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Article

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China Journal of Accounting Research

Provided in Cooperation with:

Sun Yat-sen University

Suggested Citation: Zhu, Hongjun; Zhang, Cheng; Li, He; Chen, Shimin (2015) : Information environment, market-wide sentiment and IPO initial returns: Evidence from analyst forecasts before listing, China Journal of Accounting Research, ISSN 1755-3091, Elsevier, Amsterdam, Vol. 8, Iss. 3, pp. 193-211,
<https://doi.org/10.1016/j.cjar.2015.01.002>

This Version is available at:

<https://hdl.handle.net/10419/187633>

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Contents lists available at ScienceDirect

China Journal of Accounting Research

journal homepage: www.elsevier.com/locate/cjar

Information environment, market-wide sentiment and IPO initial returns: Evidence from analyst forecasts before listing



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ARTICLE INFO

Article history:

Received 12 March 2014

Accepted 5 January 2015

Available online 28 January 2015

JEL classification:

G02

G14

G24

Keywords:

Market-wide sentiment

Analyst forecasts

IPO initial return

ABSTRACT

Measuring the information environment of firms using analyst (price) forecast bias and forecast dispersion before listing, we empirically examine the interactive influence of the information environment and market-wide sentiment on the initial returns of initial public offerings (IPOs). We find the smaller the analyst forecast bias/dispersion, the lower the effect market-wide sentiment has on IPO initial returns. This finding indicates that information asymmetry is a basic reason for noise trading occurs and demonstrates the positive effect of financial analysts during IPOs. In addition, the effect of analyst forecasts is more pronounced during periods of rising markets and when IPO prices are not regulated.

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<http://dx.doi.org/10.1016/j.cjar.2015.01.002>

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1. Introduction

In modern finance theory, stock prices are not only influenced by value-relevant information, but also significantly affected by investor sentiment. Real-world investors are not always as rational as traditional theory assumes. Cognitive bias and emotional behavior influence investors to form biased expectations or judgments during valuation and incur price fluctuations through noise trading. Noise trading leads to valuation errors in the capital market and harms the efficiency and stability of the capital market (Brown and Cliff, 2004, 2005; Baker and Wurgler, 2006; Wang and Sun, 2004).

The influence of investor sentiment on stock prices is more pronounced during initial public offerings (IPOs). The serious information asymmetry that investors face during IPOs makes them more susceptible to emotional factors and causes false investment decisions. However, short-selling constraints during IPOs make stock prices reflect only the expectations of optimistic investors and exaggerate the influence of sentiment. Foreign studies of IPO initial returns have found that rational factors such as information asymmetry, controlling rights and litigation risk are insufficient in explaining IPO initial returns and that investor sentiment plays a prominent role (Ljungqvist et al., 2006; Derrien, 2005; Cornelli et al., 2006). These studies have proposed that the over-optimism of investors in the secondary market pushes stock prices above their intrinsic value and leads to irrational initial returns.

The Chinese stock market has a shorter history than mature capital markets and its market mechanisms remain imperfect (China Securities Regulatory Commission, 2008). IPO initial returns in China were once the most anomalous returns around the world and have drawn a great deal of attention from researchers, practitioners and regulators. Meanwhile, the high offering prices, high price-to-earnings ratios and enormous funds raised during IPOs have attracted a great deal of attention from Chinese investors. One report from the Shenzhen Stock Exchange shows that most of the traders involved on the initial offering date are individuals and cover 90% of the total trading amount on the buy side. As a result of this individual majority, stock prices are highly affected by sentiment in China. Much evidence has shown that IPO initial returns are highly affected by investor sentiment from the secondary market and that price premiums on initial offering dates are caused by over-optimistic behavior (Song and Liang, 2001; Cao and Dong, 2006; Jiang, 2007).

Trading activity caused by investor sentiment constitutes noise trading in the capital market. Based on Black's (1986) definition of noise trading, information insufficiency and asymmetry are the basic premises of noise trading. In other words, investors are not priori irrational, but are rather forced to make investment decisions based on sentiment because information asymmetry makes information lack relevance and reliability. As a result, sentiment factors affect trading behavior and make stock prices deviate from their intrinsic value. Consequently, this paper tries to determine whether improving the information environment and decreasing the information asymmetry between companies and investors can decrease noise trading and hence decrease the effect of investor sentiment on stock prices.

Sell-side financial analysts are an important part of the information environment. Taking advantage of their privileged information sources and professional analysis, analysts produce earnings forecasts and investment ratings for investors. Analyst reports are especially important information sources for individuals, who suffer from information asymmetry. As Chinese analysts continue developing, they are playing an increasingly important role in market pricing (Huang and Ding, 2011). Numerous studies have confirmed that analyst forecasts reduce information asymmetry between companies and investors (Zhu et al., 2007). However, studies have focused only on listed firms and the information role of analyst forecasts for pre-listing firms remains unknown. Contrary to the constraints placed on analyst forecasts for pre-listing firms in foreign countries, there is no such prohibition in the Chinese stock market. Analysts can follow pre-listing firms and forecast offering prices. This paper examines whether analyst during the pre-IPO period can improve pricing efficiency and stabilize the market.

Based on the actual conditions of the Chinese stock market, this paper follows classic theories related to IPO initial returns in behavioral finance, uses analyst (price) forecast bias and forecast dispersion to measure the quality of the information environment, and examines the interactive influence of the information environment and market-wide sentiment on IPO initial returns. To verify the influence of market sentiment on IPO initial returns, this paper finds that the smaller the analyst forecast bias or dispersion, the lower the effect market-wide sentiment has on IPO initial returns. These findings indicate that information asymmetry is a basic

reason for noise trading and demonstrate the positive effect of financial analysts during IPOs. In addition, the effect of analyst forecasts is more pronounced during periods of rising markets than periods of falling markets. This indicates that rising markets may enhance investment willingness and that a high amount of investor attention effectively explains value-relevant information. Finally, this paper finds that analyst forecasts have a more pronounced effect when IPO prices lack regulation, indicating that regulation also plays an important role.

This paper makes three main contributions to the existing literature. First, it enriches the research related to IPO initial returns. It also details the noise trading generation process and demonstrates that improving the information environment can restrain noise trading and reduce the influence of market-wide sentiment on initial returns. These findings are conducive to understanding anomalous returns and, more importantly, identifying effective ways to decrease the sentimental premium for IPO firms. In addition, this paper uses analyst forecasts as a proxy for the external information environment and thus provides a different perspective of the information environment from that of other studies.

Second, this paper contributes to the analyst forecast literature. Due to the analyst following constraint placed on pre-listing firms, studies have focused only on the analyst forecasts of listed firms and confirmed the intermediary role of analysts' information. Contrary to listed firms, pre-listing firms face a more severe information asymmetry problem and the demand for analysts as intermediaries are more urgent. Based on this special institutional setting in China, this paper verifies the intermediary role of analysts for pre-IPO firms.

Third, this paper provides empirical evidence for behavioral finance theory. It focuses on the basic question of behavioral finance: how does investor sentiment affect stock prices? Although basic behavioral finance theory observes that information asymmetry is an important objective reason for noise trading, empirical results remain scarce. Taking advantage of the special research setting of the Chinese IPO market, our paper provides empirical evidence for the theory and thus contributes to the existing literature.

Zhu et al. (2013) also investigate the relationship between market sentiment and Chinese IPO initial returns and determine that the better the accounting quality, the weaker the influence of market sentiment on initial returns. However, they focus on the internal information environment, which reduces the influence of market sentiment on initial returns. This paper focuses on analyst forecasts before listing and emphasizes the effect of the external information environment. As the Chinese stock market has developed, analysts have become an indispensable component of the information environment and have essential implications for investor behavior. In this sense, our paper is a supplement to that of Zhu et al. (2013) and enriches our understanding of the information environment for IPO firms.

The remainder of this paper is structured as follows. Part II summarizes the related literature. Part III develops our hypotheses. Part IV describes our research design. Part V provides the empirical results. Part VI concludes the paper.

2. Literature review

2.1. IPO initial return literature

IPO initial returns are among the most long-standing anomalies in the capital market. Studies have produced two theories as to their origin, primary market underpricing theory and secondary market overpricing theory. Primary market underpricing theory considers information asymmetry between subscribers (Rock, 1986; Benveniste and Wilhelm, 1990; Loughran and Ritter, 2004; Ibbotson, 1975) and agency problems (Brennan and Franks, 1997; Stoughton and Zechner, 1998) to lead to valuation risk during IPOs. To maintain the offering process, companies must keep the offering price under its intrinsic value. When stocks enter the secondary market, their prices soon return to their intrinsic value and IPO initial returns are formed.

