Does Investors' Belief on Other Investors' Information Acquisition Affect Trading and Price?

By

Yuting Wang

B.A. Accounting
Tsinghua University, 2020

SUBMITTED TO THE DEPARTMENT OF MANAGEMENT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN MANAGEMENT RESEARCH

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

February 2024

Authored by: Yuting Wang
Department of Management
January 9, 2024

Certified by: Joseph Weber
Department of Management
Thesis supervisor

Accepted by: Eric So
Professor, Global Economics and Finance
Faculty Chair, MIT Sloan PhD Program

Does Investors' Belief on Other Investors' Information Acquisition Affect Trading and Price?

By

Yuting Wang

SUBMITTED TO THE DEPARTMENT OF MANAGEMENT ON JANUARY 9, 2024,
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN MANAGEMENT RESEARCH

ABSTRACT

I study how investors' *belief* on other investors' information acquisition about an asset affects trading and price, holding constant investors' *actual* information acquisition. I hypothesize that the predictions depend on the trading strategy investors adopt, which is essentially determined by the nature of the asset and the level of investor sophistication. In a world where investors are able to form high-quality independent estimates of the fundamental asset value, they extract other investors' signals from the price change and end up trading *more* aggressively on their private signals when they believe there have been *more* information acquirers. In contrast, in a world where investors cannot form high-quality independent estimates of the asset value, they tend to adopt a heuristic strategy and trade *less* aggressively on their private signals when they believe there have been *more* information acquirers. Using comprehensive private meetings data in China from 2007 to 2017 and a mandate by the Shenzhen Stock Exchange in 2012 that requires firms to disclose the dates and participants of private meetings within two trading days, I find that investors on average trade less aggressively when they believe there have been more information acquirers, consistent with the heuristic world. The results are concentrated in firms with high information uncertainty, e.g., firms with high market-to-book and volatility, which approximate a world where investors are less likely to have a high-quality fundamental anchor, supporting my theoretical mechanisms.

Thesis supervisor: Joseph Weber

Title: George Maverick Bunker Professor of Management
Professor of Accounting at the MIT Sloan School of Management

Acknowledgements

I thank Rodrigo Verdi and Joseph Weber for guidance and support for this paper. I am also grateful to John Core, Charles Downing, Paul Fontanier, Zoe Han, David Kim, Jason Kim, S.P. Kothari, Beatrice Michaeli, Tim de Silva, Eric So, Fabio da Silva Soares, Gabriel Voelcker, Chloe Xie, Rachel Yoon, Jiaheng Yu, and Cindy Zhang for their valuable feedback. All errors are my own.

Contents

List of Figures

List of Tables

1. Introduction

This paper examines how investors' *belief* on other investors' information acquisition affects trading and price. The motivation comes from the increasing transparency of private meetings between the firm and investors, due to disclosure regulation and big data.[1] Prior research suggests that the transparency of private meetings affects the capital market by altering the incentives of investors/analysts to acquire information. For instance, Ru et al. (2022) shows that firms that have not been visited attract more analyst attention after the disclosure of private meetings. I extend the literature by studying how this transparency affects trading and price, even when the *actual* information acquisition is held constant.

Traditional view from the efficient market hypothesis (EMH) suggests that the price aggregates all information about the asset value (Fama 1970). Therefore, given the information each investor holds about the asset, it is fairly and uniquely priced, meaning that investors' belief on other investors' information acquisition does not matter for trading or price. In this paper, however, I hypothesize that when investors get imperfect signals, their belief on other investors' information acquisition is an important factor they consider when trading, which also affects the equilibrium asset price.

Specifically, I propose and test two worlds where investors consider this factor in two different ways. The basic setup of the first world resembles the noisy rational expectations (noisy REE) economy in Diamond and Verrecchia (1981). A subset of investors acquire a private message from the firm, from which they diversly form independent signals about the firm value. They rationally learn from price about other informed investors' signals and form a posterior estimate of the firm value by putting a higher weight on price change when they

[1] For example, since July 2012, the Shenzhen Stock Exchange in China has been requiring firms to disclose the dates and participants of private meetings between the firm and investors/analysts within two trading days. Besides, alternative data such as corporate jet flights (Bushee et al. 2018) and GPS taxi trip records (Choy and Hope 2021) have been able to capture private meetings that are previously unobservable.

believe more investors have acquired the information and expressed their opinions in price, which means the price change is more informative. Finally, they submit demand for the firm based on the gap between their estimate of the firm value and market price. Since all the informed investors' signals are based on the same firm fundamentals (i.e., the message), the price change typically goes into the same direction of and reinforces their private signals, so they end up trading *more* aggressively[2] on their private signals when they believe there have been *more* information acquirers.

In the second world, a subset of investors acquire a private message from the firm as they do in the first world. The key difference is that now investors cannot form high-quality independent signals on the firm value from the message.[3] Although they do not have a good sense how much the firm is worth in absolute value, they do have a way to gauge the relative information content of the message.[4] Rather than basing their demand on the gap between their own estimate of the firm value and market price, they adopt a second-best heuristic strategy that infers how much of the message has been incorporated into price based on the belief on other investors' information acquisition. If investors expect *more* information acquirers, they conjecture that a greater extent of the message has been impounded into price, so they trade *less* aggressively, i.e., submit a smaller order given the same message received. This resembles the crowded trade problem faced by "unanchored" arbitrageurs in Stein (2009), who trade less

[2] Trade aggressiveness in this paper is defined as the size of an investor's demand given the same initial *signal* (or *message* in the second world) on the asset value and market price. The definition is different from the imperfect competition Kyle (1985) model which defines trade aggressiveness as the size of demand given the same *estimate* of the asset value and market price. Kyle (1985) assumes that the informed has perfect knowledge of the asset value. For the same *estimate* (i.e., the perfect knowledge) of the asset value, the informed submits a larger order when the market is deeper (i.e., more liquid). In this paper, since the informed investors get imperfect *signals*, they can form different *estimates* of the asset value even with the same initial *signal* because they consider other pieces of information. Indeed, the different level of aggressiveness in my paper is driven by the same initial *signal* leading to different *estimates* of the asset value due to different beliefs on other investors' information acquisition.

[3] Which means the signal has a large bias and (or) low precision.

[4] To illustrate, suppose investors know from private meetings before public announcement that the firm's earnings this quarter will grow by 20%. Although they do not know how much the firm is worth given the message, they learn from historical observation that this type of good news is on average associated with a 10% increase in market price. This seems to still requires some sophistication, but the implication is unchanged if investors simply believe the price should increase when there is good news.

aggressively when they believe more arbitrageurs are entering the same strategy.[5]

To test which story better explains the real world, I exploit a unique setting in China that provides an opportunity to alter investors' *expected* number of information acquirers while holding constant the *actual* number of information acquirers. Since 2007, the Shenzhen Stock Exchange (SZSE) has been requiring firms listed on its mainboard to record private meetings with investors and analysts in quarterly reports, including the date, location, participants, and a short summary of meeting topics. Starting from July 2012, the SZSE further requires all listed firms to disclose private meetings within two trading days. Before 2012, investors have little idea how many others meet with the firm during the pre-announcement period, so they conjecture an average rate. After 2012, investors know timely how many others meet with the firm during the pre-announcement period, so the expected[6] number of information acquirers increases for firm-quarters with an abnormally high number of meetings (henceforth *high firm-quarters*) but decreases for firm-quarters with an abnormally low number of disclosed meetings (henceforth *low firm-quarters*), while the actual number of information acquirers is unchanged. This motivates a difference-in-differences (DiD) research design that compares *high firm-quarters* before and after 2012 relative to *low firm-quarters*.[7]

The empirical predictions apply to investor trading and price reaction during the pre-announcement period. The more aggressively investors trade, the more strongly price reacts. I focus on price reaction during the pre-announcement period because the holdings are made public only by a selective group of investors (e.g., mutual funds) and only at quarter-ends. I construct a sample of firm announcements and examine the extent to which the price change

[5] Stein (2009) examines the post-earnings announcement drift (PEAD) strategy that has a momentum-like flavor: arbitrageurs buy when the returns on the earnings announcement day are positive, and sell when negative. Arbitrageurs of this type of "unanchored" strategies do not base their demand on an independent estimate of fundamental value.

[6] As investors know better about other investors' information acquisition after 2012, not only the expected number of information acquirers changes, but its variance also shrinks. The DiD design described below tackles this issue since the variance decreases for both *high firm-quarters* and *low firm-quarters*.

[7] See Figure 1 for a summary of the predictions.

during pre-announcement period (-70, -1) reflects total information content of the message, proxied by the cumulative abnormal return (CAR) during the entire window (-70, 2). The assumption is that the price right after announcement reflects all the news since all investors have access to more accurate and complete information.[8] I focus first on the good news group, defined as those that beat guidance or report/forecast positive earnings growth, since previous studies suggest that firms are more willing to leak positive news before official announcement (e.g., Kothari et al. 2009). The final sample includes 9,503 earnings announcements and 5,940 earnings guidance of 449 firms listed in SZSE mainboard from 2007 to 2017.

I show that the CAR in the pre-announcement period decreases significantly by 0.5 percentage points for *high firm-quarters*[9] after 2012 relative to its mean 2.8 percentage points before 2012, holding constant the level of good news, which is proxied by CAR (-70, 2). This is consistent with investors trading less aggressively when the expected number of information acquirers increases from the conjectured average level before 2012 to the observed high level after 2012. In contrast, CAR in the pre-announcement period increases for *low firm-quarters* after 2012. This finding is again consistent with the predictions in the second world. The overall pattern suggests that the market is represented by investors closer to heuristic ones who cannot form high-quality independent estimates of the fundamental firm value.

