing stock return comovement and thus increasing stock price informativeness.

(INSERT TABLE 3.3 HERE)

3.5.2. Institutional holdings of different stake size

I test my second hypothesis, *H3.2*, by classifying institutional ownership according to the size of their stakeholdings and present the regression results in Table 3.4. An interesting pattern emerges: Column 1 shows a significantly positive coefficient on *IO_HIGH*, an insignificant coefficient on *IO_MEDIUM*, and a significantly negative coefficient on *IO_LOW*. This suggests that institutional investors with stakes greater than 5% are more likely to produce low-demand firm-specific information, thus improving the impounding of firm-specific information into stock price. This is consistent with Bushee and Goodman (2007) that the informed trading is largely concentrated in institutional investors holding large stakes in stocks. In contrast, institutional investors with medium or low stakeholdings do not reduce stock return comovement, consistent with Ali, Klasa and Zhen (2008) that institutional investors with small stakes cannot afford to acquire information. Overall, the results support the predictions of Veldkamp (2006) information-driven comovement theory that information has an increasing return in

an asset's value, such that institutional investors with high stakeholdings get more out of the information.

I further consider the geographic origins of institutional investors besides the size of their stakeholdings and re-estimate the basic regression. Through Column 2-4 of Table 3.4, the coefficients on *IO_HIGH_FOREIGN*, *IO_HIGH_FOREIGN_US* and *IO_HIGH_FOREIGN_NUS* are all positive and significant, suggesting that the size of institutional stakeholdings reinforces the positive role of foreign (especially U.S.) institutional ownership. The coefficient on *IO_HIGH_DOMESTIC* is positive but insignificant, suggesting that negative impact of *IO_DOMESTIC* on *SPI* reported in Table 3.3 is weakened for domestic institutional ownership with large stakeholdings. In contrast, the coefficients on *IO_LOW*, *IO_LOW_DOMESTIC*, *IO_LOW_FOREIGN* and *IO_LOW_FOREIGN_NUS* are negative and highly significant, suggesting that institutional ownership with low stakeholdings could not justify the high fixed costs for firm-specific information acquisition and their reliance on aggregate information generates stock return comovement. As to the coefficient on institutional ownership with medium stakeholdings, I find there is significantly positive effect of *IO_MEDIUM* on *SPI* when the institutional investors are U.S.-based. This suggests that geographic origin of institutional investors has a dominant effect on stock price informativeness.

Overall, my results presented in Table 3.4 support my second hypothesis *H3.2* and suggest that the size of institutional stakeholdings reflects the likelihood of firm-specific information production. Only institutional investors with sufficiently

large stakeholdings can afford to acquire firm-specific information by effectively spreading the fixed costs for information production over their holdings.[21]

(INSERT TABLE 3.4 HERE)

3.5.3. Institutional holdings of different trading frequency

In this section, I test my third hypothesis, *H3.3*, whether trading frequency of institutional investors lead to differential consequences of private information acquisition. Table 3.5 presents the regression of *SPI* on short-term and long-term institutional ownership. As shown in Column 1 of Table 3.5, the coefficients on *IO_SHORT* and *IO_LONG* are with expected signs respectively but insignificant, indicating that when institutional investors are grouped together, trading frequency has no relation with stock price informativeness in international stock markets. This is different from Yan and Zhang (2009) finding in the U.S. market that short-term institutional investors with frequent trading are better informed so that they trade actively to exploit their information advantage.

Next, I further partition institutional investors based on their geographic origins and re-estimate the regression. Through Columns 2-4 of Table 3.5, I find that the coefficients on *IO_SHORT_DOMESTIC* and *IO_LONG_DOMESTIC* are negative and insignificant, respectively; and the coefficient on *IO_SHORT_FOREIGN* is positive and insignificant. An interesting finding is that, the coefficient on *IO_SHORT_FOREIGN_US* is significantly positive in both Columns 3 and 4, while the coefficient on *IO_SHORT_FOREIGN_NUS* is

[21] This supports Veldkamp (2006) prediction that when more signals are produced stock return comovement falls.

marginally negative. These results suggest that difference in trading strategy (e.g., active or passive) of domestic and non-U.S. institutional investors may not indicate difference in their information choices. However, U.S. institutional investors who engage in short-term active trading strategy can effectively reduce the per-unit cost for information as the fixed costs for firm-specific information production are spread over the units traded, or the number of trades.

In summary, the results in Table 3.5 support my hypothesis *H3.3* and consistent with Yan and Zhang (2009) that trading frequency reflects institutional investors' incentives for high-value firm-specific information production. The U.S. short-term institutional investors are more effective in reducing stock return comovement.

(INSERT TABLE 3.5 HERE)

3.6. Additional tests

3.6.1. Extending test for the impact of U.S. institutions: institutional clustering

The results in Table 3.3 strongly support my first hypothesis, *H3.1*, suggesting that the increase in institutional investment by U.S. institutional investors reduces stock return comovement. In this section, I perform alternative test for the impact of U.S. institutional investors.

Grossman and Stiglitz (1980) present a rational expectations equilibrium model of information acquisition in an economy with one risky asset. They find that the value of a signal declines as more investors choose to acquire the signal. Veldkamp (2006) argues that adding uninformed investors in the market increases

the reliance on common information and generates large stock return comovement, while adding informed investors introduces new information into stock prices, thereby increasing stock price informativeness. In addition, the competition among informed investors causes the private information to be incorporated into stock price more rapidly (Holden and Subrahmanyam, 1992; Beohmer and Kelley, 2009). Since U.S. institutional investors are likely to be better informed, I posit that the increasing clustering of U.S. institutional investors in individual stocks reduces stock return comovement.

To test the above prediction, I calculate the clustering of institutional investors following Chen, Hong and Stein (2002) that use the breadth of investors as proxy for short sales lending availability to forecast future returns. In each year, the clustering of institutional investors is calculated as the number of institutional investors with long positions in a particular stock in global stock markets. I further identify the geographic origins of institutional investors and define the clustering of institutional investors as the number of institutions for each stock from different geographic origins, e.g., *IO_NUMBER*, *IO_NUMBER_DOMESTIC*, *IO_NUMBER_FOREIGN*, *IO_NUMBER_FOREIGN_US* and IO*_NUMBER_FOREIGN_NUS*.

Table 3.6 presents the regression results for Eq. (3.3) using each of the clustering measure above. As shown in Column 1, when *IO_NUMBER* is used for the measure of institutional clustering, the coefficient on *IO_NUMBER* is significantly negative (-0.0008 with t = -3.46), suggesting that increasing clustering of institutional investors increases stock return comovement. This result is consistent

with Veldkamp (2006)'s implication that if one piece of information is observed by more investors, it causes excess comovement of asset prices.

The remaining columns of the table consider the clustering of institutions according to their different geographic origins. I find a significantly negative coefficient on *IO_ NUMBER_DOMESTIC* in both Columns 2 and 4, consistent with the results in Table 3.3 that domestic institutional investors tend to facilitate intra-industry information transfers among related stocks and thus increase stock return comovement. In Columns 3 and 4, the coefficient on *IO_NUMBER_FOREIGN_US* is positive and significant at the 5% level, while the coefficient on *IO_NUMBER_FOREIGN_NUS* is significantly negative at the 10% level. The results for *IO_NUMBER_DOMESTIC* and *IO_NUMBER_FOREIGN_NUS* are consistent with Veldkamp's implication that the increasing clustering of investors who rely relatively more on common information to price multiple stocks would cause greater stock return comovement. This result for *IO_NUMBER_FOREIGN_US* supports my prediction and earlier findings that U.S. institutions are advantageous with superior information sources and generate greater competition among informed investors, thus the clustering of U.S. institutions indicates more private information flows. Overall, the analysis above using the measure of institutional clustering corroborates my first hypothesis, *H3.1*.

(INSERT TABLE 3.6 HERE)

3.6.2. Extending test for stake size: institutional ownership concentration

The results in Table 3.4 confirm previous argument in Bushee and Goodman (2007) and support my second hypothesis, *H3.2*, that institutional investors with sufficiently large stakeholdings choose to acquire low-demand, high-price information. Under Veldkamp (2006)'s information-driven comovement model, high fixed costs for private information production impede small investors from informed trading. Institutional investors with large stakeholdings are more likely to be large and sophisticated investors who can afford the high fixed costs for producing firm-specific information. Thus, I posit the greater institutional ownership concentration causes greater private information flows.

In each year, institutional ownership concentration is measured as the number of shares held by an institution with the largest stakeholdings in a stock, divided by total number of shares outstanding. I further identify the geographic origins of institutional investors and obtain the following measures, e.g., *IO_LARGE*, *IO_LARGE_DOMESTIC*, *IO_LARGE_FOREIGN*, *IO_LARGE_FOREIGN_US* and *IO_LARGE_FOREIGN_NUS*. Table 3.7 presents the regression results for Eq. (3.3) using *IO_LARGE* in place of *IO_HIGH*, *IO_MEDIUM* and *IO_LOW*. In Column 1, I find a significantly positive association between *IO_LARGE* and *SPI* (0.3096 with t = 1.96), suggesting that on average institutional ownership concentration exerts positive impact on the impounding of firm-specific information into stock price. In Column 2, I analyze the domestic and foreign institutional ownership concentration separately. The result shows that the coefficient on *IO_LARGE_DOMESTIC* is significantly negative, while the coefficient on *IO_LARGE_FOREIGN* is

significantly positive. This reinforces my previous finding in Table 3.3 that foreign institutions are advantageous in producing private information and thus improve stock price informativeness.

In Column 3 and 4, I find that *IO_LARGE_FOREIGN_US* but not *IO_LARGE_FOREIGN_NUS* is positively associated with *SPI* at the 1% significance level, indicating that the positive impact of large institutional ownership concentration on stock price informativeness is ultimately due to the impact of U.S. institutional investors. The results using institutional ownership concentration as a measure of large informed investors ascertain my previous hypothesis that U.S. institutional investors with sufficiently large stakeholdings engage in private information production, thereby reducing stock return comovement in global market.

(INSERT TABLE 3.7 HERE)

3.6.3. Changes in institutional holdings

Previous research suggests that change in institutional ownership could be capturing the trading intensity of existing institutions (e.g., Piotroski and Roulstone, 2004; Yan and Zhang, 2009; Boehmer and Kelley, 2009). Rather than examining the level of institutional holdings, I apply change in institutional holdings in the baseline regression. Change in institutional ownership represents the aggregate change in holdings from the fourth quarter of year t-1 to the fourth quarter of year t of institutional holding for an individual stock. For each year, I run the baseline regression Eq. (3.3), using the change in institutional holdings and lagged

institutional holdings instead of current institutional holdings, to re-visit my three hypotheses. The regression results are presented in Table 3.8.

Panel A indicates similar finding as in Table 3.3 with respect to domestic institutional ownership as the coefficient on Δ*IO_DOMESTIC* is strongly negative and significant. However, I find that the coefficient on Δ*IO_FOREIGN_US* is positive at the 10% significance level, after lagged *IO_FOREIGN_US* and other firm-specific controls are included in the model.

Panel B shows that the coefficient on Δ*IO_HIGH* is significantly positive while the coefficient on Δ*IO_LOW* is significantly negative, which strongly support my second hypothesis *H3.2*; foreign institutional investors, especially U.S. institutional investors, still have significantly positive impact on *SPI* as the estimate on Δ*IO_HIGH_FOREIGN_US* is positive and highly significant ($t = 2.92$).

Panel C weakly support my third hypothesis *H3.3*: the coefficient for Δ*IO_SHORT_FOREIGN_US* is positive and significant at the 10% level ($t = 1.63$). Change in long-term institutions as a whole reduces stock price informativeness, while there is no relation between *SPI* and Δ*IO_SHORT_FOREIGN_NUS*.

In short, the results in Table 3.8 using change in institutional holdings as a measure for possible trading are largely consistent with the previous findings using the level of institutional holdings and support my main hypotheses. This is in sharp contrast to Piotroski and Roulstone (2004)'s finding that the levels and changes of institutional ownership are related to stock price informativeness in an opposite direction. It is possible that my classifications based on geographical origins help to

disentangle the complicated effects of facilitating intra-industry information transfers from trading on private information.

(INSERT TABLE 3.8 HERE)

3.7. Endogeneity check: institutional investors' influence or selection?

There exists a possibility for reverse causality for the impact of institutional investment on stock price informativeness. One may argue that institutional investors may prefer to follow firms that have lower stock return comovement so that the observed impact of institutional investment on stock return comovement, or stock price informativeness, might be endogenous. To address such a concern, I run a two-stage least squares (*2SLS*) regression. This procedure considers institutional investment and stock price informativeness as being simultaneously determined. The two-stage analysis starts with separate regressions of each of the institutional holdings variables on various firm-specific characteristics using the model expressed in Eq. (3.4). Appendix B.1 provides detailed definitions for the variables in Eq. (3.4). Then I use fitted values of institutional ownership variables as independent variables in place of the true institutional ownership variables to model Eq. (3.3). Specially, stock price informativeness (*SPI*) is modeled as the function of fitted values of institutional ownership variables, and other factors that affect stock price informativeness. Estimates of the equation for stock price informativeness are reported in Table 3.9.

$$IO_{i,t} = \alpha_0 + \alpha_1 SPI_{i,t} + \alpha_2 MKTCAP_{i,t} + \alpha_3 NAF_{i,t} + \alpha_4 MB_{i,t} + \alpha_5 INVOP_{i,t}$$
$$+ \alpha_6 LEV_{i,t} + \alpha_7 CASH_{i,t} + \alpha_8 VOL_{i,t} + \alpha_9 VOLA_{i,t} + \alpha_{10} AGE_{i,t}$$

$$+ \alpha_{11} DP_{i,t} + \alpha_{12} RET_{i,t-1,t} + (Year, \text{industry, and country } dummies)$$

$$+ \varepsilon_{i,t} \qquad (3.4)$$

The results suggest the following. The coefficient on the fitted value of *IO_DOMESTIC* is still negative and significant at the 1% level; the coefficient on the fitted value of *IO_FOREIGN_US* is highly significant and positive; the coefficient on the fitted value of *IO_HIGH* is significant with an expected positive sign, while the coefficient on the fitted value of *IO_LOW* is significant with an expected negative sign; the coefficient on the fitted value of *IO_SHORT_FOREIGN_US* is significantly positive. The overall results in Table 3.9 are quantitatively and qualitatively similar with the results in Table 3.3, 3.4 and 3.5. This certifies that my earlier results are not driven by the reverse causality.

(INSERT TABLE 3.9 HERE)

3.8. Conclusion

In the framework of Veldkamp (2006), investors acquire cheap information signals that contain information useful to price multiple assets because firm-specific signals are too costly to them. As a result, the reliance on common signals contributes to excess stock return comovement and lowers firm-specific information flows in the information markets. According to this information-driven comovement theory, adding investors of different information choices would introduce new informational shocks to stock prices, thus reducing the extent of investors' reliance on common information signals. In this study, I focus on the role of institutional

investors in affecting stock return comovement and test the empirical implications of Veldkamp's information markets model.

Different from prior studies taking institutions as a whole, I classify institutional investors based on their geographic origins, the size of stakeholdings and trading frequency. My findings reveal that foreign institutional investors, U.S. institutional investors in particular, are more effective in reducing stock return comovement or enhancing stock price informativeness than domestic institutional investors. My evidence is consistent with previous research that U.S. institutional investors are more likely to be endowed with global private information and superior information processing ability. I also find that institutional investors with large stakeholdings are more effective in reducing stock return comovement, confirming that the high fixed costs for information production affect investors' information choices. In addition, I find that U.S. institutional investors with frequent trading enhance stock price informativeness, suggesting that they are likely to exploit their private information advantage through active trading.

Overall, my findings empirically support Veldkamp's information-driven comovement theory. My findings have useful implications for practitioners that firms should consider the informational impact of institutional investors in global stock markets. Since informative stock prices facilitate efficient financing and investment decisions, my results indicate the benefit for attracting certain types of institutional investors that improve stock price informativeness.

(INSERT Appendix B.1, B.2, B.3 HERE)

Chapter 4

Incentives for Private Control Benefits and Investment Sensitivity to Stock Price: International Evidence

4.1. Introduction

A fundamental question in corporate finance is how capital is allocated to the right investment project (Stein, 2003; Wurgler, 2000). The role of the stock market in such allocation process has long been debated.[22] The conventional wisdom that managers possess superior information precludes any possibility of learning from stock price. Thus, the stock market simply becomes a "side show". As such, managers can make investment decisions based on their own views on growth opportunities and ignore stock price fluctuations to act in the best interests of the long-term shareholders (Morck, Shleifer and Vishny, 1990; Blanchard, Rhee and Summers, 1993). A more recent strand of research, however, suggests that the stock market plays an active role of gathering information from outside investors and firms can improve their investment decisions by learning from stock price (Allen, 1993; Chen, Goldstein and Jiang, 2007).[23]

The importance of such learning from stock price depends on the specific stage of a firm's life cycle. In an early stage, firm-specific information such as technical expertise is crucial for the success of its investment projects and therefore private equity financing is the most suitable financing source (Maug, 2001). The

[22] Durnev, Morck and Yeung (2004) use Tobin's (1982) notion of functional form efficiency to describe the role of stock market in guiding an efficient capital allocation. They find that stock prices are functionally efficient when stock price synchronicity is low.

[23] For example, Luo (2005) shows that managers pay attention to market reaction when making its acquisition decisions.

information asymmetry is mainly caused by corporate insiders having an information advantage over outside investors, and security misvaluation leads to underinvestment (Myers and Majluf, 1984).[24] Thus, learning from stock price is not an important consideration. However, at a later stage in the firm's life cycle, as industry- and market-wide information becomes increasingly important, the stock market has its cost advantage in the production and aggregation of information (Dow and Gorton, 1997; Subrahmanyam and Titman, 1999).[25] When entrepreneurs lose their comparative advantage in gathering information, the firm is better off by going public and learning from stock price becomes increasingly important for firms to make investment decisions.[26]

Empirical studies provide evidence that stock prices serve as a useful signal for guiding and facilitating the efficient allocation of investment resources, especially when outside investors have an information advantage over insiders (Chen, Goldstein and Jiang, 2007; Giammarino, Heinkel, Hollifield and Li, 2004; Durnev, Morck and Yeung, 2004; and Luo, 2005). As stock price informativeness improves, learning from stock price becomes more effective, as indicated by an increase in investment sensitivity to stock price. Thus, studies support that the stock market in the U.S. plays an important role in capital allocation.

However, the role for stock market in the non-U.S. markets is largely unknown, especially for those economies in which ownership and control structure

[24] Giammarino, Heinkel, Hollifield and Li, 2004) examine informed managers versus informed market hypotheses in the context of SEO decisions.

[25] Subrahmanyam and Titman (1999) label such information as *serendipitous* information, that is, investors may come across valuable information by chance.

[26] In a related vein, Axelson (2007) argues that it is optimal to issue information-sensitive securities when investors rather than managers have private information. Similarly, Faure-Grimaud and Gromb (2004) show that public trading increases the incentives of large shareholders if they intend to liquidate part of their holding later on. Thus, outside investors tend to have an information-sensitive stake, whereas insiders tend to have a value-sensitive stake.

differs significantly from that of the U.S.. Under poor investor protection, concentrated ownership often emerges to mitigate agency problem between outside shareholders and managers (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1999). However, this comes with a price, as voting rights for controlling shareholders often significantly exceed their cash flow rights. Such divergence between voting rights and cash flow rights gives controlling shareholders incentives to extract private benefits at the expense of minority shareholders. My study fills this gap by examining non-U.S. firms with divergence between voting rights and cash flow rights.

Information asymmetry and agency costs are two important considerations for determining the efficiency of capital allocation (Stein, 2003). The information perspective on the link from stock prices to investment (the *learning* hypothesis) has been established for the U.S. market (Chen, Goldstein and Jiang, 2007). While the agency problem has been suggested as a possible reason to explain differential market efficiency (Durnev, Morck and Yeung, 2004),[27] the agency-cost perspective regarding the role for the stock market has not been systematically examined. An exception is a recent U.S. study by Kau, Linck and Rubin (2008) showing that agency costs adversely affect managers' propensity to "listen to the market" in the context of M&As.

In this study, I aim to provide systematic evidence on the impact of agency problems of concentrated control on corporate investment decisions in an international setting. I focus on an important feature of corporate ownership and

[27] In their concluding remarks, Durnev, Morck and Yeung (2004) point out that "the stock market exhibits a range of efficiency levels in different industries" and they speculate about "differences in transparency, arbitrage costs, arbitrage risks, monitoring costs, agency problems, and noise trading activity" as potential reasons. (p. 98)

control for non-U.S. firms, i.e., the divergence between control (voting rights) and ownership (cash flow rights) or simply the control-ownership wedge. Using the control-ownership wedge as a firm-level proxy for agency cost of concentrated control, I examine whether such agency problem affects the insiders' propensity to learn from stock prices. Agency theory predicts that insiders have a tendency to overspend internal free cash flows on sub-optimal investments for their own private benefits (e.g., Jensen, 1986). When insiders have incentives to pursue their own objectives and run counter to firm-value maximization, they are likely to ignore the signals from stock price. Thus, I predict that the agency costs associated with control-ownership divergence would reduce investment sensitivity to stock price.