The basic assumption of primary market underpricing theory is that the secondary market is efficient and stock prices reflect value-relevant information in a fair and timely manner. However, this assumption does not always hold. IPO initial returns caused by the Internet bubble in the early 21st century made researchers suspicious of the theory. They re-examined IPO initial returns from the perspective of the pricing mechanism in the secondary market and ultimately proposed secondary market overpricing theory. The theory observes that high IPO initial returns are caused not by under-valued offering prices, but by optimistic trading behavior on

the initial offering date (Purnanandam and Swaminathan, 2004; Ljungqvist et al., 2006). Derrien (2005) finds that individuals' demand for new issues is positively related to pre-IPO market returns and IPO initial returns. Cornelli et al. (2006) use offering prices in the pre-listing market to measure investor optimism, which they determine to be positively related to IPO initial returns and negatively related to long-term returns.

According to the IPO initial return calculation method, the offering and trading prices on an initial date codetermine the initial return. Consequently, primary market underpricing theory and secondary market overpricing theory are both reasonable. In fact, the principal factor influencing IPO initial returns differs between markets and periods.

IPO initial returns in China were once the most anomalous returns around the world and attracted a great deal of attention from researchers, practitioners and regulators. Contrary to mature markets, IPOs in the Chinese stock market have some specific characteristics.

The pricing process of Chinese IPOs is not market driven. Issuer, offering price and share placement qualifications are highly regulated by the Chinese Securities Regulatory Commission. These regulations offset the incentives of issuers and hence decrease pricing efficiency. For example, under the current inquiry system, underwriters cannot decide the share of allotment and their incentive to discover intrinsic value is highly weakened. Therefore, the basic premise of primary market underpricing theory does not hold in the Chinese stock market and pre-listing firms in China are unwilling to lower the offering price (Han and Wu, 2007). In contrast, regulation is one of the most significant contributors to price suppression (Liu and Xiong, 2005; Zhu and Qian, 2010) and price suppression in China is a result of government intervention (Tian, 2010).

Chinese investors, especially individuals, show extraordinary enthusiasm for new issues. High offering prices, price-to-earnings ratios and raised fund amounts often co-exist during IPOs. Many studies have discovered that investor sentiment and secondary market overpricing theory have significant explanatory power for IPO initial returns in China. For example, Song and Liang (2001) find that measurements of secondary market activity are significantly related to IPO initial returns. Cao and Dong (2006) observe that, relative to trading prices, offering prices provide more information about intrinsic value and that artificially high trading prices in the secondary market contribute to anomalous initial returns. Jiang (2007) compares the different factors that influence initial returns and finds that optimism and investor activity in the secondary market are the most prominent factors. However, the author also finds that market efficiency theory and information asymmetry theory are inadequate for explaining initial returns. All of the preceding studies demonstrate that investor sentiment is an influencing factor. However, the reasons for noise trading must be analyzed further.

Trading driven by sentiment constitutes noise trading in the capital market. Black (1986) introduces the concept of noise trading into the capital market. According to its definition, in a situation of information insufficiency and asymmetry, investors may account for value-irrelevant information in their trading behavior. Such trading is known as noise trading. Studies of irrational trading behavior have mainly focused on subjective reasons. However, according to the preceding definition, the generation of noise trading is inseparably correlated with the information environment faced by investors. Noise trading has both subjective and objective causes, but studies have rarely discussed the latter. This paper tries to determine the objective causes. We try to verify whether improving the information environment can reduce noise trading and hence lower the influence of investor sentiment on stock prices.

2.2. Studies of the relationship between the information environment and analyst forecasts

Sell-side financial analysts are important information intermediaries and an essential part of the information environment. With their privileged information sources and professional analysis, analysts produce earnings forecasts and investment ratings for investors. Due to their information asymmetry, individuals find analyst reports to be especially important information sources. Previous studies have discovered that analyst forecasts affect investor expectations significantly (Fried and Givoly, 1982). This influence depends on the forecast quality. Brown and Rozeff (1979) and Brown et al. (1987) find that the influence of analyst forecasts on market expectations is positively related to the accuracy of the forecasts. As security analysts have developed and improved, their influence in China has also improved. Huang and Ding (2011) find that as the accuracy of analyst forecasts increased after 2005, analyst forecasts have become a better proxy for market expectations than management forecasts or expectations calculated by the random walk model.

Studies have found that analyst forecasts and the information environment are interrelated and interact. Companies are first-hand information sources and analyst forecast quality is highly correlated with the information environment. [Lang and Lundholm \(1996\)](#) find that the higher the quality of corporate information disclosure, the greater the analyst following and the more accurate the forecasts. [Li and Jia \(2009\)](#) also find that the improvement of corporate disclosure quality and institutional backgrounds can significantly enhance analyst forecast accuracy and lower forecast dispersion. However, the information collection and production processes led by analysts improve the transfer of information between companies and investors. These activities improve the information environment and lower the information asymmetry between insiders and outsiders. For example, [Zhu et al. \(2007\)](#) find that analyst following improves the informativeness of stock prices and hence lowers stock price synchronicity.

Given the relationship between analyst forecasts and the information environment, researchers usually use analyst following or forecasts as proxies for the quality of the information environment. [Lang et al. \(2003\)](#) use analyst following and forecast accuracy to measure the information environment. [Gebhardt et al. \(2001\)](#) use forecast dispersion to measure the information environment. [He et al. \(2012\)](#) use analyst forecast bias and forecast dispersion to measure the information environment.

Researchers have not yet determined the relationship between analyst forecasts and offering prices or IPO initial returns due to the analyst forecast regulations in most countries. Taking the U.S. stock market as an example, analysts are forbidden to publish forecasts from the pre-IPO period up to 40 days after listing. In contrast, analyst forecasts before listing are permitted in China, creating an opportunity for researchers. [Chu and Cang \(2008\)](#) investigate the relationship between forecast dispersion before listing and IPO initial returns based on valuation risk and find the two to be positively related. [Yao \(2011\)](#) finds a positive relationship between analyst optimism before listing and initial returns. [Chu and Cang \(2008\)](#) and [Yao \(2011\)](#) base their studies on primary market underpricing theory and secondary market overpricing theory, respectively. However, the complexity of the factors influencing IPO initial returns makes it difficult to distinguish between the two theories and a gap in the research remains.

3. Hypothesis development

According to the analytical framework for IPO initial returns in the behavioral finance field, initial returns are mainly caused by over-optimistic trading behavior in the secondary market. First, although expectations vary across investors, short-selling constraints during IPOs prohibit pessimistic investors from trading. As such, price reflects only optimistic expectations. Second, resource scarcity and historical high yields for new issues exaggerate investor optimism. Consequently, transaction prices on initial trading dates are unilaterally determined by optimistic investors and quickly rise above their intrinsic value.

High overall market yields are among the most important causes of investor optimism. The current high level of market returns makes investors overestimate the market's persistence and form overly optimistic expectations of company prospects, thereby enhancing investors' intent for new issues ([Derrien, 2005](#)).

The trading activity driven by investor sentiment constitutes noise trading in the stock market. Noise trading not only makes stock prices unfairly reflect value relevant information but also harms the efficiency of the capital markets. According to [Black's \(1986\)](#) definition of noise trading, information insufficiency and asymmetry are the primary causes of noise trading. In other words, investors are not priori irrational. Information asymmetry makes their decision-making process lack sufficient information, which introduces the sentiment signal into investment decisions.

Relative to listed firms, IPO firms disclose finite information to the market. This makes the information asymmetry more severe and the valuation risk higher. As a result, noise trading is more frequent and the influence of sentiment on stock price is more severe. Finally, high IPO initial returns are formed. Improving the information environment and decreasing information asymmetry may enhance the sufficiency and certainty of information during the decision-making process, and hence increase the weight investors place on value-relevant information and decrease the influence of investor sentiment on IPO initial returns.

As important information intermediaries between listed firms and investors, analysts play an essential role in the information environment. Through privileged information channels and professional information

analysis, analysts publish earnings forecasts and investment ratings for the market. Analyst forecasts are important information sources and significantly affect market expectations.

