

Market Feedback: Evidence from the Horse's Mouth

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Abstract

We survey 3,626 Chinese public firms to examine the real consequences of financial markets. More than 90% of firms pay attention to the stock market, for the purposes of learning information from the market to guide real investment decisions and of accessing external financing. These findings provide direct evidence for the wide existence of market feedback effect via a learning channel and a financing channel. Firms are more likely to learn information when their stock prices contain more information produced by analysts, when managers are less informed, and when market participants have more private information. Firms are more likely to monitor the stock market for the financing reason when they are more financially constrained and when have larger capital needs. Our analysis thus provides substantial support for that financial markets are not only a side show, but instead, affect real economy.

Key words: Corporate investment, learning, financing

JEL number: G14, G31, D25

1. INTRODUCTION

Market efficiency is a fundamental concept in financial economics. It refers to the extent to which the prevailing market prices are informative about the future value of the traded assets. The underlying economic reason that market efficiency is important is that it has real consequences. In the primary market,¹ the well-functioning of financial markets helps to facilitate the companies' access to external capital, thereby allowing them to tap into new investment opportunities. This financing channel is labeled as the "capital budgeting" channel (e.g., Brogaard, Ringgenberg, and Sovich, 2019). In the secondary market, the financial market aggregates useful information from various market participants, who trade on their private information, and this information can guide the decision of real decision makers, such as firm managers and creditors. This learning channel is often labeled as an "informational feedback effect" in the literature (See Bond, Edmans, and Goldstein (2012) for a survey on this effect).

Testing the idea of the informational feedback effect is particularly difficult, because the information sets of market participants and real decision makers are unobservable. Even some basic conceptual questions remain debates. For instance, since firm managers are supposed to be the most informed players, what extra information can they learn from the asset market? The existing literature typically runs regressions from real investment on price informativeness measures as well as control variables and rely on the investment-to-price sensitivity to draw inferences on whether real decision makers learn information from asset prices.² However, this inference, at its best, is only indirect and suggestive. Instead, in this paper, we provide direct evidence of market feedback by conducting a survey on companies. Here, the term of "market feedback" means that the well-functioning of financial markets feeds back into the real economy, either through the capital budgeting channel or through the informational feedback effect channel.

Specifically, we design and administer a survey to elicit the opinions of Chinese

¹ The primary market is where securities are created. We broadly include into the primary market both the initial public offering (IPO) (creating shares of a private corporation to the public in a new stock issuance) and the seasoned equity offering (SEO) (creating new shares by an already publicly traded company).

² E.g., Chen, Goldstein, and Jiang (2007), Bakke and Whited (2010), Foucault and Frésard (2012, 2014), Dessaint, Foucault, Frésard, and Matray (2019), and Jayaraman and Wu (2020).

public firms on market feedback. We ask all of the 3,628 firms listed on the Shanghai and Shenzhen stock exchanges whether they pay close attention to their own or peer firms' stock prices, and the reasons for which they watch these prices. Our questions aim to test the theories on market feedback more directly than the usual method of trying to identify such effects by examining the outcomes of firm decisions. We manage to collect responses from 3,626 firms, representing a response rate of 99.99%. Thus, our study does not suffer from the sampling bias commonly seen in other survey studies. We also believe that the information we collected from the survey is reliable because 1) the information is typically provided by top executives or teams specializing in capital market affairs, who are sufficiently informed about their firms' behaviors and are able to provide accurate information; and 2) the respondents are unlikely to hide their true opinions as we carefully ask plain, academic questions without "correct" answers and stick to a strict "limited use" policy in the survey.

We find substantial and direct support for the existence of market feedback. Among the 3,626 responding firms, 271 (7.5%) only care about their own stock prices; 36 (1.0%) only care about peer firms' stock prices; and 3,049 (84.1%) closely watch both prices. Simply put, market feedback does exist in 92.6% of the Chinese public firms. This effect is also prevalent across all industries, as the probability of watching the stock prices ranges from 85.9% (non-banking finance) to 98.1% (defense). Regarding the channels of the feedback effect, we find the most important reasons behind market feedback are to learn information for investment (the informational feedback or learning channel), and evaluate financing opportunities (the capital budgeting or financing channel). 75.2% and 66.1% of the 3,320 firms watching their own stock prices pick these reasons, respectively. The third important reason is the pressure from the board and the shareholders (the monitoring channel), and 35.6% of the firms pick it. Incentive pays (the compensation channel) and M&A protection (the M&A channel) are not chosen by many firms, which might be due to these practices are not very popular in the Chinese market.

Next, we use the responding firms' characteristics and behaviors, observable in the public market, to test their subjective responses about market feedback and the learning

and financing channels behind it.³ Specifically, we regress survey responses on information and capital budgeting measures at the firm level to examine the latter's effects on probability of choosing the learning and financing channels. Our prior is, if market feedback exists, firms with more informative stock prices and fewer financial resources would pay more attention to their stock prices.

We find robust evidence suggesting that market feedback is driven by information contained in the stock prices, i.e., the informational feedback effect channel. We categorize the stock information into three types: analyst information produced by financial analysts, managerial information possessed by insiders; and trader information compounded to prices via stock trades. Consistent with our intuition, regression results suggest that firms are more likely to learn information for making investment decisions when their stock prices contain more information produced by analysts, managers are less informed about the firms, and market traders are able to contribute more information to prices. Meanwhile, the conjecture that market feedback is driven by the purpose of capital budgeting, i.e., the financing channel, is also supported by empirical evidence. Regression results show that financially constrained firms are more likely to watch their stock prices for financing opportunities. We observe similar patterns for firms with large capital needs that invested heavily in the past or have large investment plans in the future.

Additionally, we find that the learning (financing) channel is more (less) pronounced among profitable firms with a high Tobin's Q , probably due to these firms intend to learn information about investment opportunities but are not short of capital. We also show that firms that have long history, pledge more shares, and are not cross listed are less likely to learn for investment information. In contrast, firms with more pledged shares are more likely to watch the stock prices for financing opportunities. We also find that firms with CEO-chairman duality and managers with professional service backgrounds are more likely to watch the stock prices for investment information, but CEO-chairmen duality is negatively correlated to the financing channel.

³ Methodologically, this approach integrating survey and field data has at least one advantage that our subject of interest is immune from biases introduced by the survey method. That is, when survey responses are used for both dependent variables and independent variables and correlated measurement errors on both sides of the regression can significantly bias the coefficients (Bertrand and Mullainathan, 2001).

Last, to further strengthen our findings about the existence of market feedback in the Chinese market, we replicate the main tests in Chen, Goldstein, and Jiang (2007) to examine the power of the classical empirical tests on market feedback (the informational feedback effect channel in particular) in our context; and double-check the influences of the three types of information. Following the standard practice in Chen, Goldstein, and Jiang (2007), we are able to identify the learning channel among Chinese public firms. In addition, besides the traditional informativeness measures such as R^2 and PIN, we also confirm that firms can respond to analyst information, managerial information, and trader information contained in their stock prices by altering their investment decisions.

Our paper makes contributions to two strands of literature. First, it contributes to the literature on the informational feedback effect. As mentioned above, the existing literature uses regression analysis to make indirect inference on the informational feedback effect (e.g., Chen, Goldstein, and Jiang, 2007; Foucault and Frésard, 2012, 2014). The most recent literature makes an effort to overcome the endogeneity issues using various settings (e.g., Foucault and Frésard, 2012, 2014; Dessaint, Foucault, Frésard, and Matray, 2019). Still, the evidence is indirect and suggestive. By contrast, our paper provides direct evidence on the real consequences of financial markets, both through the informational feedback effect of the secondary market and through the capital budgeting of the primary market, and further identifies when these channels are important.

Second, our paper contributes to the growing literature that uses surveys to identify and measure the importance of various economic channels. Graham and Harvey (2001) and Graham, Harvey, and Rajgopal (2005) use survey data to examine the cost of capital, capital budgeting, capital structure, and corporate financial reporting. Glaser and Weber (2007) and Dorn and Sengmueller (2009) have used survey data to study the excessive trading puzzle. Choi and Robertson (2020) rely on survey data to compare many factors that may affect investment decisions. Giglio, Maggiori, Stroebel, and Utkus (2020a, 2020b) employ survey-based expectations to analyze people's belief dynamics. Liu, Peng, Xiong, and Xiong (2020) propose a new approach of combining subjective survey responses with observational data to study behavioral biases of investors in Chinese stock market. Our paper offers the first study to examine the real consequences of financial markets, and our

survey data is comprehensive which does not suffer the sampling bias commonly seen in other survey studies.

2. THE SURVEY

2.1 *The questionnaire*

Starting from 2017, the PBC School of Finance at Tsinghua University and the China Securities Regulatory Commission (the counterpart of the SEC in China, the CSRC henceforth) jointly survey the Chinese public firms every six months to collect opinions on the macro economy and a variety of topics that may interest the policymakers and academia. Every public firm in the Chinese stock market is invited by the CSRC to respond to the surveys, which are designed by researchers from both the school and the CSRC, and distributed by the regulator.