I also allow for the possibility that the wedge-based agency problem may deter outside investors from engaging in information-based trading, which in turn leads to less informative stock prices. Controlling shareholders of high-wedge firms have incentives to camouflage their self-dealing activities by reducing the incorporation of firm-specific information into stock prices. Since the less informative stock prices are not useful to guide investment decisions with the presence of large control-ownership wedge, I would also observe a weakened association between investment and stock price.

Consistent with my prediction, I find that corporate investments are less sensitive to stock prices for high-wedge firms than for low-wedge firms. This suggests that U.S. evidence on the so-called *learning* hypothesis may be conditioned upon agency problems. Using factors such as dividend, corporate cash holdings and R&D intensity to capture the extent of wedge-related agency problems, I find that

firms with low dividends, or high cash holdings, or high R&D intensity tend to have lower investment sensitivity to stock price. This further confirms that agency problem of concentrated control contributes to the reduction in the effectiveness of learning from the stock market. Overall, stock market would play a less important role in capital allocation when the wedge-related agency problem is severe.

This study contributes to the on-going debate with regard to the role of the stock market in determining the firm's real activities. First, my results shed lights on the impact of wedge-related agency problems on the effectiveness of learning from the stock market. The evidence is especially relevant for economies in which divergence between control and ownership is prevalent. Second, my study complements other studies that examine the role of agency problems in explaining investment sensitivity to stock price. For example, Kau, Linck and Rubin (2008) find that managers with high pay-performance sensitivity pay more attention to the market reaction when making major investment decisions. My findings confirm that agency problems cause firms to deviate from optimal investments implied by stock prices and therefore should be considered as an important factor determining the role of the stock market in guiding investment decisions.

The remainder of the essay is organized as follows. Section 2 reviews the literature and develops research hypotheses. Section 3 explains the sample selection procedure, the data and the design of the empirical tests. Section 4 presents the main empirical results. Section 5 extends the basic test with three agency-based factors. Section 6 performs robustness checks. Section 7 presents additional tests controlling

for stock price informativeness. Section 8 offers the future firm performance analysis. Section 9 concludes the essay.

4.2. Extant research and hypothesis development

In this section, I review the studies on investment sensitivity to stock prices, in particular, the learning from the stock market. I then post a general research question of whether and how the control-ownership wedge affects managers' propensity to use the information reflected in stock prices for their investment decisions.

Managers make investment decisions based on both their own private information and public information revealed from stock price. Thus, the investment-to-price sensitivity is driven by the relative importance of insiders' private information to the information impounded in stock prices. Through trading and public disclosure, stock price (as captured by Tobin's *q*) incorporates private information held by both managers and outside investors. If market efficiency is relatively high and stock price is more informative, then the information impounded into stock price could carry more weight for managers' investment decisions than private information held by corporate insiders. Thus, as managers learn more private information held by outside investors, the investment sensitivity to stock price increases. In this process, the stock market plays a critical role of gathering information originally held by outside investors but unknown to managers.[28]

[28] Even though private information held by outside investors does not directly affect either investment or stock price, how efficient stock price incorporates such information over time through trading does affect the relative importance of public information to information (both public and private) used for making investment decision.

From an agency perspective, the agency costs associated with control-ownership wedge affects insiders' propensity to follow the stock market in two ways. First, agency problem associated with control-ownership wedge would lead to sub-optimal investments, as conflicts between controlling shareholders and minority shareholders distort corporate investment (Jensen, 1986; Wei and Zhang, 2008). In particular, when the control-ownership wedge is high, controlling shareholders have more incentives to extract private control benefits through overspend internal cash flows on sub-optimal investments and non-arm's length transactions. By doing so, they manage to transfer income or assets out of firms whose profits must be shared with minority shareholders and into firms whose profits accrue to controlling shareholders. In contrast, when cash flow rights for controlling shareholders are relatively high, any sub-optimal investment inflicts a substantial cost for controlling shareholders. Thus, the control-ownership wedge affects the deviation of firm's investment from the optimal level conditioned on the information reflected in stock prices.

Second, ownership and control structure influences the firm's information environment and therefore affects the learning. As the divergence between voting rights and cash flow rights increases, controlling shareholders would have more incentives to camouflage their self-serving behaviors by reducing transparency, for example, via opportunistic earnings management or other biased financial reporting, thereby increasing the cost of information production about the firm (Fan and Wong, 2002). In addition, institutional investors, especially foreign institutions, would be reluctant to invest in firms with weak corporate governance (Leuz, Lins and

Warnock, 2009). Thus, the control-ownership wedge discourages informed traders from engaging in risk arbitrage, which leads to less informative stock prices.

The control-ownership wedge could also affect controlling shareholders' payoff patterns and this in turn has a negative impact on a firm's information environment. As noted by Jin and Myers (2006), corporate insiders extract private benefits by capturing more cash flows when they are higher than perceived by outside investors, which in turn creates incentives for controlling shareholders to choose an opaque information environment. Perotti and von Thadden (2003) also argue that a firm's transparency is affected by its dominant investors' payoff pattern and their study has a direct implication for my study: Cash flows for controlling shareholders in high-wedge firms are less sensitive to the firm's upward profit potential than that of low-wedge firms. Thus, controlling shareholders would prefer opacity to transparency[29], which results in a relatively less informative stock price (Jin and Myers, 2006).

Putting the two aspects together, I expect that controlling shareholders' propensity to learn from stock price is negatively related to the control-ownership wedge. Thus, for high-wedge firms, stock market plays a less important role in capital allocation. This leads to the following hypothesis in alternative form:

> ***H4.1*: *Control-ownership wedge reduces the effectiveness of learning from stock price for corporate insiders in making corporate investment.***

[29] In an effort to explain why bank-dominated firms tend to be more opaque than equity-dominated firms, Perotti and von Thadden (2003) show that the firm's transparency is a choice variable based on its dominant investors' payoff pattern. Specifically, they argue that "under lack of transparency expected profits are lower, but the volatility of profits and output are lower as well". As a result, "there is a natural preference by lenders for less ex post information dissemination, as they do not gain from higher profits but suffer from higher risk". On the other hand, "firms dominated by shareholders encourage greater informativeness of prices, as information dissemination on average increases profitability as well as risk" (p. 63).

4.3. Data and methodology

4.3.1. Data

I obtain ownership and control structure data from Claessens, Djankov and Lang (2000) which covers nine East Asian countries (Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand) for 1996; and the ownership data from Faccio and Lang (2002) which covers 13 Western European countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom) for the period 1996-1999. Due to the limited availability of the ultimate ownership data, my analyses are performed only for the single sample year, i.e., 1996. Similar to Leuz, Lins and Warnock (2009), for the Western European firms with ownership data available for one of three years 1997-1999, I assume that the ownership structure is stable over years and take the ownership data for years 1997-1999 as that for year 1996.

I identify the ultimate owners according to the procedure in La Porta, Lopez-de-Silanes, Shleifer and Vishny (1999). While the voting right indicates the capability of controlling shareholders to expropriate, their cash flow rights are linked to the incentive to expropriate minority shareholders. I define control-ownership wedge as the ratio of voting rights to cash flow rights for the ultimate shareholder and use it as the firm-level agency cost proxy. For 440 firms, both cash flow rights and voting rights for controlling shareholders are above 50%. These firms form a special group of firms with a divergence between control and ownership. To capture the true nature of the absolute control, I set voting rights to be equal to 100% for

these firms, because even with less than 100% of cash flow rights, controlling shareholders have absolute control over corporate decisions.[30]

I obtain financial data from *Worldscope* and firm value data from *Datastream* database. I start with the firms that are included in Claessens et al. (2000) and Faccio and Lang (2002), and delete the following firms: (1) firms with missing SEDOL code; (2) financial institutions, SIC code 6000-6999); (3) firms with missing values for ownership structures; (4) firms with voting rights smaller than 5%, i.e., an ultimate shareholder is defined as the shareholder who holds at least 5% of the voting rights of the firm and who is not controlled by anybody else); (5) firms that have missing values for capital expenditure, net property, plant, and equipment, total asset, market capitalization, revenue, and data required to compute cash flow from operation and Tobin's *q*. R&D expenditure is set to be zero if missing.(6) firms with non-positive total asset or book value of equity, e.g., Khan and Watts (2009).The final sample comprises 2,861 firms across 22 countries for year 1996.

To mitigate the effects of extreme values in the regressions, I winsorize all financial variables at the bottom and top 1% levels. Appendix C.2 provides the distribution of the sample firms by country.

4.3.2. Baseline regression

Following Chen, Goldstein and Jiang (2007), I use a firm-level cross-sectional regression for testing my hypothesis:

$$I_{i,t} = \alpha_0 + \beta_1 q_{i,t-1} + \beta_2 Wedge_{i,t-1} + \beta_3 q_{i,t-1} Wedge_{i,t-1} + \beta_4 CF_{i,t}$$

[30] For example, a firm with 51% of voting rights and 51% of cash flow rights should not be considered as having a wedge of one. Thus, we set voting rights equal to 100% when voting rights is larger than 50%.

$$+ \beta_5 MKTCAP_{i,t} + \beta_6 RETURN_{i,t+1} + \beta_7 1/ASSET_{i,t-1}$$

$$+ (Industry\ Dummy) + (Country\ Dummy) + \varepsilon \qquad (4.1)$$

where $I_{i,t}$ is corporate investment for firm i in year t. I have three measures for corporate investment: (i) *CAPX* is the capital expenditure scaled by beginning-of-year total assets; (ii) *CAPXRND* is *CAPX* plus *R&D* expenditure scaled by beginning-of-year total assets. If *R&D* expenditure is missing, I assign a zero value to *R&D*; (iii) *CHGPPE* is the change in PP&E scaled by beginning-of-year total assets. Control-ownership wedge (*Wedge*), measured as the ratio of voting rights over cash flow rights by the ultimate controlling shareholder, captures the leverage effect of voting rights exceeding cash flow rights. The wedge indicates the extent to which controlling shareholders can exercise their control without suffering proportional cash flow consequences.

Based on prior studies on investment, I include the following control variables in the baseline regression models. To account for the well-documented cash flow impact on investment (e.g., Fazzari, Hubbard, and Petersen, 1988; Wei and Zhang, 2008), I include cash flow from operation (*CF*), measured as net income before extraordinary item *minus* change in current asset *plus* change in current liability *plus* change in cash and equivalents *minus* change in debt in current liability *plus* depreciation and amortization expense, scaled by beginning-of-year assets. To account for the insiders' market timing tendency that insiders invest more when their stock is overpriced and future return is lower, I follow Roll, Schwartz, and Subrahmanyam (2009)'s method by including one-year leading annual return (*RETURN*). To isolate the correlation between investment and Tobin's *q* induced by

common scaling variable (Chen, Goldstein and Jiang, 2007), I include *1/ASSET*. I include market capitalization to control for the firm size effect. Industry and country dummy variables are included in the models to control the industry and country effect. Appendix C.1 provides the detailed definitions of all the variables included in Eq. (4.1).

4.3.3. Descriptive statistics

Table 4.1 provides descriptive statistics. The primary variable of interest is the divergence between voting rights and cash flow rights for ultimate controlling shareholders. On average, voting rights exceed cash flow rights by about 10%. Cash flow right has a mean of 24.81% and a median of 19.40%, whereas voting right has a mean of 34.11% and a median of 23.29%. *Wedge* has a mean of 1.76 and a median of 1.11. Not shown in the table, there is no deviation of voting rights from cash flow rights for 46.66% of my sample firms (i.e., *Wedge* = 1).

Table 4.2 reports correlation matrix among investments and other key variables. Among three measures of investment, *CAPX*, *CAPXRND* and *CHGPPE* are positively correlated with each other and significant at the 1% level. Lagged *q* is positively correlated with each of the investment measures at the 1% significance level, consistent with the *Q*-theory of investment. Cash flow rights are significantly positively correlated with three measures of investments. Both voting rights and cash flow rights are positively correlated with *CAPX* and *CAPXRND* with 1% significance level, but are not significantly correlated with *CHGPPE*.

Among the variables that may have potential moderating effects on the relation between control-ownership wedge and investment sensitivity to stock price, I have the following observations. First, *Wedge* is negatively correlated with dividend yield (*DIV*) at the 1% significance level. This suggests that controlling shareholders tend to withhold dividends, a finding consistent with La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000) and Faccio and Lang (2002) that dividends can attenuate the agency problems by removing resources that would otherwise be diverted to controlling shareholders for their private benefits. Second, *Wedge* is positively associated with cash holdings (*CASH*) at the 10% significance level, consistent with the finding of Kalcheva and Lins (2007) that controlling shareholders of firms with extreme managerial agency problems tend to hold more cash. Third, *Wedge* is positively correlated with *R&D* intensity, suggesting that controlling shareholders of high-wedge firms may prefer intangible assets which are easier to appropriate (Durnev and Kim, 2005).

(INSERT TABLES 4.1 AND 4.2 HERE)

4.4. Main empirical results

In this section, I conduct regression analysis to examine the relation between control-ownership wedge and the sensitivity of investment to stock prices.

I begin the analysis of the impact of control-ownership wedge on the investment sensitivity to stock prices. Following Chen, Goldstein and Jiang (2007), I use $q_{i,t-1}$ as an explanatory variable that interacts with *Wedge*. The main regression is

given by Eq. (4.1). The test on the impact of control-ownership wedge centers on the sign of β_3. The hypothesis *H4.1* translates as $\beta_3<0$.

I estimate Eq. (4.1) and report the results in Table 4.3. Throughout the study, to alleviate a concern about potential serial correlation in the data, I report *t*-statistics that are adjusted using robust standard errors for clustering at the country level (Petersen, 2009). Consistent with Chen, Goldstein and Jiang (2007), the coefficient for $q_{i,t-1}$ is positive at the 1% significance level. Among the control variables, cash flow from operation (*CF*) is positively related to the measures of investment, consistent with the prior studies that investments are positively related to cash flows (Wei and Zhang, 2008). *MKTCAP* is positively related to the investment measures. Different from Roll, Schwartz, and Subrahmanyam (2009), I find that the estimated coefficient of *RETURN* is positive and significant although the models which could indicate that timing the market may not be a majority concern for investment decisions when other factors are considered.

Regarding the main variables of interest, $q_{i,t-1}$ $Wedge_{i,t-1}$, the estimated coefficient of β_3 is significant with an expected sign at the 5% level (-0.0032 with t = -2.14) when *CAPX* is used as dependent variable. The coefficient of β_3 is -0.0005 (significant at the 10% level) when *CAPXRND* is used as the dependent variable, and is -0.0051 (significant at the 1% level) when *CHGPPE* is used as the dependent variable. This confirms the hypothesis that the divergence between voting rights and cash flow rights reduces the effectiveness of learning from stock price. In other words, the relative importance of the information impounded in the stock price to insiders' private information would be lower when firms with a greater control-

ownership wedge make investment decisions. The overall investment sensitivity to stock price is captured by $\beta_1 + \beta_3$ *Wedge*. Given that *Wedge* at the 75th percentile is 1.8536, the investment sensitivity to stock price remains positive when the wedge reaches its 75th percentile (0.0082 - 0.0032x1.8536 = 0.0023). This suggests that firms with a relatively high control-ownership wedge still follow stock price to guide their investments. However, when the wedge reaches its 95th percentile at 5.00, the investment sensitivity to stock price is no longer positive (0.0082 - 0.0032x5.00 = -0.0078).

The results have several implications: First, controlling shareholders for these high-wedge firms tend to pursue non-value-maximizing activities in order to extract private control benefits. Thus, they choose to deviate from the optimal level of investment implied by the stock price. Eventually the information about controlling shareholders' actions flows from insiders to the market, possibly with a delay. Second, because insiders have incentives to camouflage their action for extracting private benefits as suggested by Fan and Wong (2002), firms with higher control-ownership wedge would have a less informative stock price. Thus, private information by outside investors remains unknown to corporate insiders, whereas private information by insiders would matter more in making corporate investment.

Overall, the results suggest that ownership and control structure of a firm is an important determinant for the tendency of firms to follow the market. The results are consistent with the view that potential agency problems between controlling and minority shareholders cause a reduction in learning from the stock market. Since the

regression results using three different investment measures are, overall, qualitatively similar, I use *CAPX* as the dependent variable in the following analysis.

(INSERT TABLE 4.3 HERE)

4.5. Extending basic tests to additional factors

The negative impact of the control-ownership wedge on investment sensitivity to stock price raises an interesting question: whether this result is mainly driven by the conflicts of interest between controlling and minority shareholders. To provide additional evidence on my main finding, I further investigate whether investment sensitivity to stock price is conditioned by other factors that are known to influence the conflicts of interest between the two types of shareholders.

4.5.1. Dividend

Dividend plays an important role in resolving the conflicts of interest between controlling and minority shareholders. In particular, dividends remove resources that are prone to expropriation by controlling shareholders and thus dividend payouts can be perceived as a commitment for controlling shareholders to refrain from expropriating minority shareholders.[31] Faccio, Lang and Young (2001) examine East Asian and European economies to study the expropriation of outside shareholders by controlling shareholders. They find that dividends are higher for firms with more severe agency problems of control-ownership wedge. Kalcheva and

[31] "Insofar as dividends are paid on a pro rata basis, they benefit outside shareholders relative to the alternative of expropriation of retained earnings" (La Porta et al., 2000, p.2). They show that dividends are higher in countries with better investor protection, especially for low-growth firms, as minority shareholders in such environment would use their legal power to extract dividends from firms.

Lins (2007) confirm that dividends are negatively linked to firm-level agency problems. As a result, investors would pay a premium for firms with high dividend in weak governance regimes (Pinkowitz, Stulz and Williamson, 2006).

I expect that increasing dividend payouts would partially alleviate the negative impact of control-ownership wedge on investment sensitivity to stock price. Panel A of Table 4.4 reports the results of estimating the baseline regression in Eq. (4.1) for each dividend-sorted quartile portfolio. The test focuses on the coefficient for $q_{i,t-1}Wedge_{i,t-1}$ and the results show an interesting trend: the coefficients for $q_{i,t-1}Wedge_{i,t-1}$ is significantly negative at the 1% level only for the lowest dividend quartile, i.e., Q1 (-0.0073 with t = -3.25), while it is marginally significantly negative for Q2, insignificant for Q4, and significantly positive for Q3. This result lends further support to the view that that agency problem associated with control-ownership wedge is exacerbated for firms with low dividend payments. Put differently, the conflict of interest between controlling and minority shareholders is likely to be an important driver for a reduction in investment sensitivity to stock price. A low dividend payment would be perceived as a warning sign for potential expropriation of minority shareholders. The finding is thus consistent with Francis, Schipper and Vincent (2005) that dividends convey additional information for firms with control-ownership wedge.

4.5.2. Cash holding

Next, I examine whether corporate cash holdings moderate the negative impact of the control-ownership wedge on investment sensitivity to stock price.

Prior studies link cash holdings to the intensity of expropriation of minority shareholders by controlling shareholders. Kalcheva and Lins (2007) find that controlling shareholders tend to hold more cash especially for countries with weak investor protection. Pinkowitz, Stulz and Williamson (2006) show that diverting cash for private uses is easier than to steal a plant; thus, cash holdings facilitate controlling shareholders to extract Private control benefits. As a result, the marginal value of cash holding decreases in the divergence between insiders' voting and cash flow rights (Masulis, Wang and Xie, 2007).

I estimate the baseline regression in Eq. (4.1) on each quartile portfolio sorted by cash holdings and report the results in Panel B of Table 4.4. As expected, the coefficients for $q_{i,t-1}Wedge_{i,t-1}$ decrease monotonically from the lowest cash-holding quartile (Q1) to the highest one (Q4). In particular, the coefficient for Q4 is negative at the 1% significance level. This suggests that high cash holdings tend to strengthen the negative association between *Wedge* and investment sensitivity to stock price. I attribute this finding to an aggravated agency problem associated with control-ownership wedge.

4.5.3. R&D intensity

I further investigate whether R&D intensity affects the impact of control-ownership wedge on the investment sensitivity to stock price. There are two reasons to consider R&D intensity. First, R&D expenditure is a major contributor to information asymmetry: R&D projects are unique to the developing firm such that it is difficult for outside investors to learn about the benefits of the R&D investment by observing the R&D performance of related firms (Aboody and Lev, 2000). Also,

since R&D is expensed immediately, no information on changes in productivity of R&D is reported in financial statements. Furthermore, the risk effect of R&D expenditure could dominate its benefits, and R&D investment generates future benefits that are far more uncertain than benefits from investments in PP&E (Shi, 2003; Kothari, Laguerre and Leone, 2002). Second, R&D spending is one important type of 'soft' capital input and is therefore vulnerable to managerial discretion (Himmelberg, Hubbard and Palia, 1999). Thus, R&D expenditure is used to proxy for the cost of diversion.[32]

Taken together, learning from stock price for R&D intensive firms is likely to be less effective and the firm's investment is more likely to subject to agency problems associated with control-ownership wedge. Thus, I expect that the negative impact of control-ownership wedge on the investment sensitivity to stock price would be accentuated for R&D intensive firms. To test this conjecture, I rank my sample (with non-zero capitalized R&D) by capitalized R&D, *CAPRD* (Chan, Lakonishok, and Sougiannis, 2001) and run the baseline regression in Eq. (4.1) on each *CAPRD*-sorted quartile portfolio.

$$CAPRD_{i,t} = RD_{i,t} + 0.8RD_{i,t-1} + 0.6RD_{i,t-2} + 0.4RD_{i,t-3} + 0.2RD_{i,t-4} \qquad (4.2)$$

Panel C of Table 4.4 reports the results for *CAPRD*-sorted quartiles to investigate the impact of R&D intensity on investment sensitivity to stock price. While all the coefficients for $q_{i,t-1}$ are positive, only the coefficient for the lowest quartile is positive at the 1% significance level (0.01346 with t = 2.58). This confirms that R&D investments are firm-specific and thus stock price is less useful

[32] Durnev and Kim (2005) argue that "intangible assets are hard to monitor and easier to steal" (p.1471).

in guiding investments for firms with high R&D intensity. Turning to the main variable of interest, $q_{i,t-1}Wedge_{i,t-1}$, I find that its coefficient is negative at the 1% significance level only for the highest two R&D quartiles (-0.0032 with t = -7.20 for Q4; -0.0111 with t = -2.46 for Q3), whereas it is positive and significant for the lowest two R&D intensity quartiles. This is consistent with the notion that R&D intensity exacerbates the agency problem of control-ownership wedge.