Analyst forecasts are highly correlated with the information environment. Companies are first-hand information sources that include not only public disclosure but also private disclosure during field studies. As a result, analyst forecast quality is highly correlated with a company's information environment. However, the information collection and production processes led by analysts improve the transfer of information between companies and investors and hence lower the information asymmetry between insiders and outsiders (Lang and Lundholm, 1996; Li and Jia, 2009).

For these reasons, researchers usually use analyst forecast characteristics as proxies for the quality of the information environment (Lang et al., 2003; Gebhardt et al., 2001; He et al., 2012). Following previous studies, this paper uses analyst forecast bias and forecast dispersion to measure the quality of the information environment. As no constraints are placed on analyst forecasts for pre-listing firms, the Chinese stock market is an ideal context for investigating the function of analyst forecasts (proxies of the information environment) to limit the influence of market sentiment on noise trading.

According to the preceding analysis, we expect the improvement of the information environment to decrease the asymmetry between firms and investors, and thus weaken the effect of market-wide sentiment on IPO initial returns. Using analyst forecast characteristics as proxies for the information environment, we propose the following hypotheses.

Hypothesis 1.1. Lower analyst forecast bias significantly reduces the influence of market-wide sentiment on IPO initial returns.

Hypothesis 1.2. Lower analyst forecast dispersion significantly reduces the influence of market-wide sentiment on IPO initial returns.

In the capital market, market efficiency is closely related to the attention investors pay to information. Classic behavioral finance theory observes that investor attention is usually limited when he or she is faced with complicated tasks and complex information (Aboody et al., 2010). Consequently, investor attention varies with market conditions and is usually high during periods when the market is rising (Karlsson et al., 2009; Hou et al., 2008). During these periods, investors' belief in potential gains for new issues makes them willing to participate in new issue offerings. Consequently, value-relevant information including analyst forecasts gains more attention than it would during periods of market decline. Paying a lot of attention makes investors fully understand the value-relevant messages of analyst forecasts and ensures that the information environment plays a more prominent role. In contrast, investors' willingness to participate in new issue offerings declines when the market drops. Consequently, value-relevant information such as analyst forecasts receives less attention and the role of the information environment declines. Therefore, we propose the following hypotheses.

Hypothesis 2.1. The role of lower analyst forecast bias in reducing the influence of market-wide sentiment on IPO initial returns is more prominent during periods in which the market is rising.

Hypothesis 2.2. The role of lower analyst forecast dispersion in reducing the influence of market-wide sentiment on IPO initial returns is more prominent during periods in which the market is rising.

According to the preceding analysis, improvement of the information environment may reduce the influence of market-wide sentiment on IPO initial returns. In fact, IPO initial returns include the influence of both offering and trading prices. It is possible that both primary market underpricing theory and secondary market overpricing theory apply. Studies of primary market underpricing theory have argued that offering-price discounts are caused not by firms in China but by regulators. To keep the Chinese stock market stable in its early stages, the China Securities Regulatory Commission regulated offering prices based on the price-to-earnings ratio. For example, the price-to-earnings ratio was kept below 20 during 2002–2004. The upper limit of the price-to-earnings ratio was canceled when the new security law was promulgated and the inquiry system

was enforced. However, the China Securities Regulatory Commission continued to set guidelines for offering prices and recommended that the price-to-earnings ratio remains below 30. In late 2009, the offering price regulation was completely canceled and IPO pricing entered an age of marketization.

The regulation of the price-to-earnings ratio during IPOs produces value-relevant information and especially good news that is otherwise insufficiently reflected in stock prices. Primary market underpricing theory is therefore likely to play a more important role in initial returns. Consequently, the effect of the information environment on noise trading in the secondary market may be weaker during regulatory periods. On the contrary, regulations disappear during marketization periods and the influence of market-wide sentiment on IPO initial returns becomes stronger. Therefore, we propose the following hypotheses.

Hypothesis 3.1. The role of lower analyst forecast bias in reducing the influence of market-wide sentiment on IPO initial returns is more prominent during marketization periods than during regulatory periods.

Hypothesis 3.2. The role of lower analyst forecast dispersion in reducing the influence of market-wide sentiment on IPO initial return is more prominent during marketization periods than during regulatory periods.

4. Research design

4.1. Sample selection

We select IPO firms from the Chinese A-share market during 2001–2011 and obtain 1326 observations. We remove 27 financial industry observations and 13 special listings from the sample (including 1 private placement listing, 2 leftover historical listings and 10 stock swap listings). We also remove sample firms followed by three or fewer analysts before listing and ultimately obtain 949 observations. We source financial and analyst forecast data before IPOs from the WIND database; IPO, financial and stock trading data after listing from the CSMAR database; and investment account data from the CCER database.

4.2. Empirical model and variable definitions

In examining our hypotheses, we establish the following econometric models to investigate the influence of analyst forecast bias and forecast dispersion on IPO initial returns:

$$\begin{aligned}
 IR = & \beta_0 + \beta_1 \times SENT + \beta_2 \times Lerr + \beta_3 \times Lerr \times SENT + \beta_4 \times PE + \beta_5 \times TA + \beta_6 \times ROE \\
 & + \beta_7 \times LEV + \beta_8 \times Growth + \beta_9 \times Shriss + \beta_{10} \times Age + \beta_{11} \times Regu + \beta_{12} \times Delay \\
 & + \beta_{13} \times ZXB + \beta_{14} \times CYB + Ind_Dummy + Year_Dummy + \varepsilon
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 IR = & \beta_0 + \beta_1 \times SENT + \beta_2 \times Ldisp + \beta_3 \times Ldisp \times SENT + \beta_4 \times PE + \beta_5 \times TA + \beta_6 \times ROE \\
 & + \beta_7 \times LEV + \beta_8 \times Growth + \beta_9 \times Shriss + \beta_{10} \times Age + \beta_{11} \times Regu + \beta_{12} \times Delay \\
 & + \beta_{13} \times ZXB + \beta_{14} \times CYB + Ind_Dummy + Year_Dummy + \varepsilon
 \end{aligned} \tag{2}$$

We define the variables as follows.

4.2.1. IPO initial return

The independent variable *IR* refers to the IPO initial return and reflects the percentage change from the offering price to the close price on the initial date. $IR = (\text{Close price on initial date} - \text{Offering price}) / \text{Offering price}$.

4.2.2. Market-wide sentiment

Studies have measured investor sentiment through direct and indirect methods. Among the direct methods are questionnaires submitted to investors. Although such a method directly reflects the ex ante sentiment, sample selection bias and measurement error (i.e., the feedback from questionnaire subjects deviates from reality) make it problematic. Indirect methods measure sentiment through ex postmeasurement, including market

returns, trading volume, stock turnover, percentage of stock raising, short selling ratios and close-end fund discounts. Relative to direct methods, indirect methods are easy to obtain and replicate.

Lacking authoritative and continuous questionnaires to capture investor sentiment in China, researchers have usually measured sentiment indirectly. We choose measurements based on the following rules. The first rule is applicability. Due to differences in institutional background and market environment, foreign market measurements are not applicable to China. For example, Lee et al. (1991) find that close-end fund discounts are significantly affected by sentiment and have become popular measurements. However, close-end funds in China remain very small, lack liquidity and are inconvenient for reflecting investor sentiment (Liu and Xiong, 2005). The second rule is pertinence. Because individuals play an important role in the Chinese stock market, the measurement we choose should reflect the variability of individual investors' sentiments. Measurements such as monthly net purchased funds and cash holding percentage by funds reflect only the sentiments of institutional investors and are unsuitable for our context. The third rule is availability. Availability determines the cost and replicability of our research. Accordingly, we choose the following two measurements.

The first measurement is *Mret*, which stands for pre-IPO market returns (120 trading days before listing). As a sentiment signal, market returns have an important influence and implications for investor sentiment and trading behavior. Fisher and Statman (2002) find that investor sentiment and market returns are positively related. Derrien (2005) also observes that high market returns before listing enhance the demand for new issues and result in high IPO initial returns. Accordingly, we expect *Mret* to be positively related to initial returns.

The second measurement is *NewAcct*, which stands for the number of investment accounts opened during the IPO month. *NewAcct* refers to the willingness of over-the-counter investors' participation and directly reflects market-wide sentiment. Han and Wu (2007) use monthly opened investment accounts to measure investor sentiment. Shiller (2005) identifies the increase in stock market participants as an important cause of the bull market. Accordingly, we expect *NewAcct* to be positively related to IPO initial returns.

