Divergence of Opinion and IPO Valuation

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Abstract：   This paper analyzes the relationship between investors' divergence of opinion and the valuation of IPOs both in the short run and in the long run. Merton (1987) argues that divergence of opinion captures the inherent risk and thus should be positively related to the long run performance of assets while Miller (1977) presents that divergence of opinion will fuel the asset pirce irrationaly in the short run and will lead to the long run underperformance. Using a sample of 667 IPO firms from 2001 to 2009 in Chinese stock market, we examine the relationship between divergency of opinion and IPO valuation. Using the average price of analysts' forecasts as fair value of IPOs, we divide the abnormal initial return of IPOs into two parts: underpricing in the primary market and overvaluation in the secondary market. We find that the divergence of opinion affects underpricing in the primary market as a risk factor and also overvaluation in the secondary market through the optimistic investors. The dispersion of analysts' forecasts, the turnover rate on the first trading day and the aftermarket volatility of IPOs, proxies for the divergence of opinion among investors, are positively related to underpricing in the primary market and overvaluation in the secondary market. The long run performance of IPOs measured from the offer price is

positively related to the divergence of opinion, indicating that divergence of opinion captures the inherent risk of IPOs. However, the long run performance of IPOs measured from the first day closing price is negatively related to the divergence of opinion, supporting Miller's proposition that divergence of opinion leads to short term overvaluation and long term underperformance in a market with short sales constraints.

Key words: Divergence of opinion, IPO，Abnormal initial return, Underpricing, Overvaluation

EMF classification code: 350

1. Introduction

The phenomenon of abnormal initial return (*AIR*) of IPOs has been well documented by the literature. Based on investor rationality in an efficient market, the first day trading price is supposed to be the fair value of IPOs but the offer price is considered to be set below the fair value. Then IPOs are underpriced and exhibit positive *AIR* in the short run (Rock, 1986; Benveniste and Spindt, 1989). However, the long-run underperformance of IPOs (Ritter, 1991; Loughran and Ritter, 1994) challenges the underpricing literature. From the vantage of a longer horizon, the offer price of IPOs may be equal to the fair value but the first day trading price may be inflated. *AIR* should be regarded as a result of overvaluation in the short run. Miller (1977; 2000) uses the divergence of opinion to explain the long run underperformance of IPOs. He argues that in a market with short sales constraints, the pessimistic investors will stay out of the market and the asset price is determined by the most optimistic investors. The IPO market is just such a market with short sales constraints[1]. And when the new shares are firstly traded, the divergence of opinion is the largeset since there is no public trading information of the firm. The offer price of IPOs may be equal to the fair value but optimistic investors drive the first day trading price above the fair value of IPOs. In the long run, when there is more public information available in the market, the divergence of opinion is lower. The price converges to the fair value and the long run underperformance appears as the initial overvaluation is corrected.

Houge, Loughran, Suchanek, and Yan (2001) give empirical supports for this explanation. Measuring the divergence of opinion by flipping ratio, opening bid-ask spread and the time of the first trade, they found the divergence of investors' opinion on the first trading day could explain the long run underperformance of IPOs. Loughran and Marietta-Westberg (2005) use the turnover rate as measurement of the divergence of opinion. The portfolio constructed by the IPO stocks with high turnover rate has

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[1] Miller (2000) argues that "the stock of initial public offerings cannot be sold short at the start of trading. The reason is that the short selling process requires borrowing the certificates in order to make delivery. However, it takes a while for the underwriter to actually distribute the shares, and until this process is completed the stock is not available for lending."

lower long run returns. Using the aftermarket return volatility as a proxy of divergence of opinion, Gao, Mao and Zhong (2006) also find a negative relationship between the divergence of opinion and the long run performance of IPOs.

However, Merton (1987) and Gebhardt, Lee and Swaminathan (2001) proposed opposite theories. They believe that the divergence of opinion represents the fundamental risk of firms. High degree of divergence of opinion means high level of uncertainties in the future and thus high idiosyncratic risk level of the firm. According to this view, we can expect that the high degree of divergence of opinion will lead to a higher level of initial return and a higher long term return in the IPO market. Since IPO firms with higher risk should be underpriced at a higher level and thus investors will earn a higher return in the long run. The short run underpricing and long run performance are reasonable compensation for investors who face with higher uncertainties in the future. Beneda and Zhang (2009) document a positive relationship between the idiosyncratic risk and the underpricing of IPO firms. Using the return volatility of IPOs as proxy for the divergence of opinion, they find that underpricing and the short-run (240 trading days) post-IPO returns. They argue that the idiosyncratic risk is incorporated into the offer price and underpring compensates investors for acuqiring costly information.

Then there are contradictions on how the divergence of opinion will affect the valuation of IPOs. From Miller's proposition, the divergence of opinion will affect the valuation of IPOs in an irrational way; The optimistic investors will drive the first day above the intrinsic value of IPOs. The higher the degree of divergence of opinion, the higher initial return of IPOs and the lower the long run performance of IPOs. However, from the view of Merton (1987), divergence of opinion captures the fundamental risk of firm; Invetors need higher return as compensation for higher uncertainties in the future. In the IPO context, a larger divergence of opinion indicates higher initial return and higher long run return.

How will the divergence of opinion affect the valuation of IPOs in the short run and in the long run? The answer also depends on another question: Are IPOs underpriced or overvalued? The positive relationship between idiosyncratic risk and

underpricing indicate the IPOs are underpriced. However, the negative relationship between the divergence of opinion and long run underperformance suggests that IPOs are overvalued. The offer price and the first day trading pirce determine the initial return of IPOs together. There is information asymmetry in the primary market and investors face high uncertainties for their investing of IPOs. So IPOs need to be underpriced to compensate investors for the idiosyncratic risk. At the same time, the optimistic investors will drive the first day trading price above the fair value in a market with short sales constraints and IPOs may be overvalued in the secondary market. We need distinguish between underpricing and overvaluation to get a clear picture on the relationship between divergence of opinion and IPO valuation. Purnanandam and Swaminathan (2004) use price multiples of comparable firms in the same industry as reasonable price of IPOs and find that IPOs are overpriced in the primary market. But they pay no attenttion to the possible overvaluation in the secondary market.

Using long run performance to examine the IPO piricing efficiency, we need also use different start point. When we examine whether IPOs are underpriced or not, we should measure the long run performance of IPO from the offer price. When we examine whether IPOs are overvalued or not, we should measure the long run performance of IPOs from the first day trading price. Even Gao, Mao and Zhong (2006) and Houge, Loughran, Suchanek, and Yan (2001) find negative relationship between the divergence of opinion and the long run return, they all measure the return from the first day trading price and the basic assumption is that IPOs are overvalued on the first trading day but not underpriced in the primary market.