Some may find it hard to imagine a modern financial market dominated by so-called "heuristic" investors, but in fact, the conditions in the first world are quite demanding. First, investors need to be able to form a high-quality estimate of the firm value. If they only have a rough sense of firm value with a large bias or low precision, they are better off adopting the "heuristic" strategy. Second, even if investors are able to form high-quality estimates of the firm value, they need to rationally assign some precision on old price and learn about other

[8] Investors also know the number of private meetings from quarterly reports starting from 2007.
[9] See definition in Page 3.

informed investors' signals from the price change.[10] If they ignore the information in price and rely solely on their own signals, the belief on other investors' information acquisition would be irrelevant. To provide stronger evidence that the result is driven by investors' ability to form high-quality fundamental estimates, I run cross-sectional tests based on the ex-ante probability that this condition holds. Previous studies define "information uncertainty" (IU) in terms of the precision with which firm value can be estimated, considering younger firms and firms with higher volatility, expected growth, and price-to-book as examples of high-IU firms (Lee and So 2015). I show that the result in the main regression is concentrated in high-IU firms that better approximate the second world where investors are less likely to be able to form high-quality estimates of the fundamental firm value.

The findings are less likely to be explained by alternative mechanisms. One alternative two-sided story is that, when visitors expect more visitors, on the one hand, the "competition effect" drives them to trade more aggressively, aiming to front-run the others. On the other hand, the market becomes less liquid when more investors are informed (e.g., Kyle 1985), so the "illiquidity effect" can make investors trade less aggressively due to large market impact. However, this definition of aggressiveness emphasizes the *speed* of price change but could not speak to the total *amount* of price change during the pre-announcement period[11]. Besides, this alternative story could not explain why the pattern is concentrated in high-IU firms. Other stories[12] suggest that investors' belief on other investors' information acquisition would affect their incentives to acquire information, whereas I hold the *actual* information acquisition constant throughout the analysis.

[10] This is the typical characterization of agents in REE models, see, for example, Grossman and Stiglitz (1980).
[11] For instance, the continuous auction equilibrium in Kyle (1985) suggests that the informed ultimately impounds all the information into price just before the final period.
[12] For instance, since the price could deviate from the fundamental value for a relatively long time and the arbitrage capital could be impatient (e.g., De Long et al. 1990, Shleifer and Vishny 1997), when investors expect more information acquirers, they are more inclined to acquire information believing that they can collectively move price back to intrinsic value and profitably exit sooner. Ru et al. (2022) also proposes a two-sided story on how analysts' incentive to visit is affected by other analysts' visits.

This paper contributes to the literature by being the first to propose and test a two-sided story that investigates how the belief on other investors' information acquisition affects investor trading and price. It sheds light on a fundamental question in capital market research – what factors do investors consider when trading and how it affects price? Contrary to the traditional view from the EMH which suggests that an asset is uniquely and fairly priced by the information investors acquire about the asset, I show that the mere *belief* on other investors' information acquisition can affect trading and price holding constant the *actual* information acquisition, and the sign of the effect depends on whether investors are able to form high-quality independent estimates of the fundamental asset value. As the belief on other investors' information acquisition affects perceived information asymmetry, this paper adds to the broad literature on how information asymmetry affects investor trading (e.g., Grossman and Stiglitz 1980), liquidity (e.g., Kyle 1985, Glosten and Milgrom 1985), and cost of capital (e.g., Easley and O'hara 2004, Hughes et al. 2007). This paper is also related to a nascent literature relaxing the assumption of complete knowledge of a stock's information environment[13], which mostly look at how the uncertainty about whether other are informed affects liquidity (Li 2013), risk-premia (Banerjee and Green 2015), and return skewness (Peress and Schmidt 2023).

This paper also complements a growing literature that examines the private meetings between firms and investors. While firms have limited ability to selectively disclose material non-public information to analysts and investors in private settings since Regulation Fair Disclosure (Reg FD) was passed in 2000, anecdotal evidence suggests that private meetings stay active as the unclear definition of "materiality" allows firm managers considerable leeway in helping analysts and investors complete a "mosaic of information that, taken together, is material" (SEC 2000; Soltes 2018). Brown et al. (2015) provide survey evidence that sell-side

[13] For instance, in Grossman and Stiglitz (1980), investors know exactly the number of informed investors in the market and the precision of their signals.

analysts perceive private communications with firm management as more useful sources of information than public disclosures even after the passage of Reg FD. The extant literature mostly examines the usefulness of private meetings to analysts and investors (e.g., Cheng et al. 2016, Han et al. 2018, Bradley et al. 2022). This paper adds to this stream of literature by showing that investors' belief on other investors' information acquisition is an important factor they consider when trading on the information they acquire.

Finally, this paper is related to the disclosure regulation literature, particularly the mandatory disclosure of private meetings and investor identity, which has become increasingly common (e.g., Ru et al. 2022, Verrecchia and Zhu 2022). Although the main focus of this paper is not to discuss the pros and cons of mandatory disclosure of private meetings, the theoretical predictions and empirical findings are consistent with mandatory disclosure of private meetings improving both investor welfare and market efficiency either in the first world where investors put more correct weights on the price change and thus form more accurate posterior estimates of the asset value, or in the second world where investors are able to coordinate better ex ante to avoid under-reaction or over-reaction to news.

The remainder of this paper is organized as follows. Section 2 reviews the related literature. Section 3 introduces the two worlds, the empirical setting, testable hypotheses, and research design. Section 4 discusses the empirical results. Section 5 concludes.

2. Related Literature

2.1 Literature on investor trading strategies

It is the investors' trading strategy that essentially distinguishes the two worlds in this paper. The first world resembles the noisy REE economy in Diamond and Verrecchia (1981) where investors estimate the true asset value as a weighted average of price and other signals, with the weights depending on their relative precision. Investors then submit demand as a

function of the gap between their estimate of the asset value and the current price. However, Diamond and Verrecchia (1981) do not introduce uncertainty in information acquisition, nor do they investigate how investors' belief on other investors' information acquisition affects investor trading and price formation.

Stein (2009) models a crowded trade problem faced by PEAD arbitrageurs, similar to my second world which is represented by "unanchored" investors. Arbitrageurs there cannot observe firm fundamentals, so, instead of basing their demand on independent estimates of the firm value, they exploit a statistical pattern (i.e., under-reaction to news) that yield profitable arbitrage. Since the strategy is "unanchored", they worry about crowding so they trade less aggressively when they expect many other arbitrageurs are also entering the same strategy. I extend the spirit of Stein (2009) beyond arbitrage strategies and suggest that even information about firm fundamentals acquired from private meetings can lead to unanchored trading when investors cannot form high-quality estimates of the fundamental firm value.

Besides, this paper is also related to the literature on investors' reaction to private vs. public news. Daniel et al. (1998) propose a behavioral theory suggesting that investors over-react to private signals and under-react to public signals due to over-confidence and biased self-attribution. Chan (2003) documents that firms covered by media experience drifts (i.e., under-reaction) and firms that have price jumps without observable public news experience reversals (i.e., over-reaction), which he interprets to be consistent with Daniel et al. (1998). Vega (2006), however, shows that whether information is public or private is irrelevant and what matters is whether information is associated with the arrival of informed or uninformed traders. Since the key feature of public news is that everyone knows everyone knows, this paper informs the debate on whether investors trade more aggressively on private or public signals and how the price is affected.

2.2 Literature on private meetings between firms and investors

Studies examining the consequences of private meetings are limited due to the private nature of such interactions. While private communications can occur in well-publicized events such as broker-hosted conferences (Green et al. 2014; Bushee et al. 2017) and analyst/investor days (Kirk and Markov 2016) whose calendars and participants are publicly disclosed in advance and transcripts are released with little delay, they generally do not provide an opportunity for investors to ask in-depth questions in a one-on-one setting with management (Bushee et al. 2017). Brown et al. (2019) poll IROs at 610 publicly traded firms and suggest that more informative private meetings occur at unobservable settings such as non-deal roadshows (NDRs), private phone calls, and site visits.

Soltes (2014) and Solomon and Soltes (2015) obtain proprietary records of private meetings between analysts and management from a large NYSE company and provide descriptive insights on where, when, and why analysts privately meet with management. Bushee et al. (2018) analyze corporate jet flight patterns to identify NDRs where firm managers travel to meet with institutional investors. Bradley et al. (2022) collect a novel sample of NDRs from a financial publisher TheFlyOnTheWall.com that acquires data through leaks from employees within the brokerage firm and find that institutional investors trade heavily and profitably around NDRs at the expense of retail traders. Choy and Hope (2021) capture face-to-face private meetings between analysts and firm managers using GPS taxi trip records and find that private meetings lead to more accurate analyst forecasts.

Chinese researchers have made significant progress in moving this nascent literature forward, primarily due to data availability (Lennox and Wu 2022). Since 2007, companies listed on the mainboard of the SZSE have been required to record private meetings in their quarterly reports. Starting from July 2012, SZSE further requires firms to disclose these information together with more detailed meeting notes within two trading days. Cheng et al. (2016) and Han et al. (2018) find that forecast accuracy improves after analysts meet with firms.

Cheng et al. (2019) find abnormal market reactions around the dates of investor visits and that changes in holdings of visiting investors are more predictive of future performance than those of non-visitors.

2.3 Literature on disclosure of private meetings and investor identity

The two most related empirical papers are Ru et al. (2022) and Verrecchia and Zhu (2022)[14]. Ru et al. (2022) show that after the disclosure of private meetings, analysts allocate more attention to firms that have not been visited by analysts. The tension is that, on the one hand, other analysts' visits reduce the expected benefits of visiting the same firm since "more gold has been mined". On the other hand, other analysts' visits indicate the existence of value-relevant information, thus attracting subsequent analysts to extract additional information. Verrecchia and Zhu (2022) find that liquidity decreases but trading volume increases after the disclosure of short positions of short sellers with better reputation. The tension is that, on the one hand, the "illiquidity effect" suggests that the disclosure of informed traders should alert other investors and market makers, making the market less liquid and inhibiting subsequent trade. On the other hand, the "information effect" suggests that the information others glean from the informed trades might motivate subsequent trades. The two papers focus on entirely different outcome variables to mine, and their predictions do not depend on the features of the agents or firms although they also propose a two-sided story.