(INSERT TABLE 4.4 HERE)

4.6. Robustness checks

To ensure the validity of my results, I conduct a number of robustness checks in this session. Since the learning is achieved through the revelation of new information in stock prices over a certain time period, changes in stock price (Δq) could do a better job than q itself to capture the effect of learning from outside investors. Dow and Gorton (1997) argue that lagged stock returns outperform q in predicting investment. Thus, I can have an alternative test of my hypothesis with Δq. To the extent that insider's private information is relatively stable over time, Δq would capture mostly the private information formerly held by outside investors and revealed in the stock market. A comparison of the results in Table 4.3 and column 1 of Table 4.5 shows that the results using Δq in place of q are qualitatively similar to those using q.

I note that Japanese and the U.K. firm-year observations account for 17.83% and 23.77% of my overall sample, respectively. I re-estimate all regressions using the weighted least square (WLS) procedure to check whether my results are unduly

influenced by the unequal size of country samples across different countries. As shown in Appendix C.1, the number of observations for each country varies from 680 for U.K. to 33 for Portugal in my sample. The results of the OLS regressions presented in Tables 3 could thus be affected by a large number of sample firms from a few countries such as Japan and U.K.. To address this issue, I re-estimate the regression using the following weighting schemes: [1/the number of firms in each country] *times* the number of countries in my sample (which is 22). As shown in column 2 of Table 4.5, the WLS results are qualitatively identical to the corresponding OLS results that are reported in Table 4.3. This suggests that the OLS results reported in Table 4.3 are robust to the unequal distribution of sample firms across different countries.

However, when I split the sample into East Asia and Western Europe subsamples, the results are different. As shown in columns 3 and 4 of Table 4.5, while the lagged *q* is positive and significant for the Western Europe subsample, it is no longer significant for the East Asia subsample. The interaction term between lagged *q* and *Wedge* is negative and significant for the Western Europe subsample, but insignificant for the East Asia subsample. Thus, it appears that the stock market plays a weaker role in capital allocation in East Asian countries, compared with the same role in Western European countries. This is consistent with the finding of Faccio, Lang and Young (2001) that other large shareholders in Western Europe help contain the controlling shareholder's expropriation of minority shareholders, but large shareholders in East Asia collude in the expropriation.

(INSERT TABLE 4.5 HERE)

So far my analysis implicitly assumes that ownership variables are exogenously determined. In reality, ownership structure evolves over time. Helwege, Pirinsky and Stulz (2007) find that U.S. firms tend to become widely held in ten years after their IPOs. There is a possibility for a reverse causality for the impact of control-ownership wedge on investment sensitivity to stock price. Controlling shareholders could change the ownership structure in response to a change in a firm's investment opportunities. For example, if investment opportunities, captured by q, increase, controlling shareholders may intend to increase their cash flow rights and therefore decreasing the wedge. Thus, controlling shareholders have more incentives to invest optimally and avoid over-investment. In this case, I may observe a negative relation between investment and the interaction of lagged q and *Wedge*. However, I argue that endogeneity issue is not a major concern because it is unlikely that controlling shareholders adjust their cash flow rights and voting rights in anticipation of changes in the firm's fundamentals.

4.7. Control-ownership wedge and stock price informativeness: further analysis

Recent research finds that investment sensitivity to stock price is a function of stock price informativeness (Chen, Goldstein and Jiang, 2007; Luo, 2005). In this section, I perform further empirical tests by explicitly considering the effect of stock price informativeness.

Informative stock price is only a necessary condition for the learning from the stock market. On the one hand, if stock prices contain little or no information about a firm's growth opportunities, its investment decisions do not respond to stock

prices, then control-ownership wedge does not matter.[33] On the other hand, if stock prices are highly informative, then whether the firm's investments follow stock prices still depends on the interest alignment between corporate insiders and minority shareholders. Controlling shareholders may choose to ignore the signals from the stock market and invest sub-optimally in order to extract private control benefits. Thus, I expect that control-ownership wedge reduces investment sensitivity to stock price, only for firms with relatively more informative stock prices.

I test this prediction by partitioning the sample by stock price informativeness and run the baseline regression Eq. (4.1). Stock price informativeness (*SPI*) is captured by firm-specific return variation that reflects the impounding of firm-specific information into stock price (Morck, Yeung and Yu, 2000). Table 4.6 presents the regression results for two *SPI*-subsamples. The coefficients on $q_{i,t-1}$ are significant and positive for firms with high stock price informativeness, but not for those with low stock price informativeness. The contrasting result confirms my conjecture that the learning from the stock market exists only when stock prices are relatively informative. More interestingly, the coefficients on *Wedge*q* are negative and significant for firms with high stock price informativeness, but only marginally significant for those with low stock price informativeness. This is consistent with my prediction that informative stock prices are a necessary condition for corporate insiders to follow stock prices in making their investment decisions; when the agency problem is severe or control-ownership wedge is high, corporate insiders tend to deviate from the optimal investment,

[33] For example, Wang, Wu and Yang (2009) find that corporate investments do not respond to stock prices in China and they argue that it is because stock prices contain little information about future growth opportunities.

signaled by stock prices, in order to extract private control benefits. Overall, my findings suggest that the agency problem of concentrated control is an additional determinant of the learning from the stock market, beyond the effect of stock price informativeness as shown in Chen, Goldstein and Jiang (2007).

(INSERT TABLE 4.6 HERE)

4.8. Control-ownership wedge and firm performance

So far, I find that the learning from the stock market in making investment decisions is adversely affected by the divergence between controlling shareholders' voting rights and cash flow rights. It is therefore natural to investigate whether such negative impact of control-ownership wedge also affects firm performance.[34] I address this issue in this section.

Wei and Zhang (2008) conclude that firms with higher wedge-related agency problems would suffer from overinvestment through testing investment sensitivity to cash flow. Making selective corporate investment decisions is one possible channel for controlling insiders to secure private control benefits at the expense of outside minority shareholders. The deviation of corporate investment from its optimal level could partially explain the observed low investment sensitivity to stock prices. I speculate that a lack of effective learning from the stock market and poor investment decisions lead to poor firm performance. To examine how control-ownership wedge affects the contribution of corporate investment to firm performance, I employ the

[34] Roll, Schwartz and Subrahmanyam (2009) examine the effect of option trading on investment sensitivity to stock price as well as on firm performance. They find that option trading improves the learning from the stock market and has a positive impact on firm valuation.

framework used by Masulis, Wang and Xie (2009). The regression model is specified as follows:

$$Performance_{i,t(t+1,\ t+2)} = \alpha_0 + \beta_1 CAPX_{i,t} + \beta_2 WEDGE_{i,t} + \beta_3 CAPX_{i,t} WEDGE_{i,t} + \beta_4 CF_{i,t} + \beta_5 MKTCAP_{i,t} + \beta_6 LEV_{i,t} + \beta_7 SGROWTH_{i,t} + (Industry, country\ dummies) + \varepsilon_{i,t} \quad (4.3)$$

Table 4.7 presents the regression results of Eq. (4.3). The dependent variables are *ROA* of year t, t+1, t+2 through Column 1 - 3 and *RETURN* of year t, t+1, t+2 through Column 4 - 6. I find that capital expenditure has a significantly positive impact on current and future *ROA*, indicating that, on average, corporate investment increases operating performance, whereas I find no obvious or significant relation between corporate investment and future stock returns. More importantly, the coefficient of interaction term between corporate investment and control-ownership wedge is significantly negative through Columns 2 to 5, suggesting that control-ownership wedge leads to poor investment decisions and therefore negatively affects firm performance. In sum, I find that capital expenditure contributes significantly less to firm performance for firms with greater divergence between voting rights and cash flow rights. The evidence is consistent with theoretical expectation that controlling shareholders of these firms are more likely to make sub-optimal investments to extract private control benefits.

(INSERT TABLE 4.7 HERE)

4.9. Conclusion

In this study, I investigate the role of the stock market in allocating resources in an international setting where expropriation of minority shareholders is a major concern. I hypothesize that control-ownership wedge reduces the effectiveness of a firm's learning from the stock market. My findings support the hypothesis and suggest that agency problems associated with control-ownership wedge, a prevalent feature of corporate ownership structure in East Asia and Western Europe, generate sub-optimal investments and make stock price less informative, thereby diminishing the role of the stock market in guiding corporate investment.

To further validate my finding that agency costs of control-ownership wedge contribute to the weakening of investment sensitivity to stock price, I examine the factors that are known to affect the intensity of the agency problem: dividend payouts, corporate cash holdings and R&D intensity. My evidence lends further support for the hypothesis that control-ownership wedge affect insiders' propensity to learn from stock prices. In addition, my evidence on the effect of control-ownership wedge for firms with high stock price informativeness on investment sensitivity to stock price further suggests that agency-cost based explanation of investment sensitivity to stock price goes beyond prior studies such as Chen, Goldstein and Jiang (2007). Thus, incentives for private control benefits are an important consideration for the stock market to play a critical role in capital allocation. I also find that the agency problem of control-ownership wedge reduces the contribution of investment to firm performance. Taken all these results together, this study puts forward strong evidence that agency problems associated with

control-ownership wedge are an incrementally important factor that determines the effectiveness of learning from the stock market.

In a different context, Doidge, Karolyi and Stulz (2004) propose the *bonding* hypothesis that controlling shareholders refrain from extracting private control benefits after their shares are cross listed on the organized U.S. exchanges. Such cross-listing enhances the role of stock market for guiding the corporate investment (Foucault and Gehrig, 2008). My results complement these two studies in that they provide evidence on the trade-off relation between private control benefits and informationally efficient market to achieve allocational efficiency.

Besides control-ownership wedge, there could be other unobserved fundamental factors that determine both ownership structure and the role of the stock market in guiding investment decisions. For example, firms may choose to go public instead of private placement when the demand for public information exceeds the incremental cost of going public (Maug, 2001). The decreasing information advantage of corporate insiders is accompanied by a more dispersed ownership (Helwege, Pirinsky and Stulz, 2007). Thus, the firm's technology, product market competition, and the scope of its market may jointly determine the degree of its ownership structure and its dependence on the stock market for information gathering. I leave these intriguing issues to future research.

(INSERT APPENDIX C.1 and C.2 HERE)

Chapter 5

Conclusion and Future Research Opportunities

This thesis has investigated issues on stock return comovement and corporate investment in the international stock markets. The main findings are summarized as follows: The first essay finds that the agency cost of the divergence between voting rights and cash flow rights causes the incentives for asymmetric disclosure of good and bad news, thereby increasing stock return comovement, and influencing the likelihood of extreme stock returns. The empirical evidence is consistent with the theoretical argument of "insiders' withholding of good news" in Jin and Myers (2006). The second essay shows that foreign institutional investors, U.S. institutional investors in particular, with sufficiently large stakeholdings and frequent trading can cover the high fixed costs for producing firm-specific information, thereby reducing stock return comovement. The empirical evidence is consistent with the information-driven comovement theory in Veldkamp (2006).

The first two essays of this thesis are separately built upon the two perspectives based on the theoretical models of Jin and Myers (2006) and Veldkamp (2006), respectively. The former focuses on insiders' incentives for private control benefits, while the latter focuses on outside investors' information choices. My empirical findings strongly support both models. Thus my findings have important implications for practitioners that firms should consider the informational consequence of ownership structure and institutional investment in global stock markets.

The third essay finds that the agency costs of concentrated control weakens the propensity of firms to follow the stock market in making investment decisions. Informative stock prices can facilitate efficient financing and investment decisions, while insiders would ignore the information content of stock prices and reach sub-optimal decisions due to agency problems. Thus third essay may provide some insights on the weakened role of financial markets in non-U.S. economies.

My future research can be carried out in the following areas. First, the investigation of the impact of insiders' asymmetric disclosure incentives on stock return comovement for the non-U.S. firms can be extended to the U.S. firms with dual class share structure. Firms with dual class shares have a divergence between voting rights and cash flow rights and end up with potentially extreme agency problems (Masulis, Wang and Xie, 2009). Thus, it would be interesting to examine whether the U.S. firms under a strong investor protection still experience similar agency consequence of asymmetric disclosure incentives.

Second, the finding that foreign (especially U.S.) institutional investors with large stakeholdings and/or trading frequency contribute more to the impounding of firm-specific information into stock price motivate a further investigation into its implication. Specifically, can the presence of such institutional investors translate their information advantage into superior returns? I expect that stocks held by these institutional investors would outperform other stocks.

Third, it is a natural extension to investigate whether market liquidity affects the role of stock price in guiding corporate investments by examining investment sensitivity to stock price. On the one hand, market liquidity leads to a more

informative stock price, thereby making corporate investment more effective. On the other hand, market liquidity discourages active monitoring, thereby making investment deviate more from its optimal level. Thus, the net effect of market liquidity on investment sensitivity to stock price would be an empirical issue.

Appendices

Appendix A.1
Variable definitions

Wedge is voting rights over cash flow rights of the largest controlling shareholder.

Cash Flow Rights is the ultimate cash flow rights of the largest controlling shareholder.

Voting Rights is the ultimate voting rights of the largest controlling shareholder.

Firm-Specific Weekly Return is equal to *ln*(1+*residual*), where the residual is from the augmented market model regression:

$$r_{i,t} = \alpha_i + \beta_{1,t} r_{m,j,t-1} + \beta_{2,t}(r_{us,t-1} + e_{j,t-1}) + \beta_{3,t} r_{m,j,t} + \beta_{4,t}(r_{us,t} + e_{j,t}) + \beta_{5,t} r_{m,j,t+1} + \beta_{6,t}(r_{us,t+1} + e_{j,t+1}) + \varepsilon_{i,t}$$

SPI is a measure of firm-specific information arriving to the security market based on R^2 from the augmented market model regression. Specifically, $SPI = ln((1 - R^2)/R^2)$.

JUMP is an indicator variable equal to 1 if a firm experiences one or more *Firm-Specific-Weekly Return* rising 3.00 or more standard deviations above the mean of *Firm-Specific-Weekly Return* within a year and equal to zero otherwise.

CRASH is an indicator variable equal to 1 if a firm experiences one or more *Firm-Specific-Weekly Return* falling 3.00 or more standard deviations below the mean of *Firm-Specific-Weekly Return* within a year and equal to zero otherwise.

CAAR is the cumulative absolute value of abnormal returns over the three-day event window (-1, 1), or five-day event window (-2, +2), relative to the annual earnings announcement date reported in I/B/E/S summary database. The abnormal return over the estimation window is the residual returns from the firm's market model estimated over (-120, -10).

DIVERS is the number of business segments.

VARROA is the logarithmic transformation of the R^2 from a regression of a firm's yearly return on assets on a value-weighted market index of ROA, and is estimated using 9 yearly observations in each firm-specific regression.

HERF is revenue-based Herfindahl index of industry-level concentration.

NIND is the natural log of the number of firms in each industry used to calculate *HERF*.

STDROA is the standard deviation of ROA measured over the past three years including current year.

ACCR is the absolute value of total accounting accruals scaled by the absolute value of operating cash flows.

LOSS is equal to 1 if net income before extraordinary is negative and 0 otherwise.

MKTCAP is the natural log of market capitalization at the end of the year (in USD, $million).

NAF is the number of analysts issuing forecasts for the firm during the fiscal year.

VOL is the average monthly share turnover over the current year, where share turnover is calculated as the monthly trading volume divided by total number of shares outstanding during the month.

DTURN is the average monthly share turnover over the current year, minus the average monthly share turnover over the previous year, where monthly share turnover is calculated as the monthly trading volume divided by total number of shares outstanding during the month.

CSKEW is the skewness of the *Firm-Specific-Weekly Return* over the current year. A larger positive (negative) value is associated with a stock that has a more right-skewed (left-skewed) return distribution.

SIGMA is the standard deviation of the *Firm-Specific-Weekly Return* over the current year.

RET is the mean of the *Firm-Specific-Weekly Return* over the current year.

ROA is the income before extraordinary items divided by the beginning-of-year total asset.

MB is the ratio of market value of equity to the book value of equity at the end of the year.

Surprise is unexpected earnings, calculated as the difference between actual earnings and consensus earnings forecast divided by lagged price. Consensus EPS is estimated as the mean of one-year ahead EPS forecast issued over the three months prior to fiscal year end. If one analyst issues more than one estimate during the three months prior to fiscal yearend, we take the latest value.

DISP is the standard deviation of the analysts' earnings forecasts, scaled by the year-end price.

REPLAG is earnings reporting lags, calculated as the number of days from the fiscal year-end to the earnings announcement date reported by I/B/E/S.

LEV is the book value of long-term debt scaled by the sum of market value of equity and book value of long-term debt at the end of the year.

IO_TOTAL is total institutional ownership, calculated as the sum of the number of share holdings of all institutions in a stock divided by total number of shares outstanding at the end of the first quarter of 1997. We exclude the observations with total institutional ownership larger than 100%.

IO_HIGH is the sum of the number of share holdings of institutions with more than 5% stake in a stock, divided by total number of shares outstanding at the end of the first quarter of 1997.

IO_MEDIUM is the sum of the number of share holdings of institutions with a stake between 1% and 5% in a stock, divided by total number of shares outstanding at the end of the first quarter of 1997.

IO_LOW is the sum of the number of shares holdings of institutions with less than 1% stake in a stock, divided by total number of shares outstanding at the end of the first quarter of 1997.

IO_LARGE is the number of share holdings of the institution with the largest stock in a stock, divided by total number of shares outstanding at the end of the first quarter of 1997.

Appendix A.2
Sample distribution by country

Country	AUT	BEL	CHE	DEU	ESP	FIN	FRA	
N. firms	38	32	67	27	34	21	207	
Country	GBR	HKG	IDN	ITA	JPN	KOR	MYS	
N. firms	295	72	52	67	623	91	57	
Country	NOR	PHL	PRT	SGP	SWE	THA	TWN	*Total*
N. firms	50	26	27	63	54	56	57	2016

Note:

AUT	Austria	JPN	Japan
BEL	Belgium	KOR	Korea
CHE	Switzerland	MYS	Malaysia
DEU	Germany	NOR	Norway
ESP	Spain	PHL	Philippines
FIN	Finland	PRT	Portugal
FRA	France	SGP	Singapore
GBR	U.K.	SWE	Sweden
HKG	Hong Kong	TWN	Taiwan
IDN	Indonesia	THA	Thailand
ITA	Italy		

Appendix B.1
Variable definitions

SPI is a measure of firm-specific information arriving to the securities market based on R^2 from the expanded market model regression:

$$r_{i,t}=\alpha_j+\beta_{1,t}r_{m,j,t-1}+\beta_{2,t}(r_{us,t-1}+e_{j,t-1})+\beta_{3,t}r_{m,j,t}+\beta_{4,t}(r_{us,t}+e_{j,t})+\beta_{5,t}r_{m,j,t+1}+\beta_{6,t}(r_{us,t+1}+e_{j,t+1})+\varepsilon_{j,t}$$

Specifically, $SPI = ln((1-R^2)/R^2)$.

DIVERS is the number of business segments.

HERF is revenue-based Herfindahl index of industry-level concentration.

NIND is the natural log of the number of firms in each industry used to calculate *HERF*.

STDROA is the standard deviation of ROA measured over past five years including current year.

ACCR is the absolute value of accounting accruals scaled by the absolute value of operating cash flow.

LOSS is equal to 1 if net income before extraordinary is negative and 0 otherwise.

MKTCAP is the natural log of market capitalization at the end of the year (in USD, $million).

NAF is the number of analysts issuing forecasts for the firm during the fiscal year.

VOL is annual share turnover over the current year, where share turnover is calculated as the trading volume divided by total number of shares outstanding during the year.

MB is the ratio of market value of equity to the book value of equity measured at the end of the year.

INVOP is calculated as market value of equity plus book value of asset minus book value of equity, scaled by book value of asset.

LEV is the book value of long-term debt scaled by the sum of market value of equity and book value of long-term debt at the end of the year.

CASH is cash and equivalents, scaled by beginning-of-year assets.

VOLA is the volatility estimated as the standard deviation of monthly returns over the previous two years.

AGE is firm age, calculated as the log of number of months since first return appears in Datastream.

DP is dividend yield, calculated as cash dividend divided by share price.

PRICE is share price from Datastream.

RELlag12 is cumulative gross return over the past 12 months.

IndustryDummies is industry indicators based on two-digit SIC code.