The main purpose of this paper is to examine the relationship between the divergence of opinion and the IPO valuation both in the short run and in the long run. Chinese IPO market is a natural laboratory to test such relationships. Firstly, short sales are strictly forbidden in Chinese stock market. Since there is no hisotorical trading information of the IPO firm, a large amount of retails investors[2] in IPO

market have great difficulties and large divergence of opinion in the valuation of new shares. When there is both divergence of opinion and short sales constraints, the Chinese IPO market provide a clear background to test whether the optimistic investors will fuel the asset price or not. Secondly, there is both severe information asymetry and divergece of opinion, we can examine whether the offer price of IPOs is set below the fair value as compensation for high idiosyncratic risk.

Using the average price of financial analysts' forecast as an intrinsic value of IPOs, this paper divides *AIR* into two parts: underpricing in the primary market and overvaluation in the secondary market. Using a sample of 667 IPO firms in Chinese IPO market during 2001-2009, we find interesting results that IPOs are both underpriced and overvalued in Chinese stock market. The average *AIR* during 2001-2009 is 0.6880[3]. Underpricing of IPOs is 0.5063 and accounts for 73.59 percent of the total initial return. However, the overvaluation is 0.1818 and accounts for 26.41 percent of the total initial return.

This separation allows us to examine how the divergence of opinion will affect the asset pricing in the short run. Using the dispersion of analysts' forecast, the turnover rate and the abnormal volatility as proxies for divergence of opinion, we find that the divergence of opinion is positively related to both underpring in the primary market and overvaluation in the secondary market.

In the long run, we use two different ways to measure the performance of IPOs. Firstly, we measure the long run performance of IPOs from the offer price. The results show that for investors who bought IPOs at the offer price, the three years cumulative abnormal return is 79.77%, giving further support for underpricing of IPOs in the short run. For investors who bought IPOs with low level of underpricing, they can make an abnormal return of 32.38% after three years. For investors who bought IPOs with high level of underpricing, they can make an abnormal return of 132.64% after three years. The long run performance measured from the offer price is positively related to the divergence of opinion. These results are consistent with Merton's

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[3] In this paper, we use "ln(P_1/P_0)" to measure the abnormal initial return of IPOs, where P_1 is the first day closing price, P_0 is the offer price. When using "(P_1-P_0)/ P_0" to measure the initial return of IPOs, the abnormal initial return is 113.82%.

argument. The divergence of opinion indicates the idiosyncratic risk . The high degree of divergence of opinion captures the high intrinsic risk of the IPO firm, thus IPOs need to be underpriced to compensate the investors in the short run and investors will have high long term returns.

Secondly, we measure the long run performance of IPOs from the first day closing price. We also find long run underperformance of IPOs in Chinese stock market: IPO firms underperformed the market by 16.08% on average. IPOs with high overvaluation underperform the market by 24.93% after three years of trading, while IPOs with low overvaluation underperform the market only by 6.32%. This underperformance is consistent with the overvaluation in the short run. And the results also show that the divergence of opinion is negatively related to the long run performance of IPOs. In the secondary market, the most optimistic investors will buy the new shares actively and drive the first day trading price above the intrinsic value of IPOs. The higher degree of divergence of opinion, the higher the first day trading price and lower the long run return of IPOs.

Our paper contributes to the literature in two folds: first, we provide a possible way to explain *AIR* better. Although Purnanandam and Swaminathan (2004) provide evidence that IPOs are overpriced at the offer price by 50% as measured by industry matched multiples. But they do not pay attention to the possible overvaluation in the secondary market. We provide evidence that IPOs can be both underpriced and overvalued. There is severe information asymmetry in the IPO market and thus IPOs need to be underpriced to compensate the high risk of investors. But in a stock market with heterogeneous beliefs and short sales constraints, the optimistic investors may cause the overvaluation of IPOs in the short run. In this way, we can explain the long run underperformance of IPOs and also the hot issues market. The data set (the average forecast price) we use to divide the underpricing and overvaluation is unique in Chinese stock market, but the idea is not unique.

Second, the separation of underpring and overvaluation allows us to examine the relationship between divergence of opinion and asset pricing clearly in the IPO setting. We present evidence that divergence of opinion captures the idiosyncratic risk of the

firm and the inherent risk is incorporated into the offer price. Underpricing is a necessary compensation for the idiosyncratic risk of the IPO firm. Our results also show that in a stock market with short sales constraints, the divergence of opinion will fuel the asset pricing. The first day trading price of IPOs is determined by the most optimistic investors. They drive the first day trading price above the fair value of IPOs and in the long run the price converges to the fair value and the overvaluation in the short run is corrected.

2 Underpricing and Overvaluation of IPOs

In this paper, we use logarithm return to measure *AIR*, which is different from the traditional way used in previous literatures. In this way, we propose a simple method to divide *AIR* into underpricing in the primary market and overvaluation in the secondary market, as shown in the following:

$$
\begin{aligned}
AIR &= Ln\frac{P_1}{V_R} + Ln\frac{V_R}{P_0} \\
&= Ln\frac{P_1}{P_0}
\end{aligned}
\tag{1}
$$

Where, P_1 is the closing price on the first trading day, P_0 is the offer price and V_R is the intrinsic value of IPOs.

Then, we define:

$$
Under = Ln\frac{V_R}{P_0}
$$

$$
Over = Ln\frac{P_1}{V_R}
\tag{2}
$$

Where, *Under* is the return resulted from underpricing in the primary market. When *Under*>0, it means that IPOs are underpriced in the primary market. When *Under*<0, it means that IPOs are overpriced in the primary market. *Over* is the return resulted from overvaluation in the secondary market. If *Over*>0, it indicates that investor sentiment drives the first day trading price above the intrinsic value and thus IPOs are overvalued in the secondary market. If *Over*<0, it indicates that IPOs are undervalued in the secondary market.

Then the most important thing is how to define the intrinsic value, V_R, of IPOs. Purnanandam and Swaminathan (2004) use price multiples of comparable firms in the

same industry as reasonable price of IPOs. But it is difficult for us to choose matching firms for each IPO firm because of the relatively short history and the small numbers of listed firms in Chinese stock market.

Fortunately, there is unique data set in Chinese stock market. In days before the listing of IPOs, financial analysts provide research reports on IPO firms and present their forecasts of the possible range of the reasonable trading price. They use DCF methods or comparable firms as basis of their forecast with a view to the IPO firm's prospects and the market condition. However, the analysts may disagree with the profitability and the growth prospects of the IPO firm, which results in a wide range of the expectation of the reasonable price among different analysts. Furthermore, they will influence the individual investors' expectation on the first trading day since the investors can read the analyst's forecasts from different medias, such as *China Security News, Security Times* and *Shanghai Security News*. Miller (1977) said that when there is divergence of opinion, the average valuation of investors is a good indication of the fair value of the asset. So we use the average price of the financial analysts' forecast as a proxy for the intrinsic value of IPOs.