In June 2019, we administer a special survey on the real effect of the stock market among the Chinese public firms. Specifically, we ask these firms about 1) in general, whether they keep watching the stock prices in the public market; and 2) if so, the reasons for which they watch the stock prices. Questions in the survey include:

I. How much does your company pay attention to the stock market? (Select one answer)

- A. Only care about the price of your own company's stock*
- B. Only care about the prices of other similar companies' stocks*
- C. Both A and B*
- D. Only care about the composite stock index*
- E. Do not care about the stock market at all*

II. If you choose A or C in I: Which of the following is the reason that you CARE about the stock price of your OWN company? (Select all that apply)

- A. The stock price contains information that is new for investment decisions*
- B. The stock price would impact refinancing (SEO/ bond issuance/ bank loan)*
- C. The compensation of management is linked to the stock price, or they hold stocks or options*
- D. The pressure from the board and shareholders*
- E. Merger and acquisition protection*

As our study aims to provide direct evidence on the real effect of the stock market,

we design the questions based on indirect empirical findings in the literature about firms watching the stock prices for real decisions. Question I is about the existence of market feedback, and solicits managers' opinions on whether they watch the stock market for useful information. Choice A echoes studies concluding managers extract information from their own stock prices (e.g., Luo (2005); Chen, Goldstein, and Jiang (2007)); and Choice B echoes studies suggesting managers also keep an eye on peer firms' stock prices (e.g., Foucault and Frésard (2014)).

Question II attempts to collect managers' opinions on the purposes of watching their own stock prices, conditional on they agree with the statement that they care about their own firms' stock prices (choose A or C in Question I). Answers to this question reveal information about the channels of the feedback effect. Choice A echoes studies finding managers learn information for making investment decisions (e.g., Chen, Goldstein, and Jiang (2007)), and we term it as the "learning channel;" Choice B echoes studies showing managers pay attention to stock prices for financing opportunities (Giammarino et al., 2004; Goldstein, Yang, and Zuo, 2020), and we term it as the "financing channel;" Choice C echoes studies linking stock prices and managerial incentives (Kang and Liu, 2008), and we term it as the "compensation channel;" Choice D echoes studies on the substitution effect between market monitoring and board monitoring, because market monitoring is more powerful with more informative stock prices (Ferreira, Ferreira, and Raposo, 2011). We term it as the "monitoring channel;" and Choice E echoes studies finding managers take into account the market responses when determining whether to cancel an M&A deal (Luo, 2005), and we term it as the "M&A channel."

Besides the above questions, we also ask the public firms to provide information on the positions of the respondents who are assigned by the firms to fill in the questionnaire. The identities of the responding firms are also recorded, enabling us to combine the survey data and public information to perform in-depth analyses.

2.2 The responses

We managed to collect responses from 3,626 firms, representing a response rate of 99.99%. The two non-responding firms include a firm that listed on the exchange for

less than one week and another that was financially distressed. That is, our survey covers almost every public firm in the Chinese market, and so our results do not suffer from the representativeness issue that are common in survey-based studies.

We believe that the information we collected from the survey is reliable for two reasons. First, in most of the surveyed firms the responses are provided by members of the top management, who are sufficiently informed about their firms' behaviors and are able to provide accurate information. Figure 1 shows that in 73.8% (2,678) of the 3,626 responding firms, the respondent takes very important managerial positions including chairman of the board, director, CEO, CFO, and board secretary.⁴ In another 23.1% (839) of the firms, the answers are prepared by the office of investor relations, which is a specialized team in charge of capital market affairs led by the board secretary. Only 3.0% (109) of the firms assign other offices or functions such as the general administration to provide the responses.

[Figure 1]

Second, the respondents are unlikely to hide their true opinions when responding to the survey. Though the questionnaire was distributed to the firms by the regulator, we think the respondents do not have the incentive to provide biased information to cater to the CSRC's needs or to avoid unnecessary troubles because 1) we carefully ask plain, academic questions which apparently can not be used to judge a firm's behavior (that is, there is no "correct" answers for these questions); and 2) in the survey, we formally declare that the responses and other relevant information are only used in policy and academic research in a large sample. We promise not to analyze individual firms or leak the information to outsiders. In fact, we strictly complied to the same policies in the previous 6 rounds of surveys, which is helpful on building a trust relation between the survey team and the respondents.

2.3 Summary statistics on the responding firms

In this section, we provide summary statistics on the 3,626 firms responding to our

⁴ In Chinese public firms, the board secretary is an important member of the management. Besides handling affairs about the board, the shareholder meeting, and communication with the regulators, she is also responsible for functions about the capital market, including information disclosure, investor relations, and raising capital.

survey. Information on stock prices and firm fundamentals as of 2018 is retrieved from the China Stock Market & Accounting Research Database (CSMAR). Note that the responding sample contains 99.99% of the Chinese public firms, hence we are in fact summarizing the population of the Chinese public firms.

[Table 1]

According to Table 1, an average public firm in the Chinese stock market, which of course responded to our survey, is about 20.6 years old since its establishment. It has a total asset of 11.8 billion RMB (1.7 billion in US dollars), and its market capitalization at the end of 2018 is 9.5 billion RMB (1.4 billion in US dollars). The average firm is moderately levered with a leverage ratio of 43%. The valuation of the firm is lower than that in the US market, as the Tobin's Q is around 1.8. It is also less profitable with a ROA of 3.1%. On average, there are 6.1 analysts following this public firm. Meanwhile, 37.5% of the firm's outstanding shares are held by institutional investors including mutual funds, insurance companies, pension funds, investment banks, and trust firms. Share pledging is an important financing tool in the Chinese market, and the shareholders of the average firm pledge 15.7% of the firm's total shares as the collaterals for loans. The reported insiders' trading activities are relatively thin, as their trading volume only account for 0.1% of total shares outstanding. In addition, 32% of the public firms are ultimately owned by the state, and 3% of them are cross listed on stock exchanges outside China mainland.

3. DIRECT EVIDENCE ON MARKET FEEDBACK

In this section, we summarize firms' responses to our questions to provide direct evidence on market feedback. Through the analysis, we term the behavior of watching own or peer firms' stock prices as the general market feedback effect; and use the learning channel and financing channel defined in Subsection 2.1 to refer to the practices of watching own stock prices for investment and financing purposes. Besides survey results in the full sample, we also summarize responses across industries to explore the heterogeneity in firms' behaviors.

3.1 The prevalence of market feedback

Our first question (*I. How much does your company pay attention to the stock market?*) is

about the existence of the general market feedback, or whether managers watch stock prices in the public for useful information to guide their real decisions. As shown in Figure 2, among the 3,626 responding firms, 271 (7.5%) respond that they only care about their own stock prices (Choice A); 36 (1.0%) agree with that they only care about peer firms' stock prices (Choice B); 3,049 (84.1%) say that they pay attention to both their own and peer firms' stock prices (Choice C); and 43 (1.2%) only care about the overall market conditions (Choice D). Only 227 (6.3%) indicate that, they do not care about the stock market at all (Choice E). In other words, 92.6% of the responding firms are closely watching stock prices for some reasons (Choice A+B+C). Note that 99.9% of the Chinese public firms have responded to our survey, that is, market feedback does exist in more than 90% of the Chinese public firms.

[Figure 2]

This direct survey evidence on the prevalence of market feedback in China is consistent with the empirical findings in Chen and Liu (2018), which follows Chen et al. (2007) and find a positive relation between price informativeness and investment-price sensitivity among the Chinese public firms. Our finding strongly supports that it is a common practice for public firms to use the information from the stock market, which is concluded by many previous studies based on indirect evidence.

3.2 Channels for market feedback

Our second question (*II. If you choose A or C in I: Which of the following is the reason that you CARE about the stock price of your OWN company?*) enquires about why the firms watch their own stock prices. The 3,320 firms choosing A or C in question I are asked to provide their opinions. As the firms are allowed to choose more than one answers in this question, these frequency counts of each choice do not add up to 3,320.

[Figure 3]

The most important reasons for watching their own stock prices are to learn information for investment (the learning channel, Choice A) and to evaluate financing opportunities (the financing channel, Choice B), which are widely documented in the literature. 2,496 (75.2%) and 2,193 (66.1%) of the 3,320 firms that watch their own stock

prices pick Choice A and Choice B, respectively. The third important reason underlying market feedback is the pressure from the board and the shareholders (the monitoring channel, Choice D), and 1,183 (35.6%) firms agree with this statement. The compensation channel (Choice C) is not chosen by many firms (375 firms, 11.3%), which may be explained that equity-linked compensations such as stock options are not very popular among Chinese public firms due to strict regulations. The M&A channel (Choice E) is the least frequently chosen reason (337 firms, 10.2%), as hostile takeovers are scarcely seen in the Chinese market due to higher ownership concentration in public firms.

Our following regression analyses focus on the learning channel (Choice A) and the financing channel (Choice B), because they are the most prominent feedback effects documented in the literature as well as the most important feedback mechanisms suggested by our survey evidence.