Appendix B.2
Definition of long-term and short-term institutional investors

Yan and Zhang (2009) classify institutional investors into short-term and long-term investors on the basis of their portfolio turnover (churn rate) over the past four quarters. Specifically, each quarter, first calculate the aggregate purchase and sale for each institution:

$$CR\_buy_{k,t} = \sum_{i=1}^{N_k} | S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\Delta P_{i,t} |, S_{k,i,t} > S_{k,i,t-1} \quad \text{(a)}$$

$$CR\_sell_{k,t} = \sum_{i=1}^{N_k} | S_{k,i,t}P_{i,t} - S_{k,i,t-1}P_{i,t-1} - S_{k,i,t-1}\Delta P_{i,t} |, S_{k,i,t} <= S_{k,i,t-1} \quad \text{(b)}$$

where $P_{i,t}$ is the share price for stock i at the end of quarter t, and $S_{k,i,t}$ is the number of share of stock i held by investor k at the end of quarter t, respectively. $CR\_buy_{k,t}$ and $CR\_sell_{k,t}$ are institution k's aggregate purchase and sale for quarter t, respectively. Institution k's churn rate for quarter t is then defined as:

$$CR_{k,t} = \frac{\min(CR\_buy_{k,t}, CR\_sell_{k,t})}{\sum_{i=1}^{N_k} \frac{S_{k,i,t}P_{i,t} + S_{k,i,t-1}P_{i,t-1}}{2}} \quad \text{(c)}$$

Next, we calculate each institution's average churn rate over the past four quarters as:

$$AVG\_CR_{k,t} = \frac{1}{4}\sum_{j=0}^{3} CR_{k,t-j} \quad \text{(d)}$$

Given the average churn rate measure, each quarter we sort all institutional investors into three tertile portfolios based on $AVG\_CR_{k,t}$. Those who ranked in the top tertile with highest average churn rate are classified as short-term institutional investors, and those who ranked in the bottom tertile with lowest average churn rate are classified as long-term institutional investors. Finally, for each stock, we define the short-term (long-term) institutional ownership (hereafter *IO_LONG* and *IO_SHORT*) as the ratio between the number of shares held by short-term (long-term) institutional investors and the total number of shares outstanding.

Appendix B.3
Sample distribution by year and by country

Year	*N. observations*	*Percentage*
1997	1812	0.04
1998	1958	0.05
1999	2481	0.05
2000	3034	0.06
2001	3483	0.05
2002	3959	0.05
2003	4521	0.05
2004	5111	0.06
2005	6549	0.08
2006	7048	0.09
Total	39956	

Country	ARG	AUT	BEL	BMU	BRA	CAN	CHE	CHL	CHN
N. observations	173	277	413	18	460	1992	886	343	281
Country	CZE	DEU	DNK	ESP	FIN	FRA	GBR	GRC	HKG
N. observations	35	2338	491	485	578	2439	382	638	1437
Country	HUN	IDN	IND	IRL	ISR	ITA	JPN	KOR	LUX
N. observations	94	425	860	130	245	1003	14171	1363	37
Country	MYS	NLD	NOR	NZL	PAK	PER	PHL	POL	PRT
N. observations	1313	151	319	160	101	75	256	133	176
Country	RUS	SGP	SWE	THA	TWN	VEN	ZAF		*Total*
N. observations	88	773	771	856	2164	27	599		39956

Note:

ARG	Argentina	ISR	Israel
AUT	Austria	ITA	Italy
BEL	Belgium	JPN	Japan
BMU	Bermuda	KOR	Korea
BRA	Brazil	LUX	Luxembourg
CAN	Canada	MYS	Malaysia
CHE	Switzerland	NLD	Netherlands
CHL	Chile	NOR	Norway
CHN	China	NZL	New Zealand
CZE	Czech Republic	PAK	Pakistan
DEU	Germany	PER	Peru
DNK	Denmark	PHL	Philippines
ESP	Spain	POL	Poland
FIN	Finland	PRT	Portugal
FRA	France	RUS	Russian Federation
GBR	U.K.	SGP	Singapore
GRC	Greek	SWE	Sweden
HKG	Hong Kong	THA	Thailand
HUN	Hungary	TWN	Taiwan
IDN	Indonesia	VEN	Venezuela
IND	India	ZAF	South Africa
IRL	Ireland		

Appendix C.1
Variable definitions

Wedge is voting rights over cash flow rights of the largest controlling shareholder.

Cash Flow Rights (*C*) is the ultimate cash flow rights of the largest controlling shareholder.

Voting Rights (*V*) is the ultimate voting rights of the largest controlling shareholder.

CAPX is capital expenditure, scaled by beginning-of-year assets (%).

CAPXRND is capital expenditure plus R&D, scaled by beginning-of-year assets (%).

CHGPPE is change in Property, Plant and Equipment, scaled by beginning-of-year assets (%).

Q is market value of equity plus book value of asset minus book value of equity, scaled by book value of asset.

DIV is total cash dividends paid, scaled by total asset (%).

CASH is cash and equivalents, scaled by beginning-of-year assets (%).

CAPRD is capitalized *R&D* expense, calculated as the five-year average research and development expense, scaled by beginning-of-year assets (%)

CF is net income before extraordinary item – change in current asset + change in current liability +change in cash and equivalents - change in debt in current liability + depreciation and amortization expense, scaled by beginning-of-year assets (%).

MKTCAP is the natural log of market capitalization at the end of the year (in USD, $million).

RETURN is annual stock return for the next one year.

1/ASSET is the inverse of beginning-of-year assets.

SPI is a measure of firm-specific information arriving to the securities market based on R^2 from the expanded market model regression:
$r_{i,t}=\alpha_j+\beta_{1,t}r_{m,j,t-1}+\beta_{2,t}(r_{us,t-1}+e_{j,t-1})+\beta_{3,t}r_{m,j,t}+\beta_{4,t}(r_{us,t}+e_{j,t})+\beta_{5,t}r_{m,j,t+1}+\beta_{6,t}(r_{us,t+1}+e_{j,t+1})+\varepsilon_{j,t}$
Specifically, $SPI = ln((1-R^2)/R^2)$.

LEV is the book value of long-term debt scaled by the sum of market value of equity and book value of long-term debt at the end of the year.

SGROWTH is annual growth rate in sales revenue (%).

IndustryDummies is industry indicators based on two-digit SIC code.

Appendix C.2
Sample distribution by country

Country	AUT	BEL	CHE	DEU	ESP	FIN	FRA	GBR	
N. firms	34	32	71	269	41	38	224	680	
Country	HKG	IDN	IRL	ITA	JPN	KOR	MYS		
N. firms	114	72	32	75	510	149	83		
Country	NOR	PHL	PRT	SGP	SWE	THA	TWN		*Total*
N. firms	48	42	33	99	58	60	97		2861

Note:

AUT	Austria	ITA	Italy
BEL	Belgium	JPN	Japan
CHE	Switzerland	KOR	Korea
DEU	Germany	MYS	Malaysia
ESP	Spain	NOR	Norway
FIN	Finland	PHL	Philippines
FRA	France	PRT	Portugal
GBR	U.K.	SGP	Singapore
HKG	Hong Kong	SWE	Sweden
IDN	Indonesia	TWN	Taiwan
IRL	Ireland	THA	Thailand

References

References A (Chapter 2)

Aboody, D., Kasznik, R., 2000. CEO stock option awards and corporate voluntary disclosures. Journal of Accounting and Economics 29, 73-100.

Ali, A., Klasa, S., Zhen, L.O., 2008. institutional stakeholdings and better-informed traders at earnings announcements. Journal of Accounting Economics 46, 47-61.

Bae, K.H., Lim, C., Wei, K.C.J., 2006. Corporate governance and conditional skewness in the world's stock markets. Journal of Business 79 (6), 2999-3028.

Bertland, M., Mehta, P., Mullainathan, S., 2002. Ferreting out tunneling: an implication to Indian business groups. Quarterly Journal of Economics 117, 121-148.

Bris, A., Goetzmann, W.N., Zhu, N., 2007. Efficiency and the bear: short sales and markets around the world. Journal of Finance 62, 1029-1079.

Bushee, B.J., 1998. The influence of institutional investors on myopic R&D investment behavior. The Accounting Review 73, 305-333.

Chen, J., Hong, H., Stein, J., 2001. Forecasting crashes: trading volume, past returns, and conditional skewness in stock prices. Journal of Financial Economics 61, 345-381.

Claessens, S., Djankov, S., Lang, L.H.P., 2000. The separation of ownership and control in East Asian corporations. Journal of Financial Economics 58, 81-112.

Cronqvist, H., Fahlenbrach, R., 2008. Large shareholders and corporate policies. Review of Financial Studies 22, 3942-3976.

Dajnkov, S., La Porta, R., Lopez-de-Silanes, F., Shleifer. A., 2008. Law and the economics of self-dealing. Journal of Financial Economics 88, 430-465.

Dimson, E., 1979. Risk measurement when shares are subject to infrequent trading. Journal of Financial Economics 7, 197-226.

Faccio, M., Lang, M.H., 2002. The ultimate ownership of Western European corporations. Journal of Financial Economics 65, 365-395.

Fan, J.P.H., Wong, T.J., 2002. Corporate ownership structure and the informativeness of accounting earnings in East Asia. Journal of Accounting and Economics 22, 401-425.

Fernandes, N., Ferreira, M.A., 2009. Insider trading law and stock price informativeness. Review of Financial Studies 22, 1845-1887.

Fernandes, N., Ferreira, M.A., 2008. Does international cross-listing improve investment efficiency? Journal of Financial Economics 88, 216-244,

Ferreira, M.A., Laux, P.A., 2007. Corporate governance, idiosyncratic risk and information flow. Journal of Finance 62, 951-989.

Ferreira, M.A., Matos, P., 2008. The colors of investors' money: the role of institutional investors around the world. Journal of Financial Economics 88, 99-533.

Haggard, K.S., Martin, X., Pereira, R., 2008. Does voluntary disclosure improve stock price informativeness? Financial Management, 747 -768.

Hameed, A., Morck, R., Shen, J., Yeung, B., 2008. Information market, analyst, and the comovement of stock prices. SSRN Working Paper.

Haw, I.-M., Hu, B., Hwang, L.-S., Wu, W., 2004. Ultimate ownership, income management, and legal and extra-legal institutions. Journal of Accounting Research 42, 423-462.

Hong, H., Stein, J., 2003. Differences in opinion, short sales constraints, and market crashes. Review of Financial Studies 16, 487-525.

Hutton, A.P., Marcus, A.J., Tehranian, H., 2009. Opaque financial reporting, r-square, and crash risk. Journal of Financial Economics 94, 67-86.

Jin, L., Myers, S., 2006. R-square around the world: new theory and new tests. Journal of Financial Economics 79, 257-292.

Joh, S.W., 2003. Corporate governance and firm profitability: evidence from Korea before the economic crisis. Journal of Financial Economics 68, 287-372.

Johnson, S., La Porta, R., Lopez-De-Silanes, F., Shleifer, A., 2000. Tunneling. American Economic Review 90, 193-228.

Khan, M., Watts, R., 2009. Estimation and empirical properties of a firm-year measure of conservatism. Working Paper.

Kim, J.-B., Yi, C.H., 2006. Ownership structure, business group affiliation, listing status and earnings management: Korean evidence. Contemporary Accounting Research 23, 427–464.

Kim, J.-B., Shi, H., 2010. Voluntary IFRS adoption and stock price synchronicity around the world: Does analyst following and institutional infrastructure matter? SSRN Working Paper.

Kim, J.-B., Zhang, L., 2010. Does accounting conservatism reduce stock price crash risk? Firm-level evidence. SSRN Working Paper.

Kothari, S. P., Shu, S., Wysocki, P. D., 2009. Do managers withhold bad news? Journal of Accounting Research 47, 241–276.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 1999. Corporate ownership around the world. Journal of Financial Economics 58, 3-27.

Lang, M.H., Lins, K.V., Miller, D.P., 2004. Concentrated control, analyst following, and valuation: Do analysts matter most when investors are protected least? Journal of Accounting Research 42 (3), 589-622.

Leuz, C., Lins, K.V., Warnock, F.E., 2009. Do foreigners invest less in poorly governed firms? Review of Financial Studies 22, 3246-3285.

Lins, K.V., 2003. Equity ownership and firm value in emerging markets. Journal of Financial and Quantitative Analysis 38 (1), 159-184.

Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements? Journal of Financial Economics 59, 215–260.

Petersen, M.A., 2009. Estimating standard errors in finance panel data sets: comparing approaches. Review of Financial Studies 22, 435-480.

Piotroski, J.D., Roulstone, D.T., 2004. The influence of analysts, institutional investors, and insiders on the incorporation of market, industry, and firm-specific information into stock price. The Accounting Review 79 (4), 1119-1151.

Shleifer, A., Vishny, R., 1997. A survey of corporate governance. Journal of Finance 52, 737-783.

Veldkamp, L., 2006. Information markets and the comovement of asset prices. Review of Economic Studies 73, 823-845.

References B (Chapter 3)

Admati, A.R., Pfleiderer, P., 1988. Selling and trading on information in financial markets. American Economic Review 78, 96-103.

Albuquerque, R., Bauer, G. H., Schneider, M., 2009. Global private information in international equity markets. Journal of Financial Economics 94, 18-46.

Ali A., S. Klasa, and O.L. Zhen. 2008. Institutional stakeholdings and better-informed traders at earnings announcements. Journal of Accounting and Economics 46, 47-61.

Bailey, W., Mao, C.X., Sirodom, K., 2007. Investment restrictions and the cross-border flow of information: some empirical evidence. Journal of International Money and Finance 26, 1-25.

Barberis, N., Shleifer, A., Wurgler, F., 2005, Comovement. Journal of Financial Economics 75, 283-317.

Boehmer E., E. K. Kelley. 2009. Institutional investors and the informational efficiency of prices. Review of Financial Studies (forthcoming).

Bris, A., Goetzmann, W.N., Zhu, N., 2007. Efficiency and the bear: short sales and markets around the world. Journal of Finance LXII, 1029-1079.

Brennan, M., Cao, H., 1997. International portfolio investment flows. Journal of Finance 52, 1851-1880.

Brockman, P., Liebenberg, I., Schutte M., 2010. Comovement, information production, and the business cycle. Journal of Financial Economics forthcoming.

Bushee, B.J., 1998. The influence of institutional investors on myopic R&D investment behavior. The Accounting Review 73, 305-333.

Bushee, B.J., Goodman, T.H. 2007. Which institutional investors trade based on private information about earning and returns? Journal of Accounting Research 45, 289-322.

Chan, L.K.C., Lakonishok, J., Swaminathan, B., 2007. Industry classifications and return comovement. Financial Analysts Journal 63, 56-70.

Chen, J., Hong, H., Stein, J.C., 2002. Breadth of ownership and stock returns. Journal of Financial Economics (66), 171-205.

Cheo, H., Kho, B.C., Stulz, R., 2005. Do domestic investors have an edge? The trading experience of foreign investors in Korea. Review of Financial Studies 18, 795 – 829.

Chorida, T., Roll, R., Subbrahmanyam, A., 2009. Recent trends in trading activity. SSRN Working paper.

Covrig, V., Lau, S.T., Ng, L., 2006. Do domestic and foreign fund managers have similar preferences for stock characteristics? A cross-country analysis. Journal of International Business Studies 47, 407-429.

Dimson, E., 1979. Risk measurement when shares are subject to infrequent trading. Journal of Financial Economics 7, 197-226.

Dvorak, T., 2005. Do domestic investors have an information advantage? Evidence from Indonesia. Journal of Finance 60, 817-839.

Fernandes, N., Ferreira, M.A., 2008. Does international cross-listing improve investment efficiency? Journal of Financial Economics 88, 216-244,

Ferreira, M.A., Laux, P.A., 2007. Corporate governance, idiosyncratic risk and information flow. Journal of Finance 62, 951-989.

Ferreira, M.A., Matos, P., 2008. The colors of investors' money: the role of institutional investors around the world. Journal of Financial Economics 88, 99-533.

Gompers, P.A., Metrick, A., 2001. Institutional investors and equity prices. Quarterly Journal of Economics 116, 229-59.

Grinblatt, M., Keloharju, M., 2000. The investment behavior and performance of various investor-types: a study of Finland's unique data set. Journal of Financial Economics 55, 43-67.

Grossman, S., Stiglitz, J., 1980. On the impossibility of informationally efficient markets. American Economic Review 70, 393-408

Hameed, A., Morck, R., Shen, J., Yeung, B., 2008. Information market, analyst, and the comovement of stock prices. SSRN Working Paper.

Holden, C.W., Subrahmanyam, A., 1992. Long-lived private information and imperfect competition. Journal of Finance 47, 247-270.

Jin, L., Myers, S., 2006. R^2 around the world: new theory and new tests. Journal of Financial Economics 79, 257-292.

Kang, J.K., Stulz, R., 1997. Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan. Journal of Financial Economics 46, 3-28.

Karolyi G.A., Lee, K.H., van Dijk, M.A., 2009. Commonality in returns, liquidity, and turnover around the world. SSRN Working Paper.

Khan, M., Watts, R., 2009. Estimation and empirical properties of a firm-year measure of conservatism. Working Paper.

Leuz, C., Lins, K.V., Warnock, F.E., 2009. Do foreigners invest less in poorly governed firms? Review of Financial Studies 22, 3246-3285.

Li, K., Morck, R., Yang F., Yeung, B., 2004. Firm-specific information and openness of emerging markets. The Review of Economics and Statistics 86, 658-669.

Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: why do emerging markets have synchronous stock price movements? Journal of Financial Economics 59, 215–260.

Piotroski, J.D., Roulstone, D.T., 2004. The influence of analysts, institutional investors, and insiders on the incorporation of market, industry, and firm-specific information into stock price. The Accounting Review 79 (4), 1119-1151.

Roll, R., 1988. R^2. Journal of Finance 24, 545-566.

Seasholes, M., 2000. Smart foreign traders in emerging markets. Working Paper.

Swanson, P. E., Lin, A. Y., 2005. Trading behavior and investment performance of U.S. investors in global equity markets. Journal of Multinational Financial Management 15, 99-115.

Veldkamp, L., 2006. Information markets and the comovement of asset prices. Review of Economic Studies 73, 823-845.

Veldkamp, L., 2009. Information choice in macroeconomics and finance. New York University.

Veldkamp, L., Wolfers, J., 2007, Aggregate shocks or aggregate information? Costly information and business cycle comovement. Journal of Monetary Economics 54, 37-55.

Wongswan, J., 2006. Transmission of information across international equity markets. Review of Financial Studies 19 (4), 1158-1189.

Yan X. S., Zhang, Z., 2009. Institutional investors and equity returns, are short-term investors better informed? Review of Financial Studies 22 (2), 893-924.

References C (Chapter 4)

Aboody, D., Lev, B., 2000. Information asymmetry, R&D, and insider gains. Journal of Finance 55, 2747–2766.

Allen, F., 1993. Stock market and resource allocation in C. Mayer and X. Vives (eds.). Capital markets and financial intermediation, Cambridge University Press, Cambridge).

Axelson, U., 2007. Security design with investor private information. Journal of Finance 62, 2587–2632.

Blanchard, O., Rhee, C., Summers, L., 1993. The stock market, profit, and investment. Quarterly Journal of Economics 108, 115–136.

Chan, L.K.C., Lakonishok, J., Sougiannis, T., 2001. The stock market valuation of research and development expenditures. The Journal of Finance 56, 2431–2456.

Chen, Q., Goldstein, I., Jiang, W., 2007. Price informativeness and investment sensitivity to stock price. Review of Financial Studies 20, 619–650.

Claessens, S., Djankov, S., Lang, L.H.P., 2000. The separation of ownership and control in East Asian corporations. Journal of Financial Economics 58, 81–112.

Doidge, C., Karolyi, G.A., Stulz, R., 2004. Why are foreign companies listed in the U.S. worth more? Journal of Financial Economics 71, 205–238.

Dow, J., Gorton, G., 1997. Stock market efficiency and economic efficiency: Is there a connection? Journal of Finance 52, 1087–1129.

Durnev, A., Kim, E.H., 2005. To steal or not to steal: firm attributes, legal environment, and valuation. Journal of Finance 55, 1461–1493.

Durnev, A., Morck, R., Yeung, B., 2004. Value enhancing capital budgeting and firm-specific stock return variation. Journal of Finance 59, 65–105.

Faccio, M., Lang, L.H.P., 2002. The ultimate ownership of Western European corporations. Journal of Financial Economics 65, 365–395.

Faccio, M., Lang, L.H.P., Young, L., 2001. Dividends and expropriation. American Economic Review 91, 54–78.

Fan, J.P.H., Wong, T.J., 2002. Corporate ownership structure and the informativeness of accounting earnings in East Asia. Journal of Accounting and Economics 22, 401–425.

Faure-Grimaud, A., Gromb, D., 2004. Public trading and private incentives. Review of Financial Studies 17, 985–1014.

Foucault, T., Gehrig, T., 2008. Stock price informativeness, cross-listings and investment decisions. Journal of Financial Economics 88, 146–168.

Francis, J., Schipper K., Vincent, L., 2005. Earnings and dividend informativeness when cash flow rights are separated from voting rights. Journal of Accounting and Economics 39, 329–360.

Giammarino, R., Heinkel, R., Hollifield, B., Li, K., 2004. Corporate decisions, information and prices: do managers move prices or do prices move managers? Economic Notes 33, 83–110.