3. Hypothesis Development, Research Design, and Data

In this section, I first characterize the two worlds that lead to opposite predictions on how investors' belief on other investors' information acquisition affects their trading behaviors

[14] Two other papers examine the consequences of the 2012 disclosure mandate in China. Yang et al. (2020) show that after 2012, market reactions around private meetings are stronger and more predictive of firms' future earnings, and the forecast accuracy of non-visiting analysts improves. Ke et al. (2021) show that the mandate has a chilling effect on visiting analysts' information acquisition.

and price formation. In both worlds, a subset of investors acquire a private message about the firm during private meetings with management before the message is publicly disclosed. The key difference is that, in the first world, investors are able to form high-quality independent estimates of the firm value from the message and submit orders based on the gap between their estimates and the current market price, while investors in the second world cannot form high-quality independent estimates, so they adopt a second-best trading strategy based on how the message is statistically related to returns and a guess on how much of this relative information content has been impounded into price. Interestingly, holding constant the actual information acquisition, investors in the first world end up trading more aggressively when they expect more information acquirers, but the prediction is opposite in the second world.

3.1 World I: Bayesian investors who form high-quality estimates of firm value

Investors in this world are similar to the Bayesian investors in the noisy REE economy in Diamond and Verrecchia (1981). They each form an independent estimate of firm value as a weighted average of various pieces of imperfect information and the weights depend on the relative precision of each piece of information.

Suppose a subset of investors acquire the same message about the firm from private meetings with management before it is publicly disclosed, from which they diversely form high-quality independent signals on the firm value. For example, investors know from the meetings that the firm's earnings this quarter will grow by 20%. Based on this message, they each form a signal on the firm value close to its true value (i.e., high-quality). Now, they have three pieces of information: a) the price before any information acquisition, b) the price after information acquisition, c) the signal formed from the message.

Importantly, the signal they form is imperfect and diverse. Knowing that other informed investors also obtain high-quality signals, they hope to learn from the price change about these signals. They each form an estimate of the firm value as a weighted average of the three pieces

of information. When they expect that more investors have acquired the message and expressed their perspectives in price, they put a higher weight on the price change. Since the informed investors' signals are based on the same message, the price change typically goes into the same direction of and reinforces their signals, so they end up trading more aggressively given the same signal at the beginning. Below is a numerical illustration:

Suppose the price before information acquisition is 100 and the true firm value is 110. Investors who attend private meetings obtain a *message* and each form a *signal* of firm value around 110. For the sake of simplicity, I assume all investors meet with the firm and perceive the old price and their *signals* to have equal precision, so investors on average form an *estimate* of 105. This is higher than the old price, so they buy and push the price up to 105.

If investors believe they are the only one that receives the *message*, they do not learn from price, because the price increase must be due to noise traders, which is uninformative. Therefore, they stop updating their posterior *estimates* and the price stays at 105.

If instead, investors believe many other investors also receive the *message*, they infer from the price increase that other investors form *signals* above 105, since other investors also form *estimates* as the average of old price and their *signals*. Therefore, investors update their posterior *estimates* upward to, say 107, and the price increases to 107 after the second round of trading. They further infer from the price increase from 105 to 107 that the news is even better, and continue updating posteriors upwards. The spiral keeps going until their average posterior *estimate* converges to some value just below 110, since they cannot rule out the possibility that at least part of the price increase is due to noise trading.

As illustrated, in this world, when visitors expect *more* information acquirers, they do not intend to trade more aggressively at the beginning. Rather, they put a higher weight on price change which goes into the same direction of and reinforces their private signals, so they end up trading *more* aggressively.

3.2 World II: Heuristic investors who form low-quality estimates of firm value

Investors in this world are similar to the PEAD arbitrageurs in Stein (2009). They do not base their demand on an independent estimate of fundamental value, which Stein (2009) called an "unanchored" strategy. Strategies of this type are common in practice, such as buying the stocks of firms with high announcement returns, high book-to-market, or low accruals. These arbitrageurs trade less aggressively when they believe that many other arbitrageurs are entering the same strategy. I extend the spirit of Stein (2009) beyond arbitrage strategies and suggest that even information about firm fundamentals can lead to an unanchored strategy when investors cannot form a high-quality estimate of the fundamental firm value.

Same as the first world, suppose some investors acquire a message about the firm from private meetings, e.g., the firm's earnings this quarter will grow by 20%, but they cannot form a high-quality signal of the firm value based on this message. That said, they still have an incentive to attend private meetings because they at least have a rough sense of the relative information content of the news. For instance, they learn from historical observation that an earnings growth of 20% is on average associated with a 10% increase in price. This seems to still requires some sophistication, but the implication is unchanged if investors simply believe the price should increase when there is good news. They can profitably trade on this message without directly estimating how much the firm should be worth.

The informed investors adopt a second-best heuristic strategy that infers how much of the message has been reflected in price based on the belief about other investors' information acquisition. If they believe that they are the only person that receives the message, they submit a large order because the information content of the message has not been incorporated into price. If they believe that many other investors have also received the message, they submit a smaller order worrying that the price already reflects much of the news.

As illustrated above, in the second world, information acquirers cannot form a high-

quality estimate of firm value, so they "coordinate" ex ante based on the expectation of other investors' information acquisition to avoid under- or over-reaction to news. When visitors expect *more* information acquirers, they trade *less* aggressively. Appendix A1 provides simple models to characterize and derive the predictions of the two worlds.

3.3 Discussion of the intuition behind the two worlds

The two worlds nicely describe two common strategies that adhere different investment philosophies. The first is value-driven: the stock is worth buying because it is underpriced, which requires the ability of fundamental analysis. The second is news-driven: the stock is worth buying because there is good news that most people might have not known, which emphasizes the access to private information.

The reason why two worlds lead to opposite predictions is that each world have a distinct feature that the other world does not have. For the first world, the informed end up trading more aggressively when they expect more information acquirers because they extract useful signals of others from the price change that reinforces their own signals - this force does not exist in the second world since the informed does not have the ability to diversly form independent signals of firm value.[15] For the second world, the informed trade less aggressively when they expect more information acquirers because they worry that price may have overshot as unanchored informed investors are buying – this worry does not exist in the first world since the informed investors form unbiased estimates of firm value.

3.4 The Empirical Setting

On July 2, 2007, the Shenzhen Stock Exchange (SZSE) required companies listed on its mainboard to disclose private meetings with investors and analysts in their quarterly reports,

[15] This does not mean that investors in the second world do not learn from price. Actually, they are "price-takers" other than the part of the information that they think might have not been priced. It is just that the learning is unrelated with the message they get. Further, in both worlds, investors can also learn from the price change about the number of informed. The sign of prediction is unchanged but the effect of the ex-ante belief is weakened.

including the date, location, participants, and a short summary of meeting topics. This follows the Information Fair Disclosure Guidelines proposed by the SZSE in August 2006, resembling the Reg FD in the U.S. that aims to curtail selective disclosure. Starting from July 2012, the SZSE further requires all listed firms to disclose private meetings within two trading days on "HudongYi", the SZSE's online investor relations platform.[16] These reports are available to all market participants and are also fed to users by most online brokerages in a timely manner. Appendix A2 provides examples of site visit records before 2012 (in quarterly report) and after 2012 (in "HudongYi"). As can be seen, the timely disclosure under 2012 regulation provides more information, e.g., more detailed meeting notes.[17] As for the disclosure in quarterly reports, the format and content remain unchanged after 2012.

For firms in the SZSE mainboard, effectively, before July 2012, investors do not know how many investors receive private message from the firm during the pre-announcement period, so they conjecture an average number. After July 2012, investors know in a timely manner how many investors are receiving private message from the firm. This allows altering the *expected* number of information acquirers while holding constant the *actual* number of information acquirers. For example, for firm-quarters with an abnormally high number of private meetings, the expected number of information acquirers increases from the conjectured average level before 2012 to the observed high level after 2012.

3.5 Testable Hypotheses

Section 3.1 and 3.2 suggest that the two worlds give opposite predictions on how the expected number of information acquirers would affect investor trading and price reaction

[16] The SZSE Small and Medium-sized Enterprises (SME) Board and Growth Enterprises Market (GEM) Board also mandated timely disclosure after 2012, but they did not require disclosure in quarterly reports before 2012 so I cannot observe the actual private meetings before 2012 for these firms. The Shanghai Stock Exchange (SHSE) launched a similar online platform "eHudong" in 2013, but the disclosure is voluntary. To avoid selection bias, I restrict the analysis to the SZSE mainboard.

[17] However, Ru et al. (2022) suggest that the information might not be useful as they do not find any evidence suggesting an increase in non-visiting analysts' forecast accuracy, even for firms that disclose more meeting notes.

during the pre-announcement period. The more aggressively investors trade, the more strongly price reacts. I focus on price reaction since the holdings are made public only by a selective group of investors and only at quarter-ends[18]. H1a and H1b follow:

H1a: For firm-quarters with an abnormally high (low) number of private meetings, price reaction during the pre-announcement period increases (decreases) after 2012.

H1b: For firm-quarters with an abnormally high (low) number of private meetings, price reaction during the pre-announcement period decreases (increases) after 2012.

The key distinction between the two worlds is the trading strategy that investors adopt, which is essentially determined by how precise the firm value can be estimated, defined as "information uncertainty" (IU) in prior studies. Typical examples of high-IU firms include younger firms, firms with higher volatility, greater expected growth, and higher price-to-book ratios (Lee and So 2015). H1 predicts the average world. If the pattern is consistent with H1a, it should be concentrated in low-IU firms which approximate the first world where investors are more likely to form high-quality fundamental estimates. If the pattern is consistent with H1b, it should be concentrated in high-IU firms which approximate the second world where investors are less likely to form high-quality fundamental estimates. H2a and H2b follow:

H2a: The pattern in *H1a* is concentrated in low-IU firms.

H2b: The pattern in *H1b* is concentrated in high-IU firms.