3.3 *Heterogeneity across industries*

Table 2 summarizes the responses by industry. As shown in Panel A, the general market feedback effect is prevalent across all industries. In the 28 industries, the non-banking finance industry has the lowest ratio of firms watching own or peer firms' stock prices, but the fraction of watching firms is still quite high at 85.9%. Industries that are the mostly likely to watch stock prices include defense (98.1%), leisure (97.1%), home appliance (96.8%), nonferrous metals (95.8%), and computer (95.2%).

[Table 2]

Similarly, Panel B presents the summary of reasons for watching own stock prices, categorized by industries. For each channel, we rank industries from high to low by the percentage of firms in that industry agreeing with the reason. For the learning channel, pharmaceutical (82.1%), telecommunication (79.4%) and media (79.3%) have the largest fraction of consenting firm, which may be due to the relatively higher uncertainty in investments in these industries. Construction (73.9%), nonferrous metals (72.7%), and agriculture (71.8%) are the top 3 industries that agree with the financing channel, which may be explained by they are traditional industries with strong financing needs but not favored by investors. For the compensation channel, computer (20.5%), electronics (16.4%)

and textile (16.0%) have the largest fraction of consenting firms. Textile (49.3%), commerce (43.7%) and composite (42.5%) are industries that are the most intensively monitored by shareholders and the board, and agree with the monitoring channel. Lastly, for the M&A channel, the leisure industry (21.2%) has the largest number of firms watching the stock market to protect them from takeovers. In contrast, in the banking industry, there is no firms worrying about this specific threat.

4. INFORMATION, BUDGETING AND MARKET FEEDBACK

4.1 The influences of information and capital budgeting

In this section, we explore the effects of stock price information and capital budgeting on market feedback. Information and budgeting can be directly related to the learning and financing channels, which are the most important reasons for watching stock prices. For information, the learning channel suggests firms are more likely to watch the stock market for making investment decisions if there is more information contained in prices. For capital budgeting, the financing channel suggests that firms that are financially constrained and plan to raise or spend more money are more likely to watch their stock prices. Meanwhile, information (budgeting) can also have impacts on the financing (learning) channel.

In the following analyses, we first examine the influences of information and budgeting on the general market feedback effect, then we test their impacts on the learning and financing channels, respectively.

4.2 Sample and model

We use regression analysis to study the market feedback and the underlying channels behind it. We exclude firms that are financially distressed, listed for fewer than 6 months, in the process of delisting, suspended for trading, in the financial industry, or with missing key information from the sample of 3,626 responding firms, leaving a sample of 3,221 firms for empirical analysis.

The outcome variables we focus on are the responding firms' responses on market feedback, which are constructed based on the answers to the two survey questions. Specifically, we use *Watch* and *WatchSelf* that are constructed based on responses to question

I to describe firms' opinions on the general feedback effect. *Watch* is defined as a dummy variable that equals one if a firm chooses A, B or C in question I and agrees with that it pays attention to its own or peer firms' stock prices, and zero otherwise. *WatchSelf* is defined as a dummy variable that equals one if a firm chooses A or C in question I and agrees with that it only pays attention to its own stock price, and zero otherwise. We then construct another two variables based on the responses to question II, *Learn* and *Fin*, to describe firms' opinions on the learning and financing channel. *Learn* (*Fin*) is defined as a dummy variable that equals one if a firm chooses A (B) in the second question and agrees with that it pays attention to its own stock price for information on investment (financing opportunities), and zero otherwise.

We use the following specification to explore factors influencing the feedback effect, focusing on the general effect as well as the learning and financing channels:

$$Feedback = a + b*Factor + c*Controls + \varepsilon \quad (1)$$

where *Feedback* represents the outcome variables defined above (*Watch*, *WatchSelf*, *Learn*, and *Fin*). *Factor* denotes factors such as the informational environment, financing needs, and other market or firm characteristics that may affect a firm's behavior of watching stock prices in the public market. Across regressions we also include the natural logarithm of firm assets (*LnAssets*), firm leverage (*Leverage*), and the state-owned enterprise dummy (*SOE*) to control for the influences of size, capital structure and state ownership. In addition, the position, industry, province, stock exchange fixed effects are included to absorb any influences varying only with the respondent's position in the firm, industry, the firm's geographical location, and the listing stock exchange. All the independent variables are constructed with information as of 2018. Since *Feedback* is a binary choice variable, we run Probit regressions to estimate equation (1).

4.3 Information and market feedback

Previous studies have shown that firm learn information from stock prices to make investment decisions, because financial markets as a whole have the ability to aggregate different pieces of information possessed by various market players and incorporate them into security prices, suggesting the learning channel of market feedback (e.g., Grossman

and Stiglitz, 1980; Goldstein and Guembel, 2008). That is, the information contained in stock prices is one of the driving forces behind market feedback. In this subsection, we examine 1) to what extent the information contained in stock prices affects the general feedback effect, proxied by *Watch* and *WatchSelf*; and 2) how the information content in stock prices affects the learning and financing channels, proxied by *Learn* and *Fin*, respectively.

4.3.1 *Analyst information*

There are at least three different types of information that can be incorporated into stock prices. The first type is information produced by financial analysts, who are active information producers about firms they cover (e.g., Brennan, Jegadeesh, and Swaminathan (1993); Hong, Lim, and Stein (2000); Cheng et al. (2016)). We use the number of analysts following a firm (*NAnalysts*) and the number of earning forecasts produced in 2018 (*NForecasts*) to measure the information that is generated by analysts and incorporated to stock prices. By construction, there should be more information contained in stock prices if more analysts follow a firm and produce more earnings forecasts.

To test the effects of analyst information on market feedback, we regress the feedback response variables on the analyst information proxies using equation (1). Panel A in Table 3 reports the Probit regression results. Columns (1) and (2) shows the impacts of information on the general feedback effect. The marginal effects of *NAnalysts* are -0.0012 and -0.0012, which are statistically significant at the 1% level, suggesting more analysts following a firm is associated with managers' lower probability of paying attention to the firm's stock price. With a one-standard-deviation increase in *NAnalysts*, the probability of watching (their own) stock prices decreases by 1.1% (1.1%).

However, the marginal effect of *NAnalyst* is 0.0017 in the *Learn* regression in column (3) and significant at the 5% level. That is, with a one-standard-deviation increase in *NAnalysts*, the probability of price-watching for new investment information increases by 1.6%. This supports the learning channel in that managers are more likely to learn useful information from their stock prices to guide real investment decisions if these prices contain more information. In contrast, as shown by the testing results on the financing

channel in column (4), the marginal effect is -0.0030 and significant at the 1% level, suggesting more analyst information is correlated with less intensive price-watching for financing opportunities. This can be interpreted as firms with more analyst coverage also receive greater attention from investors, making it easier for them to raise money from the market. As a result, they are allowed to spend less time on closely watching the stock market. Columns (5) to (8) report regression results using $Nforecasts$ as the proxy for analyst information, and the findings stay qualitatively the same.

[Table 3]

In summary, our findings suggest that the influences of analyst information on market feedback is at least two-fold: more analyst information increases the likelihood of learning for investment information (the learning channel) but decreases the probability of price-watching for refinancing (the financing channel). Netting the two opposite effects, we observe a negative relation between analyst information and the general feedback effect.

4.3.2 Managerial information

The second type of information we consider is managerial information, as managers are insiders who are aware of firms' operations and decisions. Stock prices contain managerial information that is made public, but can not fully reflect all the information possessed by managers. For example, corporate insiders, including firm managers, may trade on their private information for excessive returns (Finnerty, 1976). Managers may also engage in earnings management by using judgement in financial reporting for capital market, contracting or regulatory incentives, making stock prices less informative (Healy and Wahlen, 1999). In other words, more intensive insider trading and earnings management suggest more private information owned by managers themselves, and they may rely less on the public information contained in stock prices, which suggests weakened market feedback. In the empirical tests, we use insider trading and earnings management to measure the managerial information contained in stock prices. The proxy for insider trading, *InsiderTrade*, is defined as the ratio of shares traded by insiders over total shares outstanding in 2018, and we follow Dechow, Sloan, and Sweeney (1995) and Jones (1991) to construct *EarnMngt*, residual accruals obtained by regressing total accruals on

fixed assets and revenue growth by industry and year, to measure the intensity of earnings management in a firm.

We then regress the feedback variables on *InsiderTrade* and *EarnMngt* to test the effects of managerial information on market feedback. Columns (1) to (4) in Panel B of Table 3 report the Probit regression results. In general, managers are less likely to watch (their own) stock prices if they actively buy or sell their firms' stocks, as the marginal effects of *InsiderTrade* are negative and significant in *Watch* and *WatchSelf* regressions in columns (1) and (2). With a one-standard-deviation increase in *InsiderTrade*, the probability of watching stock prices (of their own firms) decreases by 0.5% (0.8%).

This negative relation is to some extent driven by the learning channel because we find a negative and significant marginal effect of *InsiderTrade* in the *Learn* regression in column (3). A one-standard-deviation increase in *InsiderTrade* is associated with a 1.0% decrease in the probability of learning investment information from stock prices. That is, managers are less likely to learn investment information if they own more private information relative to the public information contained in stock prices. In column (4), we find a positive and significant relation between *InsiderTrade* and *Fin*. This may be due to more insider trading leads to higher financing cost (Bhattachary and Daouk, 2002), and managers carefully evaluate the firms' financing opportunities even when they are buying or selling the firms' shares.