Helwege, J., Pirinsky, C.A., Stulz, R., 2007. Why do firms become widely held? An analysis of the dynamics of corporate ownership. Journal of Finance 62, 995–1027.

Himmelberg, C.P., Hubbard, R.G., Palia, D., 1999. Understanding the determinants of managerial ownership and the link between ownership and performance. Journal of Financial Economics 53, 353–384.

Jin, L., Myers, S.C., 2006. R-square around the world: new theory and new tests. Journal of Financial Economics 79, 257–292.

Kalcheva, I., Lins, K.V., 2007. International evidence on cash holdings and expected managerial agency problem. Review of Financial Studies 20, 1087–1112.

Kau, J.B., Linck, J.S., Rubin, P.H., 2008. Do managers listen to the market? Journal of Corporate Finance 14, 347–362.

Kothari, S. P., Laguerre, T.E., Leone, A.J., 2002. Capitalization versus expensing: evidence on the uncertainty of future earnings from capital expenditures versus R&D outlays. Review of Accounting Studies 7, 355–382.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 1999. Corporate ownership around the world. Journal of Financial Economics 58, 3–27.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., 2000. Investor protection and corporate governance. Journal of Financial Economics 59, 3–27.

Leuz, C., Lins, K.V., Warnock, F.E., 2009. Do foreigners invest less in poorly governed firms? Review of Financial Studies 22, 3246–3285.

Luo, Y., 2005. Do Insiders learn from outsiders? Evidence from merger and acquisitions. Journal of Finance 60, 1951–1982.

Masulis, R.W., Wang, C., Xie, F., 2009. Agency problems at dual-class companies. Journal of Finance 62, 1851–89.

Maug, E., 1998. Large shareholders as monitors: is there a trade-off between liquidity and control? Journal of Finance 53, 65–98.

Maug, E., 2001. Ownership structure and the life-cycle of the firm: a theory of the decision to go public. European Finance Review 5, 167–200.

Morck, R., Shleifer, A., Vishny, R.W., 1990. The stock market and investment: is the market a side-show? Brookings Papers on Economic Activity 2, 157–215.

Myers, S.C., Majluf, N.S., 1984. Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 13, 187–221.

Perotti, E.C., von Thadden, E., 2003. Strategic transparency and informed trading: will capital market integration force convergence of corporate governance? Journal of Financial and Quantitative Analysis 38, 61–85.

Petersen, M.A, 2009. Estimating standard errors in finance panel data sets: comparing approaches. Review of Financial Studies 22, 435–480.

Pinkowitz, L., Stulz, R., Williamson, R., 2006. Does the contribution of corporate cash holdings and dividends to firm value depend on governance? A cross-country analysis. Journal of Finance 61, 2725–2751.

Roll, R., Schwartz, E., Subrahmanyam, A., 2009. Option trading activities and firm valuation. Journal of Financial Economics 94, 345–360.

Shi, C., 2003. On the trade-off between the future benefits and riskiness of R&D: a bondholders' perspective. Journal of Accounting and Economics 35, 227–254.

Stein, J.C, 2003. Agency information and corporate investment. in: G.M. Constantinides, M. Harris and R. Stulz, ed., Handbook of the Economics of Finance Volume 1A Corporate Finance (Elsevier), 111–165.

Subrahmanyam, A., Titman, S., 1999. The going-public decision and the development of financial markets. Journal of Finance 54, 1045–1082.

Tadess, S., 2004. The allocation and monitoring role capital markets: theory and international evidence. Journal of Financial and Quantitative Analysis 39, 701–730.

Wang, Y., Wu, L., Yang, Y., 2009. Does the stock market affect firm investment in china? A price informativeness perspective. Journal of Banking and Finance 33, 53–62.

Wei, K.C. J., Zhang, Y., 2008. Ownership structure, cash flow, and capital investment: evidence from East Asian economies before the financial crisis. Journal of Corporate Finance 14, 118–132.

Wurgler, J., 2000. Financial markets and the allocation of capital. Journal of Financial Economics 58, 187–214.

Tables

Table 2.1 Descriptive statistics

This table reports summary statistics for test and control variables. To be included in sample, a firm must have stock returns in the *Datastream* database, assets and other financial data in the *Worldscope* database for year 1996 and have lagged financial data as well. Financial firms are omitted (SIC 6000–6999). The ultimate ownership data are obtained from Claessens, Djankov and Lang (2000), and Faccio and Lang (2002). The exact definitions of all variables are provided in Appendix A.1.

Variables	*N. firms*	*Mean*	*Std. Dev.*	*5th Ptcl.*	*25th Pctl.*	*50th Pctl.*	*75th Pctl.*	*95th Pctl.*
Panel A: Control rights and cash flow rights of controlling shareholders								
Wedge	2016	2.1278	3.5826	1.0000	1.0000	1.1775	1.9608	5.0000
Voting rights (V)	2016	31.1817	28.8281	5.0000	10.6000	21.6650	38.3500	100.0000
Cash flow rights (C)	2016	22.6500	20.2227	1.2675	6.0000	16.0078	33.0000	65.1000
Panel B: Test variables								
SPI	2016	1.3863	0.8649	-0.0022	0.7766	1.3712	1.9925	2.8569
JUMP	2016	0.3031	0.4597	0.0000	0.0000	0.0000	1.0000	1.0000
CRASH	2016	0.2103	0.4076	0.0000	0.0000	0.0000	0.0000	1.0000
CAAR (-1, +1)	1520	0.0322	0.0322	0.0020	0.0094	0.0243	0.0430	0.0893
CAAR (-2, +2)	1520	0.0551	0.0505	0.0041	0.0206	0.0446	0.0727	0.1405
Panel C: Control variables								
DIVERS	2016	4.1964	1.9801	1.0000	3.0000	4.0000	6.0000	8.0000
VARROA	2016	2.3886	2.2648	-0.3941	0.7966	1.8872	3.4174	6.8613
HERF	2016	0.0560	0.0724	0.0083	0.0220	0.0356	0.0595	0.1833
NIND	2016	5.0534	1.2923	2.7726	4.1744	5.1818	6.0661	6.9565
STDROA	2016	0.0335	0.0629	0.0032	0.0095	0.0191	0.0363	0.0927
ACCR	2016	1.3676	4.2398	0.0520	0.2836	0.5926	1.1268	4.8231
LOSS	2016	0.1612	0.3678	0.0000	0.0000	0.0000	0.0000	1.0000
MKTCAP	2016	12.5603	1.7195	9.8146	11.4550	12.4998	13.6417	15.6012
NAF	2016	6.1652	8.4642	0.0000	0.0000	2.0000	9.0000	24.0000
VOL	2016	1.2678	51.4263	0.0019	0.0136	0.0312	0.0686	0.3789
DTURN	2016	0.6412	29.1523	-0.1032	-0.0070	0.0010	0.0126	0.0863

Table 2.1 Descriptive statistics (Continued)

SKEW	2016	0.0624	0.9198	-1.4516	-0.2944	0.1292	0.5591	1.2270
SIGMA	2016	0.0380	0.0190	0.0179	0.0258	0.0339	0.0444	0.0714
RET	2016	0.0015	0.0342	-0.0493	-0.0183	0.0002	0.0204	0.0550
ROA	2016	0.1122	0.1166	0.0018	0.0589	0.1007	0.1559	0.2874
MB	2016	2.2619	5.0704	0.4937	1.1025	1.6982	2.6334	5.8970
Surprise	1520	0.1663	8.2999	-0.6713	-0.0427	0.0118	0.1066	0.7148
DISP	1520	0.8793	8.0090	0.0005	0.0023	0.0063	0.0225	0.3776
REPLAG	1520	90.1125	47.6513	31.0000	59.0000	78.0000	111.0000	196.5000
LEV	1520	0.2471	0.2436	0.0000	0.0207	0.2002	0.4030	0.7798

Panel D: Univariate tests for sub-samples grouped by the level of control-ownership wedge

Portfolios formed by the largest controlling shareholders' "control over ownership"

	N. firms	*SPI*	*JUMP*	*CRASH*
Below Wedge median	978	1.4297	0.3204	0.2192
Above Wedge median	1038	1.3463	0.2896	0.2063
Difference		0.0834	0.0310	0.0129
t-statistics		2.15	1.71	0.72

Table 2.2 Pearson correlation matrix

All variables are as defined in Appendix A.1. The bold-faced (bold-faced italic) Coefficients are significant at less than the 1% (10%) level.

	Wedge	*Voting rights*	*Cash flow rights*	*SPI*	*JUMP*	*CRASH*	*CAAR (-1,+1)*	*CAAR (-2,+2)*
Wedge	1.0000							
Voting rights	**-0.0958**	1.0000						
Cash flow rights	**-0.2346**	**0.9132**	1.0000					
SPI	**-0.0942**	**0.2339**	**0.2674**	1.0000				
JUMP	0.0027	0.0053	0.0024	0.1543	1.0000			
CRASH	0.0074	**0.0999**	**0.0917**	**0.1851**	**-0.1523**	1.0000		
CAAR (-1,+1)	**0.0881**	**-0.0809**	**-0.1013**	-	-	-	1.0000	
CAAR (-2,+2)	**0.0616**	**-0.0713**	**-0.0787**	-	-	-	**0.8553**	1.0000
DIVERS	**0.0476**	**0.0495**	***0.0396***	**-0.1849**	-0.0136	**-0.0623**	-	-
VARROA	0.0067	0.0015	-0.0039	0.0246	-0.0036	-0.0083	-	-
HERF	-0.0318	**0.1231**	**0.1279**	**0.0775**	0.0250	**0.0452**	-	-
NIND	***0.0386***	**-0.3348**	**-0.3384**	**-0.1417**	-0.0183	**-0.0839**	-	-
STDROA	***-0.0383***	**0.0705**	**0.0901**	**0.1553**	0.0291	**0.0870**	-	-
ACCR	-0.0169	-0.0038	0.0034	0.0026	-0.0245	0.0177	-	-
LOSS	-0.0299	0.0353	**0.0485**	**0.0638**	-0.0279	**0.0882**	-	-
MKTCAP	**0.0791**	**-0.2331**	**-0.2488**	**-0.5253**	**-0.1583**	**-0.1605**	0.0245	-0.0254
NAF	**0.0453**	0.0206	0.0084	**-0.2345**	**-0.1255**	-0.0335	-0.0008	-0.004
VOL	-0.0062	-0.0036	0.0038	0.0124	-0.0146	-0.0116	-	-
DTURN	-0.0070	-0.0045	0.0029	0.0126	-0.0153	-0.0112	-	-
CSKEW	0.0028	-0.0267	-0.0208	-0.0131	**0.5045**	**-0.5950**	-	-
SIGMA	**-0.0743**	**0.1417**	**0.1671**	**0.3411**	**0.0928**	**0.1668**	-	-
RET	-0.0247	**0.1375**	**0.1551**	**0.1132**	**0.1034**	**-0.1539**	-	-
ROA	-0.0033	**0.0967**	**0.0985**	0.0396	0.0151	***-0.0381***	-	-
MB	-0.0022	-0.0095	-0.0107	0.0134	***-0.0427***	***-0.0408***	***-0.0423***	***-0.0455***
DISP	**0.2218**	**0.0651**	***0.0452***	-	-	-	0.0337	0.0276
REPLAG	**-0.0855**	**0.2234**	**0.2543**	-	-	-	**0.0978**	**0.1046**
LEV	0.0204	**0.0831**	-0.0282	-	-	-	**0.0992**	**0.0813**

Table 2.3 Relation between control-ownership wedge and stock price informativeness

This table reports regression results of stock price informativeness on control-ownership wedge, firm-specific controls and country dummies for the year 1996 data. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (2.1). *Wedge* is defined as the ratio of the largest controlling shareholder's voting rights (control) over cash flow rights (ownership). All other variables are as defined in Appendix A.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests). Economic impact is the expected change in firm R^2 resulting from an increase in each explanatory variable from the 50th percentile to 95th percentile of the sample distribution with all other variables set equal to their mean values.

Dependent variable	*Stock Price Informativeness (SPI)*				
	(1)	(2)	(3)	(4) Restricted sample	Economic impact for (2)
Wedge	**-0.0119**	**-0.0104**	**-0.0108**	**-0.0092**	0.0100
	-4.36	-3.58	-2.42	-3.30	
Cash flow rights		0.0012			-0.0143
		0.84			
DIVERS	**-0.0231**	**-0.0227**	**-0.0232**	**-0.0226**	0.0226
	-2.56	-2.55	-2.13	-2.10	
VARROA	0.0050	0.0051	0.0021	-0.0020	-0.0063
	0.48	0.49	0.21	-0.23	
HERF	0.3296	0.3481	-0.1037	-0.1968	-0.0128
	0.86	0.91	-0.20	-0.41	
NIND	0.0092	0.0105	-0.0402	-0.0080	-0.0047
	0.33	0.38	-0.73	-0.34	
STDROA	**-0.3597**	**-0.3768**	0.4831	**-0.2552**	0.0069
	-2.88	-2.87	0.92	-3.68	
ACCR	-0.0052	-0.0050	**-0.0083**	-0.0003	0.0053
	-1.14	-1.11	-2.41	-0.73	
LOSS	***-0.1020***	***-0.1026***	**-0.1575**	***-0.1158***	0.0256
	-1.68	-1.70	-2.05	-1.85	
MKTCAP	**-0.2146**	**-0.2144**	**-0.2716**	**-0.2140**	0.0301
	-8.93	-8.99	-10.88	-8.06	
NAF	**-0.0070**	**-0.0067**	0.0057	**-0.0061**	0.0228
	-3.15	-2.94	1.42	-2.54	
VOL	0.0000	0.0000	0.0001	0.0000	0.0000
	-0.80	-0.88	0.79	0.00	
Anti-self dealing index			0.2173		
			0.65		
Intercept	**3.9939**	**3.9581**	**4.9820**	**4.0979**	
	9.75	10.18	9.08	10.11	
Country dummies	Yes	Yes	No	Yes	
N. firms	2016	2016	2016	1760	
Adj R-square	0.3926	0.3927	0.2945	0.3821	

Table 2.4 The effect of control-ownership wedge on return jumps and crashes

This table reports logistic regression results of jump and crash likelihood on control-ownership wedge, firm-specific controls and country dummies for the year 1996 data. The dependent variable, *JUMP*, is an indicator variable equal to 1 if a firm experiences one or more *Firm-Specific-Weekly Return* rising 3.00 or more standard deviations above the mean of *Firm-Specific-Weekly Return* within a year and equal to zero otherwise; *CRASH* is an indicator variable equal to 1 if a firm experiences one or more *Firm-Specific-Weekly Return* dropping 3.00 or more standard deviations below the mean of *Firm-Specific-Weekly Return* within a year and equal to zero otherwise. *Wedge* is defined as the ratio of the largest controlling shareholder's voting rights (control) over cash flow rights (ownership). All other variables are as defined in Appendix A.1. Coefficient estimates are represented and their *Chi-square* (two-tailed) is displayed right below. All *Chi-square* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests). Economic impact is the expected change in the likelihood of positive jump resulting from an increase in each explanatory variable from the 50th percentile to 95th percentile of the sample distribution with all other variables set equal to their mean values.

Dependent variable	*JUMP*			*CRASH*			
	(1)	(2)	(3) Restricted sample	(4)	(5)	(6) Restricted sample	Economic impact for (1)
Wedge	**-0.0237**	***-0.0309***	***-0.0185***	-0.0167	-0.0268	-0.0060	-0.0842
	4.84	3.49	3.89	0.84	2.20	0.08	
CSKEW	**-3.4131**	**-3.4358**	**-3.5003**	**4.0643**	**3.9803**	**4.0698**	-0.6282
	387.54	402.14	339.38	315.96	323.48	274.82	
DTURN	0.2996	0.3051	0.2351	0.0013	0.0025	0.0014	0.0259
	1.89	2.58	1.76	0.01	0.01	0.01	
SIGMA	**-19.3979**	**-15.5196**	**-19.5662**	5.8081	7.2052	7.1787	-0.2678
	12.03	9.29	10.54	0.87	1.62	1.13	
RET	**6.7245**	**4.7733**	**7.0602**	-2.8467	***-4.7660***	-2.3780	0.4460
	7.43	4.99	7.55	0.95	3.24	0.62	
ACCR	0.0237	0.0307	0.0240	0.0325	0.0314	0.0348	0.1070
	0.85	1.40	0.83	1.40	1.45	1.51	
ROA	-0.7399	-0.6313	-0.9026	1.0776	0.3155	0.8181	-0.1198
	1.22	1.00	1.49	1.45	0.14	0.74	
MKTCAP	**0.1793**	**0.1742**	**0.1614**	**0.2815**	**0.3247**	**0.2624**	6.9956
	12.23	13.75	8.57	22.55	34.12	16.92	
MB	0.0250	0.0191	0.0228	**0.0337**	***0.0277***	***0.0296***	0.1155
	2.51	1.48	2.08	5.60	3.77	3.45	
Anti-self dealing index		**-0.8769**			**-1.2475**		
		9.71			12.98		
Intercept	0.2179	0.8123	0.4999	-1.4831	***-1.6377***	-1.2703	
	0.06	1.27	0.30	2.32	3.87	1.51	
Country dummies	Yes	No	Yes	Yes	No	Yes	
N. firms	443.00	436.38	384.64	348.81	342.32	303.12	
Chi-square	2016	2016	1760	2016	2016	1760	

Table 2.5 The effect of wedge on market reaction to earnings announcement

This table reports robust checks for regression results of information content of earnings announcement on control-ownership wedge, firm-specific controls and country dummies for the year 1996 data. The dependent variable, *CAAR* is the cumulative absolute value of abnormal returns over the three-day event window (-1, +1), or five-day event window (-2, +2) relative to the annual earnings announcement date reported in I/B/E/S summary database. The abnormal return over the estimation window is the residual returns from the firm's market model estimated over (-120, -10). *Wedge* is defined as the ratio of the largest controlling shareholder's voting rights (control) over cash flow rights (ownership). We define positive unexpected earnings as good news and negative unexpected earnings as bad news. All other variables are as defined in Appendix A.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	Full sample		Bad news subsample		Good news subsample	
Dependent variable	*CAAR (-1,+1)*	*CAAR (-2,+2)*	*CAAR (-1,+1)*	*CAAR (-2,+2)*	*CAAR (-1,+1)*	*CAAR (-2,+2)*
	(1)	(2)	(3)	(4)	(5)	(6)
Wedge	**0.0008**	**0.0010**	0.0008	0.0008	**0.0008**	**0.0008**
	2.60	2.75	1.45	1.33	3.14	2.06
DISP	***0.0001***	0.0000	-0.0002	-0.0003	**0.0001**	**0.0001**
	1.70	0.51	-1.01	-1.31	2.67	2.06
REPLAG	0.0000	0.0001	0.0000	0.0000	0.0000	0.0001
	1.06	1.38	0.33	0.48	0.69	0.96
NAF	0.0005	0.0014	0.0002	0.0004	**0.0007**	***0.0022***
	1.56	1.54	0.51	0.83	2.19	1.81
MKTCAP	**-0.0037**	**-0.0104**	***-0.0029***	**-0.0056**	**-0.0051**	**-0.0160**
	-3.14	-2.36	-1.63	-2.11	-5.22	-3.10
MB	0.0000	0.0000	***-0.0006***	**-0.0014**	**-0.0001**	**-0.0002**
	-0.08	0.20	-1.94	-2.00	-2.62	-2.24
LEV	0.0134	0.0191	0.0137	0.0152	0.0161	0.0294
	1.09	0.87	1.35	0.74	1.31	1.36
LOSS	**0.0039**	0.0055				
	2.25	1.33				
Intercept	**0.0634**	**0.1575**	**0.0616**	**0.1139**	**0.0794**	**0.2236**
	4.27	3.39	2.60	3.10	4.29	4.56
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
N. firms	1520	1520	674	674	846	846
Adj.R-square	0.0008	0.0010	0.0008	0.0008	0.0008	0.0008

Table 2.6 The effect of institutional ownership on the relation between wedge and stock price informativeness

This table reports regression results of stock price informativeness on control-ownership wedge, institutional ownership, interaction of control-ownership wedge and institutional ownership, firm-specific controls and country dummies for the year 1996 data. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (2.1). *Wedge* is defined as the ratio of the largest controlling shareholder's voting rights (control) over cash flow rights (ownership). *IO* denotes institutional ownership at the end of the first quarter of 1997. All other variables are as defined in Appendix A.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