4.2.3. Analyst forecasts

We use analyst forecast bias and forecast dispersion to measure the information environment of IPO firms. We obtain analyst forecast data before listing (i.e., before the offering price is determined) from the WIND database.⁴ We use the middle point of the interval forecast as the forecast value to calculate the forecast bias and forecast bias.

We define analyst forecast bias as shown in Eq. (3). Err_i refers to the analyst consensus forecast bias of firm i . $Forecast_P_{i,j}$ stands for the offering price forecast of firm i from analyst j . $P_{i,0}$ stands for the offering price of firm i . We define analyst forecast dispersion as shown in equation (4). $Disp_i$ stands for the forecast dispersion of firm i .

$$Err_i = \frac{\text{Median}(Forecast_P_{i,j}) - P_{i,0}}{P_{i,0}}. \quad (3)$$

$$Disp_i = \frac{\text{Std}(Forecast_P_{i,j})}{\text{Median}(Forecast_P_{i,j})}. \quad (4)$$

To ensure the empirical results provide economic implications, we transform the continuous measurements according to the following equation and finally obtain $Lerr_i$ (which stands for a low level of forecast bias) and $Ldisp_i$ (which stands for a low level of forecast dispersion):

$$Lerr_i = \frac{\text{Max}(Err_i) - Err_i}{\text{Max}(Err_i) - \text{Min}(Err_i)}. \quad (5)$$

$$Ldisp_i = \frac{\text{Max}(Disp_i) - Disp_i}{\text{Max}(Disp_i) - \text{Min}(Disp_i)}. \quad (6)$$

$\text{Max}(Err_i)$ and $\text{Min}(Err_i)$ refer to the maximum and minimum forecast bias values in the total sample, respectively. $\text{Max}(Disp_i)$ and $\text{Min}(Disp_i)$ refer to the maximum and minimum forecast dispersion values in the total

⁴ In our paper, the term "analysts" refers to sell-side analysts.

sample, respectively. According to the preceding formula transformation, $Lerr_i$ and $Ldisp_i$ are newly constructed continuous variables and vary between 0 and 1. The larger the variable $Lerr_i$, the lower the level of analyst forecast bias. Based on the preceding analysis, a lower forecast bias, indicating a higher-quality information environment, helps to limit the frequency of noise trading and weaken the influence of market-wide sentiment on IPO initial returns. In addition, relative to optimistic forecasts, pessimistic forecasts play a more prominent role in weakening the influence of market-wide sentiment on initial returns. Accordingly, we expect β_3 to be significantly negative in models (1) and (2).

4.2.4. Control variables

IPO initial returns are influenced by both primary market underpricing and secondary market overpricing. We focus on the latter. Consequently, we add PE (the offering price-to-earnings ratio) to control for the effect of the offering price and calculate the offering price-to-earnings ratio according to the fully diluted method. All other things being equal, the higher the offering price, the lower the initial return. Accordingly, we expect β_4 to be significantly negative.

Next, we follow previous studies in controlling for the factors that influence primary market underpricing. TA refers to the natural logarithm of the total assets at the end of the previous year before listing. Booth and Chua (1996) observe that large firms are more transparent and easily evaluated than small firms. As such, assets and IPO initial returns are negatively related. LEV refers to the leverage ratio at the end of the previous year before listing. Chen et al. (2004) use the leverage ratio to measure ex-ante risk and find the leverage ratio to be positively related to IPO initial returns. $Growth$ refers to sales growth at the end of the previous year before listing. Growth companies are difficult to evaluate due to their volatile financial performance. $Shriss$ refers to the proportion of new issues after listing. Beatty and Ritter (1986) observe that small issues are easy to manipulate. As such, companies must use higher discounts to compensate for investor risk. Meanwhile, price manipulation always leads to stock trading premiums. As a result, we predict that IPO initial returns are higher for small-issue stocks. Age refers to the number of days (divided by 360) between a company's establishment and its IPO. Ritter (1984) observes that the longer a company is established, the more information investors should obtain and the easier the evaluation should be. We expect firm age to be negatively related to initial returns. We add ROE (i.e., the return on equity at the end of the previous year before listing) to control for the influence of profitability.

In light of the significant influence of the institutional background on IPO initial returns, we add an institutional variable to control for its potential effect. First, $Regu$ is a dummy variable representing offering-price regulation. It equals 1 if the offering price is determined according to regulation and 0 if the offering price is determined through a market-oriented mechanism. In this paper, the sample period covers four periods. The first period is the trial period for market-oriented pricing (before October 2001), during which offering prices were independently determined by the listing firm and the underwriter. $Regu$ equals 0 if the firm issued during this period. The second period is the offering-price limitation period (between November 2001 and December 2004), during which offering prices had to be lower than 20 times the earnings per share under the regulation of the China Securities Regulatory Commission. $Regu$ equals 1 if the firm issued during this period. The third period is the offering-price limitation canceling period (from January 2005 to June 2009), during which the China Securities Regulation Commission canceled the offering-price upper-limit regulation and provided guidelines for new issues. The usual upper limit was 30 times the offering-price-to-earnings ratio. Accordingly, $Regu$ equals 1 if the firm issued during this period and the offering-price-to-earnings ratio is between 28 and 32, and 0 otherwise. The fourth period is the market-oriented pricing period (after July 2009), during which offering-price regulations were canceled. $Regu$ equals 0 if the firm issued during this period. Offering-price regulation restricts the upper limit of the price and results in a high initial return. As such, we expect $Regu$ to be positively related to initial returns.

Second, Mok and Hui (1998) state that the waiting period before listing is too long in China and that a long waiting period increases the risk for investors. As such, a company must lower the offering price and provide a high premium to compensate for investor risk. Accordingly, we add $Delay$ to control for the waiting period. It equals the number of days (divided by 360) between the firm's offering and listing. We expect $Delay$ to be negatively related to initial returns.

Third, the capital market in China includes a main board, a small- and medium-sized enterprises board and a growth enterprise market. The listing rules and pricing processes vary with the type of market. However, firm characteristics also vary with the type of market. Relative to firms listed on the main board, firms listed on the small- and medium-sized enterprises board or in the growth enterprise market are usually smaller and growing faster. Accordingly, we add two dummy variables, *ZXB* (which equals 1 if the firm is listed on the small- and medium-sized enterprises board and 0 otherwise) and *CYB* (which equals 1 if the firm is listed in the growth enterprise market and 0 otherwise), to capture the listing board characteristics.

We also add dummy variables to control for the influence of industry factors. Table 1 summarizes the variables.

5. Empirical results

5.1. Descriptive statistics

Table 2 shows the descriptive statistics. All of the continuous variables are winsorized at the 1% level to eliminate the influence of extreme values. Although the mean value of IPO initial returns for Chinese new issues declines from 2001 to 2011, it remains higher than that of mature capital markets. The standard deviation of initial returns is 79.1%, indicating a large difference between firms. More than 90% of new issues gain positive initial returns and only 93 new issues fall on debut (mainly in 2010 and 2011). The mean value of cumulative returns 120 trading days before listing is 23.9%, with a standard deviation of 35.7%. Seventy-six percent of the total sample is issued when the market is rising and 24% is issued in periods of falling markets. New issues in China cannot time their listing due to the offering regulations. This institutional background is convenient for our research. Although the mean value of investment accounts opened during the month of listing is about 705,300, the minimum is 47,000 and maximum is about 4.2 million. In addition, the average analyst following is about eight. The average forecast bias is 24.8% of the offering price and the maximum value is 3.25 times the offering price. The average forecast dispersion is 17% of the offering price. The analysts are generally optimistic; the forecast optimism is positive and significant at the 1% level.

Table 1
Variable definitions.