The definition is as follows:

P_{ij}^{L} :   the lower limit of the j_{th} financial analyst's forecast for the i_{th} IPO firm;

P_{ij}^{H} :   the upper limit of the j_{th} financial analyst's forecast for the i_{th} IPO firm;

P_{ij}^{M} : $P_{ij}^{M} = \dfrac{P_{ij}^{L} + P_{ij}^{H}}{2}$, the average of the lower limit and upper limit of the

j_{th} financial analyst's forecast for the i_{th} IPO firm.

Suppose n to be the numbers of financial analysts who provide forecasts for the i_{th} IPO firm, the average forecast price of n financial analysts is:

$$P_i^{M} = \dfrac{\sum\limits_{j=1}^{n} P_{ij}^{M}}{n} = V_R \qquad (3)$$

We use the average forecast price to proxy for the intrinsic value of IPOs. In this way, we can divide *AIR* into underpring in the primary market (*Under*) and

overvaluation in the secondary market (*Over*).

3 Hypothesis development and measures of divergence of opinion

3.1 Divergence of opinion and short run valuation of IPOs

Merton (1987) and Gebhardt, Lee and Swaminathan (2001) believe that the divergence of opinion represents the fundamental risk of firms. High degree of divergence of opinion means high level of uncertainties in the future. In this view, the divergence of opinion will affect the asset pricing in a reasonable way. In the IPO market, there is no public trading data for IPO firms, investors may have difficulties in the valuation of the new shares. There will be high degree of heterogeneous beliefs among investors when there is high level of uncertainties in the future of the firm. The high degree of divergence of opinion means high ex-ante risks in investing of IPOs. This kind of idiosyncratic risk should be incorporated into the offer price and IPOs should be underpriced to compensate the investors. IPOs with higher degree of heterogeous beliefs will be underpriced more since they have higher inherent risk. We can expect that:

H1: the level of underpricing is positively related to the degree of divergence of opinion.

Classical CAPM has a key assumption that all the investors have homogeneous expectations. However, Miller（1977）argues that the homogeneous expectation is not reasonable. In the real world, when being uncertain about the future and having difficulties in estimating the value of securities, the investors show divergence of opinions, that is, they have heterogeneous expectations. Buyers and sellers are trading in the market, and prices always move towards the investors with stronger willingness. When there is short sales constrains, pessimistic investors can't express their bearish

opinions through making short sales, and they just sit out of the market. In the short run, stock price only reflects the optimistic investors' valuation information and often deviates from the intrinsic value, causing the overvaluation of assets. The higher degree of the investors' divergence of opinion is, the higher the level of the overvaluation of assets is. From this opinion, the divergence of opinion will affect the asset price in an unreasonable way.

Chinese IPO market is a natural library for testing the influence of the divergence of opinion on assets' price because there are strict short sales constraints in the stock market. No firms are allowed to short selling any stocks. Because there is no public information about trading, the uncertainty of the IPO companies' value makes the divergence of investors' opinion even higher. At the same time, the short sales constrains drive the pessimistic investors out of the market, so in short run, the new stocks' price is determined by the most optimistic investors. A high degree of divergence of opinion indicates that some investors are more optimistic and have higher expectations on the value of the new firms. We can hypothesize that:

H2: the level of overvaluation is positively related to the degree of divergence of opinion.

3.2 Financial analysts' coverage and short run valuation of IPOs

In the stage of IPO, financial analysts play an important role in two ways: First, they can reduce the level of information asymetry in the primary market. Financial anlysts provide research report in which more information is widely known and the valuation numbers are more understandable by the less sophisticated investors. Bowen, Chen, and Cheng (2004) find that higher analyst coverage (the numbers of financial analysts) significantly reduces the underpricing associated with Seasoned Equity Offerings (SEOs). In the IPO setting, we can aslo expect that the financial anlysts reprots can reduce the level of information asymetry and thus IPOs are less underpriced.

H3: the level of underpricing is negatively related to the financial analysts'

coverage.

However, the financial analysts can affect the valuation of IPOs in the other way. Aggarwal, Krigman, and Womack (2002) note that post-IPO analyst recommendations can boost share price and greater analyst coverage might lead to greater investor recognition of the IPO company. Cliff and Denis (2004) gives empirical support for these argument. They find that the financial analysts' coverage is positively related to the underpricing of IPOs. Although they use the financial anlysts' post-IPO coverage provided by the main underwriter, we use the financial analysts' pre-IPO coverage, and these financial analysts are not from the main underwriter in this paper. More financial analysts' coverage can push the investor demands and boost the first day trading price. So we can expect that:

H4: the level of overvaluation is positively related to the financial analysts'

coverage.

Here, we use the number of financial analysts who provide the forecast price for the IPO firms to proxy the financial analysts' coverage.

3.3 Divergence of opinion and long run performance of IPOs

In the view of Merton (1987), the divergence of opinion is a risk factor. Then the higher the divergence of opinion, the higher long run return of the firm is. Since the first day trading price may be inflated by the optimistic investors, we can not measure the long run return from the first day trading price directly. But we can measure the long run performance of IPOs from the offer price. The higher degree of heterogeneous beliefs indicates a higher risk of the firm and the investors will demand a higher long run return. We hypothesize that:

H5: The degree of divergence of opinion is positively related to the long run

performance of IPOs measured from the offer price.

According to Miller's proposition, the first day trading price was inflated by optimistic investors. In the long run, the price will converge to the intrinsic value and

result in the long run underperformance of IPOs. When the degree of heterogeneous beliefs is high, it indicates a higher level of overvaluation and a lower level of long run performance. Here, we can measure the long run performance of IPOs from the first day closing price. We hypothesize that:

H6: The degree of divergence of opinion is negatively related to the long run performance of IPOs measured from the first day closing price.

3.3 Measures of divergence of opinion

Miller and Reilly(1987), Harris and Raviv (1993) and Lee and Swaminathan(2000) measure the divergence of opinion by trading volume. Diether, Malloy and Scherbina (2002) use the dispersion of analysts' forecast of future earnings. Boehme, Danielsen and Sorescu (2006) also use the trading volume, volatility of stocks' return and the dispersion of analysts' forecast together to measure the divergence of opinion.