Dependent variable	*Stock Price Informativeness (SPI)*				
	(1)	(2)	(3)	(4)	(5)
IO =	*IO_TOTAL*	*IO_HIGH*	*IO_MEDIUM*	*IO_LOW*	*IO_LARGE*
Wedge	**-0.0168**	**-0.0126**	**-0.0141**	***-0.0127***	**-0.0136**
	-3.28	-3.02	-1.97	-1.87	-3.24
IO	-0.2079	-0.1395	-1.1649	0.8325	-0.1883
	-0.73	-0.51	-1.42	0.36	-0.48
*Wedge*IO*	**0.0535**	**0.0603**	0.0800	0.2182	**0.1202**
	3.00	2.60	1.57	0.67	2.65
DIVERS	**-0.0292**	**-0.0289**	**-0.0284**	**-0.0283**	**-0.0289**
	-3.48	-3.37	-3.34	-3.36	-3.41
VARROA	0.0083	0.0082	0.0078	0.0084	0.0083
	0.76	0.74	0.71	0.79	0.75
HERF	-0.0909	-0.0809	-0.0781	-0.0081	-0.0851
	-0.19	-0.17	-0.16	-0.02	-0.18
NIND	-0.0079	-0.0072	-0.0064	-0.0066	-0.0076
	-0.39	-0.35	-0.32	-0.06	-0.37
STDROA	-0.0263	-0.0237	-0.0106	-0.0038	-0.0245
	-0.21	-0.18	-0.09	-0.35	-0.20
ACCR	-0.0040	-0.0040	-0.0040	**-0.2092**	-0.0040
	-0.37	-0.37	-0.37	-3.76	-0.37
LOSS	**-0.2058**	**-0.2083**	**-0.2047**	**-0.2577**	**-0.2081**
	-3.61	-3.76	-3.59	-6.81	-3.75
MKTCAP	**-0.2542**	**-0.2544**	**-0.2545**	**-0.0026**	**-0.2548**
	-7.82	-7.97	-7.88	-0.94	-8.04
NAF	-0.0019	-0.0022	-0.0019	-0.0269	-0.0021
	-0.60	-0.68	-0.60	-0.67	-0.67
VOL	-0.0537	-0.0608	-0.0282	**-0.1407**	-0.0613
	-1.37	-1.39	-0.72	-3.48	-1.40
Intercept	-0.1124	-0.1021	-0.1359	**-0.3076**	-0.1023
	-1.10	-0.95	-1.26	-6.34	-0.97
Country dummies	yes	yes	yes	yes	yes
N. firms	1151	1151	1151	1151	1151
Adj R-square	0.4378	0.4374	0.4380	0.4371	0.4375

Table 2.7 Robustness checks

This table reports regression results of stock price informativeness on control-ownership wedge, firm-specific controls and country dummies for the year 1996 data. Three subsamples are used in the analysis. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (2.1). *Wedge* is defined as the ratio of the largest controlling shareholder's voting rights (control) over cash flow rights (ownership). *Industry classification* is based on two-digit SIC code. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All other variables are as defined in Appendix A.1. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

Dependent variable	*Stock Price Informativeness (SPI)*					
	(1)	(2)	(3)	(4)	(5)	(6)
	WLS	East Asia	Europe	Exclude Japan, U.K.	Std. errors Corrected For Firm clustering	Std. errors Corrected For Industry, Country Clustering
Wedge	**-0.0128**	**-0.0279**	**-0.0082**	**-0.0097**	**-0.0101**	**-0.0101**
	-3.36	-3.74	-2.66	-3.22	-2.61	-2.66
DIVERS	**-0.0261**	**-0.0313**	-0.0106	**-0.0241**	**-0.0228**	**-0.0228**
	-2.07	-5.71	-0.68	-2.43	-2.63	-2.69
VARROA	**0.0243**	-0.0045	0.0197	***0.0193***	0.0050	0.0050
	2.13	-0.60	1.57	1.75	0.70	0.73
HERF	0.3260	-0.0896	0.5465	0.2121	0.2611	0.2611
	0.62	-0.13	1.17	0.41	0.70	0.64
NIND	0.0027	-0.0087	0.0299	0.0292	0.0067	0.0067
	0.05	-0.37	0.64	0.56	0.24	0.20
STDROA	-0.2786	0.0441	**-0.2631**	-0.0511	-0.2492	-0.2492
	-0.87	0.09	-3.06	-0.10	-0.97	-1.17
ACCR	-0.0015	-0.0001	-0.0066	-0.0065	-0.0003	-0.0003
	-0.71	-0.76	-1.52	-1.54	-0.78	-0.76
LOSS	-0.0611	***-0.1606***	**-0.0627**	-0.0527	**-0.1194**	**-0.1194**
	-1.05	-1.96	-2.68	-0.83	-2.59	-2.48
MKTCAP	**-0.2076**	**-0.2299**	**-0.1941**	**-0.2024**	**-0.2157**	**-0.2157**
	-8.06	-7.90	-7.59	-7.36	-15.50	-14.40
NAF	**-0.0110**	**-0.0127**	**-0.0052**	**-0.0087**	**-0.0067**	**-0.0067**
	-3.45	-2.42	-2.17	-3.40	-2.53	-2.35
VOL	***-0.0001***	0.0000	-0.0158	0.0000	0.0000	0.0000
	-1.60	-0.98	-0.28	-0.81	-0.42	-0.35
Intercept	**3.9085**	**4.3945**	**3.8762**	**3.7301**	**4.0138**	**4.0138**
	11.86	11.62	12.14	10.64	16.52	14.47
Country dummies	yes	yes	yes	yes	yes	yes
N. firms	2016	1097	919	1098	2016	2016
Adj R-square	0.3737	0.3236	0.2865	0.3342	0.3889	0.3889

Table 3.1 Descriptive statistics

This table reports descriptive statistics for test and control variables. To be included in sample, a firm must have stock returns in the *Datastream* database, assets and other financial data in the *Worldscope* database for the period 1997-2006 and have lagged financial data as well. Financial firms are omitted (SIC 6000–6999). The institutional ownership data is obtained from *Thomson Financial* database. The exact definitions of all variables are provided in Appendix B.1.

	N. observations	*Mean*	*Std. Dev.*	*5th Ptcl.*	*25th Pctl.*	*50th Pctl.*	*75th Pctl.*	*95th Pctl.*
Panel A Institutional ownership variables								
IO_TOTAL	39956	0.0631	0.0953	0.0004	0.0060	0.0279	0.0817	0.2405
IO_DOMESTIC	39956	0.0333	0.0607	0.0000	0.0005	0.0097	0.0402	0.1398
IO_FOREIGN	39956	0.0298	0.0625	0.0000	0.0003	0.0062	0.0298	0.1416
IO_FOREIGN_US	39956	0.0101	0.0387	0.0000	0.0000	0.0000	0.0037	0.0521
IO_FOREIGN_NUS	39956	0.0198	0.0419	0.0000	0.0000	0.0034	0.0210	0.0927
IO_HIGH	39956	0.0147	0.0507	0.0000	0.0000	0.0000	0.0000	0.0971
IO_HIGH_DOMESTIC	39956	0.0082	0.0374	0.0000	0.0000	0.0000	0.0000	0.0651
IO_HIGH_FOREIGN	39956	0.0065	0.0324	0.0000	0.0000	0.0000	0.0000	0.0573
IO_HIGH_FOREIGN_US	39956	0.0028	0.0208	0.0000	0.0000	0.0000	0.0000	0.0000
IO_HIGH_FOREIGN_NUS	39956	0.0036	0.0244	0.0000	0.0000	0.0000	0.0000	0.0000
IO_MEDIUM	39956	0.0255	0.0442	0.0000	0.0000	0.0000	0.0350	0.1091
IO_MEDIUM_DOMESTIC	39956	0.0150	0.0307	0.0000	0.0000	0.0000	0.0180	0.0742
IO_MEDIUM_FOREIGN	39956	0.0105	0.0266	0.0000	0.0000	0.0000	0.0107	0.0589
IO_MEDIUM_FOREIGN_US	39956	0.0038	0.0168	0.0000	0.0000	0.0000	0.0000	0.0248
IO_MEDIUM_FOREIGN_NUS	39956	0.0067	0.0181	0.0000	0.0000	0.0000	0.0000	0.0424
IO_LOW	39956	0.0229	0.0328	0.0000	0.0028	0.0103	0.0296	0.0885
IO_LOW_DOMESTIC	39956	0.0101	0.0141	0.0000	0.0000	0.0046	0.0145	0.0388
IO_LOW_FOREIGN	39956	0.0128	0.0238	0.0000	0.0000	0.0036	0.0142	0.0592
IO_LOW_FOREIGN_US	39956	0.0034	0.0106	0.0000	0.0000	0.0000	0.0025	0.0171
IO_LOW_FOREIGN_NUS	39956	0.0094	0.0176	0.0000	0.0000	0.0019	0.0108	0.0434
IO_SHORT	37293	0.0252	0.0465	0.0000	0.0001	0.0058	0.0294	0.1150
IO_SHORT_DOMESTIC	37293	0.0123	0.0302	0.0000	0.0000	0.0004	0.0103	0.0647

Table 3.1 Descriptive statistics (Continued)

IO_SHORT_FOREIGN	37293	0.0129	0.0320	0.0000	0.0000	0.0006	0.0105	0.0686
IO_SHORT_FOREIGN_US	37293	0.0037	0.0184	0.0000	0.0000	0.0000	0.0001	0.0187
IO_SHORT_FOREIGN_NUS	37293	0.0092	0.0236	0.0000	0.0000	0.0003	0.0074	0.0480
IO_LONG	37293	0.0082	0.0209	0.0000	0.0000	0.0012	0.0082	0.0353
IO_LONG_DOMESTIC	37293	0.0051	0.0159	0.0000	0.0000	0.0000	0.0034	0.0249
IO_LONG_FOREIGN	37293	0.0039	0.0141	0.0000	0.0000	0.0001	0.0033	0.0160
IO_LONG_FOREIGN_US	37293	0.0022	0.0110	0.0000	0.0000	0.0000	0.0014	0.0101
IO_LONG_FOREIGN_NUS	37293	0.0017	0.0085	0.0000	0.0000	0.0000	0.0005	0.0077
Panel B Stock price informativeness								
SPI	39956	1.1434	0.8912	-0.2901	0.5222	1.1241	1.7369	2.6649
Panel C Firm-specific control variables								
DIVERS	39956	4.0965	2.0031	1.0000	3.0000	4.0000	6.0000	8.0000
HERF	39956	0.0564	0.0721	0.0085	0.0182	0.0316	0.0695	0.1768
NIND	39956	5.3701	1.3385	2.9957	4.3944	5.4381	6.5191	7.2240
STDROA	39956	0.0548	0.1044	0.0073	0.0173	0.0314	0.0581	0.1722
ACCR	39956	1.2845	2.8731	0.0501	0.2641	0.5550	1.0817	4.5000
LOSS	39956	0.1880	0.3907	0.0000	0.0000	0.0000	0.0000	1.0000
MKTCAP	39956	11.7544	2.3623	7.1799	10.6588	11.8928	13.1962	15.3546
NAF	39956	5.0578	8.2500	0.0000	0.0000	1.0000	6.0000	23.0000
VOL	39956	0.0893	0.5362	0.0015	0.0096	0.0280	0.0750	0.3334
MB	39956	1.8837	2.5790	0.3700	0.8036	1.3250	2.2358	5.3911
Q	39956	1.3935	0.9033	0.6951	0.9314	1.1279	1.5037	3.0131
LEV	39956	0.4618	1.0980	0.0000	0.0187	0.2067	0.5745	1.9019
VOLA	39956	0.1599	0.1653	0.0116	0.0531	0.1132	0.2108	0.4694
CASH	39956	-3.7156	1.5243	-6.1496	-4.6836	-3.7900	-2.7777	-1.1154
AGE	39956	4.9589	0.6698	3.7612	4.4998	5.0173	5.4161	5.9480
DP	39956	8.1873	2.4253	4.2271	6.6276	8.2355	9.8083	12.0551
PRICE	39956	4.1753	2.8510	-0.2523	2.0149	4.0705	6.3099	8.5271
RETlag12	39956	0.0066	0.0393	-0.0588	-0.0145	0.0071	0.0281	0.0702

Table 3.2 Pearson correlation matrix

All variables are defined in Appendix B.1. The bold-faced (bold-faced italic) Coefficients are significant at less than the 1% (10%) level.

	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*SPI*
IO_TOTAL (A)	1.0000										
IO_DOMESTIC (B)	**0.7656**	1.0000									
IO_FOREIGN ©	**0.7807**	**0.1958**	1.0000								
IO_FOREIGN_US (D)	**0.6201**	**0.1977**	**0.7533**	1.0000							
IO_FOREIGN_NUS (E)	**0.5905**	**0.1091**	**0.7942**	**0.1987**	1.0000						
IO_HIGH (F)	**0.7375**	**0.6325**	**0.5099**	**0.3850**	**0.4041**	1.0000					
IO_MEDIAN (G)	**0.8157**	**0.6568**	**0.6054**	**0.5127**	**0.4285**	**0.3277**	1.0000				
IO_LOW (H)	**0.6644**	**0.3600**	**0.6632**	**0.5149**	**0.5126**	**0.1536**	**0.5141**	1.0000			
IO_SHORT (I)	**0.7828**	**0.5547**	**0.6527**	**0.4736**	**0.5359**	**0.5474**	**0.6622**	**0.5360**	1.0000		
IO_LONG (J)	**0.5499**	**0.4449**	**0.4057**	**0.3985**	**0.2346**	**0.4112**	**0.4289**	**0.3849**	**0.2257**	1.0000	
SPI	-0.0020	**0.0456**	**-0.0474**	**0.0099**	**-0.0798**	**0.0923**	**0.0339**	**-0.1945**	-0.0057	**-0.0557**	1.0000
DIVERS	**-0.0176**	**-0.0407**	**0.0127**	**-0.0293**	**0.0460**	**-0.0550**	**-0.0608**	**0.1161**	**-0.0332**	**0.0220**	**-0.1528**
HERF	**0.0287**	**-0.0164**	**0.0596**	0.0050	**0.0843**	**0.0369**	**0.0287**	**-0.0126**	**0.0558**	**-0.0235**	**-0.0169**
NIND	**-0.1038**	**-0.0581**	**-0.1018**	**-0.0122**	**-0.1405**	**-0.0979**	**-0.0910**	**-0.0273**	**-0.1086**	-0.0040	**-0.0322**
STDROA	**0.0442**	**0.0492**	**0.0195**	**0.0265**	0.0046	**0.0672**	**0.0526**	**-0.0467**	**0.0479**	-0.0082	**0.0903**
ACCR	**-0.0702**	**-0.0520**	**-0.0566**	**-0.0323**	**-0.0546**	**-0.0233**	**-0.0537**	**-0.0957**	**-0.0603**	**-0.0432**	**0.0292**
LOSS	**-0.0618**	**-0.0364**	**-0.0588**	**-0.0106**	**-0.0779**	**0.0122**	**-0.0485**	**-0.1331**	**-0.0640**	**-0.0390**	**0.0627**
MKTCAP	**0.1618**	**0.0538**	**0.1944**	**0.1737**	**0.1293**	**-0.0086**	**0.0893**	**0.3633**	**0.1020**	**0.1863**	**-0.2747**
NAF	**0.2053**	**0.0567**	**0.2579**	**0.0735**	**0.3164**	**-0.0303**	**0.0906**	**0.5217**	**0.1779**	**0.1161**	**-0.2561**
VOL	**0.0242**	**0.0107**	**0.0264**	**0.0152**	**0.0254**	**0.0118**	**0.0178**	**0.0280**	**0.0356**	0.0062	**-0.0378**
MB	**0.2308**	**0.1615**	**0.1950**	**0.1360**	**0.1649**	**0.0853**	**0.2095**	**0.2561**	**0.2381**	**0.0753**	**-0.0235**
Q	**-0.0129**	**-0.0024**	**-0.0174**	**-0.0105**	**-0.0163**	**-0.0122**	**-0.0234**	**0.0129**	**-0.0182**	**0.0054**	**-0.0504**
LEV	**0.0743**	0.0302	**0.0840**	**0.0716**	**0.0591**	**0.0369**	**0.0816**	**0.0489**	**0.1054**	-0.0087	**0.0552**
CASH	**0.1115**	**0.0741**	**0.0980**	**0.0522**	**0.0979**	**0.0702**	**0.0993**	**0.0815**	**0.1391**	***0.0322***	**-0.1463**
VOLA	**0.1423**	**0.0975**	**0.1223**	**0.0725**	**0.1152**	**0.0412**	**0.1229**	**0.1841**	**0.1437**	**0.0453**	**-0.0399**
AGE	**-0.0809**	**-0.0803**	**-0.0452**	***-0.0008***	**-0.0667**	**-0.0861**	**-0.1265**	**0.0690**	**-0.1100**	**0.0336**	**-0.1474**
DP	**-0.0483**	**-0.1320**	**0.0546**	**0.0185**	**0.0642**	**-0.0689**	**-0.1048**	**0.1076**	**-0.0567**	**0.0211**	**-0.2761**
PRICE	**-0.0880**	**-0.0896**	**-0.0472**	**-0.0180**	**-0.0537**	**-0.1068**	**-0.0960**	**0.0390**	**-0.0682**	-0.0033	**-0.1014**
RETlag12	**0.0897**	**0.0490**	**0.0892**	**0.0652**	**0.0727**	**0.0214**	**0.0843**	**0.1139**	**0.1215**	***-0.0089***	**0.0811**

Table 3.3 Geographic origins of institutional investors and stock price informativeness

This table reports the regression results of stock price informativeness on geographic origins of institutional investors, controls, year, industry and country dummies for 1997-2006 data. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (3.1). All other variables are defined in Appendix B.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	(1)	(2)	(3)	(4)
IO_TOTAL	-0.0433			
	-0.42			
IO_DOMESTIC		**-0.3913**		**-0.3850**
		-2.65		-2.63
IO_FOREIGN		**0.2696**		
		2.32		
IO_FOREIGN_US			**0.7565**	**0.7821**
			4.47	4.73
IO_FOREIGN_NUS			-0.2394	-0.2021
			-1.53	-1.32
DIVERS	**-0.0244**	**-0.0241**	**-0.0241**	**-0.0241**
	-7.63	-7.49	-7.48	-7.45
HERF	0.1417	0.1454	0.1531	0.1477
	1.30	1.34	1.41	1.36
NIND	**0.2768**	**0.2780**	**0.2745**	**0.2763**
	2.52	2.54	2.52	2.53
STDROA	-0.0188	-0.0240	-0.0136	-0.0219
	-0.41	-0.53	-0.30	-0.48
ACCR	-0.0004	-0.0004	-0.0004	-0.0005
	-0.22	-0.22	-0.26	-0.28
LOSS	***-0.0398***	***-0.0425***	***-0.0413***	-0.0447
	-1.81	-1.94	-1.87	-2.05
MKTCAP	**-0.1732**	**-0.1749**	**-0.1770**	**-0.1758**
	-21.39	-21.46	-21.94	-21.46
NAF	**-0.0073**	**-0.0075**	**-0.0071**	**-0.0070**
	-5.13	-5.26	-5.05	-4.99
VOL	**-0.0438**	**-0.0434**	**-0.0445**	**-0.0434**
	-3.55	-3.55	-3.56	-3.56
Intercept	***1.4903***	***1.5269***	**1.5443**	**1.5425**
	1.89	1.95	1.97	1.97
Year, industry, country dummies	yes	yes	yes	yes
N. firms	7859	7859	7859	7859
N. observations	39956	39956	39956	39956
Adj R-square	0.3021	0.3027	0.3029	0.3033

Table 3.4 Stake size of institutional investors and stock price informativeness

This table reports the regression results of stock price informativeness on the stake size of institutional investors, controls, year, industry and country dummies for 1997-2006 data. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (3.1). All other variables are defined in Appendix B.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	(1)	(2)	(3)	(4)
IO_HIGH	**0.4044**			
	4.43			
IO_HIGH_DOMESTIC		0.1120		0.1627
		1.01		1.42
IO_HIGH_FOREIGN		**0.6925**		
		5.08		
IO_HIGH_FOREIGN_US			**0.9749**	**0.9295**
			3.46	3.49
IO_HIGH_FOREIGN_NUS			**0.4031**	**0.3796**
			2.51	2.35
IO_MEDIUM	0.2715			
	1.50			
IO_MEDIUM_DOMESTIC		-0.1088		-0.1208
		-0.38		-0.43
IO_MEDIUM_FOREIGN		**0.9848**		
		4.58		
IO_MEDIUM_FOREIGN_US			**0.9359**	**1.0279**
			2.47	2.78
IO_MEDIUM_FOREIGN_NUS			***0.5116***	***0.5822***
			1.63	1.92
IO_LOW	**-1.8560**			
	-5.09			
IO_LOW_DOMESTIC		**-4.3841**		**-4.5801**
		-4.22		-4.61
IO_LOW_FOREIGN		**-1.1454**		
		-2.38		
IO_LOW_FOREIGN_US			0.7257	1.7117
			0.76	1.67
IO_LOW_FOREIGN_NUS			**-3.1609**	**-2.7390**
			-6.10	-4.91
DIVERS	**-0.0241**	**-0.0235**	**-0.0237**	**-0.0235**
	-7.56	-7.30	-7.22	-7.19
HERF	0.1259	0.1253	0.1405	0.1234
	1.16	1.16	1.30	1.15
NIND	**0.2716**	**0.2770**	**0.2644**	**0.2740**
	2.47	2.51	2.42	2.49
STDROA	-0.0221	-0.0343	-0.0124	-0.0311
	-0.48	-0.76	-0.27	-0.69
ACCR	-0.0003	-0.0004	-0.0004	-0.0005
	-0.19	-0.23	-0.24	-0.32
LOSS	***-0.0418***	**-0.0483**	***-0.0428***	**-0.0519**
	-1.91	-2.24	-1.94	-2.41
MKTCAP	***-0.1587***	**-0.1565**	***-0.1680***	**-0.1565**

Table 3.4 Stake size of institutional investors and stock price informativeness (Continued)