3.6 Research Design

Figure 1 presents the predictions on pre-announcement market reaction for good news group in both worlds. To formally test the hypotheses, I estimate a DiD as in Regression (1),

[18] In China, Mutual funds disclose ten largest holdings at quarter-ends and all holdings at year-ends. Public firms disclose ten largest shareholders at quarter-ends.

which compares *high firm-quarters* before and after 2012 relative to *low firm-quarters*. $High_{it}$ is an indicator of firm-quarters with a high number of private meetings in pre-announcement period (-70, -1). $High_{it}$ is equivalent to abnormal site visits after adding firm-specific controls X_{it} that captures the expected component of site visits in the regression[19], and $High_{it} \times Post_t$ is equivalent to abnormal site visits $\times Post_t$ after adding $X_{it} \times Post_t$[20]. $Post_t$ takes the value of one for 2013-2017 and zero for 2007-2011. The control vector X_{it} includes market beta, market cap, book-to-market, three-day momentum, a state-owned enterprise (SOE) indicator, industry dummies, and CAR (-70, 2) as a proxy for the total information content.

$$CAR(-70,-1)_{it} = \beta_1 High_{it} + \beta_2 High_{it} \times Post_t + B \cdot X_{it} + \Gamma \cdot X_{it} \times Post_t + \alpha_i + \lambda_t + \varepsilon_{it} \quad (1)$$

The coefficient of interest is β_2, which H1a predicts to be positive and H1b predicts to be negative. For cross-sectional tests (H2a and H2b), I split the sample based on proxies of information uncertainty, such as market-to-book and volatility (Lee and So 2015).

3.7 Data

The site visit data come from the Corporate Site Visit Database by Datago Technology Limited. All other data come from Wind database. The final sample includes 18,282 earnings announcements and 10,105 earnings guidance from 449 firms listed in SZSE mainboard from 2007-2017. The good news sample include 9,559 earnings announcements and 5,746 earnings guidance, defined as those that beat guidance or report/forecast positive earnings growth.

4. Results

4.1 Descriptive Statistics

4.1.1 The number of firms with site visits

[19] According to Frisch-Waugh Theorem.
[20] See Ed deHaan et al. (2021).

I use all firms in SZSE mainboard during 2007-2017 for the analysis. Table 1 reports the number of firms in SZSE mainboard and how many of them have site visits each year. There are very few entrants or exits to SZSE mainboard during our sample period, providing a balanced panel sample with little concern on selection. For each year during 2007-2017, the vast majority of firms report that they hold site visits, suggesting that most firms do comply with the mandatory disclosure of site visits in quarterly reports since 2007.

4.1.2 Site visits during the pre-announcement period

The empirical tests focus on price reactions during the pre-announcement period. The most common and informative public announcements are earnings announcement (EA) and earnings guidance (EG), which together explain over 60% of quarterly stock return variance (Beyer et al. 2010). Table 2 summarizes site visits that occur within the 70-day window before EA/EG. From 2007 to 2017, 30% to 50% of EA/EGs have site visits during the 70 days before announcement. The frequency of site visits declines after 2012, but firms seem to combine site visits after 2012 since the average number of visitors increases for each visit day[21], consistent with proprietary cost and compliance cost of site visit disclosure. I report site visits at the day level because firms can decide whether to disclose meetings on the same day separately[22].

4.1.3 When do site visits occur?

Figure 2 plots the frequency of site visits around EA/EG. The Y-axis represents the likelihood of the occurrence of site visits for each day during the (-70, 70) window around announcements. There seems to be a relatively "quiet" period around ten days before EA/EG, consistent with corporate insiders avoiding being accused of selective disclosure of material

[21] Although most site visits are initiated by investors and analysts, firms are able to negotiate the visiting date with visitors (Cheng et al., 2019).
[22] For instance, when a firm reports meetings with investor A and investor B on June 3, 2009 using two entries, we do not know whether the firm meets with A and B together or separately.

non-public information before announcements.

4.1.4 Determinants of site visits, pre-2012 vs. post-2012

Table 3 examine determinants of site visits before and after the disclosure mandate. Larger firms with upcoming good news, lower volatility, and higher book-to-market are more likely to be visited. The determinants are unchanged after 2012, alleviating selection concerns, e.g., *high firm-quarters* before and after 2012 are not comparable.

4.2 Main Results

4.2.1 H1: Do high firm-quarters have stronger pre-announcement reaction after 2012?

I first examine the aggregate pattern to see whether firm-quarters with an abnormally high number of private meetings have stronger or weaker price reaction on average during the pre-announcement period after 2012 relative to firm-quarters with an abnormally low number of private meetings. Table 4 presents the results from Regression (1). Column (1) shows that, for *high firm-quarters* with good news, the CAR (-70, -1) decreases significantly by 1.5 percentage points after 2012 relative to its mean 2.8 percentage points[23] before 2012. After adding controls, quarter fixed effects, firm fixed effects, and, in the tightest specification (3), firm × post fixed effects which take out firm-specific trends from the pre-2012 period to the post-2012 period[24], the magnitude falls to 0.5 percentage points but remains significant. This is consistent with investors trading less aggressively when the expected number of information acquirers increases from the conjectured average level before 2012 to the observed high level after 2012, suggesting that the market on average is represented by investors closer to heuristic ones who cannot form high-quality independent estimates of the fundamental firm value.

[23] 2.227+0.550 according to Specification (1).
[24] This is feasible because a firm have both *high* and *low* quarters during 2007-2017.

4.2.2 H2: Is the pattern in 4.2.1 concentrated in high-IU firms?

The results in Section 4.2.1 are consistent with investors on-average unable to form high-quality estimates of fundamental firm value. Prior studies define "information uncertainty" (IU) in terms of the precision with which firm value can be estimated, considering firms with higher price-to-book and volatility as examples of high-IU firms (Lee and So 2015). Table 5 split the sample into subgroups based on market-to-book and volatility, suggesting that the results are concentrated in high-IU firms, support my hypothesis that when investors cannot form high-quality estimates of fundamental firm value, they adopt heuristic strategy by trading less aggressively when they expect more information acquirers. Table 6 reports the results from a triple-difference regression, confirming that the difference between subgroups (e.g., high vs. low market-to-book) is significant.[25]

4.3 Additional Tests

4.3.1 Parallel pre-trends

An important assumption is that the pre-announcement returns for *high vs. low firm-quarters* would have similar trends without the 2012 disclosure mandate. Although the parallel trend assumption is not directly testable due to the unobservable counterfactual (i.e., that the mandate already happened), I test if pre-trends are parallel. Since the key result is the cross-sectional difference between high-IU firms and low-IU firms, I modify the triple difference regression in Table 6 by substituting *Post* dummy with *year* dummies.

Figure 3 plots the coefficients of *year* dummies of the modified regression. To achieve higher statistical power, instead of creating a dummy for each year, I create four dummies, 2007-2009 (benchmark), 2010-2011, 2012-2014, 2015-2017. The results show that high vs. low market-to-book/volatility firms do not exhibit differential pre-trends with regards to the

[25] For brevity, I only report coefficient of interest in the table. One can crosscheck the triple difference regression is correct by comparing the coefficients in Table 5 and Table 6, e.g., -0.945-(-0.151)=-0.794.

differences in pre-announcement returns between *high* vs. *low firm-quarters* before 2012.

4.3.2 Continuous definition of high vs. low firm-quarters

The analysis so far defines *high (low) firm-quarters* as those with (without) site visits during (-70, -1) of EA/EG. One concern is that the binary coding of *high* vs. *low firm-quarters* does not consider the change in the intensity of private meetings after 2012. For instance, Ru et al. (2022) suggests that private meetings likely spread more evenly across firms after 2012, so the results can simply be driven by *high firm-quarters* having fewer site visits, though still defined as high. To alleviate this concern, I run robustness tests using the number of days with site visits during (-70, -1) of EA/EG, *Count70*. The key cross-sectional results are presented in Appendix A4, which remain qualitatively unchanged compared to Table 5. The documented effect is a bit weaker probably due to firms combining site visits after 2012 so *Count70* likely understates the intensity of site visits after 2012, which is biased against finding smaller pre-announcement reaction for *high firm-quarters*.

4.3.3 Firm-quarters with bad news

The analysis throughout focuses exclusively on good news. These results, however, do not apply to bad news. Interestingly, the market reaction around private meetings before bad news disclosure is actually positive[26]. This is consistent with both risk-based explanation that private meetings help alleviate the perceived risk of bad news or that investors are deceived by manager's obfuscation of upcoming bad news.

5. Conclusion

This paper examines how investors' belief on other investors' information acquisition affects trading and price in the context of the increasingly transparent private meetings. I

[26] The results are available upon request.

propose two distinct worlds where investors incorporate their beliefs on others' information acquisition into their trading differently, leading to different outcomes in trade aggressiveness and price reaction. Utilizing a unique setting in China that allows for variation in investors' belief on the number of information acquirers while holding the actual number of information acquirers constant, I show that information acquirers trade less aggressively when they believe that more other investors have also acquired the information. The results are concentrated in firms with high information uncertainty for which investors are less likely to form high-quality estimates of the fundamental value, supporting my theoretical mechanisms. This paper aims to provide conceptual and empirical insights into how informed investors consider other investors' information acquisition when trading, as well as potential implications of mandatory disclosure of private meetings for investor welfare and market efficiency.

REFERENCES

Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. Journal of accounting research, 159-178.

Banerjee, A. V. (1992). A simple model of herd behavior. The quarterly journal of economics, 107(3), 797-817.

Banerjee, S., & Green, B. (2015). Signal or noise? Uncertainty and learning about whether other traders are informed. Journal of Financial Economics, 117(2), 398-423.

Bastianello, F., & Fontanier, P. (2021). Partial equilibrium thinking in general equilibrium. Working paper, Harvard University.

Bernard, V. L., & Thomas, J. K. (1989). Post-earnings-announcement drift: delayed price response or risk premium?. Journal of Accounting research, 27, 1-36.

Blankespoor, E., deHaan, E., & Marinovic, I. (2020). Disclosure processing costs, investors' information choice, and equity market outcomes: A review. Journal of Accounting and Economics, 70(2-3), 101344.

Bowen, R. M., Dutta, S., Tang, S., & Zhu, P. (2020). Does Stricter Disclosure Regulation of Private Meetings Improve the Information Environment?. Available at SSRN 3723824.

Bradley, D., Jame, R., & Williams, J. (2022). Non-Deal Roadshows, Informed Trading, and Analyst Conflicts of Interest. The Journal of Finance, 77(1), 265-315.

Brav, A., & Heaton, J. B. (2002). Competing theories of financial anomalies. The Review of Financial Studies, 15(2), 575-606.

Brown, L. D., Call, A. C., Clement, M. B., & Sharp, N. Y. (2015). Inside the "black box" of sell-side financial analysts. Journal of Accounting Research, 53(1), 1-47.