Columns (5) to (8) report regression results using *EarnMngt* as the proxy for managerial information. We obtain positive relations between earnings management and overall price-watching in columns (5) and (6). This is the net influence of an insignificant learning channel (column (7)) and a positive and significant financing channel (column (8)). In this case, the positive effects of *EarnMngt* in the financing channel dominate the negative effects in the learning channel, so we observe a positive effect on the general market feedback effect.

In summary, we find that managerial information contained in stock prices is positively correlated with the learning channel but negatively correlated with the financing channel. The impacts on the general market feedback effect depend on the strength of proxy we use for managerial information.

4.3.3 *Trader information*

The last type of information we take into account is trader information compounded to stock prices via stock trades, as stock prices can reveal traders' private information that is otherwise not available to managers (Grossman and Stiglitz 1980; Easley and O'Hara, 1987). We use the ratio of shares held by the largest 3 shareholders (*Top3Shares*) and the ratio of shares held by institutional investors (*InsShares*) to measure trader information and assume these shareholders are capable to produce more information about the firm and incorporate it to stock prices (Boone and White, 2015). Our prior for the empirical tests is that managers are more likely to watch stock prices with greater ownership concentration and institutional shareholding.

Panel C of Table 3 reports the results of regressing firms' responses to market feedback on trader information variables. The *Watch* and *WatchSelf* regression results in columns (1) and (2) show that large shareholder ownership (*Top3Shares*) is negatively and significantly correlated with price-watching activities and the general market feedback effect. Results of the *Learn* regression in column (3) supports the learning channel as the marginal effect of *Top3Shares* is positive and significant. Meanwhile, the marginal effect in the financing channel test in column (4) is negative but insignificant. Using *InsShares* to proxy for trader information, we can observe similar patterns: a negative effect on the general market feedback (columns (5) and (6)), an insignificant but positive effect on the learning channel (column (7)), and a negative and significant effect on the financing channel (column (8)). The negative influence on the financing channel is consistent with the notion that with a more concentrated ownership structure and more professional and dedicated investors, the cost of raising capital could be lower.

In summary, we find that trader information is negatively correlated to the overall market feedback, which is the net influence of a positive effect on the learning channel and a negative effect on the financing channel.

4.4 *Financial constraints, capital needs and market feedback*

In this subsection we test the effects of capital budgeting on market feedback. Intuitively, if managers are able to collect information from the marketplace, they would

have better access to external capital due to the improved functioning of the financial market (Goldstein, Yang, and Zuo, 2020). Our prior is that if the firms are more financially constrained or have larger investment plans in the future, they are more likely to take advantage of the better functioning financial market for the purpose of fundraising by closely watching stock prices. That is, according to the financing channel, we should observe stronger market feedback effects among these firms.

4.4.1 *Financial constraints*

We first test the effects of financial constraints on market feedback, using the KZ score (KZ) suggested by Kaplan and Zingales (1997) and firm free cashflow (CF) calculated as the ratio of net cash flows from operations divided by beginning-of-year book assets to measure firms' financial constraints. Then we regress market feedback response variables on the financial constraints proxies using equation (1).

[Table 4]

Panel A of Table 4 reports the Probit regression results. In regressions with KZ as an independent variable in columns (1) to (4), we exclude firm leverage (*Leverage*) as a control because it is considered in the construction of KZ . Columns (1) and (2) in Panel A shows that KZ is positively correlated to *Watch* and *WatchSelf*, but statistically this relation is insignificant. Meanwhile, the marginal effect of KZ is positive and significant at the 1% level in the *Fin* regression in column (4) and there is no significant result from the *Learn* regression in column (3). Similarly, from columns (5) to (8), we find CF , which is negatively correlated to financial constraints, is negatively and significantly associated to *Watch*, *WatchSelf*, and *Fin*, but has no significant impacts on *Learn*. These results support the financing channel that firms watch (their own) stock prices for financing opportunities, i.e., the financing channel.

4.4.2 *Capital needs*

Next we test the financing channel from the demand side. That is, firms with larger capital needs are more likely to pay attention to stock prices for financing reasons. We construct two proxies for capital needs: *NSEO*, the number of seasoned equity offerings in 2018; and *ChgBudget*, a firm's expectation on increases in capital expenditure in 2019

compiled with information from a survey question.⁵ These two variables capture a firm's investment intensity in the past and in the future, and are able to reflect its needs for capital.

Panel B in Table 4 reports results regressing the feedback response variables on capital needs variables and other controls, based on the specification in equation (1). Columns (1) to (4) show that, *NSEO* is positively and significantly correlated to *WatchSelf*. That is, firms raising more capital in the past are more likely to watch their own stock prices. This finding is by large driven by the financing channel, as we find a positive and significant relation between *NSEO* and *Fin* in column (4) and there is no such relation in the learning channel test in column (3). Tests based on the expected financing needs, *ChgBudget*, is slightly weaker but qualitatively unchanged. In column (8), the marginal effect of *ChgBudget* is positive and significant, supporting our prior about the financing channel that firms planning to raise more money are more likely to watch the stock market for the financing purpose.

In a nutshell, we are able to conclude that market feedback are more pronounced among financially constrained firms with more capital needs, which is driven by the financing channel.

5. OTHER CHARACTERISTICS AND MARKET FEEDBACK

In this section, we explore the effects of other firm and managerial characteristics on market feedback following the specification in equation (1). Besides the general feedback effect proxied by *Watch* and *WatchSelf*, we also consider the influences on the learning channel (*Learn*) and the financing channel (*Fin*) to investigate the driving forces of the price-watching behaviors.

5.1 Tobin'Q, profitability and market feedback

Tobin's Q is widely used in studies about the feedback effects focusing on the investment-price sensitivity as a proxy for investment opportunities (e.g., Chen et al. (2007); Foucault and Frésard (2014)). In the same spirit of these studies, we also test the effects of firms' profitability measured by return on assets on their responses on market feedback.

⁵ In the survey, we also ask firms about their investment plans in 2019 compared to 2018. We assign different values to *ChgBudget* according to firms' responses: -2 denotes "large decrease"; -1 denotes "small decrease"; 0 denotes "no change"; 1 denotes "small increase"; and 2 denotes "large increase".

5.1.1 *Tobin's Q*

Columns (1) to (4) in Table 5 reports the Probit regression results with Q as the independent variable of interest. Interestingly, the marginal effects of Q on general market feedback, captured by *Watch* and *WatchSelf*, are negative and significant in columns (1) and (2). That is, managers are less likely to watch the stock market when their firms have a high Q value. Though it appears to contradict with the prior that firms are more likely to learn investment information if they are facing better investment opportunities proxied by higher Q , as suggested by Chen et al. (2007), to a large extent this result can be reconciled by the following findings: 1) in the *Learn* regression in column (3) Q has a positive and significant effect on price-watching by the learning channel, which is consistent with previous studies; and 2) column (4) shows Tobin's Q is negatively and significantly correlated to price-watching due to financing reasons, which is plausible because firms with high Q are favored by investors and do not have to worry much about raising capital. The overall negative effect in column (1) and (2) is driven by the financing channel.

[Table 5]

5.1.2 *ROA*

Columns (5) to (8) reports the Probit regression results on the effects of firm profitability proxied by *ROA*. Results are qualitatively the same as those from the analysis of Q . That is, firms with higher ROA are able to make more investments, so we observe a positive influence of ROA on price-watching for the investment purpose (*Learn*) in column (7). Meanwhile, according to column (8) these profitable firms are able to raise capital at lower cost, and they do not have strong incentives to pay close attention to the stock market for financing opportunities. The negative influence on general market feedback we find in columns (5) and (6) is the net effect of these two channels.

5.2 *The influences of other firm and managerial characteristics*

We explore the influences of firm age, share pledging, cross listing, managerial tenure, CEO-chairman duality, and managers' backgrounds on market feedback in this subsection.

5.2.1 *Firm characteristics*

Panel A of Table 6 reports the results of regressing the feedback response variables on a vector of firm characteristics. Column (3) shows that firm age (*FirmAge*) is negatively and significantly correlated to the learning channel (*Learn*). That is, firms with a long history are more experienced in investments and may have other information sources, and they rely less on the information contained in stock prices to make decisions.

Columns (5) to (8) relate share pledging (*PledgeShare*), defined as the ratio of shares pledged by shareholders as collateral for financing over total shares outstanding, to market feedback. Share pledging is commonly seen in the Chinese market, and 40.5% of Chinese public firms have share pledge loans by the end of 2019. Column (7) shows that with more shares pledged, firms are less likely to learn investment information proxied by *Learn*, and column (8) suggests more pledged shares are associated with higher probability of price-watching for financing (*Fin*). This pattern may be reconciled as with more shares pledged, the shareholders are more cautious about firms' operation to maintain a stable share price to avoid unintended liquidation and losses. To accomplish this, they would ask the management to cut risky investments and maintain a certain level of financing capacity, suggesting less intensive learning for investment information but more price-watching for financing opportunities. Overall, the marginal effects of *PledgeShare* on market feedback, proxied by *Watch* is positive and significant as shown in column (5).