Variable	Definition
IR	IPO initial return. Reflects the percentage change in price from the offering price to the close price on the initial date. $IR = (\text{Close price on initial date} - \text{Offering price}) / \text{offering price}$
Mret	Market return pre-IPO (120 trading days before listing)
NewAcct	Number of investment accounts opened during the month of IPO (natural logarithm)
Err	Forecast bias. $Err = (\text{Median value of analyst forecasts of offering price} - \text{Offering price}) / \text{Offering price}$
Lerr	$Lerr = (\text{Maximum } Err - \text{Forecast bias}) / (\text{Maximum } Err - \text{Minimum } Err)$
Disp	Forecast dispersion. $Disp = \text{Standard deviation of analyst forecasts of offering price} / \text{Median value of analyst forecasts of offering price}$
Ldisp	$Ldisp = (\text{Maximum } Disp - \text{Forecast dispersion}) / (\text{Maximum } Disp - \text{Minimum } Disp)$
PE	Offering price-to-earnings ratio, calculated according to the fully diluted method
Lnta	Natural logarithm of total assets at the end of the previous year before listing
ROE	Return on equity at the end of the previous year before listing
LEV	Leverage ratio at the end of the previous year before listing
Growth	Sales growth at the end of the previous year before listing
Shriss	Proportion of new issues after listing
Age	Number of days (divided by 360) between establishment and listing
Regu	Dummy variable representing offering-price regulation. Equals 1 if the offering price is determined under regulation and 0 if it is determined by market mechanism
Delay	Waiting period. Equals the number of days (divided by 360) between the firm's offering and listing
ZXB	Equals 1 if the firm is listed on the small- and medium-sized enterprises board and 0 otherwise
CYB	Equals 1 if the firm is listed in the growth enterprise market and 0 otherwise

Table 2
Descriptive statistics.

Variable	N	Mean	Std. Dev.	Min.	Median	Max.
IR	949	0.700	0.791	−0.118	0.436	3.807
Mret	949	0.239	0.357	−0.377	0.205	1.549
NewAcct	949	4.256	0.663	1.548	4.148	6.042
nFollow	949	8.256	3.821	3.000	8.000	26.000
Err	949	0.248	0.405	−0.269	0.127	3.255
Lerr	949	0.882	0.092	0.198	0.910	1.000
Disp	949	0.170	0.078	0.016	0.163	0.534
Ldisp	949	0.682	0.145	0.000	0.694	0.969
PE	949	45.965	20.387	12.220	42.560	108.700
Shriss	949	0.248	0.046	0.100	0.250	0.444
TA	949	11.044	1.132	9.358	10.832	15.483
ROE	949	0.265	0.101	0.055	0.253	0.597
LEV	949	0.487	0.163	0.120	0.495	0.839
Growth	949	0.285	0.285	−0.236	0.231	1.396
Age	949	4.086	3.162	0.819	2.775	14.333
Delay	949	0.035	0.014	0.022	0.031	0.108
ZXB	949	0.601	0.490	0	1	1
CYB	949	0.272	0.445	0	0	1
Regu	949	0.126	0.333	0	0	1

5.2. Test of Hypothesis 1

5.2.1. Empirical results

First, we examine the influence of market-wide sentiment and analyst forecasts on IPO initial returns. Table 3 shows the results. We use cumulative market returns before listing to measure market sentiment in columns (1)–(3), and use the number of new accounts opened in the month of listing to measure market sentiment in columns (4)–(6). After controlling for other factors, we find market-wide sentiment to be positively related to IPO initial returns. The coefficient of cumulative market return (*Mret*) is 0.725 and the coefficient of new accounts (*Acct*) is 0.272. The positive relationship between market sentiment and initial returns infers that secondary market over-pricing is the main cause of IPO initial returns. The coefficient would be negative if the primary market underpricing theory dominates. We add *Lerr* to columns (2) and (5) to determine the influence of analyst forecast bias. The results show that the lower the analyst forecast bias, the weaker the initial return. We add *Ldisp* to columns (3) and (6) to determine the influence of forecast dispersion. The results show that the lower the analyst forecast dispersion, the weaker the initial return. All of these results demonstrate that forecast bias and dispersion may lower initial returns.

Among the control variables, *TA* and *ROE* are negatively related to IPO initial returns. This result indicates that the transparent information environment of a large firm decreases the asymmetry between firms and investors and hence lowers the initial returns. The higher the profitability, the lower the initial return. The sales growth rate raises the level of initial returns due to its high financial volatility and valuation difficulty. The offering price-to-earnings ratio (*PE*) and proportion of new issues (*Shriss*) are negatively related to initial returns. The regulation and waiting periods have positive effects on initial returns. In addition, the initial returns of firms listed on the small- and medium-sized enterprises board and in the growth enterprise market are lower than those of firms listed on the main board due to the differences in size, growth and offering price level.

To further investigate the influence of analyst forecasts, we add the interaction of analyst forecast characteristics and market-wide sentiment to the empirical model. Table 4 shows the results. Columns (1) and (2) investigate the influence of the interaction on initial returns and indicate a negative relationship for both measurements. The coefficient of the interaction of analyst forecast bias and market-wide sentiment shows that a lower analyst forecast bias significantly decreases trading frequency in an improved information environment and thus weakens the influence of market-wide sentiment on IPO initial returns. The coefficient of the interaction is significantly negative as expected.

Table 3
The influence of individual factors on IPO initial returns.

<i>SENT</i> =	<i>Mret</i>			<i>Acct</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>SENT</i>	0.725 ^{***} (10.09)	0.620 ^{***} (9.80)	0.716 ^{***} (10.04)	0.272 ^{***} (6.06)	0.226 ^{***} (5.77)	0.267 ^{***} (6.01)
<i>Lerr</i>		-4.334 ^{***} (-16.72)			-4.482 ^{***} (-16.79)	
<i>Ldisp</i>			-0.552 ^{***} (-4.22)			-0.575 ^{***} (-4.25)
<i>TA</i>	-0.213 ^{***} (-8.23)	-0.186 ^{***} (-8.18)	-0.213 ^{***} (-8.33)	-0.209 ^{***} (-7.82)	-0.182 ^{***} (-7.74)	-0.210 ^{***} (-7.91)
<i>ROE</i>	-1.142 ^{***} (-6.02)	-1.164 ^{***} (-7.01)	-1.054 ^{***} (-5.57)	-1.189 ^{***} (-6.06)	-1.205 ^{***} (-7.03)	-1.097 ^{***} (-5.61)
<i>LEV</i>	0.105 (0.79)	0.170 (1.47)	0.140 (1.07)	0.182 (1.34)	0.239 ^{**} (2.00)	0.218 (1.61)
<i>Growth</i>	0.290 ^{***} (4.32)	0.190 ^{***} (3.22)	0.269 ^{***} (4.03)	0.260 ^{***} (3.76)	0.162 ^{***} (2.66)	0.239 ^{***} (3.47)
<i>PE</i>	-0.008 ^{***} (-6.36)	-0.004 ^{***} (-4.10)	-0.008 ^{***} (-6.85)	-0.005 ^{***} (-4.32)	-0.002 ^{**} (-2.06)	-0.006 ^{***} (-4.84)
<i>Shriss</i>	-0.833 [*] (-1.89)	-1.278 ^{***} (-3.31)	-0.873 ^{**} (-2.00)	-0.578 (-1.27)	-1.078 ^{***} (-2.70)	-0.624 (-1.38)
<i>Age</i>	0.003 (0.59)	0.001 (0.16)	0.004 (0.75)	0.002 (0.35)	-0.000 (-0.08)	0.003 (0.52)
<i>Delay</i>	1.348 (0.88)	2.977 ^{**} (2.21)	1.547 (1.01)	2.422 (1.50)	3.917 ^{***} (2.77)	2.608 (1.63)
<i>Regu</i>	0.351 ^{**} (4.88)	0.162 ^{**} (2.54)	0.342 ^{***} (4.79)	0.329 ^{***} (4.41)	0.137 ^{**} (2.07)	0.320 ^{***} (4.32)
<i>ZXB</i>	-0.159 ^{**} (-2.00)	-0.132 [*] (-1.90)	-0.163 ^{**} (-2.07)	-0.185 ^{**} (-2.25)	-0.153 ^{**} (-2.13)	-0.188 ^{**} (-2.31)
<i>CYB</i>	-0.235 ^{**} (-2.55)	-0.224 ^{***} (-2.78)	-0.250 ^{***} (-2.74)	-0.269 ^{***} (-2.83)	-0.253 ^{***} (-3.04)	-0.284 ^{***} (-3.01)
<i>Cons</i>	4.272 ^{***} (10.62)	6.556 ^{***} (17.37)	4.726 ^{***} (11.45)	2.966 ^{***} (6.36)	5.546 ^{***} (12.73)	3.460 ^{***} (7.26)
<i>Ind</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	949	949	949	949	949	949
<i>R2_Adj</i>	0.605	0.698	0.612	0.578	0.677	0.586
<i>F</i>	38.223	55.677	38.400	34.261	50.771	34.483
<i>p</i>	0.000	0.000	0.000	0.000	0.000	0.000

^{*} Significance levels at 10%.