	-18.94	-17.94	-21.10	-17.72
NAF	**-0.0055**	**-0.0055**	**-0.0050**	**-0.0043**
	-3.54	-3.58	-3.55	-3.02
VOL	**-0.0407**	**-0.0385**	**-0.0428**	**-0.0384**
	-3.41	-3.34	-3.45	-3.32
Intercept	***1.3839***	***1.3772***	***1.5149***	***1.3792***
	1.75	1.74	1.93	1.74
Year, industry, country dummies	yes	yes	yes	yes
N. firms	7859	7859	7859	7859
N. observations	39956	39956	39956	39956
Adj R-square	0.3042	0.3062	0.3046	0.3075

Table 3.5 Trading frequency of institutional investors and stock price informativeness

This table reports the regression results of stock price informativeness on short- /long-term institutional ownership, controls, year, industry and country dummies for 1997-2006 data. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (3.1). All other variables are defined in Appendix B.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	(1)	(2)	(3)	(4)
IO_SHORT	0.0513			
	0.33			
IO_SHORT_DOMESTIC		-0.4412		-0.4141
		-1.48		-1.39
IO_SHORT_FOREIGN		0.2419		
		1.02		
IO_SHORT_FOREIGN_US			**1.2745**	**1.2722**
			3.08	3.10
IO_SHORT_FOREIGN_NUS			***-0.4805***	***-0.4534***
			-1.84	-1.77
IO_LONG	**-1.0106**			
	-2.22			
IO_LONG_DOMESTIC		-0.7486		-0.7508
		-1.15		-1.17
IO_LONG_FOREIGN		-0.3619		
		-0.91		
IO_LONG_FOREIGN_US			-0.7861	-0.7381
			-1.40	-1.34
IO_LONG_FOREIGN_NUS			0.0190	0.0276
			0.03	0.04
DIVERS	**-0.0242**	**-0.0240**	**-0.0240**	**-0.0239**
	-7.66	-7.57	-7.57	-7.59
HERF	0.0901	0.0925	0.0988	0.0944
	0.81	0.83	0.89	0.85
NIND	**0.2542**	**0.2590**	**0.2557**	**0.2587**
	2.08	2.14	2.10	2.14
STDROA	-0.0255	-0.0263	-0.0241	-0.0284
	-0.56	-0.57	-0.53	-0.62
ACCR	0.0006	0.0006	0.0006	0.0005
	0.33	0.33	0.32	0.31
LOSS	***-0.0391***	***-0.0402***	***-0.0390***	***-0.0414***
	-1.72	-1.77	-1.70	-1.82
MKTCAP	**-0.1706**	**-0.1731**	**-0.1746**	**-0.1737**
	-20.21	-20.51	-20.88	-20.53
NAF	**-0.0071**	**-0.0072**	**-0.0070**	**-0.0069**
	-4.88	-4.92	-4.77	-4.74
VOL	**-0.0410**	**-0.0410**	**-0.0424**	**-0.0414**
	-3.33	-3.34	-3.34	-3.34
Intercept	***1.6021***	***1.6136***	***1.6338***	***1.6195***
	1.87	1.90	1.92	1.91
Year, industry, country dummies	yes	yes	yes	yes

Table 3.5 Trading frequency of institutional investors and stock price informativeness (Continued)

N. firms	7778	7778	7778	7778
N. observations	37293	37293	37293	37293
Adj R-square	0.3019	0.3059	0.3062	0.3065

Table 3.6 Institutional clustering and stock price informativeness

This table reports the regression results of stock price informativeness on institutional clustering, controls, year, industry and country dummies for 1997-2006 data. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (3.1). All other variables are defined in Appendix B.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	(1)	(2)	(3)	(4)
IO_NUMBER_TOTAL	**-0.0008**			
	-3.46			
IO_NUMBER_DOMESTIC		**-0.0090**		**-0.0095**
		-4.17		-4.47
IO_NUM_FOREIGN		0.0001		
		0.36		
IO_NUMBER_FOREIGN_US			**0.0019**	**0.0033**
			2.33	3.31
IO_NUMBER_FOREIGN_NUS			**-0.0012**	***-0.0007***
			-3.60	-1.68
DIVERS	**-0.0237**	**-0.0225**	**-0.0235**	**-0.0219**
	-7.24	-7.26	-7.03	-6.97
HERF	0.1294	0.0850	0.1416	0.0877
	1.19	0.79	1.30	0.82
NIND	**0.2715**	**0.2730**	**0.2741**	**0.2742**
	2.47	2.48	2.50	2.49
STDROA	-0.0132	-0.0274	-0.0060	-0.0186
	-0.28	-0.60	-0.13	-0.41
ACCR	-0.0002	-0.0003	-0.0003	-0.0003
	-0.14	-0.16	-0.19	-0.20
LOSS	***-0.0377***	**-0.0453**	***-0.0377***	**-0.0455**
	-1.71	-2.09	-1.71	-2.11
MKTCAP	**-0.1615**	**-0.1464**	**-0.1673**	**-0.1461**
	-19.89	-14.76	-20.90	-14.48
NAF	**-0.0054**	**-0.0051**	**-0.0049**	**-0.0036**
	-3.50	-3.06	-3.40	-2.45
VOL	**-0.0414**	**-0.0373**	**-0.0426**	**-0.0372**
	-3.40	-3.15	-3.43	-3.10
Intercept	***1.3954***	***1.2902***	***1.4379***	***1.2836***
	1.77	1.62	1.83	1.61
Year, industry, country dummies	yes	yes	yes	yes
N. firms	7859	7859	7859	7859
N. observations	39956	39956	39956	39956
Adj R-square	0.3031	0.3066	0.3034	0.3078

Table 3.7 Institutional ownership concentration and stock price informativeness

This table reports the regression results of stock price informativeness on institutional ownership concentration, controls, year, industry and country dummies for 1997-2006 data. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (3.1). All other variables are defined in Appendix B.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	(1)	(2)	(3)	(4)
IO_LARGE_TOTAL	***0.3096***			
	1.96			
IO_LARGE_DOMESTIC		**-0.4678**		**-0.4559**
		-2.39		-2.33
IO_LARGE_FOREIGN		**0.7440**		
		3.80		
IO_LARGE_FOREIGN_US			**1.2660**	**1.2594**
			3.37	3.35
IO_LARGE_FOREIGN_NUS			0.2599	0.2786
			1.20	1.29
DIVERS	**-0.0243**	**-0.0241**	**-0.0241**	**-0.0241**
	-7.57	-7.44	-7.48	-7.46
HERF	0.1474	0.1524	0.1568	0.1560
	1.36	1.41	1.45	1.44
NIND	**0.2761**	**0.2763**	**0.2751**	**0.2759**
	2.52	2.52	2.52	2.52
STDROA	-0.0157	-0.0179	-0.0150	-0.0170
	-0.34	-0.39	-0.33	-0.37
ACCR	-0.0003	-0.0004	-0.0003	-0.0004
	-0.18	-0.22	-0.20	-0.23
LOSS	***-0.0383***	***-0.0402***	***-0.0396***	***-0.0410***
	-1.73	-1.83	-1.79	-1.86
MKTCAP	**-0.1737**	**-0.1754**	**-0.1763**	**-0.1767**
	-21.65	-21.75	-21.89	-21.79
NAF	**-0.0074**	**-0.0074**	**-0.0074**	**-0.0074**
	-5.21	-5.22	-5.26	-5.23
VOL	**-0.0441**	**-0.0439**	**-0.0441**	**-0.0439**
	-3.53	-3.53	-3.54	-3.55
Intercept	***1.4958***	***1.5402***	***1.5393***	**1.5522**
	1.90	1.96	1.96	1.98
Year, industry, country dummies	yes	yes	yes	yes
N. firms	7859	7859	7859	7859
N. observations	39956	39956	39956	39956
Adj R-square	0.3022	0.3026	0.3026	0.3028

Table 3.8 Institutional holdings change and stock price informativeness

This table reports the regression results of stock price informativeness on change in institutional holdings, controls, year, industry and country dummies for 1997-2006 data. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (3.1). All other variables are defined in Appendix B.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

Panel A: Geographic origins of institutional investors and stock price informativeness

	(1)	(2)	(3)	(4)
Δ*IO_TOTAL*	-0.1656			
	-1.51			
Δ*IO_DOMESTIC*		**-0.4793**		**-0.4736**
		-2.99		-2.95
Δ*IO_FOREIGN*		0.0913		
		0.64		
Δ*IO_FOREIGN_US*			***0.4813***	***0.4795***
			1.87	1.88
Δ*IO_FOREIGN_NUS*			***-0.3444***	-0.2979
			-1.74	-1.51
lagIO_TOTAL	-0.0035			
	-0.03			
lagIO_DOMESTIC		**-0.3691**		**-0.3669**
		-2.11		-2.13
lagIO_FOREIGN		**0.3329**		
		2.38		
lagIO_FOREIGN_US			**0.8419**	**0.8748**
			4.20	4.51
lagIO_FOREIGN_NUS			-0.2248	-0.1945
			-1.23	-1.08
DIVERS	**-0.0238**	**-0.0235**	**-0.0235**	**-0.0235**
	-7.37	-7.20	-7.19	-7.17
HERF	0.1057	0.1108	0.1179	0.1130
	0.92	0.97	1.04	0.99
NIND	**0.2767**	**0.2788**	**0.2760**	**0.2780**
	2.36	2.37	2.36	2.37
STDROA	-0.0445	-0.0508	-0.0407	-0.0490
	-0.89	-1.02	-0.80	-0.98
ACCR	-0.0009	-0.0009	-0.0009	-0.0010
	-0.51	-0.51	-0.55	-0.57
LOSS	-0.0338	***-0.0368***	-0.0355	***-0.0393***
	-1.49	-1.64	-1.55	-1.75
MKTCAP	**-0.1714**	**-0.1732**	**-0.1753**	**-0.1741**
	-20.66	-20.77	-21.27	-20.76
NAF	**-0.0074**	**-0.0076**	**-0.0071**	**-0.0071**
	-5.14	-5.27	-4.98	-4.94
VOL	**-0.0435**	**-0.0429**	**-0.0447**	**-0.0430**
	-2.20	-2.19	-2.20	-2.21
Intercept	***1.4635***	***1.4988***	***1.5096***	***1.5068***
	1.75	1.80	1.82	1.81
Year, industry, country dummies	yes	yes	yes	yes

Panel A: Geographic origins of institutional investors and stock price informativeness (Continued)

N. firms	7530	7530	7530	7530
N. observations	36478	36478	36478	36478
Adj R-square	0.3062	0.3069	0.3071	0.3075

Panel B: Stake size of institutional investors and stock price informativeness

	(1)	(2)	(3)	(4)
Δ*IO_HIGH*	**0.2546**			
	2.00			
Δ*IO_HIGH_DOMESTIC*		-0.1217		-0.0842
		-0.76		-0.52
Δ*IO_HIGH_FOREIGN*		**0.5959**		
		3.70		
Δ*IO_HIGH_FOREIGN_US*			**0.9571**	**0.8993**
			3.03	2.92
Δ*IO_HIGH_FOREIGN_NUS*			0.2417	0.2519
			1.16	1.22
Δ*IO_MEDIUM*	0.0163			
	0.09			
Δ*IO_MEDIUM_DOMESTIC*		-0.2816		-0.2942
		-1.00		-1.07
Δ*IO_MEDIUM_FOREIGN*		***0.5303***		
		1.87		
Δ*IO_MEDIUM_FOREIGN_US*			0.2847	0.3546
			0.55	0.72
Δ*IO_MEDIUM_FOREIGN_NUS*			0.3343	0.4271
			0.95	1.24
Δ*IO_LOW*	**-1.4514**			
	-3.76			
Δ*IO_LOW_DOMESTIC*		**-2.7148**		**-2.8604**
		-2.85		-3.04
Δ*IO_LOW_FOREIGN*		**-1.2831**		
		-2.41		
Δ*IO_LOW_FOREIGN_US*			-0.4272	0.1851
			-0.32	0.13
Δ*IO_LOW_FOREIGN_NUS*			**-2.4969**	**-2.0898**
			-3.66	-2.96
lagIO_HIGH	**0.5197**			
	4.91			
lagIO_HIGH_DOMESTIC		0.1916		***0.2522***
		1.49		1.93
lagIO_HIGH_FOREIGN		**0.8182**		
		5.42		
lagIO_HIGH_FOREIGN_US			**0.8497**	**0.7755**
			3.32	3.10
lagIO_HIGH_FOREIGN_NUS			**0.5761**	**0.5441**
			3.01	2.82
lagIO_MEDIUM	**0.5096**			
	2.01			
lagIO_MEDIUM_DOMESTIC		0.1610		0.1294
		0.44		0.36
lagIO_MEDIUM_FOREIGN		**1.4096**		
		4.84		
lagIO_MEDIUM_FOREIGN_US			**1.2699**	**1.3559**
			2.50	2.62
lagIO_MEDIUM_FOREIGN_NUS			**0.8649**	**0.9274**
			2.06	2.27
lagIO_LOW	**-2.3134**			

Panel B: Stake size of institutional investors and stock price informativeness (Continued)

	-5.33			
lagIO_LOW_DOMESTIC		**-5.4089**		**-5.6385**
		-4.26		-4.68
lagIO_LOW_FOREIGN		**-1.4853**		
		-2.71		
lagIO_LOW_FOREIGN_US			0.9353	**2.1618**
			0.92	1.98
lagIO_LOW_FOREIGN_NUS			**-3.7608**	**-3.2811**
			-6.48	-5.22
DIVERS	**-0.0235**	**-0.0228**	**-0.0230**	**-0.0228**
	-7.34	-7.00	-6.92	-6.92
HERF	0.0834	0.0814	0.0999	0.0763
	0.73	0.71	0.88	0.67
NIND	**0.2697**	**0.2770**	**0.2621**	**0.2742**
	2.29	2.33	2.23	2.31
STDROA	-0.0462	-0.0618	-0.0397	-0.0606
	-0.93	-1.25	-0.79	-1.24
ACCR	-0.0008	-0.0009	-0.0010	-0.0011
	-0.49	-0.53	-0.56	-0.63
LOSS	-0.0337	***-0.0400***	-0.0357	***-0.0430***
	-1.49	-1.80	-1.56	-1.94
MKTCAP	**-0.1533**	**-0.1500**	**-0.1642**	**-0.1499**
	-17.88	-16.78	-20.39	-16.63
NAF	**-0.0052**	**-0.0051**	**-0.0045**	**-0.0037**
	-3.28	-3.25	-3.23	-2.56
VOL	**-0.0387**	**-0.0354**	**-0.0420**	**-0.0354**
	-2.10	-2.04	-2.12	-2.03
Intercept	1.3343	1.3106	***1.4809***	1.3004
	1.59	1.55	1.78	1.54
Year, industry, country dummies	yes	yes	yes	yes
N. firms	7530	7530	7530	7530
N. observations	36478	36478	36478	36478
Adj R-square	0.3089	0.3113	0.3093	0.3127

Panel C: Trading frequency of institutional investors and stock price informativeness

	(1)	(2)	(3)	(4)
Δ*IO_SHORT*	0.1023			
	0.43			
Δ*IO_SHORT_DOMESTIC*		-0.3448		-0.3289
		-1.05		-0.99
Δ*IO_SHORT_FOREIGN*		0.0271		
		0.12		
Δ*IO_SHORT_FOREIGN_US*			0.6824	***0.6952***
			1.59	1.63
Δ*IO_SHORT_FOREIGN_NUS*			-0.4493	-0.4386
			-1.47	-1.45
Δ*IO_LONG*	**-1.0546**			
	-2.09			
Δ*IO_LONG_DOMESTIC*		-0.6146		-0.6144
		-0.84		-0.85
Δ*IO_LONG_FOREIGN*		-0.4856		
		-1.14		
Δ*IO_LONG_FOREIGN_US*			-0.8791	-0.8079
			-1.32	-1.24
Δ*IO_LONG_FOREIGN_NUS*			-0.2921	-0.2584
			-0.38	-0.34
lagIO_SHORT	0.2037			
	0.72			
lagIO_SHORT_DOMESTIC		-0.3273		-0.2957
		-0.90		-0.82
lagIO_SHORT_FOREIGN		***0.6278***		
		1.90		
lagIO_SHORT_FOREIGN_US			**1.7875**	**1.7710**
			3.63	3.63
lagIO_SHORT_FOREIGN_NUS			-0.1241	-0.1090
			-0.37	-0.33
lagIO_LONG	**-1.6527**			
	-2.31			
lagIO_LONG_DOMESTIC		-1.0904		-1.1053
		-1.20		-1.23
lagIO_LONG_FOREIGN		**-1.2345**		
		-2.15		
lagIO_LONG_FOREIGN_US			-1.0000	-0.9194
			-1.24	-1.16
lagIO_LONG_FOREIGN_NUS			**-2.0994**	**-2.0712**
			-2.64	-2.60
DIVERS	**-0.0243**	**-0.0242**	**-0.0242**	**-0.0242**
	-7.54	-7.42	-7.44	-7.48
HERF	0.0343	0.0357	0.0411	0.0375
	0.28	0.30	0.34	0.31
NIND	0.2045	0.2114	0.2101	0.2124
	1.44	1.51	1.50	1.51
STDROA	-0.0497	-0.0530	-0.0519	-0.0561
	-0.97	-1.03	-1.02	-1.09
ACCR	0.0002	0.0001	0.0001	0.0001
	0.09	0.09	0.05	0.06

Panel C: Trading frequency of institutional investors and stock price informativeness (Continued)

LOSS	**-0.0309**	**-0.0323**	**-0.0312**	**-0.0338**
	-1.29	**-1.35**	**-1.30**	**-1.42**
MKTCAP	**-0.1703**	**-0.1734**	**-0.1752**	**-0.1741**
	-19.90	-20.39	-20.88	-20.43
NAF	**-0.0073**	**-0.0074**	**-0.0070**	**-0.0070**
	-4.87	-4.91	-4.71	-4.68
VOL	**-0.0396**	**-0.0395**	**-0.0412**	**-0.0399**
	-1.98	-1.99	-2.00	-2.00
Intercept	**2.4384**	**2.4503**	**2.4551**	**2.4433**
	2.59	2.63	2.64	2.63
Year, industry, country dummies	yes	yes	yes	yes
N. firms	7363	7363	7363	7363
N. observations	33179	33179	33179	33179
Adj R-square	0.2965	0.2963	0.2967	0.297

Table 3.9 Endogeneity test

This table reports two-stage regression results of stock price informativeness on institutional ownership, controls, year, industry and country dummies for 1997-2006 data. The dependent variable, *SPI*, is the log of $((1-R^2)/R^2)$ where R^2 is the explanatory power of the market model in Eq. (3.1). All other variables are defined in Appendix B.1. Coefficient estimates are represented and their two tailed *t-statistics* is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

Panel A: Geographic origins of institutional investors and stock price informativeness

	(1)	(2)	(3)	(4)
IO_TOTAL	-0.0646			
	-0.49			
IO_DOMESTIC		**-0.5983**		**-0.6026**
		-2.83		-2.93
IO_FOREIGN		**0.4027**		
		3.00		
IO_FOREIGN_US			**1.1050**	**1.1732**
			5.46	5.84
IO_FOREIGN_NUS			***-0.3565***	-0.2963
			-1.86	-1.57
DIVERS	**-0.0244**	**-0.0240**	**-0.0239**	**-0.0239**
	-7.61	-7.42	-7.41	-7.37
HERF	0.1408	0.1463	0.1577	0.1501
	1.30	1.35	1.45	1.39
NIND	**0.2769**	**0.2788**	**0.2736**	**0.2765**
	2.52	2.55	2.51	2.54
STDROA	-0.0189	-0.0222	-0.0097	-0.0174
	-0.41	-0.49	-0.21	-0.38
ACCR	-0.0004	-0.0003	-0.0004	-0.0004
	-0.22	-0.19	-0.27	-0.27
LOSS	***-0.0399***	**-0.0433**	***-0.0413***	**-0.0459**
	-1.82	-2.00	-1.87	-2.12
MKTCAP	**-0.1729**	**-0.1753**	**-0.1784**	**-0.1766**
	-21.17	-21.29	-22.19	-21.35
NAF	**-0.0073**	**-0.0076**	**-0.0069**	**-0.0069**
	-5.08	-5.28	-4.97	-4.90
VOL	**-0.0437**	**-0.0430**	**-0.0447**	**-0.0431**
	-3.55	-3.54	-3.56	-3.56
Intercept	***1.4870***	**1.5396**	**1.5644**	**1.5620**
	1.89	1.97	2.00	2.00
Year, industry, country dummies	yes	yes	yes	yes
N. firms	7859	7859	7859	7859
N. observations	39956	39956	39956	39956
Adj R-square	0.3021	0.3031	0.3033	0.3040