[Table 6]

Columns (9) to (12) report the effects of cross listing on the feedback effect. The stock prices of cross-listed firms are more informative because investors from abroad can contribute information to prices (Foucault and Frésard, 2014). In our setting, this implies managers of cross-listed firms are more likely to watch stock prices. Column (11) shows results consistent with this prior. The probability of learning investment information (the learning channel) is 4.1% higher among cross-listed firms.

5.2.2 Managerial characteristics

Panel B of Table 6 reports results on managerial characteristics. Columns (1) and (2) show that *Tenure*, the average tenure of a firm's top management, is negatively and significantly correlated to the general market feedback effect proxied by *Watch* and

WatchSelf. We also observe negative but insignificant results by the learning and financing channel in columns (3) and (4). This pattern is by large consistent with our findings on firm age. That is, more experienced managers have more information sources and use the information effectively, so they rely less on collecting information from market prices.

Columns (7) and (8) suggest that the learning channel (*Learn*) is positively affected by CEO-chairman duality (*Duality*), while the financing channel (*Fin*) is negatively affected by *Duality*. The influence on the general market feedback is insignificant, as shown in columns (5) and (6). This can be interpreted as that in firms where the chairmen are also appointed as CEOs, the agency problem between shareholders and managers is alleviated to some extent and these firms are able to quickly respond to opportunities with unified leadership (Brickley et al., 1997). As a result, they are more likely to find investment and financing opportunities. Consequently, they need to watch the prices for investment information, but pay less attention on prices for the financing purpose.

Columns (9) to (12) report results on the managers' backgrounds. We define a dummy variable, *Professional*, to measure the managers' backgrounds in professional services including business, accounting, finance, management, and law. Our prior is that with experiences in professional services, managers are more likely to use the information contained in stock prices because they are more aware of the functioning of the capital market. The marginal effects of *Professional* are positive and significant in columns (9), (10), and (11), which supports our conjecture.

6. LEARNING AND INVESTMENT-PRICE SENSITIVITY

In Section 3, we provide direct evidence that 3,049 (92.6%) out of the 3,626 Chinese public firms are watching stock prices. One of the most important reasons behind this market feedback is that managers are learning information for making investment decisions, as 75.2% of the 3,221 firms paying attention to their own stock prices admit they hope to extract new investment information from prices. We also show that analyst information, managerial information, and trader information are the three types of information contained in stock prices and learned by firms in Subsection 4.3.

In this section, we replicate the tests in Chen et al. (2007) to 1) examine the power

of the classical empirical tests on market feedback (the learning channel in particular) in the Chinese market; and 2) double-check the influences of the three types of information we proposed in Subsection 4.3. Specifically, we run the following regression:

$$Capex_{i,t+1} = a_i + b_t + c*Q_{i,t}*Info_{i,t} + d*Q_{i,t} + e*Info_{i,t} + \varepsilon_{i,t} \quad (2)$$

where *Capex* denotes a firm's capital expenditure scaled by beginning of year assets; *Q* denotes Tobin's Q; and *Info* denotes price informativeness measures. We also include firm and year fixed effects in regressions to absorb any influence varying only with firm and time.

The first category of informativeness measures we consider in the replication are the proxies commonly used in previous studies examining market feedback, including 1) $1-R^2$, the R^2 based price nonsynchronicity measure proposed by Roll (1988) and Durnev, Morck, and Yeung (2004); 2) *PIN*, probability of information-based trading constructed according to Easley, Kiefer, and O'Hara (1996); and 3) *D1*, the price delay measure suggested by Hou and Moskowitz (2005). The second category of measure we use include the three information variables proposed in Subsection 4.3: *NAnalysts*, *InsiderTrade*, and *InsShares*. These are proxies for analyst information, managerial information, and trader information, respectively.

We replace *Info* with the above informativeness measures and estimate equation (2). Table 7 reports the OLS regression results. In general, the coefficient estimate on *Q* is positive on significant across regressions. In column (1), the coefficient estimate on the variable of interest, $Q*(1-R^2)$, is positive and significant at the 1% level. That is, Chinese public firms respond to investment opportunities more actively when their stock prices more informative, which is consistent with Chen et al. (2007). Column (2) reports results with *PIN* as the informativeness measure and find insignificant results. This may be because *PIN* is a noisy measure in the Chinese stock market since a lot of trades are speculation-based and carry no information. Column (3) shows the coefficient estimate on $Q*D1$ is negative and significant at the 1% level, from which we can draw the same conclusion as in the $1-R^2$ test. By large, the indirect evidence suggests the existence of the feedback effect in the Chinese stock market.

Columns (4) to (6) report replication results based on the analyst, managerial, and

trader information measures. The coefficient estimate on $Q*NAnalysts$ is positive and significant at the 1% level in column (4), suggesting that firms' investments are more responsive to investment opportunities if more analysts are following the firm and contribute information to their stock prices. Column (5) shows the investment-price sensitivity is lower for firms with more insider trading (*InsiderTrade*), in which managers are more likely to rely on private information. In column (6), the coefficient estimate on $Q*InsShares$ is positive and significant, which suggests institutional investors is a source of information that is contained in stock prices. It is noteworthy that the results on *NAnalysts*, *InsiderTrade*, and *InsShares* are consistent with those from the tests on the effects of information on the learning channel reported in Subsection 4.3. In other words, we are able to find significant feedback effects with these three information measures in the Chinese market using both direct and indirect testing methods.

[Table 7]

In summary, following the standard practice in Chen et al. (2007), we are able to identify the learning channel among Chinese public firms. Besides the traditional informativeness measures, we also confirm that firms can also respond to analyst information, managerial information, and trader information contained in their stock prices by altering their investment decisions.

7. CONCLUSION

In this paper, we rely on survey to examine the real consequences of financial markets. Our survey is comprehensive, covering 3,626 Chinese public firms and representing a response rate of 99.99%. We find that more than 90% of firms pay attention to the stock market and that the most salient reasons for them to monitor markets is to learn information from the market and to access external financing. These findings provide direct evidence for the wide existence of market feedback effect via a learning channel and a financing channel. In addition, our analysis shows that market feedback is stronger for firms with more informative stock prices and fewer financial resources. We also replicate the indirect evidence of the learning channel. Overall, our analysis highlights the prevalence and importance of market feedback.

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FIGURES

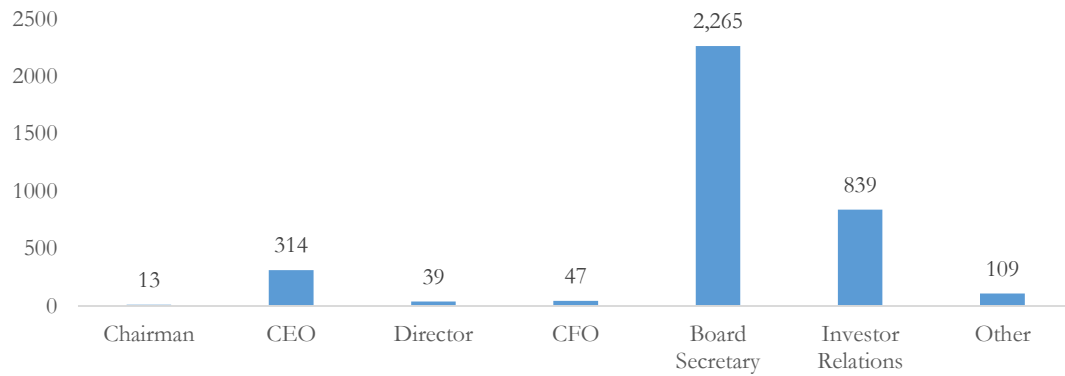


Figure 1: Distribution of the respondents' positions in their firms

This figure plots the distribution of the positions of the respondents that are assigned by their firms to respond to the market feedback survey. 3,626 Chinese public firms listed on the Shanghai and Shenzhen Stock Exchange responded to the survey.

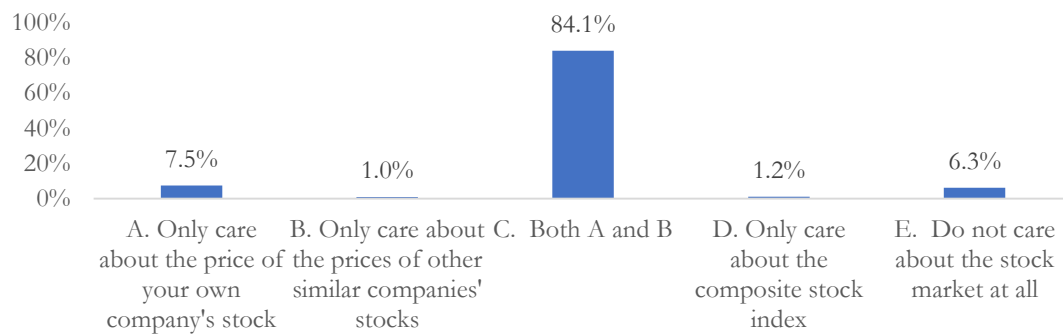


Figure 2: Responses to survey question I

This figure plots the frequencies by which each choice is chosen by the 3,626 responding firms in survey question I (*How much does your company pay attention to the stock market?*).