Brown, L. D., Call, A. C., Clement, M. B., & Sharp, N. Y. (2019). Managing the narrative: Investor relations officers and corporate disclosure. Journal of Accounting and Economics, 67(1), 58-79.

Bulow, J., & Klemperer, P. (2002). Prices and the Winner's Curse. RAND journal of Economics, 1-21.

Bushee, B. J., Gerakos, J., & Lee, L. F. (2018). Corporate jets and private meetings with investors. Journal of Accounting and Economics, 65(2-3), 358-379.

Bushee, B. J., Jung, M. J., & Miller, G. S. (2017). Do investors benefit from selective access to management?. Journal of Financial Reporting, 2(1), 31-61.

Chan, W. S. (2003). Stock price reaction to news and no-news: drift and reversal after headlines. Journal of Financial Economics, 70(2), 223-260.

Cheng, Q., Du, F., Wang, B. Y., & Wang, X. (2019). Do corporate site visits impact stock prices?. Contemporary Accounting Research, 36(1), 359-388.

Cheng, Q., Du, F., Wang, X., & Wang, Y. (2016). Seeing is believing: Analysts' corporate site visits. Review of Accounting Studies, 21(4), 1245-1286.

Choy, S., & Hope, O. K. (2021). Private Communication between Managers and Financial Analysts: Evidence from Taxi Ride Patterns in New York City. Available at SSRN 3920680.

Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under-and overreactions. the Journal of Finance, 53(6), 1839-1885.

deHaan, E., Moon, J., Shipman, J.E., Swanquist, Q.T. and Whited, R.L., 2021. Control variables in interactive models. Georgia Tech Scheller College of Business Research Paper, (3959861).

De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise trader risk in financial markets. Journal of political Economy, 98(4), 703-738.

Diamond, D. W., & Verrecchia, R. E. (1981). Information aggregation in a noisy rational expectations economy. Journal of financial economics, 9(3), 221-235.

Drake, M. S., Guest, N. M., & Twedt, B. J. (2014). The media and mispricing: The role of the

business press in the pricing of accounting information. The Accounting Review, 89(5), 1673-1701.
Easley, D., & O'hara, M. (1992). Time and the process of security price adjustment. The Journal of finance, 47(2), 577-605.
Easley, D., & O'hara, M. (2004). Information and the cost of capital. The journal of finance, 59(4), 1553-1583.
Eyster, E., Rabin, M., & Vayanos, D. (2019). Financial markets where traders neglect the informational content of prices. The Journal of Finance, 74(1), 371-399.
Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. The journal of Finance, 25(2), 383-417.
Frazzini, A. (2006). The disposition effect and underreaction to news. The Journal of Finance, 61(4), 2017-2046.
Glosten, L. R., & Milgrom, P. R. (1985). Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. Journal of financial economics, 14(1), 71-100.
Green, T. C., Jame, R., Markov, S., & Subasi, M. (2014). Access to management and the informativeness of analyst research. Journal of Financial Economics, 114(2), 239-255.
Grossman, S. J., & Stiglitz, J. E. (1980). On the impossibility of informationally efficient markets. The American economic review, 70(3), 393-408.
Han, B., Kong, D., & Liu, S. (2018). Do analysts gain an informational advantage by visiting listed companies?. Contemporary Accounting Research, 35(4), 1843-1867.
Hellwig, M. F. (1980). On the aggregation of information in competitive markets. Journal of economic theory, 22(3), 477-498.
Hirshleifer, D. A., Myers, J. N., Myers, L. A., & Teoh, S. H. (2008). Do individual investors cause post-earnings announcement drift? Direct evidence from personal trades. The Accounting Review, 83(6), 1521-1550.
Hughes, J. S., Liu, J., & Liu, J. (2007). Information asymmetry, diversification, and cost of capital. The accounting review, 82(3), 705-729.
Ke, B., Kong, D., & Liu, S. (2021). Company Visit Disclosure Regulation and Analysts' Information Acquisition. Available at SSRN 3870279.
Kim, G., Baik, B., Lee, K., & Hong, S. (2021). Wikipedia Articles and Post-Earnings Announcement Drift.
Kirk, M. P., & Markov, S. (2016). Come on over: Analyst/investor days as a disclosure medium. The Accounting Review, 91(6), 1725-1750.
Kothari, S. P., Shu, S., & Wysocki, P. D. (2009). Do managers withhold bad news?. Journal of Accounting research, 47(1), 241-276.
Kyle, A. S. (1985). Continuous auctions and insider trading. Econometrica: Journal of the Econometric Society, 1315-1335.
Lee, C. M., & So, E. C. (2015). Alphanomics: The informational underpinnings of market efficiency. Foundations and Trends® in Accounting, 9(2–3), 59-258.
Lee, C. M., & So, E. C. (2017). Uncovering expected returns: Information in analyst coverage proxies. Journal of Financial Economics, 124(2), 331-348.
Lennox, C., & Wu, J. S. (2022). A review of China-related accounting research in the past 25 years. Journal of Accounting and Economics, 101539.
Li, T. (2013). Insider trading with uncertain informed trading. Available at SSRN 946324.
Mayew, W. J. (2008). Evidence of management discrimination among analysts during earnings conference calls. Journal of Accounting Research, 46(3), 627-659.
Peress, J., & Schmidt, D. (2023). Uncertainty about what's in the price. Working paper.
Ru, Y., Zheng, R., & Zou, Y. (2020). Public Disclosure of Private Meetings: Does Observing Peers' Information Acquisition Affect Analysts' Attention Allocation?. Available at SSRN 3727718.

SEC (2000). Release Number 33-781: https://www.sec.gov/rules/final/33-7881.htm. August 15, 2000.
Shleifer, A., & Vishny, R. W. (1997). The limits of arbitrage. The Journal of finance, 52(1), 35-55.
Soltes, E. (2018). What can managers privately disclose to investors. JREG Bulletin, 36, 148.
Stein, J. C. (2009). Presidential address: Sophisticated investors and market efficiency. The Journal of Finance, 64(4), 1517-1548.
Thaler, R. H. (1988). Anomalies: The winner's curse. Journal of economic perspectives, 2(1), 191-202.
The Securities and Exchange Commission. (2000). Selective Disclosure and Insider Trading.
Vega, C. (2006). Stock price reaction to public and private information. Journal of Financial Economics, 82(1), 103-133.
Verrecchia, R. E. (2001). Essays on disclosure. Journal of accounting and economics, 32(1-3), 97-180.
Verrecchia, R. E., & Zhu, C. (2022). Liquidity, Trade, and Investor-Identity Disclosure. Available at SSRN.
Yang, J., Lu, J., & Xiang, C. (2020). Do disclosures of selective access improve market information acquisition fairness? Evidence from company visits in China. Journal of Corporate Finance, 64, 101631.

Figure 1. Predictions on pre-announcement returns for the good news group

This figure plots the predictions on pre-announcement market reaction for good news group in both worlds.

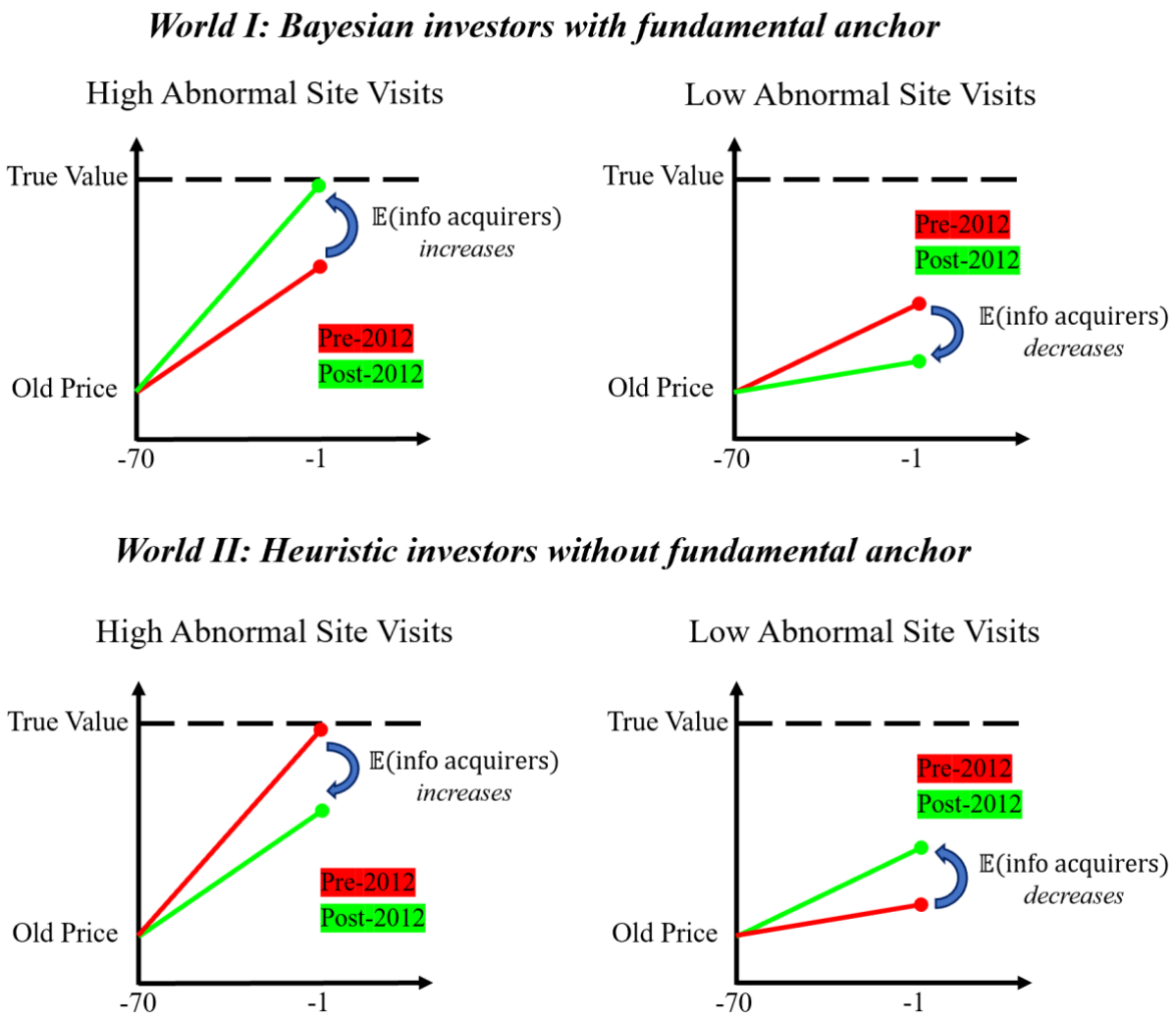


Figure 2. Likelihood of site visits (-70, 70) around public announcements (Earnings Announcements/Earnings Guidance)

This figure plots the frequency of site visits during the (-70, 70) window around EA/EG. The Y-axis represents the likelihood of the occurrence of site visits for each day.