^{**} Significance levels at 5%.

^{***} Significance levels at 1%.

Columns (3) and (4) verify whether analyst forecast dispersion weakens the influence of market-wide sentiment on initial returns. The results also show that lower analyst forecast dispersion may significantly decrease trading frequency and thus weaken the influence of market-wide sentiment on IPO initial returns. Hypothesis 1 is thus supported.

5.2.2. Robustness checks

We conduct the following robustness checks to enhance the reliability of our results.

First, we change the calculation window for cumulative market returns. We calculate the cumulative market returns for the 90 (120 in the preceding analysis) trading days before listing to measure market sentiment. The results are shown in columns (1) and (2) of Table 5. Although we change the calculation window, market-wide sentiment continues to have a positive effect on IPO initial returns and a lower analyst forecast bias and dispersion significantly weaken the influence of market-wide sentiment on IPO initial returns.

Second, we use industry cumulative returns to measure investor sentiment. Researchers have discovered remarkable price co-movements within industries and have observed that investor sentiment plays an

Table 4
Test of Hypothesis 1.

<i>SENT</i> =	<i>Mret</i> (1)	<i>Acct</i> (2)	<i>SENT</i> =	<i>Mret</i> (3)	<i>Acct</i> (4)
<i>SENT</i>	2.307*** (5.42)	0.856*** (3.89)	<i>SENT</i>	1.473*** (6.60)	0.607*** (4.73)
<i>Lerr</i>	-3.497*** (-10.56)	-1.076 (-0.89)	<i>Ldisp</i>	-0.220 (-1.38)	1.701** (2.08)
<i>SENT</i> × <i>Lerr</i>	-2.004*** (-4.01)	-0.742*** (-2.90)	<i>SENT</i> × <i>Ldisp</i>	-1.158*** (-3.58)	-0.514*** (-2.82)
<i>TA</i>	-0.181*** (-8.04)	-0.183*** (-7.82)	<i>TA</i>	-0.208*** (-8.16)	-0.207*** (-7.84)
<i>ROE</i>	-1.174*** (-7.13)	-1.200*** (-7.03)	<i>ROE</i>	-1.028*** (-5.46)	-1.090*** (-5.60)
<i>LEV</i>	0.160 (1.40)	0.226* (1.90)	<i>LEV</i>	0.111 (0.85)	0.190 (1.40)
<i>Growth</i>	0.191*** (3.27)	0.159*** (2.63)	<i>Growth</i>	0.271*** (4.10)	0.241*** (3.51)
<i>PE</i>	-0.004*** (-3.99)	-0.002** (-2.18)	<i>PE</i>	-0.008*** (-6.46)	-0.005*** (-4.64)
<i>Shriss</i>	-1.171*** (-3.05)	-1.042*** (-2.62)	<i>Shriss</i>	-0.901** (-2.08)	-0.636 (-1.42)
<i>Age</i>	0.002 (0.34)	-0.000 (-0.02)	<i>Age</i>	0.006 (1.01)	0.004 (0.70)
<i>Delay</i>	2.876** (2.15)	3.812*** (2.70)	<i>Delay</i>	1.786 (1.18)	2.889* (1.81)
<i>Regu</i>	0.147** (2.31)	0.128* (1.94)	<i>Regu</i>	0.346*** (4.87)	0.313*** (4.25)
<i>ZXB</i>	-0.143** (-2.07)	-0.165** (-2.31)	<i>ZXB</i>	-0.166** (-2.12)	-0.188** (-2.32)
<i>CYB</i>	-0.229*** (-2.87)	-0.265*** (-3.19)	<i>CYB</i>	-0.253*** (-2.79)	-0.283*** (-3.01)
<i>Cons</i>	5.869*** (14.25)	2.778*** (2.65)	<i>Cons</i>	4.407*** (10.50)	1.891*** (2.59)
<i>Ind</i>	Yes	Yes	<i>Ind</i>	Yes	Yes
<i>Year</i>	Yes	Yes	<i>Year</i>	Yes	Yes
<i>N</i>	949	949	<i>N</i>	949	949
<i>R2_Adj</i>	0.703	0.680	<i>R2_Adj</i>	0.617	0.589
<i>F</i>	55.610	50.144	<i>F</i>	38.263	34.095
<i>p</i>	0.000	0.000	<i>p</i>	0.000	0.000

* Significance levels at 10%.

** Significance levels at 5%.

*** Significance levels at 1%.

important role (He, 2001). It can be inferred that investor sentiment varies with the type of industry and that industry cumulative returns may be a better measurement of sentiment. Accordingly, we use industry cumulative returns in the 120 trading days before listing to measure sentiment. The results are shown in columns (3) and (4) of Table 5 and continue to support Hypothesis 1.

Third, we use the mean value of analyst forecasts as the consensus analyst forecast and recalculate analyst forecast bias and forecast dispersion. The results are shown in columns (5)–(8) of Table 5 and our findings are still consistent.

5.3. Test of Hypothesis 2

To investigate whether the effect of analyst forecasts (i.e., weakening the influence of market-wide sentiment on initial returns) depends on investor attention, we use cumulative market returns before listing to measure the market condition and divide the sample period into periods of rising markets and falling markets. Table 6 shows the results.

Table 5
Robustness checks.

<i>SENT</i> = <i>Forecast Characteristic</i> =	<i>Mret_90d</i> <i>Opt_med</i> (1)	<i>Mret_90d</i> <i>Disp_med</i> (2)	<i>Iret_120d</i> <i>Opt_med</i> (3)	<i>Iret_120d</i> <i>Disp_med</i> (4)	<i>Mret_120d</i> <i>Opt_mean</i> (5)	<i>Mret_120d</i> <i>Disp_mean</i> (6)	<i>NewAcct</i> <i>Opt_mean</i> (7)	<i>NewAcct</i> <i>Disp_mean</i> (8)
<i>SENT</i>	3.767*** (5.09)	0.975*** (2.71)	1.779*** (4.04)	1.312*** (5.58)	2.290*** (5.49)	1.425*** (7.67)	0.862*** (3.92)	0.603*** (5.55)
<i>Lerr</i>	-3.798*** (-12.07)		-3.954*** (-12.91)		-3.830*** (-11.50)		-1.325 (-1.10)	
<i>SENT</i> × <i>Lerr</i>	-3.918*** (-4.66)		-1.464*** (-2.83)		-1.985*** (-4.06)		-0.757*** (-2.98)	
<i>Ldisp</i>		-0.431*** (-2.66)		-0.280* (-1.79)		-0.205 (-1.44)		1.917** (2.57)
<i>SENT</i> × <i>Ldisp</i>		-0.948* (-1.82)		-1.071*** (-3.12)		-1.212*** (-4.14)		-0.565*** (-3.38)
<i>TA</i>	-0.182*** (-7.78)	-0.215*** (-8.02)	-0.185*** (-8.13)	-0.215*** (-8.32)	-0.174*** (-7.81)	-0.207*** (-8.15)	-0.176*** (-7.59)	-0.207*** (-7.85)
<i>ROE</i>	-1.216*** (-7.11)	-1.052*** (-5.32)	-1.143*** (-6.87)	-1.000*** (-5.25)	-1.131*** (-6.95)	-1.021*** (-5.46)	-1.155*** (-6.84)	-1.083*** (-5.59)
<i>LEV</i>	0.217* (1.82)	0.210 (1.53)	0.205* (1.77)	0.178 (1.35)	0.156 (1.37)	0.109 (0.84)	0.222* (1.89)	0.187 (1.38)
<i>Growth</i>	0.171*** (2.82)	0.241*** (3.46)	0.174*** (2.94)	0.250*** (3.74)	0.185*** (3.19)	0.271*** (4.10)	0.154** (2.57)	0.239*** (3.50)
<i>PE</i>	-0.003** (-2.45)	-0.006*** (-5.07)	-0.004*** (-3.65)	-0.008*** (-6.30)	-0.004*** (-3.65)	-0.008*** (-6.49)	-0.002* (-1.85)	-0.006*** (-4.73)
<i>Shriss</i>	-1.220*** (-3.06)	-0.852* (-1.86)	-1.085*** (-2.79)	-0.756* (-1.72)	-1.181*** (-3.11)	-0.909** (-2.10)	-1.046*** (-2.66)	-0.652 (-1.46)
<i>Age</i>	0.001 (0.10)	0.004 (0.61)	0.001 (0.22)	0.006 (0.99)	0.002 (0.45)	0.006 (1.04)	0.000 (0.10)	0.004 (0.72)
<i>Delay</i>	2.382* (1.71)	0.835 (0.52)	2.876** (2.12)	1.743 (1.13)	3.253** (2.46)	1.817 (1.20)	4.126*** (2.95)	2.970* (1.86)
<i>Regu</i>	0.155** (2.35)	0.365*** (4.88)	0.171*** (2.66)	0.359*** (5.00)	0.132** (2.10)	0.345*** (4.89)	0.114* (1.74)	0.310*** (4.22)
<i>ZXB</i>	-0.152** (-2.12)	-0.170** (-2.07)	-0.143** (-2.04)	-0.170** (-2.15)	-0.134* (-1.96)	-0.168** (-2.16)	-0.155** (-2.19)	-0.189** (-2.34)
<i>CYB</i>	-0.248*** (-2.98)	-0.274*** (-2.87)	-0.237*** (-2.93)	-0.264*** (-2.88)	-0.222*** (-2.81)	-0.256*** (-2.84)	-0.256*** (-3.12)	-0.286*** (-3.06)
<i>Cons</i>	6.074*** (14.67)	4.696*** (10.78)	6.193*** (15.28)	4.460*** (10.53)	6.022*** (14.75)	4.381*** (10.63)	2.899*** (2.77)	1.880*** (2.86)
<i>Ind</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Year</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N</i>	949	949	949	949	949	949	949	949
<i>R2_Adj</i>	0.679	0.576	0.696	0.608	0.710	0.620	0.687	0.592
<i>F</i>	49.933	32.465	53.991	36.853	57.524	38.738	51.716	34.521
<i>p</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