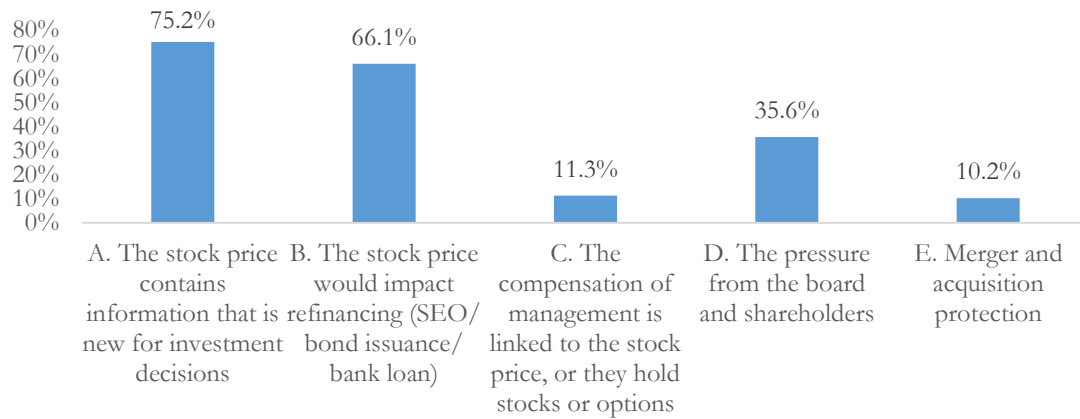


Figure 3: Responses to survey question II

This figure plots the frequencies by which each choice in question II (*If you choose A or C in I: Which of the following is the reason that you CARE about the stock price of your OWN company?*) is chosen by the 3,320 responding firms choosing A or C in survey question I.

TABLES

Table 1: Summary statistics on the responding firms

This table reports summary statistics on the 3,626 Chinese public firms responding to the feedback survey. Information on stock prices and firm fundamentals is as of 2018.

	Mean	P5	P25	Med	P75	P95	STD
Firm Age (year)	20.58	11.82	16.95	20.47	24.50	30.30	4.95
SOE	0.32	0.00	0.00	0.00	1.00	1.00	0.47
Cross Listing	0.03	0.00	0.00	0.00	0.00	0.00	0.18
Total Assets (billion RMB)	11.83	0.72	1.84	4.13	10.68	76.91	19.09
Market Cap (billion RMB)	9.53	1.85	3.02	5.01	10.43	42.86	10.73
Capital Expenditure (%)	4.86	0.03	1.05	3.16	7.08	17.59	4.94
Tobin's Q	1.81	0.89	1.10	1.50	2.20	4.31	0.93
ROA (%)	3.07	-16.02	1.18	3.46	6.58	12.99	6.38
Leverage	0.43	0.11	0.26	0.41	0.58	0.82	0.21
No. Analysts	6.14	0.00	0.00	1.00	8.00	32.00	9.32
Insider Trading (%)	0.13	0.00	0.00	0.00	0.00	1.30	0.34
Institutional Ownership (%)	37.54	0.92	18.26	38.28	56.15	77.07	22.99
Pledged Shares (%)	15.68	0.00	0.06	11.15	27.84	48.23	15.86

Table 2: Responses to survey questions by industry

This table summarizes the responses to the survey questions by industry. There are 3,626 responses to question I, and 3,320 to question II. The fraction of firms in an industry that agree with each choice is reported.

Panel A: I. *How much does your company pay attention to the stock market?* N=3,626

Industry	N. firms	A. Own stock	B. Peers' stocks	C. Both A and B	D. Comp. index	E. Don't care
Defense	54	11.1%	3.7%	83.3%	0.0%	1.9%
Leisure	35	20.0%	2.9%	74.3%	0.0%	2.9%
Home appliance	62	4.8%	0.0%	91.9%	0.0%	3.2%
Nonferrous Metals	118	6.8%	2.5%	86.4%	0.0%	4.2%
Computer	207	4.8%	1.0%	89.4%	1.4%	3.4%
Electrical equipment	195	7.2%	0.5%	87.2%	0.0%	5.1%
Chemical	330	7.9%	0.9%	85.5%	0.6%	5.2%
Bank	32	0.0%	3.1%	90.6%	3.1%	3.1%
Agriculture	92	7.6%	1.1%	84.8%	2.2%	4.3%
Construc. materials	72	8.3%	0.0%	84.7%	0.0%	6.9%
Composite	43	7.0%	0.0%	86.0%	0.0%	7.0%
Construction	128	4.7%	3.1%	85.2%	0.8%	6.3%
Pharmaceutical	295	5.1%	0.3%	87.5%	2.0%	5.1%
Media	153	5.2%	1.3%	86.3%	0.7%	6.5%
Automobile	171	7.0%	0.6%	84.8%	0.6%	7.0%
Utilities	157	10.2%	0.6%	81.5%	0.0%	7.6%
Transportation	114	11.4%	0.0%	80.7%	1.8%	6.1%
Light industry	124	2.4%	3.2%	86.3%	1.6%	6.5%
Electronics	235	9.8%	1.3%	80.9%	0.9%	7.2%
Machinery	332	9.0%	0.3%	82.2%	2.4%	6.0%
Telecommunication	106	9.4%	0.0%	82.1%	0.9%	7.5%
Food and beverage	92	5.4%	0.0%	85.9%	1.1%	7.6%
Commerce	98	9.2%	1.0%	79.6%	0.0%	10.2%
Real estate	129	7.8%	0.8%	80.6%	0.8%	10.1%
Steel	32	12.5%	3.1%	71.9%	3.1%	9.4%
Textile	87	8.0%	1.1%	78.2%	3.4%	9.2%
Mining	62	14.5%	1.6%	71.0%	3.2%	9.7%
Nonbanking finance	71	1.4%	0.0%	84.5%	4.2%	9.9%

Panel B: II. Which of the following is the reason that you CARE about the stock price of your OWN company? N=3,320

Industry	N. firms	A. Learn	B. Financing	C. Compensation	D. Monitoring	E. M&A Protect
Pharmaceutical	273	82.1%	65.2%	9.9%	38.8%	13.6%
Telecommunication	97	79.4%	66.0%	13.4%	21.6%	12.4%
Media	140	79.3%	66.4%	9.3%	40.0%	5.7%
Defense	51	78.4%	66.7%	9.8%	25.5%	3.9%
Automobile	157	77.1%	67.5%	10.2%	29.9%	10.2%
Electronics	213	77.0%	70.0%	16.4%	38.0%	10.3%
Computer	195	76.9%	69.2%	20.5%	34.4%	11.8%
Light industry	110	76.4%	69.1%	10.0%	35.5%	13.6%
Construc. materials	67	76.1%	65.7%	6.0%	37.3%	10.4%
Leisure	33	75.8%	60.6%	9.1%	42.4%	21.2%
Nonbanking finance	61	75.4%	70.5%	9.8%	34.4%	4.9%
Chemical	308	75.3%	60.7%	11.7%	34.1%	10.4%
Agriculture	85	75.3%	71.8%	3.5%	36.5%	8.2%
Home appliance	60	75.0%	56.7%	13.3%	38.3%	10.0%
Construction	115	74.8%	73.9%	13.9%	36.5%	10.4%
Real estate	114	74.6%	66.7%	7.0%	36.0%	3.5%
Machinery	303	74.3%	67.0%	11.6%	37.0%	11.2%
Electrical equipment	184	73.9%	69.6%	12.0%	34.8%	9.8%
Food and beverage	84	73.8%	52.4%	14.3%	31.0%	13.1%
Mining	53	73.6%	64.2%	11.3%	37.7%	5.7%
Commerce	87	73.6%	63.2%	9.2%	43.7%	12.6%
Utilities	144	72.9%	65.3%	7.6%	33.3%	11.1%
Bank	29	72.4%	58.6%	13.8%	37.9%	0.0%
Transportation	105	71.4%	64.8%	6.7%	29.5%	6.7%
Composite	40	70.0%	50.0%	12.5%	42.5%	10.0%
Textile	75	66.7%	66.7%	16.0%	49.3%	9.3%
Nonferrous Metals	110	66.4%	72.7%	7.3%	33.6%	10.9%
Steel	27	48.1%	55.6%	3.7%	37.0%	3.7%