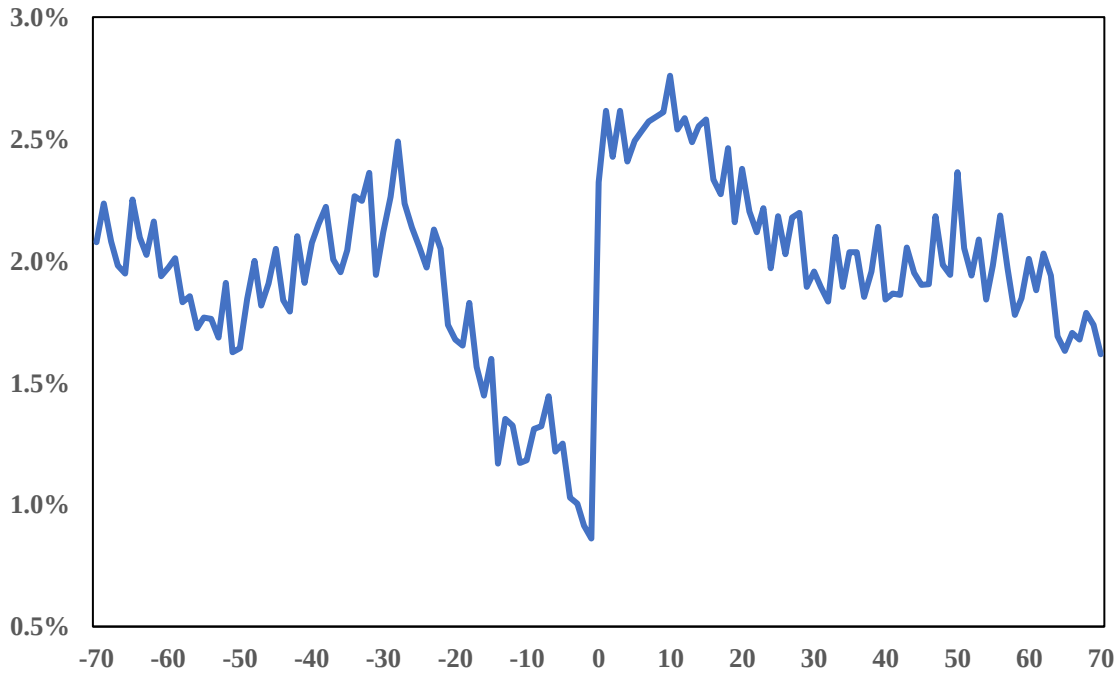
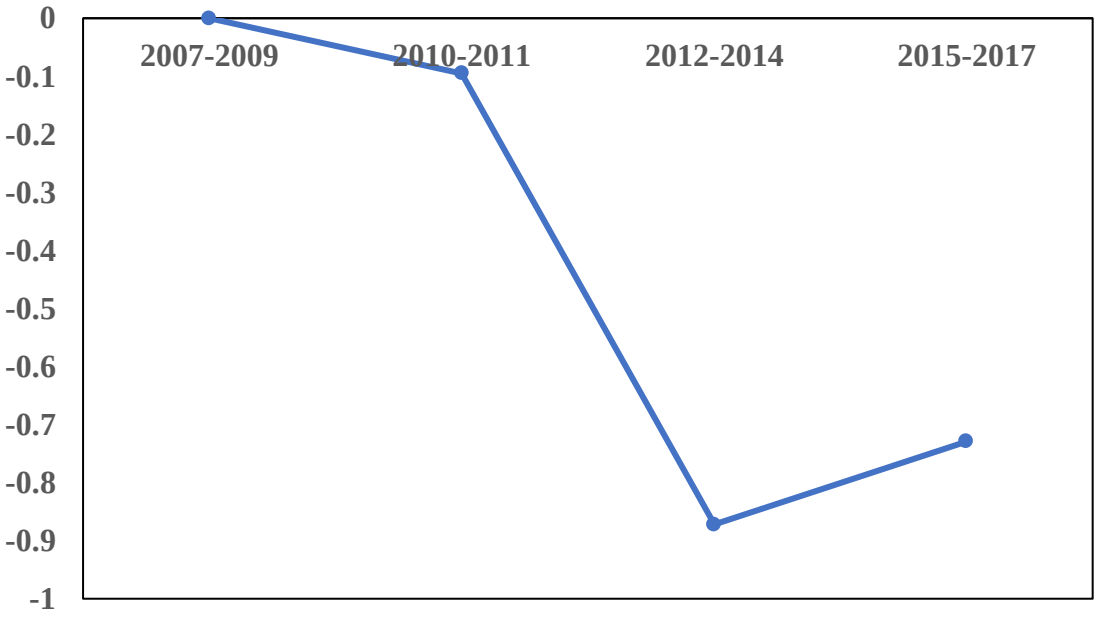


Figure 3. Parallel Pre-Trends

This figure plots the coefficients of *Year* dummies of the modified Table 6 by substituting *Post* dummy with *Year* dummies. To achieve higher statistical power, instead of creating a dummy for each year, I create four dummies, 2007-2009 (benchmark), 2010-2011, 2012-2014, 2015-2017.

Panel A: Parallel pre-trends, by Market-to-Book



Panel B: Parallel pre-trends, by Volatility

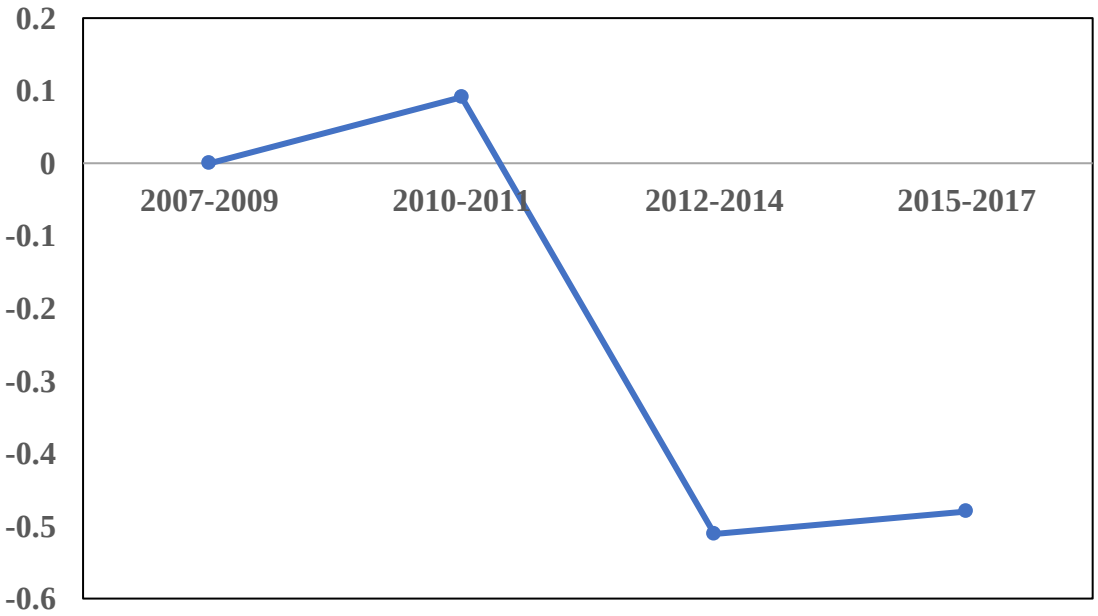


Table 1. The number of firms in SZSE mainboard holding site visits

This table reports the number of firms in SZSE mainboard and how many of them hold site visits at least once each year during 2007-2017.

Year	# Firms	# Firms with site visits	% Firms with site visits
2007	437	313	72%
2008	429	324	76%
2009	432	374	87%
2010	431	388	90%
2011	432	374	87%
2012	433	412	95%
2013	446	426	96%
2014	446	407	91%
2015	448	391	87%
2016	448	386	86%
2017	449	376	84%

Table 2. Site visits before earnings announcement (EA) or guidance (EG)

This table reports statistics on site visits that occur within the 70-day window before earnings announcement and earnings guidance during 2007-2017.

Year	# EA/EG	# EA/EG with site visits during (-70, -1)	% EA/EG with site visits during (-70, -1)	Average # days visited during (-70, -1), if visited	Average # visitors per day, if visited
2007	1360	425	31%	3.10	1.64
2008	2008	691	34%	2.93	1.84
2009	2125	947	45%	3.79	2.27
2010	2173	1042	48%	3.92	2.3
2011	2290	943	41%	3.47	2.46
2012	2297	977	43%	2.96	2.61
2013	2461	858	35%	2.75	3.07
2014	2464	819	33%	2.59	3.25
2015	2552	871	34%	2.37	
2016	2591	842	32%	2.34	
2017	2633	833	32%	2.59	

Table 3. Determinants of site visits before and after the 2012 mandate

This table reports the determinants of site visits before and after the 2012 disclosure mandate. The dependent variable is the number of days visited during the (-70, -1) window of EA/EG. Heteroscedasticity-robust standard errors in parentheses. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level.