* Significance levels at 10%.

** Significance levels at 5%.

*** Significance levels at 1%.

Columns (1) and (2) of Table 6 use cumulative market returns to measure market sentiment and re-estimate model (1) for different sample periods. During the rising market periods, the coefficient of sentiment is significantly positive and the coefficient of the interaction term is significantly negative. Thus, market-wide sentiment is the primary cause of initial returns and a lower analyst forecast bias significantly weakens the influence of sentiment on those returns. However, during the declining market periods, the coefficient of the interaction term is insignificant. Columns (3) and (4) use new accounts opened during the month of listing to measure market sentiment and obtain similar results.

Columns (5)–(8) use cumulative market returns and the number of new accounts to measure market-wide sentiment and re-estimate model (2) for both periods to investigate whether lower analyst forecast dispersion

Table 6
Test of Hypothesis 2.

<i>SENT</i> =	<i>Mret</i>		<i>Acct</i>		<i>SENT</i> =	<i>Mret</i>		<i>Acct</i>	
	Market Rise (1)	Market Decline (2)	Market Rise (3)	Market Decline (4)		Market Rise (5)	Market Decline (6)	Market Rise (7)	Market Decline (8)
<i>SENT</i>	2.096*** (4.24)	8.005* (1.81)	0.814*** (3.36)	0.077 (0.05)	<i>SENT</i>	1.553*** (5.60)	-1.518 (-1.09)	0.567*** (4.04)	0.612 (0.67)
<i>Lerr</i>	-3.689*** (-9.05)	-1.959* (-1.76)	-1.235 (-0.90)	-0.458 (-0.07)	<i>Ldisp</i>	-0.047 (-0.21)	0.363 (1.04)	1.640* (1.76)	3.751 (0.80)
<i>SENT</i> × <i>Lerr</i>	-1.806*** (-3.02)	-7.841 (-1.56)	-0.704** (-2.48)	-0.272 (-0.16)	<i>SENT</i> × <i>Ldisp</i>	-1.418*** (-3.42)	3.854** (1.99)	-0.491** (-2.42)	-0.977 (-0.83)
<i>TA</i>	-0.185*** (-6.84)	-0.148*** (-3.42)	-0.191*** (-6.84)	-0.146*** (-3.24)	<i>TA</i>	-0.220*** (-7.07)	-0.141*** (-3.22)	-0.223*** (-6.99)	-0.151*** (-3.33)
<i>ROE</i>	-1.206*** (-6.03)	-1.137*** (-3.78)	-1.213*** (-5.89)	-0.980*** (-3.18)	<i>ROE</i>	-1.034*** (-4.45)	-1.039*** (-3.47)	-1.094*** (-4.59)	-0.937*** (-3.02)
<i>LEV</i>	0.153 (1.12)	0.095 (0.44)	0.228 (1.61)	0.135 (0.61)	<i>LEV</i>	0.076 (0.48)	0.067 (0.31)	0.166 (1.03)	0.152 (0.68)
<i>Growth</i>	0.216*** (3.03)	0.054 (0.50)	0.186** (2.54)	0.054 (0.49)	<i>Growth</i>	0.332*** (4.07)	0.045 (0.42)	0.307*** (3.68)	0.063 (0.56)
<i>PE</i>	-0.004*** (-3.56)	-0.004 (-1.45)	-0.003*** (-2.71)	-0.003 (-0.90)	<i>PE</i>	-0.007*** (-5.22)	-0.006** (-2.29)	-0.006*** (-4.47)	-0.004 (-1.64)
<i>Shriss</i>	-1.204*** (-2.73)	-1.098 (-1.32)	-1.049** (-2.32)	-1.374 (-1.60)	<i>Shriss</i>	-0.924* (-1.83)	-0.879 (-1.06)	-0.664 (-1.28)	-1.124 (-1.31)
<i>Age</i>	0.001 (0.16)	0.002 (0.18)	-0.002 (-0.28)	0.005 (0.51)	<i>Age</i>	0.005 (0.74)	0.001 (0.07)	0.002 (0.31)	0.005 (0.54)
<i>Delay</i>	3.243** (2.19)	3.675 (0.88)	3.934** (2.55)	2.395 (0.53)	<i>Delay</i>	1.673 (0.99)	3.032 (0.73)	2.578 (1.46)	1.588 (0.36)
<i>Regu</i>	0.256*** (3.40)	-0.325** (-2.48)	0.205*** (2.66)	-0.139 (-1.08)	<i>Regu</i>	0.452*** (5.29)	-0.211 (-1.58)	0.373*** (4.27)	-0.132 (-1.01)
<i>ZXB</i>	-0.171* (-1.93)	0.012 (0.11)	-0.200** (-2.19)	0.012 (0.10)	<i>ZXB</i>	-0.203** (-1.99)	0.013 (0.12)	-0.213** (-2.04)	-0.011 (-0.09)
<i>CYB</i>	-0.283*** (-2.78)	-0.009 (-0.07)	-0.323*** (-3.09)	-0.014 (-0.10)	<i>CYB</i>	-0.327*** (-2.79)	0.020 (0.15)	-0.353*** (-2.95)	-0.018 (-0.13)
<i>Cons</i>	6.084*** (12.59)	4.306*** (3.62)	3.108*** (2.67)	3.469 (0.57)	<i>Cons</i>	4.456*** (8.84)	2.289*** (2.84)	2.277*** (2.74)	0.290 (0.07)
<i>Ind</i>	Yes	Yes	Yes	Yes	<i>Ind</i>	Yes	Yes	Yes	Yes
<i>Year</i>	Yes	Yes	Yes	Yes	<i>Year</i>	Yes	Yes	Yes	Yes
<i>N</i>	718	231	718	231	<i>N</i>	718	231	718	231
<i>R2_Adj</i>	0.716	0.370	0.699	0.331	<i>R2_Adj</i>	0.623	0.373	0.604	0.323
<i>F</i>	45.048	4.859	41.627	4.248	<i>F</i>	29.891	4.915	27.681	4.141
<i>p</i>	0.000	0.000	0.000	0.000	<i>p</i>	0.000	0.000	0.000	0.000

* Significance levels at 10%.

** Significance levels at 5%.

*** Significance levels at 1%.

weakens the influence of sentiment on initial returns. The results show that lower analyst forecast dispersion weakens only the influence of sentiment on initial returns during the periods of rising markets (columns (5) and (7)). The coefficient of the interaction term is insignificant (column (8)) or significantly positive (column (6)) during the periods of declining markets.