Table 3: Information and market feedback

This table reports the Probit regression results about the effects of information on firms' responses to market feedback questions. The sample consists of 3,221 firms responding to the survey. Dependent variables include dummy variables constructed based on responses to the general market feedback effect, the learning channel, and the financing channel. The independent variables of interest are analyst, managerial, and trader information measures. The position, industry, province, stock exchange fixed effects are included. See Appendix A or definitions of variables. Marginal effects are reported. Standard errors reported in parentheses are adjusted for heteroscedasticity and clustering at the industry level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>
<i>NAnalysts</i>	-0.0012*** (0.0004)	-0.0012*** (0.0004)	0.0017** (0.0007)	-0.0030*** (0.0005)				
<i>NForecasts</i>					-0.0005*** (0.0001)	-0.0005*** (0.0001)	0.0008*** (0.0003)	-0.0013*** (0.0002)
<i>LnAssets</i>	0.0039 (0.0042)	0.0032 (0.0043)	0.0093 (0.0061)	-0.0005 (0.0066)	0.0037 (0.0040)	0.0031 (0.0039)	0.0086 (0.0056)	-0.0010 (0.0066)
<i>Leverage</i>	-0.0180 (0.0204)	-0.0071 (0.0313)	-0.1361*** (0.0404)	0.4538*** (0.0395)	-0.0181 (0.0202)	-0.0073 (0.0309)	-0.1346*** (0.0399)	0.4540*** (0.0401)
<i>SOE</i>	-0.0127* (0.0072)	-0.0060 (0.0083)	0.0100 (0.0190)	-0.0876*** (0.0160)	-0.0126* (0.0072)	-0.0059 (0.0084)	0.0103 (0.0187)	-0.0873*** (0.0161)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,221	3,221	3,042	3,042	3,221	3,221	3,042	3,042
Pseudo R ²	0.0244	0.0255	0.0184	0.0441	0.0245	0.0256	0.0187	0.0441

Panel B: Managerial Information

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>
<i>InsiderTrade</i>	-1.4608** (0.6969)	-2.0700*** (0.4296)	-2.6811** (1.0772)	2.8388* (1.5849)				
<i>EarnMgmt</i>					0.0855* (0.0510)	0.0990** (0.0431)	0.0197 (0.0803)	0.1746** (0.0738)
<i>LnAssets</i>	-0.0024 (0.0033)	-0.0031 (0.0034)	0.0174*** (0.0049)	-0.0155*** (0.0052)	0.0039 (0.0036)	0.0027 (0.0035)	0.0219*** (0.0078)	-0.0132 (0.0110)
<i>Leverage</i>	-0.0073 (0.0187)	0.0038 (0.0287)	-0.1505*** (0.0379)	0.4786*** (0.0364)	-0.0122 (0.0358)	0.0126 (0.0316)	-0.1461*** (0.0513)	0.3554*** (0.0775)
<i>SOE</i>	-0.0109 (0.0071)	-0.0049 (0.0083)	0.0048 (0.0196)	-0.0791*** (0.0152)	-0.0084 (0.0105)	-0.0029 (0.0119)	0.0193 (0.0164)	-0.0645*** (0.0227)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,221	3,221	3,042	3,042	2,053	2,053	1,981	1,973
Pseudo R ²	0.0224	0.0245	0.0180	0.0424	0.0235	0.0275	0.0239	0.0385

Panel C: Trader Information								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>
<i>Top3Shares</i>	-0.0760*** (0.0159)	-0.0613*** (0.0183)	0.1066*** (0.0381)	-0.0366 (0.0698)				
<i>InsShares</i>					-0.0461*** (0.0109)	-0.0528*** (0.0153)	0.0220 (0.0248)	-0.0564** (0.0279)
<i>LnAssets</i>	-0.0015 (0.0033)	-0.0024 (0.0034)	0.0161*** (0.0049)	-0.0151*** (0.0049)	0.0008 (0.0030)	0.0006 (0.0027)	0.0151*** (0.0052)	-0.0108** (0.0053)
<i>Leverage</i>	-0.0159 (0.0190)	-0.0030 (0.0293)	-0.1408*** (0.0377)	0.4757*** (0.0340)	-0.0135 (0.0183)	-0.0031 (0.0280)	-0.1481*** (0.0383)	0.4738*** (0.0353)
<i>SOE</i>	-0.0094 (0.0071)	-0.0028 (0.0083)	0.0059 (0.0205)	-0.0806*** (0.0148)	-0.0045 (0.0072)	0.0026 (0.0085)	0.0034 (0.0202)	-0.0738*** (0.0146)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,221	3,221	3,042	3,042	3,218	3,218	3,040	3,040
Pseudo R ²	0.0248	0.0249	0.0185	0.0422	0.0248	0.0262	0.0177	0.0426

Table 4: Capital budgeting and market feedback

This table reports the Probit regression results about the effects of capital budgeting on firms' responses to market feedback questions. The sample consists of 3,221 firms responding to the survey. Dependent variables include dummy variables constructed based on responses to the general market feedback effect, the learning channel, and the financing channel. The independent variables of interest are financial constraints and capital needs measures. The position, industry, province, stock exchange fixed effects are included. See Appendix A or definitions of variables. Marginal effects are reported. Standard errors reported in parentheses are adjusted for heteroscedasticity and clustering at the industry level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Financial Constraints								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>
<i>KZ</i>	0.0021 (0.0019)	0.0011 (0.0026)	-0.0091 (0.0070)	0.0417*** (0.0056)				
<i>CF</i>					-0.2048*** (0.0678)	-0.1854*** (0.0430)	-0.0038 (0.0980)	-0.3168*** (0.0956)
<i>LnAssets</i>	-0.0030 (0.0028)	-0.0027 (0.0025)	0.0078* (0.0043)	0.0157*** (0.0047)	0.0003 (0.0030)	-0.0006 (0.0032)	0.0169*** (0.0049)	-0.0116** (0.0049)
<i>Leverage</i>					-0.0187 (0.0168)	-0.0048 (0.0281)	-0.1481*** (0.0378)	0.4587*** (0.0387)
<i>SOE</i>	-0.0125* (0.0071)	-0.0057 (0.0084)	-0.0012 (0.0208)	-0.0816*** (0.0157)	-0.0109 (0.0072)	-0.0041 (0.0085)	0.0011 (0.0204)	-0.0822*** (0.0155)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,095	3,095	2,929	2,929	3,152	3,152	2,976	2,976
Pseudo R ²	0.0223	0.0245	0.0161	0.0375	0.0259	0.0263	0.0175	0.0442

Panel B: Capital Budgeting								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>
<i>NSEO</i>	0.0158 (0.0102)	0.0194* (0.0103)	-0.0394 (0.0256)	0.0749*** (0.0251)				
<i>ChgBudget</i>					0.0013 (0.0037)	0.0038 (0.0035)	0.0055 (0.0063)	0.0177*** (0.0057)
<i>LnAssets</i>	-0.0028 (0.0033)	-0.0036 (0.0034)	0.0188*** (0.0048)	-0.0182*** (0.0052)	-0.0023 (0.0032)	-0.0029 (0.0033)	0.0176*** (0.0049)	-0.0146*** (0.0053)
<i>Leverage</i>	-0.0082 (0.0191)	0.0029 (0.0294)	-0.1521*** (0.0382)	0.4802*** (0.0365)	-0.0076 (0.0191)	0.0040 (0.0292)	-0.1495*** (0.0393)	0.4841*** (0.0352)
<i>SOE</i>	-0.0100 (0.0071)	-0.0034 (0.0084)	0.0064 (0.0204)	-0.0803*** (0.0150)	-0.0102 (0.0074)	-0.0039 (0.0087)	0.0060 (0.0205)	-0.0833*** (0.0150)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,221	3,221	3,042	3,042	3,221	3,221	3,042	3,042
Pseudo R ²	0.0222	0.0239	0.0180	0.0433	0.0217	0.0235	0.0177	0.0428

Table 5: Tobin's Q, profitability and market feedback

This table reports the Probit regression results about the effects of capital budgeting on firms' responses to market feedback questions. The sample consists of 3,221 firms responding to the survey. Dependent variables include dummy variables constructed based on responses to the general market feedback effect, the learning channel, and the financing channel. The independent variables of interest are Tobin's Q and ROA. The position, industry, province, stock exchange fixed effects are included. See Appendix A or definitions of variables. Marginal effects are reported. Standard errors reported in parentheses are adjusted for heteroscedasticity and clustering at the industry level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>
<i>Q</i>	-0.0126** (0.0053)	-0.0126** (0.0058)	0.0143* (0.0077)	-0.0271*** (0.0043)				
<i>ROA</i>					-0.2809*** (0.0863)	-0.2237** (0.1131)	0.3062*** (0.0956)	-0.5104** (0.2175)
<i>LnAssets</i>	-0.0061 (0.0043)	-0.0069 (0.0048)	0.0222*** (0.0066)	-0.0242*** (0.0050)	0.0005 (0.0037)	-0.0008 (0.0041)	0.0143*** (0.0051)	-0.0105** (0.0044)
<i>Leverage</i>	-0.0159 (0.0177)	-0.0048 (0.0272)	-0.1427*** (0.0370)	0.4626*** (0.0392)	-0.0453 (0.0281)	-0.0260 (0.0433)	-0.1092*** (0.0418)	0.4115*** (0.0302)
<i>SOE</i>	-0.0118* (0.0070)	-0.0051 (0.0085)	0.0084 (0.0198)	-0.0839*** (0.0157)	-0.0109 (0.0071)	-0.0039 (0.0085)	0.0075 (0.0199)	-0.0828*** (0.0158)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,221	3,221	3,042	3,042	3,221	3,221	3,042	3,042
Pseudo R ²	0.0241	0.0252	0.0180	0.0433	0.0261	0.0256	0.0185	0.0439