In this paper, we use the dispersion of analysts' forecast price of the first day trading price to measure the divergence of opinions. It is a more direct description of the different opinions among investors compared with other variables The dispersion of analysts' forecast price is also an *ex ante* measure of heterogeneous beliefs among investors because these kind of information can be available before the trading of the IPO firm.

The dispersion of the forecast price of the ith IPO is:

$$Dispersion = \frac{stadev(P_{ij}{}^{M})}{P_{i}{}^{M}} \qquad (4)$$

Where,

$stadev(P_{ij}{}^{M})$ refers to the standard deviation of the n analysts' forecast prices for the ith IPO stock. P_{i}^{M} is the same meaning as we defined before. The higher dispersion of analysts' forecast price shows analysts have larger disagreements about the valuation of IPOs. The related information about the analyst forecast is mainly abstracted from the database of WIND and manually collected from the column of "New Stock Valuation" on *China Security News*、*Security Times* and *Shanghai*

Security News.

Meanwhile, Miller (1977) points out that most of the trades happen just because the pessimistic investors sell their stocks to the optimistic investors. So, the turnover rate on the first day of trading (*TR)* can be a measure of the divergence of opinion. If the turnover rate is higher, the divergence of investors' opinion is greater.

Following Gao, Mao and Zhong (2006), we also use abnormal volatility of IPOs to measure the divergence of opinion.

$$Volatility = Vol_{ipo} - Vol_{mar} \tag{5}$$

Where, VOL_{ipo}: the standard deviation of the first 25^4 daily returns after the listing, excluding the initial return;

$VOL_{mar:}$ the standard deviation of daily index returns over the same period.

4 Data and Descriptive statistics

4.1 Data

Since the financial analysts provide such forecasting information since 2001, we choose the IPO firms from 2001 to 2009 as the sample, excluding IPO firms in the financial industry and firms who actually conducted seasoned equity offering in the A-share stock market. Finally, our sample consists of 667 IPO firms. The basic information of the IPO firms came from the database of *CCER* and *WIND*. The related information about the analysts' forecast is mainly abstracted from the database of *WIND* and manually collected from the column of "New Stock Valuation" on *China Security News*、*Security Times* and *Shanghai Security News*. We have collected 8,405 forecast price observations for our 667 IPO firms.

4.2 Descriptive statistics

Table 1 reports the descriptive statistics of the analysts' forecast data. For 667 IPO firms in our sample, the mean forecast price is 18.17 Yuan per share. On average, there are 12.6 financial analysts who provide price forecasts for the same IPO firm. The minimum numbers of financial analysts for one IPO firm is 2, while the

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[4] We also use the 50, 75, or 100 daily returns. These do not affect our conclusion.

maximum numbers is 31. The mean width of the analysts' forecast price for one IPO firm is 9.82 Yuan per share. The minimum width is 0.15 Yuan, indicating a very small level of heterogeneous beliefs, while the maximum width is 71.5 Yuan, indicating that for the same IPO firm, the width between the highest average forecast price and the lowest average forecast price is 71.5 Yuan, the financial analysts have great disagreement on the valuation of new shares. The width of the upper limit and the lower limit for one IPO firm is 12.11 Yuan, and the highest width is 83 Yuan. (可删)

Table 1 Descriptive statistics for Financial Analysts' Forecast

P_i^M is the average forecast price for the i_{th} IPO firm . $Max(P_{ij}^M)(j=1,2......n)$ is the highest forecast price (the average of the upper limit and the lower limit) and $Min(P_{ij}^M)$ $(j=1,2......n)$ is the lowest forecast price (the average of the upper limit and the lower limit) for the i_{th} firm. $Max(P_{ij}^H)$ is the highest of the upper limit of the forecast price and $Min(P_{ij}^L)$ is the lowest of the lower limit of the forecast price for the i_{th} firm.

	P_i^M	Coverage (Numbers of analysts)	$Max(P_{ij}^M)-Min(P_{ij}^M)$ (j=1,2....n)	$Max(P_{ij}^H) -Min(P_{ij}^L)$ (j=1,2....n)
N	667	667	667	667
Mean	18.17	12.6	9.82	12.11
Median	15.47	12	6.48	8.05
Minimum	2.94	2	0.15	0.70
Maximum	82.5	31	71.50	83.00
Std. Deviation	11.1	11.10	9.46	11.11

Table 2 gives the descriptive statistics for short run valuations of IPO firms and for variables of divergence of opinion. The mean (median) offer price of IPOs (P_0) is 11.33 (8.98) Yuan per share. The mean (median) of the average forecast price (V_R) is 18.17 (15.47) Yuan per share. The first day closing price is 23.05 Yuan per share, which is much higher than the offer price and also higher than the average price of the financial analysts' forecast. The mean (median) *AIR* is 0.6880 (0.6320). The corresponding *AIR* when measured as $(P_1- P_0)/ P_0$ is 113.82% (88.14%). We can see that *AIR* in China is much higher than that reported in other countries (Ljungqvist, 2007). The mean (median) of underpricing is 0.5063(0.4609), accounting for 73.59 (72.93) percent of the total initial return; However, the mean (median) overvaluation is 0.1818 (0.1300), accounting for 26.41 percent of the total initial return. The results show that IPOs in China are both underpriced in the primary market and overvalued in the secondary market. But the underpricing contributes to the most part of initial

return.

The mean of *Dispersion* is 15.31%, indicating that the divergence of opinion is relatively high among the financial analysts. The mean turnover rate on the first trading day (*TR*) is 61.44%, which is much higher than the average turnover rate of in the first year of trading[5]. The abnormal volatility of the 25 days after listing (VOl_{25}) is 1.21%, indicating that the volatility of IPOs is higher than the market return in the same period.

Table 2 Descriptive statistics for short run valuation of IPO firms and Divergence of Opinion
This table reports descriptive statistics for short run valuation of IPOs and divergence of opinion. P_0 is the offer price of the IPOs. P_1 is the first day closing price of IPOs. V_R is the average price of the financial analysts' forest of the reasonable price of IPOs. *AIR* is the abnormal initial return of IPOs, measured by $Ln(P_1 /P_0)$. *Under* is the underpricing in the primary market, measured by $Ln(V_R /P_0)$. *Over* is the overvaluation in the secondary market, measured by $Ln(P_1/V_R)$. *Dispersion* measures the divergence of opinion among investors, measured as the standard deviation of analysts' forecast price divided by the average of the forecast price. *TR* is the turnover rate on the first trading day. VOl_{25} is the difference between the standard deviation of the first 25 daily returns of IPOs and the standard deviation of the daily returns of the market index in the same period.