5.4. Test of Hypothesis 3

To analyze the effect of analyst forecasts across different periods of regulation, we divide the sample period into pricing regulated and marketization periods based on the regulation rules. The specific method is described in the definition of *Regu*. Table 7 shows the results.

Columns (1) and (2) use cumulative market returns to measure sentiment and investigate the effect of analyst forecasts across different sample periods. The results show that sentiment has a significant positive effect on initial returns during the marketization period. However, the coefficient is not significant

Table 7
Test of Hypothesis 3.

<i>SENT</i> =	<i>Mret</i>		<i>Acct</i>		<i>SENT</i> =	<i>Mret</i>		<i>Acct</i>	
	Regulated	Market-oriented	Regulated	Market-oriented		Regulated	Market-oriented	Regulated	Market-oriented
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
<i>SENT</i>	0.368 (0.35)	3.778*** (6.18)	-0.144 (-0.26)	1.072*** (3.34)	<i>SENT</i>	1.273* (1.70)	1.642*** (6.48)	0.702 (1.61)	0.547*** (3.67)
<i>Lerr</i>	-5.762*** (-5.77)	-2.239*** (-5.87)	-9.137*** (-2.57)	0.960 (0.60)	<i>Ldisp</i>	-0.449 (-0.51)	-0.095 (-0.64)	0.344 (0.10)	2.004** (2.22)
<i>SENT</i> × <i>Lerr</i>	0.455 (0.34)	-3.578*** (-5.19)	0.725 (1.02)	-1.052*** (-2.90)	<i>SENT</i> × <i>Ldisp</i>	-0.356 (-0.31)	-1.429*** (-4.03)	-0.134 (-0.20)	-0.579*** (-2.77)
<i>TA</i>	-0.390*** (-3.10)	-0.172*** (-7.91)	-0.417*** (-3.28)	-0.172*** (-7.56)	<i>TA</i>	-0.412** (-2.43)	-0.189*** (-8.12)	-0.470*** (-2.72)	-0.188*** (-7.77)
<i>ROE</i>	-0.252 (-0.27)	-1.179*** (-7.45)	-0.865 (-0.91)	-1.169*** (-7.06)	<i>ROE</i>	-0.214 (-0.17)	-1.013*** (-5.95)	-0.998 (-0.77)	-1.030*** (-5.82)
<i>LEV</i>	0.637 (1.01)	0.177 (1.61)	1.127* (1.77)	0.212* (1.84)	<i>LEV</i>	-0.073 (-0.09)	0.165 (1.40)	0.540 (0.63)	0.209* (1.70)
<i>Growth</i>	0.103 (0.37)	0.200*** (3.47)	0.065 (0.23)	0.198*** (3.28)	<i>Growth</i>	0.476 (1.31)	0.241*** (3.90)	0.373 (1.00)	0.234*** (3.63)
<i>PE</i>	0.096 (0.79)	-0.005*** (-5.03)	-0.035 (-0.28)	-0.003*** (-2.78)	<i>PE</i>	0.387** (2.47)	-0.007*** (-6.99)	0.237 (1.48)	-0.005*** (-5.06)
<i>Shriss</i>	-1.379 (-0.66)	-0.978*** (-2.65)	-1.975 (-0.92)	-0.863** (-2.24)	<i>Shriss</i>	-2.185 (-0.77)	-0.729* (-1.85)	-2.666 (-0.92)	-0.504 (-1.23)
<i>Age</i>	0.007 (0.30)	0.002 (0.42)	-0.016 (-0.74)	0.005 (1.01)	<i>Age</i>	0.016 (0.55)	0.006 (1.14)	-0.018 (-0.63)	0.009 (1.61)
<i>Delay</i>	9.456 (1.24)	2.715** (2.11)	13.585* (1.76)	2.627* (1.90)	<i>Delay</i>	3.144 (0.31)	2.051 (1.49)	10.011 (0.97)	2.024 (1.38)
<i>ZXB</i>	-0.961** (-2.13)	-0.126* (-1.92)	-0.985** (-2.15)	-0.133* (-1.93)	<i>ZXB</i>	-0.587 (-0.97)	-0.145** (-2.07)	-0.627 (-1.02)	-0.156** (-2.14)
<i>CYB</i>		-0.186** (-2.45)		-0.217*** (-2.73)	<i>CYB</i>		-0.199** (-2.44)		-0.227*** (-2.67)
<i>Cons</i>	9.701** (2.30)	4.864*** (11.54)	14.919*** (2.79)	1.338 (0.95)	<i>Cons</i>	-2.875 (-0.57)	3.984*** (10.38)	-1.004 (-0.18)	1.873** (2.45)
<i>Ind</i>	Yes	Yes	Yes	Yes	<i>Ind</i>	Yes	Yes	Yes	Yes
<i>Year</i>	Yes	Yes	Yes	Yes	<i>Year</i>	Yes	Yes	Yes	Yes
<i>N</i>	120	829	120	829	<i>N</i>	120	829	120	829
<i>R2_Adj</i>	0.646	0.577	0.634	0.537	<i>R2_Adj</i>	0.361	0.515	0.334	0.474
<i>F</i>	7.777	29.999	7.446	25.625	<i>F</i>	3.102	23.539	2.869	20.116

* Significance levels at 10%.

** Significance levels at 5%.

*** Significance levels at 1%.

during the regulated period. This is consistent with our preceding analysis. When regulation of the offering-price-to-earnings ratio is canceled during the marketization period, investor sentiment in the secondary market is the primary cause of high IPO initial returns. In addition, the interaction is significantly negative during the marketization period. This finding indicates that lower analyst forecast bias significantly weakens the influence of market-wide sentiment on initial returns. However, the coefficient of the interaction term is insignificant during the regulated period. We also use the number of new accounts opened during the listing month to measure sentiment and find similar results. Sentiment has a significant positive effect on initial returns only during the marketization period and lower analyst forecast bias only weakens the relationships during this period.

Columns (5)–(8) use analyst forecast dispersion as the independent variable to investigate the effect of analyst forecasts across different sample periods. Hypothesis 3 remains highly supported.

6. Conclusion

Speculative sentiment and lack of rationality are long-standing drawbacks in the Chinese stock market, especially during IPOs. Trading driven by sentiment not only induces prices that deviate from their intrinsic value, but also exacerbates market volatility. Normalizing investor behavior and improving market rationality are essential for the development of the Chinese stock market.

This paper investigates the influence of sentiment on stock prices during IPOs and determines that market-wide sentiment has a significant effect on IPO initial returns. We use analyst forecast bias and forecast dispersion to measure the information environment and investigate whether an improvement of that environment weakens the influence of sentiment on stock prices. We find that lower analyst forecast bias and forecast dispersion decrease noise trading and thus weaken the influence of sentiment on IPO initial returns.

These results have several implications. First, noise trading is caused by the subjective reasons of investors and the objective information environment faced by those investors. Information asymmetry is an important cause of noise trading and results in the deviation of stock prices from their intrinsic value. Improving the information environment and information transparency is the effective way of decreasing noise trading. Accordingly, the improvement of information disclosure quality is the key point of IPO reforms.

Second, the results affirm the positive role played by analysts. Although we cannot rule out that analyst forecast bias is caused by a conflict of interest among stakeholders, the empirical results show that, as information intermediaries, analysts lower the information asymmetry between firms and investors. Encouraging the development of intermediaries such as analysts may accelerate the improvement of the information system in the capital market.

Third, we find that the analyst's role as an intermediary works only during marketization periods. Therefore, we can infer that pricing regulation is essential for information system effectiveness. The regulation of offering prices ignores differences in firm characteristics and leads to price distortion. Consequently, the government should change its role from participant to regulator during periods of market-oriented reform, after which the market can truly be rectified and improved.

Finally, we find that investor attention is the premise for information acquisition. Strengthening investor education and guiding investors to establish correct investment concepts and sustain their attention are necessary steps in the development of the capital market.

Acknowledgements

The authors thank the executive editor and anonymous referees for their helpful suggestions. This study was sponsored by the Institute of Finance and Accounting at Shanghai University of Finance and Economics, National Natural Science Foundation of China (Project No. 71172144), Major Project of Ministry of Education, Humanities and Social Science Research Base (Project No. 11JJD790055), and Program for New Century Excellent Talents in University (Project No. NCET-12-0902).

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