Table 6: Other characteristics and market feedback

This table reports the Probit regression results about the effects of capital budgeting on firms' responses to market feedback questions. The sample consists of 3,221 firms responding to the survey. Dependent variables include dummy variables constructed based on responses to the general market feedback effect, the learning channel, and the financing channel. The independent variables of interest include a vector of firm and managerial characteristics that may affect market feedback. The position, industry, province, stock exchange fixed effects are included. See Appendix A or definitions of variables. Marginal effects are reported. Standard errors reported in parentheses are adjusted for heteroscedasticity and clustering at the industry level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Firm characteristics												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>
<i>FirmAge</i>	-0.0003 (0.0008)	-0.0005 (0.0008)	-0.0042*** (0.0015)	0.0018 (0.0012)								
<i>PledgeShare</i>					0.0590*** (0.0169)	0.0269 (0.0194)	-0.1241*** (0.0417)	0.2324*** (0.0509)				
<i>CrossList</i>									0.0019 (0.0235)	0.0021 (0.0304)	0.0414** (0.0210)	-0.0617 (0.0555)
<i>LnAssets</i>	-0.0023 (0.0032)	-0.0031 (0.0033)	0.0181*** (0.0049)	-0.0158*** (0.0052)	-0.0025 (0.0032)	-0.0031 (0.0033)	0.0172*** (0.0049)	-0.0160*** (0.0054)	-0.0024 (0.0032)	-0.0032 (0.0033)	0.0161*** (0.0053)	-0.0137** (0.0059)
<i>Leverage</i>	-0.0079 (0.0189)	0.0031 (0.0289)	-0.1509*** (0.0403)	0.4796*** (0.0360)	-0.0146 (0.0194)	0.0020 (0.0287)	-0.1339*** (0.0402)	0.4483*** (0.0372)	-0.0078 (0.0189)	0.0034 (0.0290)	-0.1509*** (0.0385)	0.4800*** (0.0359)
<i>SOE</i>	-0.0097 (0.0071)	-0.0029 (0.0084)	0.0112 (0.0203)	-0.0831*** (0.0155)	-0.0011 (0.0074)	0.0009 (0.0084)	-0.0143 (0.0264)	-0.0438*** (0.0137)	-0.0101 (0.0070)	-0.0036 (0.0081)	0.0057 (0.0203)	-0.0793*** (0.0157)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,221	3,221	3,042	3,042	3,202	3,202	3,024	3,024	3,221	3,221	3,042	3,042
Pseudo R ²	0.0217	0.0233	0.0191	0.0423	0.0233	0.0234	0.0191	0.0460	0.0217	0.0232	0.0178	0.0423

Panel B: Managerial characteristics												
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>	<i>Watch</i>	<i>WatchSelf</i>	<i>Learn</i>	<i>Fin</i>
<i>Tenure</i>	-0.0037** (0.0017)	-0.0050*** (0.0016)	-0.0103 (0.0079)	-0.0004 (0.0041)								
<i>Duality</i>					0.0058 (0.0066)	0.0068 (0.0063)	0.0363*** (0.0105)	-0.0284* (0.0153)				
<i>Professional</i>									0.0318*** (0.0090)	0.0363*** (0.0119)	0.1036*** (0.0347)	-0.0064 (0.0503)
<i>LnAssets</i>	-0.0013 (0.0033)	-0.0016 (0.0035)	0.0203*** (0.0063)	-0.0153*** (0.0059)	-0.0022 (0.0033)	-0.0029 (0.0034)	0.0186*** (0.0051)	-0.0164*** (0.0054)	-0.0026 (0.0033)	-0.0034 (0.0034)	0.0168*** (0.0048)	- 0.0154*** (0.0053)
<i>Leverage</i>	-0.0095 (0.0186)	0.0011 (0.0287)	- 0.1561*** (0.0426)	0.4790*** (0.0371)	-0.0076 (0.0188)	0.0035 (0.0288)	- 0.1487*** (0.0390)	0.4782*** (0.0364)	-0.0086 (0.0192)	0.0026 (0.0293)	- 0.1551*** (0.0408)	0.4794*** (0.0354)
<i>SOE</i>	-0.0101 (0.0070)	-0.0037 (0.0083)	0.0064 (0.0196)	-0.0809*** (0.0150)	-0.0086 (0.0070)	-0.0019 (0.0084)	0.0149 (0.0217)	-0.0874*** (0.0168)	-0.0107 (0.0071)	-0.0043 (0.0084)	0.0040 (0.0191)	- 0.0807*** (0.0156)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	3,221	3,221	3,042	3,042	3,221	3,221	3,042	3,042	3,221	3,221	3,042	3,042
Pseudo R ²	0.0225	0.0244	0.0185	0.0421	0.0219	0.0234	0.0188	0.0426	0.0226	0.0242	0.0191	0.0421

Table 7: Information contained in stock prices and firm capital expenditure

This table reports the OLS regression results about the effects of capital budgeting on firms' responses to market feedback questions. The sample consists of 25,501 firm-year observation from 1999 to 2018. The dependent variable is capital expenditure, and the independent variables of interest include a vector of price informativeness measures. The firm and year fixed effects are included. See Appendix A or definitions of variables. Standard errors reported in parentheses are adjusted for heteroscedasticity and clustering at the stock level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

$Y=Capex$	(1)	(2)	(3)	(4)	(5)	(6)
$Info=$	$1-R2$	PIN	$D1$	$NAnalysts$	$InsiderTrade$	$InsShares$
$Q*Info$	0.0061*** (0.0018)	-0.0034 (0.0034)	-0.0041*** (0.0009)	0.0003*** (0.0001)	-0.1913*** (0.0729)	0.0088*** (0.0016)
Q	0.0029** (0.0011)	0.0050*** (0.0007)	0.0070*** (0.0006)	0.0041*** (0.0005)	0.0062*** (0.0005)	0.0043*** (0.0006)
$Info$	-0.0142*** (0.0046)	-0.0005 (0.0085)	0.0097*** (0.0030)	-0.0005*** (0.0002)	-0.0946 (0.2538)	-0.0573*** (0.0044)
Obs.	24,930	16,255	22,317	25,501	22,013	23,342
N. Stocks	2,119	2,636	2,437	2,636	2,636	2,635
Adj. R^2	0.0188	0.0102	0.0156	0.0169	0.0187	0.0409

APPENDIX

Variable definitions.

Variables are constructed with information during the year of or by the end of 2018.

Variable	Definition
<i>Watch</i>	A dummy variable that equals one if the firm chooses A, B or C in survey question I, and zero otherwise.
<i>WatchSelf</i>	A dummy variable that equals one if the firm chooses A or C in survey question I, and zero otherwise.
<i>Learn</i>	A dummy variable that equals one if the firm chooses A in survey question II, and zero otherwise.
<i>Budget</i>	A dummy variable that equals one if the firm chooses B in survey question II, and zero otherwise.
<i>LnAsset</i>	The natural logarithm of a firm's total assets in million RMB.
<i>Leverage</i>	The ratio of a firm's total debt over its total assets.
<i>SOE</i>	A dummy variable that equals to one if a firm is owned by the state, and zero otherwise.
<i>EarnMgmt</i>	Residual accruals obtained by regressing total accruals on fixed assets and revenue growth by industry and year, following Dechow, Sloan, and Sweeney (1995) and Jones (1991).
<i>InsiderTrade</i>	The ratio of shares traded by insiders over total shares outstanding.
<i>Top3Shares</i>	The ratio of shares held by the 3 largest shareholder over total shares outstanding.
<i>InsShares</i>	The ratio of shares held by institutional investors over total shares outstanding.
<i>KZ</i>	The KZ score for financial constraints constructed according to Kaplan and Zingales (1997).
<i>CF</i>	The ratio of net cash flows from operations divided by beginning-of-year book assets.
<i>NSEO</i>	The number of seasoned equity offerings.
<i>ChgBudget</i>	A firms' expectation on capital expenditure in 2019, compiled with information from the survey. -2 denotes "large decrease"; -1 denotes "small decrease"; 0 denotes "no change"; 1 denotes "small increase"; and 2 denotes "large increase".
<i>Q</i>	Tobin's Q, calculated as (market value of total equity + book value of assets - book value of equity)/(book value of assets)
<i>ROA</i>	The ratio of the firm's income before taxes and interests over its total assets.
<i>FirmAge</i>	The total number of years since a firm's establishment.
<i>PledgeShare</i>	The ratio of shares pledged over total shares outstanding.
<i>CrossList</i>	A dummy variable that equals one if the firm is cross listed on another market outside China mainland, and zero otherwise.
<i>Tenure</i>	The average tenure of a firm's top executives.

<i>Duality</i>	A dummy variable that equals one if the firm's CEO is appointed as chairman, and otherwise zero.
<i>Professional</i>	The fraction of top executives with professional service backgrounds including business, accounting, finance, management, and law.
<i>Capex</i>	Capital expenditure scaled by beginning of year total assets.
<i>1-R2</i>	R2 is obtained by regressing daily stock returns on market and industry returns.
<i>PIN</i>	Probability of informed trading.
<i>D1</i>	The price delay measure constructed as in Hou and Moskowitz (2005).