	N	Mean	Median	Minimum	Maximum	Std. Deviation
P_0	667	11.33	8.98	2.18	60.00	8.25
V_R	667	18.17	15.47	2.94	82.50	11.10
P_1	667	23.05	17.81	2.80	131.00	16.58
AIR	667	0.6880	0.6320	-0.3776	1.8534	0.3675
Under	667	0.5063	0.4609	-0.1103	1.6417	0.2922
Over	667	0.1818	0.1300	-0.6442	1.3028	0.2601
Dispersion	667	0.1531	0.1428	0.0153	1.0476	0.0864
TR	667	0.6629	0.6654	0.2317	0.9326	0.1387
VOl_{25}	667	0.0134	0.0122	-0.0133	0.0462	0.0093

Table 3 shows the distribution of the short run valuation of IPOs by the cohort year. *AIR* flucuates with the market conditions in different years. Chinese stock market increased a lot in the year of 2007[6], the volume of IPO and also the *AIR* of IPO are both the highest among our sample period. The level of overvaluation in the secondary market in 2007 is 0.4439, contributing to most part of the intial return. The

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[5] Our data from the data base of WIND shows that the average turnover rate for IPO firms in the first year of trading is only 3.21%

[6] The Shanghai Composite Index increased from 2715.72 to 5261.56 in the year of 2007, which indicating a return of 93.74%. The Index even climed up to 6124.

level of underpricing and overvaluation explains the flucutations in *AIR* in different yeas.

Table 3 Distribution of short run valuation of IPOs by cohort year

AIR is the abnormal initial return of IPOs, measured by $Ln(P_1/P_0)$. *Under* is the underpricing in the primary market, measured by $Ln(V_R/P_0)$. *Over* is the overvaluation in the secondary market, measured by $Ln(P_1/V_R)$. V_R is the average price of the financial analysts' forest of the reasonable price of IPOs.

Year	N	AIR		Under		Over	
		mean	median	mean	median	mean	median
2001	70	0.8403	0.8678	0.8127	0.8145	0.0276	-0.0011
2002	68	0.7962	0.7745	0.8021	0.7953	-0.0059	-0.0128
2003	65	0.5144	0.5345	0.5183	0.5482	-0.0039	0.0011
2004	99	0.4859	0.4465	0.4689	0.4354	0.017	-0.0051
2005	15	0.3479	0.3815	0.2707	0.2604	0.0772	0.0634
2006	63	0.5887	0.5667	0.3669	0.3376	0.2218	0.2073
2007	113	1.0379	1.0256	0.5940	0.5642	0.4439	0.4459
2008	76	0.6965	0.6105	0.4683	0.4221	0.2282	0.2089
2009	98	0.5296	0.5654	0.1659	0.1768	0.3637	0.3322
Total	493	0.6880	0.6320	0.5063	0.4609	0.1818	0.1300

Although *AIR* fluctuates a lot, we can also see a trend of decreasing underpricing in the primary market and an increasing overvaluation in the secondary market from Table 3. This trend may relate to the change of pricing mechamism in Chinese IPO market. The public offer (the fixed price) method was once used in setting the offering price of new shares in China. In the year of 2005, bookbuilding method was introduced in Chinese IPO market. Table 4 reports the relation between the pricing mechanism and IPO valuation. The results show that *AIR* in the bookbuilding method is higher than that in the public offer method. The mean (median) *AIR* for IPOs with bookbuilding pricing method is 0.7344 (0.6452), while the mean of AIR for IPOs with public offer method is 0.6219 (0.6241). The difference between these tow groups is highly significant. The results indicate that the pricing mechanism did not reduce the level of *AIR* although the regulatory authority intends to do so. But we can see the offering price under bookbuilidng mechanism is higher that that under the public offer mechanism, with the former to be 13.42 Yuan per share while the latter to be 8.35 Yuan per share. If *AIR* in Chinese IPO market is due to the underpricing, the results about the *AIR* and the offering price is in the contradictory direction.

Table 4 Pricing Mechanism and IPO Valuation

AIR is the abnormal initial return of IPOs, measured by Ln(P_1 /P_0). *Under* is the underpricing in the primary market, measured by Ln(V_R /P_0). *Over* is the overvaluation in the secondary market, measured by Ln(P_1/V_R). V_R is the average price of the financial analysts' forest of the reasonable price of IPOs. *Pubilc offer* indictates the sample of IPOs are priced using the fixed price method. *Bookbuild* indicates the samples of IPOs are priced using the bookbuiliding method. The numbers in the parentheses are the t-statistics for difference in means and z-statistics for difference in medians. ***, significant at 1% level; **, significant at 5% level; *, significant at 10% level.

	Pricing Mechanism	N	Mean	Median
AIR	*Bookbuilding*	392	0.7344	0.6452
	Public Offer	275	0.6219	0.6241
	Difference		0.1125***	0.0211***
	T(Z)		（4.00）	（3.19）
P_0	*Bookbuilding*	392	13.42	10.60
	Public Offer	275	8.35	7.24
	Difference		5.07***	3.36***
	T(Z)		(8.19)	(8.12)
Under	*Bookbuilding*	392	0.4344	0.3910
	Public Offer	275	0.6088	0.6031
	Difference		-0.1744***	-0.2122***
	T(Z)		（-7.93）	（-8.04）
Over	*Bookbuilding*	392	0.3001	0.2649
	Public Offer	275	0.0131	-0.0037
	Difference		0.2869***	0.2686***
	T(Z)		（18.70）	（15.06）

However, the seperation of underpricing and overvaluation explains the divergency. IPOs with bookbuilding mechnism have lower underpricing in the primary market, with the mean of underpricing to be 0.4344, which is lower than a mean underpricing of 0.6088 for IPOs with public offer mechanism. However, the overvluation in the secondary market for IPOs with bookbuliding mechanism is 0.3001, which is significantly higher than a mean overvaluation of 0.0131 for IPOs with public offer mechanism. The results show that the pricing mechanism may affect the setting of the offering price, but it can not control the first day trading price effectively.

Table 5 presents the descriptive statistics for the long run valuation of IPOs. The excess long run return of IPOs is the difference between the long run return of IPOs

and the long run return of market index. For IPOs listed in *Shanghai Stock Exchange*, the market index is *Shanghai Comprehensive Index*. For IPOs listed in *Shenzhen Stock Exchange*, the market index is *Shenzhen Component Index*. $CAR_{36,P1}$ and $BHAR_{36,P1}$ is the long run performance measured from the first day closing price.