	# Days visited during (-70, -1)	
	(1)	(2)
	2007-2011	2013-2017
Release good news at EA/EG	0.113**	0.105***
	(0.048)	(0.029)
Volatility	-0.003***	-0.004***
	(0.001)	(0.000)
Book-to-Market, 2nd quintile	0.300***	0.119**
	(0.075)	(0.040)
Book-to-Market, 3rd quintile	0.478***	0.197***
	(0.068)	(0.043)
Book-to-Market, 4th quintile	0.624***	0.312***
	(0.065)	(0.038)
Book-to-Market, 5th quintile	1.112***	0.710***
	(0.077)	(0.051)
Market Cap, 2nd quintile	0.171**	0.126***
	(0.063)	(0.032)
Market Cap, 3rd quintile	0.305***	0.292***
	(0.066)	(0.038)
Market Cap, 4th quintile	0.789***	0.709***
	(0.073)	(0.042)
Market Cap, 5th quintile	1.413***	1.152***
	(0.089)	(0.050)
Industry and SOE F.E.	Y	Y
N	9956	12680
R-sq	0.134	0.120

Table 4. Pre-announcement returns for high firm-quarters after 2012

This table reports results from running Regression (1) in Section 3.6. All variables are defined in Appendix A3. Heteroscedasticity-robust standard errors reported in parentheses. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level.

	CAR(-70,-1)		
	(1)	(2)	(3)
High	2.227***		
	(0.482)		
High × Post	-1.486**	-0.312	-0.520**
	(0.628)	(0.195)	(0.237)
Post	-0.009		
	(0.404)		
Constant	0.550*		
	(0.319)		
Controls	N	Y	Y
Controls × Post	N	Y	Y
Quarter F.E.	N	Y	Y
Firm F.E.	N	Y	Y
Firm × Post F.E.	N	N	Y
Obs	12891	12889	12884

Table 5. Pre-announcement returns for high firm-quarters after 2012, C/S test

This table reports cross-sectional results from running Regression (1) in Section 3.6, divided by subgroups. Panel A reports results by market-to-book, Panel B reports results by volatility. All variables are defined in Appendix A3. Heteroscedasticity-robust standard errors reported in parentheses. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level.

Panel A: Cross-sectional tests of Table 4, by Market-to-Book

	CAR(-70,-1)			
	(1)	(2)	(3)	(4)
	High Market-to-Book		Low Market-to-Book	
High × Post	-0.836**	-0.945**	0.025	-0.151
	(0.306)	(0.351)	(0.262)	(0.323)
Controls	Y	Y	Y	Y
Controls × Post	Y	Y	Y	Y
Quarter F.E.	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y
Firm × Post F.E.	N	Y	N	Y
Obs	6025	6020	6864	6864

Panel B: Cross-sectional tests of Table 4, by Volatility

	CAR(-70,-1)			
	(1)	(2)	(3)	(4)
	High Volatility		Low Volatility	
High × Post	-0.604**	-0.974**	-0.150	-0.117
	(0.298)	(0.348)	(0.264)	(0.323)
Controls	Y	Y	Y	Y
Controls × Post	Y	Y	Y	Y
Quarter F.E.	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y
Firm × Post F.E.	N	Y	N	Y
Obs	6348	6346	6541	6538

Table 6. Pre-announcement returns for high firm-quarters after 2012, DiDiD

This table reports the results from the triple-difference regression to test if the difference between subgroups in Table 5 is significant. For brevity, only coefficient of interest is reported. One can crosscheck by comparing the magnitude of coefficients in Table 5 and Table 6, e.g., -0.945-(-0.151)=-0.794. All variables are defined in Appendix A3. Heteroscedasticity-robust standard errors reported in parentheses. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level.

	CAR(-70,-1)			
	(1)	(2)	(3)	(4)
	Market-to-Book		Volatility	
(High MB/Volatility) × High × Post	-0.860**	-0.794*	-0.453	-0.857*
	(0.402)	(0.477)	(0.398)	(0.475)
Controls	Y	Y	Y	Y
Controls × Post	Y	Y	Y	Y
Quarter F.E.	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y
Firm × Post F.E.	N	Y	N	Y
Obs	12889	12884	12889	12884

Appendix A1: Theoretical characterization of the two worlds

World I: Bayesian investors with fundamental anchor

The economy has a single risky asset (e.g., a firm) traded in an open market whose value $\tilde{u}$ is uncertain. There are N identical risk-averse investors with negative exponential utility $U(w) = -\exp\left(-\frac{w}{r}\right)$.

At $T = 0$, the price of the firm P_0 has precision h, assume $\tilde{u} \sim N(P_0, h^{-1})$.

At $T = 1$, K_1 investors receive a message m about the firm, from which they diversely form an unbiased signal $z_i = \tilde{u} + \varepsilon_i$, where $\varepsilon_i \sim N(0, s^{-1})$. They cannot observe K_1, so they conjecture that $\overline{K} = \mathrm{E}[K_1]$ investors receive the message.

At $T = 2$, the asset is liquidated at $\tilde{u}$ and paid out to investors.

I further assume that investors in this world adhere to Bayesian updating rule and learn about the true firm value not only from their private signal, but also from price. They understand that since some people receive message m, price aggregates private signals about true firm value. They conjecture a linear determination of P_1:

$$P_1 = a + b\tilde{u} - c\tilde{x}, \text{ where per-capita supply } \tilde{x} = \textstyle\sum_i (x_i/N) \sim N(0, t^{-1}).$$

Let $q = \frac{P_1 - a}{b} = \tilde{u} - \frac{c}{b}\tilde{x}$, a simple transformation of P_1, to be an additional piece of information to the investors. Assuming that ε_i and $\tilde{x}$ are uncorrelated, the true firm value $\tilde{u}$ and investors' information set $\{z_i, q\}$ follow multivariate normal distribution:

$$\begin{bmatrix} \tilde{u} \\ z_i \\ q \end{bmatrix} \sim N\left(\begin{bmatrix} P_0 \\ P_0 \\ P_0 \end{bmatrix}, \begin{bmatrix} h^{-1} & h^{-1} & h^{-1} \\ h^{-1} & h^{-1} + s^{-1} & h^{-1} \\ h^{-1} & h^{-1} & h^{-1} + \left(\frac{c}{b}\right)^2 t^{-1} \end{bmatrix}\right).$$

Therefore, investors' expected true firm value conditioning on $\{z_i, q\}$ is:

$$\mathrm{E}[\tilde{u}|z_i, q] = \frac{hP_0 + sz_i + (\frac{b}{c})^2 tq}{h+s+(\frac{b}{c})^2 t}$$,and its precision

$$\mathrm{Var}[\tilde{u}|z_i, q]^{-1} = h + s + (\frac{b}{c})^2 t.$$

Based on these beliefs, investors set demand that maximizes their own expected utility. Suppose investors have initial wealth w_i and submit demand D_i, they maximize

$$\mathrm{E}[U(D_i(\tilde{u} - P_1) + w_i)|z_i, q] = \mathrm{E}[-\exp(-\frac{D_i(\tilde{u}-P_1)+w_i}{r})|z_i, q]$$

$$= -\exp(-\frac{1}{r} D_i \mathrm{E}[\tilde{u}|z_i, q] + \frac{1}{2r^2} {D_i}^2 \mathrm{Var}[\tilde{u}|z_i, q] + \frac{1}{r} D_i P_1 - \frac{w_i}{r}).$$

First order condition shows that $D_i = r \frac{\mathrm{E}[\tilde{u}|z_i, q] - P_1}{\mathrm{Var}[\tilde{u}|z_i, q]}$.

P_1 is determined by marketing clearing:

$$\tilde{x} = \sum_i (D_i/N) = \sum_i (r[hP_0 + sz_i + (\frac{b}{c})^2 tq - (h + s + (\frac{b}{c})^2 t)P_1])/N.$$

The conjecture is self-fulfilling when $K_1 = \bar{K}$, and $q = \tilde{u} - \frac{c}{b}\tilde{x}$.

$$P_1 = \frac{hP_0 + (\bar{s} + (\frac{b}{c})^2 t)\tilde{u} - (\frac{1}{r} + \frac{b}{c} t)\tilde{x}}{h+\bar{s}+(\frac{b}{c})^2 t} = a + b\tilde{u} - c\tilde{x}$$, where $\bar{s} = \frac{\bar{K}}{N} s$.

It could be seen that $\frac{b}{c} = (\bar{s} + (\frac{b}{c})^2 t)/ (\frac{1}{r} + \frac{b}{c} t)$, so that $\frac{b}{c} = r\bar{s}$, and that:

$$a = \frac{hP_0}{h+\bar{s}(1+r^2\bar{s}t)}, b = \frac{\bar{s}(1+r^2\bar{s}t)}{h+\bar{s}(1+r^2\bar{s}t)}, \text{and } c = \frac{\frac{1}{r}+r\bar{s}t}{h+\bar{s}(1+r^2\bar{s}t)}.$$

Plugging in the values of a, b, and c would re-write the demand function as:

$$D_i = r \frac{\mathrm{E}[\tilde{u}|z_i, q] - P_1}{\mathrm{Var}[\tilde{u}|z_i, q]} = r[hP_0 + sz_i + \left(\frac{b}{c}\right)^2 tq - (h + s + \left(\frac{b}{c}\right)^2 t)P_1]$$

$$= r[hP_0 + sz_i + \left(\frac{b}{c}\right)^2 t\frac{P_1 - a}{b} - (h + s + \left(\frac{b}{c}\right)^2 t)P_1]$$

$$= r[\frac{hP_0}{1+r^2\bar{s}t} + sz_i - (\frac{h}{1+r^2\bar{s}t} + s)P_1], \text{ where } \bar{s} = \frac{\bar{K}}{N}s.$$

$\frac{\partial D_I}{\partial \bar{K}} > 0$, **investors more aggressive when expect more information receivers.**

In reality, K_1 investors receive message, so the actual market price is determined by:

$$\tilde{x} = \sum_i(D_i/N) = \sum_i(r[\frac{hP_0}{1+r^2\bar{s}t} + sz_i - (\frac{h}{1+r^2\bar{s}t} + s)P_1])/N, \text{ so}$$

$$P_1 = \frac{hP_0 + s_1(1+r^2\bar{s}t)\tilde{u} - (\frac{1}{r} + r\bar{s}t)\tilde{x}}{h + s_1(1+r^2\bar{s}t)}, \text{ where } s_1 = \frac{K_1}{N}s, \bar{s} = \frac{\bar{K}}{N}s.$$

Without loss of generality, suppose the message is good news, i.e., $\tilde{u} > P_0$. Below are a set of theoretical predictions based on the formula of P_1:

i) There is an under-reaction (i.e., $P_1 < \tilde{u}$) on average, as investors put some weights on their prior P_0, and the noisy supply shock $\tilde{x}$ prevents P_1 from being fully revealing.

ii) P_1 is increasing in K_1: more people receiving the message helps price discovery, i.e., P_1 gets closer to the true firm value $\tilde{u}$.

iii) P_1 is increasing in $\bar{K}$, as long as $K_1 \neq 0$: when investors expect more investors receive the message, they trade more aggressively and P_1 gets closer to the true firm value $\tilde{u}$.

iv) P_1 is increasing in r, s, and t: when people are more risk-tolerant and get more precise signal, they trade more aggressively; when the supply is less noisy, they can extract more precise information from price, so trade more aggressively.