Panel B: Stake size of institutional investors and stock price informativeness

	(1)	(2)	(3)	(4)
IO_HIGH	**0.6037**			
	4.97			
IO_HIGH_DOMESTIC		0.1502		0.2321
		1.03		1.54
IO_HIGH_FOREIGN		**1.0446**		
		5.75		
IO_HIGH_FOREIGN_US			**1.6142**	**1.5656**
			3.41	3.48
IO_HIGH_FOREIGN_NUS			**0.5470**	**0.4894**
			2.69	2.38
IO_MEDIUM	**0.6246**			
	2.18			
IO_MEDIUM_DOMESTIC		0.1428		0.0634
		0.29		0.13
IO_MEDIUM_FOREIGN		**1.7749**		
		5.65		
IO_MEDIUM_FOREIGN_US			**1.4730**	**1.5860**
			2.33	2.43
IO_MEDIUM_FOREIGN_NUS			**0.9890**	**1.1386**
			2.22	2.64
IO_LOW	**-3.1138**			
	-5.83			
IO_LOW_DOMESTIC		**-7.5264**		**-7.8827**
		-4.04		-4.32
IO_LOW_FOREIGN		**-2.0386**		
		-3.63		
IO_LOW_FOREIGN_US			0.2763	2.1210
			0.18	1.27
IO_LOW_FOREIGN_NUS			**-4.5508**	**-4.0015**
			-6.78	-5.58
DIVERS	**-0.0241**	**-0.0231**	**-0.0234**	**-0.0230**
	-7.52	-7.21	-7.09	-7.10
HERF	0.1155	0.1137	0.1393	0.1120
	1.07	1.06	1.29	1.05
NIND	**0.2681**	**0.2775**	**0.2584**	**0.2746**
	2.44	2.50	2.37	2.48
STDROA	-0.0250	-0.0374	-0.0063	-0.0304
	-0.53	-0.80	-0.13	-0.65
ACCR	-0.0002	-0.0002	-0.0004	-0.0004
	-0.14	-0.12	-0.21	-0.25
LOSS	***-0.0425***	**-0.0509**	***-0.0429***	**-0.0554**
	-1.95	-2.39	-1.95	-2.61
MKTCAP	**-0.1492**	**-0.1441**	**-0.1644**	**-0.1446**
	-16.02	-13.85	-20.42	-13.82
NAF	**-0.0042**	**-0.0042**	**-0.0039**	***-0.0026***
	-2.58	-2.54	-2.78	-1.79
VOL	**-0.0387**	**-0.0349**	**-0.0421**	**-0.0348**
	-3.30	-3.13	-3.40	-3.12
Intercept	***1.3112***	1.2790	***1.5221***	1.2801
	1.65	1.59	1.94	1.59
Year, industry, country dummies	yes	yes	yes	yes

Panel B: Stake size of institutional investors and stock price informativeness (Continued)

N. firms	7859	7859	7859	7859
N. observations	39956	39956	39956	39956
Adj R-square	0.3055	0.3089	0.3058	0.3107

Panel C: Trading frequency of institutional investors and stock price informativeness

	(1)	(2)	(3)	(4)
IO_SHORT	0.0575			
	0.25			
IO_SHORT_DOMESTIC		**-17.5317**		**-17.4204**
		-3.30		-3.29
IO_SHORT_FOREIGN		**0.6831**		
		2.30		
IO_SHORT_FOREIGN_US			**1.9621**	**2.2387**
			4.09	4.72
IO_SHORT_FOREIGN_NUS			**-0.7642**	-0.3816
			-2.28	-1.10
IO_LONG	**-1.6673**			
	-2.34			
IO_LONG_DOMESTIC		-1.0926		-1.1042
		-1.14		-1.16
IO_LONG_FOREIGN		-0.5060		
		-0.90		
IO_LONG_FOREIGN_US			***-1.4168***	-1.2614
			-1.66	-1.35
IO_LONG_FOREIGN_NUS			0.0730	0.2342
			0.08	0.27
DIVERS	**-0.0243**	**-0.0282**	**-0.0239**	**-0.0281**
	-7.69	-9.65	-7.53	-9.65
HERF	0.0861	0.0933	0.0993	0.0957
	0.77	0.87	0.90	0.90
NIND	**0.2528**	**0.2498**	**0.2554**	**0.2498**
	2.08	2.06	2.10	2.06
STDROA	-0.0270	0.0098	-0.0257	0.0064
	-0.61	0.21	-0.56	0.13
ACCR	0.0006	0.0007	0.0006	0.0007
	0.34	0.42	0.32	0.40
LOSS	***-0.0395***	**-0.0716**	***-0.0392***	**-0.0729**
	-1.74	-3.34	-1.72	-3.40
MKTCAP	**-0.1686**	**-0.1576**	**-0.1748**	**-0.1584**
	-19.65	-14.96	-20.88	-15.03
NAF	**-0.0071**	**-0.0055**	**-0.0069**	**-0.0051**
	-4.86	-3.82	-4.72	-3.55
VOL	**-0.0405**	***-0.0163***	**-0.0426**	***-0.0170***
	-3.31	-1.63	-3.34	-1.68
Intercept	***1.5887***	**1.9245**	***1.6369***	**1.9285**
	1.86	2.27	1.92	2.28
Year, industry, country dummies	yes	yes	yes	yes
N. firms	7778	7778	7778	7778
N. observations	37293	37293	37293	37293
Adj R-square	0.3020	0.3117	0.3066	0.3126

Table 4.1 Descriptive statistics

This table reports summary statistics for test and control variables. To be included in sample, a firm must have capital expenditure, R&D, PPE, assets and other financial data in the *Worldscope* database for year 1996 and have lagged financial data as well. Financial firms are omitted (SIC 6000–6999). The ultimate ownership data is obtained from Claessens, Djankov and Lang (2000), and Faccio and Lang (2002). The exact definitions of all variables are provided in Appendix C.1.

Variables	*N. firms*	*Mean*	*Std. Dev.*	*5th Ptcl.*	*25th Ptcl.*	*50th Ptcl.*	*75th Ptcl.*	*95th Ptcl.*
Panel A: Voting rights and cash flow rights of controlling shareholders								
Wedge	2861	1.7587	1.7693	1.0000	1.0000	1.1111	1.8536	5.0000
Voting rights	2861	34.1070	29.9077	5.0000	12.6000	23.2900	42.0000	100.000
Cash flow rights	2861	24.8122	20.4739	2.0000	9.8668	19.4000	35.0000	65.5700
Panel B: Test variables								
CAPX	2861	0.0835	0.0763	0.0097	0.0312	0.0612	0.1086	0.2441
CAPXRND	2861	0.0740	0.0713	0.0085	0.0280	0.0525	0.0956	0.2000
CHGPPE	2861	0.0382	0.0857	-0.0433	-0.0068	0.0117	0.0514	0.2282
q	2861	1.4828	0.7144	0.8218	1.0460	1.2611	1.6611	2.9684
DIV	2861	0.0217	0.0274	0.0000	0.0054	0.0149	0.0309	0.0624
CASH	2861	0.1374	0.1635	0.0042	0.0396	0.0953	0.1828	0.3933
CAPRD	2861	0.0233	0.0665	0.0000	0.0000	0.0000	0.0097	0.1365
Panel C: Control variables								
CF	2861	0.0727	0.0900	-0.0717	0.0202	0.0708	0.1230	0.2219
MKTCAP	2861	12.2569	1.6811	9.3957	11.0880	12.2036	13.4117	15.1187
RETURN	2861	0.1157	0.3877	-0.3827	-0.1506	0.0426	0.3046	0.8989
1/ASSET	2861	12.6346	27.8868	0.0012	0.0400	1.3570	11.3766	59.4636
SPI	2861	1.3493	0.9834	-0.3105	0.6531	1.4039	2.0631	2.9425
LEV	2861	0.2468	0.2152	0.0000	0.0439	0.2107	0.4027	0.6341
SGROWTH	2861	0.1145	2.2483	-0.2338	-0.1103	0.0050	0.1391	0.5189

Table 4.2 Pearson correlation matrix

All variables are defined in Appendix C.1. The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level.

	CAPX	*CAPX RND*	*CHG PPE*	*q*	*Wedge*	*C*	*V*	*DIV*	*CASH*	*CAPRD*	*CF*	*MKTCAP*	*RETURN*	*1/ASSET*	*SPI*	*LEV*	*SGROWTH*
CAPX	1.0000																
CAPXRND	**0.9460**	1.0000															
CHGPPE	**0.7379**	**0.6874**	1.0000														
q	**0.1502**	**0.2095**	**0.1427**	1.0000													
Wedge	-0.0202	-0.0027	**-0.0469**	**-0.0565**	1.0000												
Voting rights (*C*)	**0.0672**	**0.0446**	0.0042	-0.0034	**-0.2731**	1.0000											
Cash flow rights (*V*)	**0.0567**	**0.0376**	-0.0104	-0.0135	**-0.0859**	0.9138	1.0000										
DIV	**0.0698**	**0.0711**	**0.0776**	**0.4630**	**-0.0611**	**0.0868**	**0.0768**	1.0000									
CASH	-0.0094	**0.0556**	***0.0318***	**0.2211**	***0.0340***	**-0.0693**	**-0.0575**	**0.1511**	1.0000								
CAPRD	**-0.0365**	**0.2588**	**-0.0808**	**0.1854**	**0.0639**	**-0.0722**	**-0.0607**	-0.0146	**0.2315**	1.0000							
CF	**0.2200**	**0.2192**	**0.1306**	**0.2841**	-0.0289	**0.0924**	**0.0876**	**0.3592**	**0.2008**	-0.0045	1.0000						
MKTCAP	**0.0431**	**0.0715**	**0.0812**	**0.1620**	**0.1210**	**-0.2588**	**-0.2279**	-0.0023	**0.1419**	**0.1103**	**0.0547**	1.0000					
RETURN	**0.0883**	**0.1063**	**0.1139**	**0.0829**	-0.0253	**0.0723**	**0.0653**	**0.1496**	**0.1290**	**0.0624**	**0.2692**	**0.0858**	1.0000				
1/ASSET	**-0.0412**	-0.0134	**-0.0357**	**0.1807**	**-0.0937**	**0.0779**	**0.0595**	**0.1331**	**0.0465**	**0.0807**	**0.0746**	**-0.5314**	**0.0635**	1.0000			
SPI	**0.0481**	**0.0449**	-0.0243	**0.0405**	**-0.1318**	**0.2887**	**0.2511**	**0.1345**	**-0.0458**	-0.0279	**0.1150**	**-0.5701**	**0.0678**	0.3503	1.0000		
LEV	**0.1086**	**0.0817**	**0.1009**	**-0.2279**	**0.0775**	**-0.1106**	**-0.0929**	**-0.3039**	**-0.1515**	**-0.0703**	**-0.2141**	**0.1645**	**-0.1648**	**-0.2304**	**-0.1394**	1.0000	
SGROWTH	**0.0535**	**0.0546**	**0.0912**	0.0256	-0.0153	0.0243	0.0284	0.0302	**0.0413**	0.0074	**0.0402**	0.0027	**0.0483**	0.0192	0.0187	-0.0284	1.0000

Table 4.3 Regression analysis of investment sensitivity to stock price and control-ownership wedge

This table reports the regression results of investment on Tobin's *q*, interaction of Tobin's *q* with control-ownership wedge of controlling shareholders, controls, industry and country dummies for the year 1996 data. Investment (*CAPX, CAPXRND, CHGPPE*) is expressed as percentage points of book assets at the beginning of the year. Tobin's *q* is defined as the market value of equity plus assets minus book value of equity over assets in t - 1. *Wedge* is defined as the ratio of the largest controlling shareholder's control over ownership in t-1. All other variables are as defined in Appendix C.1. Coefficient estimates are represented and their two tailed t-test is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	(1)	(2)	(3)
Dependent variables	*CAPX*	*CAPXRND*	*CHGPPE*
q	**0.0082**	**0.0162**	**0.0078**
	2.19	3.14	2.21
Wedge	0.0006	0.0012	-0.0002
	0.36	0.81	-0.14
q x *Wedge*	**-0.0032**	***-0.0005***	**-0.0051**
	-2.14	-1.97	-5.06
Cash flow rights	0.0001	0.0001	0.0001
	0.92	0.72	0.61
CF	**0.1265**	**0.1127**	**0.0688**
	5.57	3.65	2.54
MKTCAP	0.0039	**0.0056**	**0.0076**
	1.64	2.63	2.98
RETURN	***0.0081***	**0.0107**	**0.0173**
	1.70	2.08	3.69
1/ASSET	0.0001	0.0001	**0.0002**
	0.75	1.72	2.51
Intercept	**0.0693**	**0.0705**	**0.1191**
	8.19	7.67	13.62
Industry, country dummies	yes	yes	yes
N. firms	2861	2861	2861
Adj R-square	0.2538	0.2410	0.2254

Table 4.4 Effect of dividend, cash holdings, and R&D intensity

This table reports the regression results of investment on Tobin's *q*, interaction of Tobin's *q* with control-ownership wedge, controls, industry and country dummies for four quartiles classified based on dividend yield, cash holdings and R&D intensity. The year 1996 data is used. Dependent variable, investment (*CAPX*), is expressed as percentage points of book assets at the beginning of the year. Tobin's *q* is defined as the market value of equity plus assets minus book value of equity over assets in t - 1. *Wedge* is defined as the ratio of the largest controlling shareholder's control over ownership in t-1. *DIV* is defined as cash dividend scaled by beginning-of-year assets. *CASH* is defined as cash and marketable securities scaled by beginning-of-year assets. *CAPRD* is defined as five-year average research and development expense scaled by beginning-of-year assets. All other variables are as defined in Appendix C.1. Coefficient estimates are represented and their two tailed *t*-test is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	Q1 (Lowest)	Q2	Q3	Q4 (Highest)
Panel A: Quartiles sorted by dividend yield				
q	0.0071	-0.0196	0.0073	0.0125
	1.10	-2.12	0.84	1.98
Wedge	0.0028	0.0014	0.0034	-0.0032
	0.87	0.84	0.69	-1.87
*q*Wedge*	**-0.0073**	***-0.0089***	**0.0094**	0.0133
	-3.25	-1.81	3.69	0.79
Control variables	Yes	Yes	Yes	Yes
N. firms	715	715	716	715
Adj R-square	0.3494	0.4462	0.2434	0.2609
Panel B: Quartiles sorted by cash holdings				
q	**0.0215**	***0.0119***	**0.0095**	0.0051
	5.34	1.68	1.94	0.77
Wedge	0.0015	0.0022	***0.0056***	-0.0005
	0.56	1.21	1.67	-0.24
q x *Wedge*	0.0079	0.0046	-0.0007	**-0.0038**
	0.97	0.96	-0.21	-3.02
Control variables	Yes	Yes	Yes	Yes
N. firms	715	715	716	715
Adj R-square	0.2595	0.2563	0.3419	0.2650
Panel C: Quartiles sorted by R&D intensity				
q	**0.0346**	0.0057	0.0054	0.0132
	2.58	0.52	0.62	1.41
Wedge	0.0087	0.0027	-0.0015	**-0.0018**
	1.50	1.45	-0.83	-2.20
q x *Wedge*	**0.0313**	**0.0100**	**-0.0111**	**-0.0032**
	2.71	2.05	-2.46	-7.20
Control variables	Yes	Yes	Yes	Yes
N. firms	237	237	238	237
Adj R-square	0.3259	0.3774	0.4802	0.2610

Table 4.5 Robustness checks

This table reports robustness check for the regression results of investment on Tobin's q ($\triangle q$), interaction of Tobin's q ($\triangle q$) with control-ownership wedge of controlling shareholders, controls, industry and country dummies for different groups of sample. The year 1996 data is used. Dependent variable, investment (*CAPX*), is expressed as percentage points of book assets at the beginning of the year. Tobin's q is defined as the market value of equity plus assets minus book value of equity over assets in t - 1. *Wedge* is defined as the ratio of the largest controlling shareholder's control over ownership. All other variables are as defined in Appendix C.1. Coefficient estimates are represented and their two tailed *t*-test is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	(1)	(2)	(3)	(4)	(5)
	$\triangle q$, instead of q, as test variable	*WLS*	*East Asia*	*Western Europe*	*Exclude Japan, U.K.*
q	***0.0014***	***0.0099***	0.0069	**0.0129**	0.0039
	1.82	1.94	0.74	4.43	1.53
Wedge	0.0012	0.0007	0.0016	0.0010	0.0005
	0.65	0.32	0.86	0.47	0.24
q x *Wedge*	**-0.0082**	**-0.0040**	0.0031	**-0.0032**	***-0.0032***
	-3.21	-2.14	0.63	-2.03	-1.75
Cash flow rights	0.0001	0.0002	0.0003	0.0000	0.0001
	0.66	1.09	0.59	0.21	0.56
CF	**0.1483**	**0.0929**	**0.1315**	**0.1230**	**0.1302**
	6.28	3.68	2.53	5.91	3.53
MKTCAP	**0.0046**	**0.0073**	0.0072	0.0004	0.0069
	2.09	2.53	1.07	0.25	1.69
RETURN	0.0050	0.0120	***0.0183***	0.0050	0.0070
	0.86	1.59	1.76	1.27	1.01
1/ASSET	0.0001	0.0003	-0.0002	0.0000	0.0004
	1.23	1.54	-0.13	-0.82	1.23
Intercept	**0.0814**	**0.0821**	**-0.0633**	**0.0911**	**0.0736**
	8.85	6.78	-2.98	9.99	5.53
Industry, country dummies	yes	yes	yes	yes	yes
N. firms	2585	2861	1226	1635	1671
Adj R-square	0.2319	0.2604	0.2940	0.2322	0.2137

Table 4.6 Regression analysis of investment sensitivity to stock price, stock price informativeness, and control-ownership wedge

This table reports the regression results of investment on Tobin's *q*, interaction of Tobin's *q* with control-ownership wedge of controlling shareholders, controls, industry and country dummies for the year 1996 data. Two subsamples are formed according to the level of stock price informativeness. Investment (*CAPX*) is expressed as percentage points of book assets at the beginning of the year. Tobin's *q* is defined as the market value of equity plus assets minus book value of equity over assets in t - 1. *Wedge* is defined as the ratio of the largest controlling shareholder's control over ownership in t - 1. All other variables are as defined in Appendix C.1. Coefficient estimates are represented and their two tailed *t*-test is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	Stock Price Informativeness			
	Low		*High*	
q	0.0048	0.0034	**0.0089**	**0.0077**
	1.22	0.85	2.54	2.20
Wedge		-0.0008		**0.0035**
		-0.77		2.71
*q*Wedge*		***-0.0042***		**-0.0040**
		-1.73		-2.41
Cash flow rights		0.0001		0.0001
		0.88		0.73
CF	**0.1677**	**0.1678**	**0.1140**	**0.1147**
	6.69	6.68	6.30	6.35
MKTCAP	**0.0032**	**0.0033**	**0.0045**	**0.0044**
	2.24	2.30	2.53	2.49
RETURN	0.0085	0.0088	***0.0092***	***0.0097***
	1.43	1.50	1.86	1.97
1/ASSET	***0.0002***	0.0002	0.0000	0.0000
	1.64	1.56	0.64	0.60
Intercept	**-0.0404**	**-0.0428**	***0.1137***	0.1058
	-2.99	-3.13	1.75	1.63
Industry, country dummies	yes	yes	yes	Yes
N. firms	1430	1430	1431	1431
Adj R-square	0.3027	0.3032	0.2084	0.2128

Table 4.7 Analysis of firm performance

This table reports the regression results of the market value on investment, control-ownership wedge of controlling shareholders, interaction of investment with control-ownership wedge, controls, industry and country dummies for the year 1996 data. Investment (*CAPX)* is expressed as percentage points of book assets at the beginning of the year. *Wedge* is defined as the ratio of the largest controlling shareholder's control over ownership. All other variables are as defined in Appendix C.1. Coefficient estimates are represented and their two tailed *t*-test is displayed right below. All *t-statistics* are on an adjusted basis using robust standard errors corrected for country-level clustering (Petersen, 2009). The bold-faced (bold-faced italic) coefficients are significant at less than the 1% (10%) level (two-tailed tests).

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	ROA_t	ROA_{t+1}	ROA_{t+2}	RET_t	RET_{t+1}	RRT_{t+2}
CAPX	**0.1924**	**0.1333**	**0.1405**	**0.3149**	0.0559	-0.0283
	5.96	4.06	2.55	2.95	0.41	-0.40
Wedge	***0.0008***	-0.0006	-0.0002	0.0043	0.0006	-0.0045
	1.99	-0.66	-0.19	0.76	0.18	-1.30
*CAPX*Wedge*	-0.0036	**-0.0074**	**-0.0084**	**-0.0550**	**-0.0360**	0.0077
	-1.09	-2.47	-1.96	-3.23	-3.26	0.29
MKTCAP	**0.0063**	**0.0063**	**0.0057**	**0.0368**	**0.0362**	0.0021
	7.23	6.87	5.47	5.85	3.19	0.18
LEV	**-0.0315**	**-0.0341**	**-0.0365**	**-0.1310**	**-0.0983**	-0.0299
	-4.88	-4.25	-2.78	-2.37	-3.62	-0.53
CF	**0.5401**	**0.4115**	**0.3797**	**0.3299**	**0.5441**	**0.5268**
	7.55	14.13	14.06	4.98	4.09	4.50
SGROWTH	**0.0802**	**0.0202**	-0.0020	**0.1987**	**0.2605**	0.0093
	5.10	2.33	-0.13	3.07	4.35	0.22
Intercept	**-0.2013**	**-0.1850**	**-0.2549**	**-0.5107**	**-0.2982**	**0.1129**
	-9.90	-17.26	-24.98	-16.58	-6.78	2.44
Industry, country dummies	yes	yes	yes	yes	yes	yes
N. firms	2679	2679	2679	2605	2679	2679
Adj R-square	0.5626	0.4116	0.2614	0.2861	0.3361	0.4992