Table 5 Discriptive statistics of long run valuation of IPOs

The excess long run return of IPOs is the difference between the long run return of IPOs and the long run return of market index. $CAR_{36,P1}$ is three years cumulative abnormal return for IPO firms measured from the first day closing price. $BHAR_{36,P1}$ is three years buy-and-hold abnormal return for IPO firms measured from the first day closing price. $CAR_{36,P0}$ is three years cumulative abnormal return for IPO firms measured from the offer price. $BHAR_{36,P0}$ is three years buy-and-hold abnormal return for IPO firms measured from the offer price.

	$CAR_{36,P1}$	$BHAR_{36,P1}$	$CAR_{36,P0}$	$BHAR_{36,P0}$
N	314	314	314	314
Mean	-0.1608	-0.3707	0.7977	0.6566
Median	-0.2200	-0.3008	0.7417	0.3952
Minimum	-1.8857	-4.9020	-1.1738	-3.6509
Maximum	1.7094	8.1094	3.2545	12.0739
Std. Deviation	0.5553	1.2754	0.7929	1.7672

The results show that IPOs underperform the market in the long run. On average, for investors who bought IPOs at the first day closing price, the three years cumulative abnormal return is -16.08%. These results show that from the long run view, IPOs are overvalued. When we measure the long run performance from the offer price, we find that IPOs outperforme the market in the long run. For investors who bough IPOs at the offer price, the three years cumulative abnormal return amounts to 79.77%. In the short run, IPOs in China are severely underpriced in the primary market because of the regulations in the primary market (Tian, 2003)[7]. These results give further supports for the short run underpricing in the primary market and the overvaluation in the secondary market.

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[7] In China, IPOs are issued at a fixed price in years before 2005 and the offer price is decided by: $P_0 = PE \times EPS$, Where, P_0 is the offer price of IPO; PE is the price-to-earnings ratio and EPS is earning per share for IPO firms. *CSRC* argued that the *PE* ratio used for pricing the news share should be no lower than 15 but no higher than 20. This leads to sever underpricing in Chinese Stock market. But in years 2000, the bookbuilding mechanism is introduced in China.

5 Empirical Results

5.1 Divergence of Opinion and the short run valuation of IPOs

Univariate tests

Table 6 reports the univariate tests for divergence of opinion and the short run of IPOs. We divide our sample into quintiles. For the portfolio of IPOs with lowest dispersion of analysts' forecast, the median (mean) of *AIR* is 0.5722 (0.5659), which is much lower than the median (mean) of 0.9277 (0.9202) for the portfolio with highest dispersion of forecast, and the difference between these two groups are highly significant. This difference between *AIR* holds to be highly significant when we group our samples according to the level of first day turnover rate (*TR*) and to the level of abnormal volatility (*VOL*).

Table 6 Univariate tests: Divergence of opinion and short run valuation of IPOs

In this table, the IPO samples are divided into quintiles. This table reports *AIR, Under and Over* of IPO portfolios for Lowest *Dispersion (TR, and VOL)*, medium *Dispersion (TR, and VOL)* and highest *Dispersion (TR, and VOL)*. We use the dispersion of financial analysts' forecast of the reasonable price of IPO firms (*Dispersion)*, the first day turnover rate (TR) and the 25 days excess volatility of IPO firms to measure the divergence of opinion. The numbers in the parentheses are the t-statistics for difference in means and z-statistics for difference in medians. ***, significant at 1% level; **, significant at 5% level; *, significant at 10% level.

	Medians			Means		
	AIR	*Under*	*Over*	*AIR*	*Under*	*Over*
Low *Dispersion*	0.5722	0.5727	-0.0166	0.5659	0.5793	-0.0134
Mid *Dispersion*	0.6634	0.3975	0.1348	0.6183	0.4423	0.1760
High *Dispersion*	0.9277	0.5127	0.3938	0.9202	0.5153	0.4049
High -Low *Dispersion*	0.3555***	-0.0600*	0.4104***	0.3543***	-0.0640*	0.4183***
t(Z)	(6.77)	(1.74)	(12.29)	(7.69)	(-1.75)	(16.80)
Low *TR*	0.3801	0.4212	-0.0591	0.4022	0.4521	-0.0499
Mid *TR*	0.7906	0.5617	0.1992	0.8205	0.5813	0.2392
High *TR*	0.6888	0.3053	0.3200	0.7618	0.4162	0.3456
High -Low *TR*	0.3087***	-0.1159***	0.3791***	0.3596***	-0.0359	0.3955***
t(Z)	(8.68)	(2.88)	(12.00)	(9.91)	(-1.10)	(15.71)
Low *VOL*	0.6120	0.4968	0.0430	0.6369	0.5393	0.0976
Mid *VOL*	0.5803	0.4323	0.0602	0.6368	0.5117	0.1251
High *VOL*	0.7133	0.3330	0.3146	0.7953	0.4230	0.3722

High -Low *VOL*	0.1013***	-0.1638***	0.2716***	0.1584***	-0.1163***	0.2746***
t(Z)	(3.30)	(3.53)	(8.15)	(3.71)	(-3.48)	(8.95)
Total	0.6320	0.4609	0.1300	0.6880	0.5063	0.1818

What contributes to the high difference? We can see from Table 6 that the divergence of opinion seems to have negative relations with the underpricing in the primary market. The possible reason is that we did not control other variables in the univariate tests. But the heteregeous beliefs have a significant effect on the overvaluation in the secondary market for all our proxies of divergence of opinion. For IPOs with highest dispersion, the median (mean) overvaluation is 0.3938 (0.4049), while for IPOs with lowest dispersion, the median (mean) overvaluation is -0.0166 (-0.0134), indicating that these IPOs may be undervalued on the first day of trading. The difference of overvaluation between these two groups is significant at 1% level. When we use *TR* and *VOL* as measures of divergence of opinion, we can also see the highly significant difference of overvaluation between different portfolios of IPOs.

Table 7 shows the relation between financial analysts' coverage and IPO valuation. Using the number of financial analysts as proxy of the level of coverage, we find that the median (mean) underpricing for IPOs with fewest financial analysts' coverage is 0.6476 (0.6924) while that for IPOs with highest financial analysts' coverage is 0.2853 (0.3313). The difference is highly significant. While IPOs with highest financial analysts' coverage have a median (mean) overvaluation of 0.2187 (0.2593), highly significant than the median (mean) overvalution of 0.0351 (0.0851) for IPOs with fewest financial analysts' coverage.

Table 7 Univariate tests: Financial analysts' coverage and short run valuation of IPOs

In this table, the IPO samples are divided into quintiles. This table reports *AIR, Under and Over* of IPO portfolios for Lowest level of financial analysts' coverage (with smalest numbers of financial analysts), medium and highest level of financial analysts' coverage (with the largest numbers of financial analyst).