World II: Heuristic investors without fundamental anchor

Again, the same as the first world, the economy has a single risky asset (e.g., a firm) traded in an open market whose value $\tilde{u}$ is uncertain. There are N identical risk-averse investors with negative exponential utility $U(w) = -\exp\left(-\frac{w}{r}\right)$.

At $T = 0$, the price of the firm is P_0.

At $T = 1$, K_1 investors receive a message m about the firm. What is different from the first world is that investors do not have a fundamental anchor, i.e., they are unable to form an independent estimate of the true firm value $\tilde{u}$ from the message. However, I assume that they understand it is good news (e.g., positive earnings growth) or bad news, and they know statistically the relative information content of the news, i.e., the liquidation value will go up (down) by a certain amount in case of good (bad) news. Suppose that investors receive a good message m, and know that liquidation value will increase by $\tilde{g} \sim N(\bar{g}, s^{-1})$. Again, they cannot observe K_1, so they conjecture that $\overline{K} = \mathrm{E}[K_1]$ investors receive the message.

At $T = 2$, the asset is liquidated at $\tilde{u}$ and paid out to investors.

Similarly, informed investors submit $D_i = r\frac{\mathrm{E}[\tilde{u}|m,P_1]-P_1}{\mathrm{Var}[\tilde{u}|m,P_1]}$. Now, we characterize $P_1 = P_0 + \lambda D$, where D is the net order flow. Since investors do not have a fundamental anchor, they use an indirect way to infer $\mathrm{E}[\tilde{u}|m,P_1] - P_1$, based on the belief on how much of the information content of m is incorporated into price.

They conjecture that $\overline{K}$ investors receive the message. Therefore, a symmetric equilibrium is that $\overline{K}$ investors submit the same demand D_I and price increases by $\lambda\overline{K}D_I$, so the remaining information content of the message $\mathrm{E}[\tilde{u}|m,P_1] - P_1 = \bar{g} - \lambda\overline{K}D_I$, and $\mathrm{Var}[\tilde{u}|m,P_1] = s^{-1}$.

The symmetric equilibrium can be solved from the demand function:

$D_I = rs(\bar{g} - \lambda \bar{K} D_I)$, so $D_I = \frac{\bar{g}}{\frac{1}{rs} + \lambda \bar{K}}$.

$\frac{\partial D_I}{\partial \bar{K}} < 0$, **investors less aggressive when expect more information receivers.**

In reality, K_1 investors receive message, so the actual market price is:

$P_1 = P_0 + \lambda K_1 D_I = P_0 + \frac{\bar{g}}{\frac{1}{rs\lambda K_1} + \frac{\bar{K}}{K_1}}$, while on average, $\tilde{u} = P_0 + \bar{g}$.

Without loss of generality, suppose the message is good news, i.e., $\tilde{u} > P_0$. Below are a set of theoretical predictions based on the formula of P_1:

i) When $K_1 = \bar{K}$ as conjectured, there is an under-reaction (i.e., $P_1 < \tilde{u}$), because investors are risk-averse.

ii) P_1 is increasing in K_1: more people receiving the message leads to larger increase in price. However, it does not necessarily improve price efficiency, as it could lead to over-reaction if K_1 is much higher than $\bar{K}$.

iii) P_1 is decreasing in $\bar{K}$: when investors expect more investors receive the message, they trade less aggressively because they believe each of them should submit a smaller order so the message is impounded into price to a right extent. Holding constant the actual number of information receivers, P_1 is lower when investors expect more people receive the message.

iv) P_1 is increasing in r, s, and λ: when people are more risk-tolerant and get more precise signal, they trade more aggressively. When λ is higher, investors end up holding smaller inventory because price impact is large. Together with risk-aversion, they are willing to push the price a bit higher.

Appendix A2: Private meetings disclosures of Tsinghua Unis Co. (600100)

(Translation by Ru et al. 2022)

Panel A: Disclosure in the pre-period

Disclosure Date: March 31, 2011

Visiting Date	Location	Format	Visitors	Topics
February 12, 2010	Planning Department	Site visit	Yinhe Securities client manager	Company basic operations and the direction of future development
March 1, 2010	Planning Department	Site visit	Xiangcai Securities analyst	Company basic operations and the direction of future development
October 12, 2010	Planning Department	Site visit	Huatai Securities analyst	Company basic operations and the direction of future development
October 13, 2010	Planning Department	Site visit	Hongyuan Securities analyst	Company basic operations and the direction of future development
November 10, 2010	Planning Department	Site visit	Fangzheng Securities analyst	Company basic operations and the direction of future development

Panel B: Disclosure in the post-period

Type of Investor Relation Activities	√Specific entity investigation □Analyst conference □Media interview □Performance conference □Press conference □Road show □Site visit □Other （Please explain）
Meeting Participants	Caifu Liang Securities, Huihui Xu, Lingtian Feng, Sijing Chen
Date	September 10, 2013
Location	The meeting room of Unis
Management in Attendance	Board Secretary, Wei Zhang Deputy Manager of Securities Department, Meng Ge
Main Meeting Topics	Company basic operations and direction of future development： 1. Basic Operations Our main business is divided into 3 categories: (1) own-brand information electronic products represented by digital imaging products; (2) IT services such as software and system integration; (3) value-added distribution business.

	In the field of self-owned brands, our company is constantly moving towards providing comprehensive industry solutions for digital input. With a foundation of the complete product lines of scanners and HD shooting products as the core digital imaging hardware products, we continue to improve the development and upgrade of digital imaging application software, and establish a rich industry application platform to meet customers' needs in image collection, data processing, classified storage, information extraction, data interaction, etc. In terms of industry applications, in 2012 our company launched a comprehensive management system for catering enterprises. This system helps comprehensively manage the business, procurement, inventory, financial management, employee management, etc. It has been promoted in the Beijing area. In the field of IT services, our company has many experiences and advantages in many fields such as civil affairs, education, transportation, public security, radio and television, and other government agencies and industries. While maintaining the stable development of the traditional business, our company has completed the research and development of the "Ziguang" cloud computing management platform, formed a regional e-government cloud and SME service cloud platform, and can provide big data cloud computing solutions. In the field of value-added distribution business, our company cooperates with well-known domestic and foreign brands such as HP, Dell, Lenovo, BenQ, and Samsung. Our products cover mainstream IT products. We pay attention to the application of modern management methods and have established a perfect information management system. Our value-added distribution business is one of the top domestic distribution service providers. 2. Future Development after the M&As Our company will take this M&A as an opportunity, through business and resource integration, to gradually achieve the strategic goal to become a full-service provider in the construction, operation, and maintenance of the modern information systems. We have extensive synergies with Nengtong Technology and Shenzhen Rongchuang Tianxia. The M&A can amplify the resources in customer, technology, marketing, and service networks, enabling our company to gain the first-mover advantages in cloud computing, IT operation and maintenance services, mobile internet applications, and big data processing, to further expand the opportunities to improve the smart city business.
Attachments（if any）	No
Date of record	September 10, 2013

Appendix A3: Variable Definitions

$CAR(-70,-1)_{it}$	Cumulative abnormal returns during 70 to 1 days before earnings announcement or earnings guidance. The abnormal daily returns are residuals from regressing a stock's raw daily returns on market beta, book-to-market quintiles, size quintiles, three-day momentum, board indicators, and SOE indicators.
$High_{it}$	In baseline test (Table 4), defined as an indicator variable that has site visits during (-70, -1) window before EA/EG.
$Count70_{it}$	In robustness test (Appendix A4), defined as the number of days with site visits during (-70, -1) window before EA/EG.
$Post_t$	Indicator of Year 2013-2017 (otherwise 2007-2011)
X_{it}	Control vector, including market beta, market cap, book-to-market, three-day momentum, SOE) indicators, industry dummies, and CAR (-70, 2) as a proxy for the total information content.
C/S test: High (Low) Market-to-Book	Firms whose market-to-book is above median.
C/S test: High (Low) Volatility	Firms whose annualized volatility is above median.

Appendix A4: Modified Table 5 using Count70 instead of High

This table reports robustness checks of Table 5 using Count70 instead of High. All variables are defined in Appendix A3. Heteroscedasticity-robust standard errors reported in parentheses. * Denotes significance at 10%-level, ** at the 5%-level, and *** at the 1%-level.

Panel A: Modified Table 5 using Count70, by Market-to-Book

	CAR(-70,-1)			
	(1)	(2)	(3)	(4)
	High Market-to-Book		Low Market-to-Book	
Count70 × Post	-0.143*	-0.121	-0.003	0.013
	(0.078)	(0.091)	(0.051)	(0.067)
Controls	Y	Y	Y	Y
Controls × Post	Y	Y	Y	Y
Quarter F.E.	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y
Firm × Post F.E.	N	Y	N	Y
Obs	6025	6020	6864	6864

Panel B: Modified Table 5 using Count70, by Volatility

	CAR(-70,-1)			
	(1)	(2)	(3)	(4)
	High Volatility		Low Volatility	
Count70 × Post	-0.138*	-0.213**	0.008	0.057
	(0.080)	(0.097)	(0.050)	(0.064)
Controls	Y	Y	Y	Y
Controls × Post	Y	Y	Y	Y
Quarter F.E.	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y
Firm × Post F.E.	N	Y	N	Y
Obs	6348	6346	6541	6538