	Medians			Means		
	AIR	*Under*	*Over*	*AIR*	*Under*	*Over*
Lowest coverage	0.7859	0.6476	0.0351	0.7776	0.6924	0.0851
Mid coverage	0.7093	0.5058	0.1961	0.7499	0.4871	0.2628

Highest coverage	0.5870	0.2853	0.2187	0.5906	0.3313	0.2593
Highest -Lowest *Coverage*	-0.1989***	-0.3623***	0.1837***	-0.1870***	-0.3611***	0.1741***
t(Z)	(4.58)	(8.80)	(6.09)	(-4.64)	(-10.15)	(6.36)

Multivariate tests

In this section, we use multivariate tests to examine the relationship between the divergence of opinion and the underpricing, overvaluation and initial return of IPOs. Table 8 shows the control variables we use for the regression model.

Table 8 Control Variables

Variables	Description of variables
Bookbuilding	Dummy variable for the pricing mechanism in Chinese IPO market. In the year of 2005, the bookbuilding mechanism was introduced into Chinese IPO market and from then on, the public offer (fixed price) mechanism is replaced by bookbuilding. $$Bookbuilding = \begin{cases} 1, \text{if the bookbuilding mechanism is used in the pricing of IPOs.} \\ 0, \text{if otherwise..} \end{cases}$$
Markcon	The 63-days cumulated returns of market index before the listing of new shares, for IPOs listed in *Shanghai Stock Exchange*, the market index is *Shanghai Comprehensive Index*. For IPOs listed in *Shenzhen Stock Exchange*, the market index is *Shenzhen Component Index*.
LnTA	Natural logarithm of the total assets in the prior fiscal year of IPO.
Growth	Ln(1+average growth rate of sales in the three years prio to IPO)
Lottery	The probability of getting new shares, the reciprocal of the oversubscription rate
Shareholder	Dummy variable, $$Shareholde\,r = \begin{cases} 1, \text{if the IPO firm is state - owned enterprise.} \\ 0, \text{if otherwise.} \end{cases}$$
Industry	Dummy variable, $$Industry = \begin{cases} 1, \text{if the IPO firm belongs to the manufacturing industry.} \\ 0, \text{if otherwise.} \end{cases}$$
Underwriter	Dummy variable, $$Underwrite\,r = \begin{cases} 1, \text{if the IPO firm choose an underwrite r ranked in the top 10.} \\ 0, \text{if otherwise .} \end{cases}$$

Table 9 reports the regression results on the relationship between the divergence of opinion and the short run valuation of IPOs.

Consistent with our hypothesis H1, we find that the dispersion of analysts' forecast price is positively related to Under, with a coefficient of 0.368, significant at 1% level. The turnover rate on the first trading day is also positively related to *Under*. The results show that the dispersion of analysts' forecast price and the turnover rate on the first day of trading describe the heterogeneous beliefs among investors. A higher degree of divergence of opinion suggests that the inherent risk of the IPO firm is higher. Thus the investors need the IPOs to be underpriced to a higher degree to compensate the future uncertainties. However, the volatility of IPO returns after the first trading day has no significant effects on the underpricing.

The results aslo support H3. The underpricing of IPOs is negatively related to the financial analysts' coverage. Higher analyst coverage reduce the information asymmetry in the primary market and thus reduce the level of underpricing.

We can see that the bookbuilding method is more efficient than the fixed price mechanism in China. *Bookbuilding* has a coefficient of -0.216, significant at 1% level. The results show that the bookbuilding method can reduce the level of underpricing.

Table 9 Multivariate Tests for Divergence of Opinion and Short Run Valuation of IPOs

This table reports the multivariate tests results for divergence of opinion and the short run valuation of IPOs. We use *Under, Over* and *AIR* as dependent variables for different models respectively. *AIR* is the abnormal initial return of IPOs, measured by $\text{Ln}(P_1/P_0)$. *Under* is the underpricing in the primary market, measured by $\text{Ln}(V_R/P_0)$. *Over* is the overvaluation in the secondary market, measured by $\text{Ln}(P_1/V_R)$. V_R is the average price of the financial analysts' forest of the reasonable price of IPOs. *Dispersion* measures the divergence of opinion among investors, measured as the standard deviation of analysts' forecast price divided by the average of the forecast price. TR_1 is the turnover rate on the first trading day. VOl_{25} is the difference between the standard deviation of the first 25 daily returns of IPOs and the standard deviation of the daily returns of the market index in the same period. *Coverage* is the number of financial analysts who provide the forecast price information for the IPO firm. The control variables are shown in the following: *Bookbuilding* is a dummy variable for the pricing mechanism in Chinese IPO market, if the IPO firm uses the bookbuilding method to set the offer price, it equals to 1; Otherwise, it equals to 0. *Markcon* is the 63-days cumulated returns of market index before the listing of IPOs. *LnTA* is natural logarithm of the total assets in the prior fiscal year of IPO. *Growth* is the average sales growth rate in the three years prior to the IPO. *Growth* is defined as ln(1+the average growth rate of sales in the three years prio to IPO). *Lottery* is the probability of getting new shares and is also the reciprocal of the oversubscription rate. *Industry* is a dummy variable, for IPO firm in the manufacturing industry, it equals to 1; If otherwise, it equals to 0. *Underwriter* is a dummy variable for the reputation of underwriter. If the IPO firm is underwritten

by top 10 underwriters, it equals to 1, if otherwise, it equals to 0. ***, significant at 1% level; **, significant at 5% level; *, significant at 10% level.

Model	（1）	（2）	（3）	（4）	（5）
Dependent Variable	Under	Under	Over	Over	AIR
N	667	667	667	667	667
Constant	1.625***	1.060***	0.622***	-0.660***	0.400*
	(23.53)	（5.22）	（4.18）	（-4.62）	（1.72）
Dispersion		0.368***		0.461***	0.830***
		（2.68）		（4.77）	（5.27）
TR		0.453***		0.781***	1.234***
		（4.80）		（11.78）	（11.43）
VOL		-1.535		7.418***	5.883***
		（-1.42）		（9.78）	（4.77）
Coverage		-0.018***		-0.001	-0.019***
		(-9.27)		(-0.51)	(-8.42)
Bookbuilding	-0.126**	-0.216***	0.256***	0.029	-0.188**
	(-5.45)	（-7.04）	(14.01)	（1.33）	（-5.34）
Markcon	0.204***	0.300***	0.359***	0.530***	0.830***
	(3.92)	（5.73）	(8.71)	（14.40）	（13.85）
LnTA	-0.055***	-0.029***	-0.029***	0.007	-0.022**
	(-5.75)	(-3.11)	（-3.83）	（1.05）	（-2.07）
Growth	-0.112**	-0.076*	0.072*	0.012	-0.064
	(-2.25)	(-1.64)	（1.83）	（0.38）	（-1.20）
Lottery	-0.119***	-0.124***	-0.020	-0.024	-0.148***
	(-4.59)	(-5.22)	（-0.99）	（-1.42）	（-5.44）
Shareholder	0.141***	0.112***	-0.006	-0.003	0.109***
	(6.16)	(5.29)	(-0.32)	(-0.23)	(4.49)
Underwriter	0.075***	0.060***	-0.035**	-0.026*	0.034
	(3.44)	(3.02)	（-2.03）	（-1.86）	（1.50）
Industry	0.036*	0.020	-0.029*	-0.001	0.019
	(1.63)	(0.96)	（-1.68）	（-0.04）	（0.82）
A-R^2	0.2308	0.3558	0.3950	0.5981	0.4664
F	25.98***	31.66***	55.34***	83.60***	49.50***

Markcon is positively related to the degree of underpring. A possible reason is that in a hot market, the financial analysts will give higher forecast price for the firm, which causes a higher degree of underpricing in our model. The size of the firm is negatively related to the level of underpricing. *LnTA* has a coefficient of -0.029, significant at 1% level. The small firms usually have higher risk than the large firms, thus investors will ask for a higher degree of underpricing for small firms, the result is

consistent with that of Chen, Firth and Kim (2004). The lower the probability of getting new shares, the higher degree of underpricing, which gives support for winner's curse model of Rock (1986). The uninformed investors will need high degree of underpricing when they face with a lower probability of getting new shares. Other variables, such as the reputation of underwriter, the age of the firm, have no significant relationship with the degree of underpricing.

Consistent with our hypothesis H2, the divergence of opinion is positively related the overvaluation in the secondary market. The dispersion of analysts' forecast price of the first trading day (*Dispersion*) is positively related to IPO overvaluation. The regression coefficient is 0.461, significant at 1% level. Higher *Dispersion* indicates a higher degree of divergence of opinions among investors. In a stock market with strict short sales constraints, the optimistic investors will drive the market price higher than the intrinsic value and lead to a higher level of overvaluation. The turnover rate (*TR*) and the aftermarket volatility (*VOL*) are also positively related to IPO overvaluation, with a coefficient of 0.781 and 7.418 respectively. If the turnover rate on the first trading day is higher, it suggests that optimistic and pessimistic investors have greater disagreement and they trade the IPOs in the market actively. Short sale constrains keep the pessimistic investors staying out of the market, so the stock price is totally determined by the sentimental investors. When investors' disagreement is greater, sentimental investors have higher valuation for IPO. Therefore, the stock price in the short run contains only the valuation information of optimistic investors.

However, the financial anlysts' coverage has no significant impacts on the overvaluation of IPOs in the secondary markets, which is not consistent with our hypothesis.

Markcon is positively related to the overvaluation of IPOs. Investors are more optimistic in a hot market and will pay higher price for IPOs.

Both underpricing and overvaluation are positively related to the divergence of opinion, which contributes the significant relationship between the abnormal initial return (*AIR*) and the divergence of opinion. Financial analysts' coverage reduces the level of underpricing but has no significant relation with the overvaluation in the

secondary markets, so the financial analysts' coverage is negatively related to *AIR*. Since bookbuilding mechanism can reduce the level of underpricing, *Bookbuilding* is negatively related to *AIR*, with a coefficient of -0.188. Rajan and Servaes（2003）, Derrien (2005) and Oehler, Rummer and Smith (2005) all show that the market condition is positively related to initial returns. Consistent with these results, we also find positive relationship between market condition and the initial returns. Large firms will have lower degree of underpricing, which leads to a negative relation between *LnTA* and *AIR*. A negative coefficient of *Lottery* is caused by the higher underpricing in the primary market for firms with lower probability of getting new shares.

5.2 Divergence of Opinion and the long run valuation of IPOs

In this section, we use the long run performance of IPOs to examine whether the short run underpricing and overvaluation do exist and whether the divergence of opinion will affect the asset price as a risk factor or will affect the asset price through the behavior of irrational investors in a long run view.

Table 10 gives univariate tests on the short run and long run valuation of IPOs.

Table 10 Univariate tests: the short run and long run valuation of IPOs

We divide the samples into three groups according to the level of underpricing and overvaluation. $CAR_{36,P1}$ is three years cumulative abnormal return for IPO firms measured from the first day closing price. $BHAR_{36,P1}$ is three years buy-and-hold abnormal return for IPO firms measured from the first day closing price. $CAR_{36,P0}$ is three years cumulative abnormal return for IPO firms measured from the offer price. $BHAR_{36,P0}$ is three years buy-and-hold abnormal return for IPO firms measured from the offer price. ***, significant at 1% level; **, significant at 5% level; *, significant at 10% level.

	Medians		Means	
	$CAR_{36,P0}$	$BHAR_{36,P0}$	$CAR_{36,P0}$	$BHAR_{36,P0}$
Low *Under*	0.3025	0.1178	0.3238	0.5207
Mid *Under*	0.7236	0.4956	0.7383	0.7219
High *Under*	1.1330	0.4799	1.3264	0.7259
High -Low *Under*	0.8305***	0.3620***	1.0025***	0.2052
t(Z)	(-8.44)	(-2.54)	(-9.94)	(-0.77)
Total	0.7417	0.3952	0.7977	0.6566

	Medians		Means	
	$CAR_{36,P1}$	$BHAR_{36,P1}$	$CAR_{36,P1}$	$BHAR_{36,P1}$
Low *Over*	-0.0748	-0.2362	-0.0632	-0.3263
Mid *Over*	-0.2075	-0.2965	-0.1690	-0.2485

High *Over*	-0.3552	-0.3705	-0.2493	-0.5368
High -Low *Over*	-0.2804***	-0.1344**	-0.1862***	-0.2104
t(Z)	(-2.75)	(-1.96)	(2.47)	(1.26)
Total	-0.2200	-0.3008	-0.1608	-0.3707

For IPOs with low level of underpricing, the median (mean) three years cumulative abnormal return measured from the offer price ($CAR_{36,P0}$) is 0.3025 (0.3238). However, for IPOs with high level of underpricing, the median (mean) three years cumulative abnormal return measured from the offer price ($CAR_{36,P0}$) is 1.1330 (1.3264). The difference of long run return between these two groups is highly significant. The results show that IPOs are really underpricing in the short run.

IPO portfolio with high level of overvaluation in the short run underperforms the market by 24.93% when we measure the long run return from the first day closing price. IPO portfolio with low level of overvaluation underperforms the market by 6.32% on average. The difference of these two groups is also highly significant in a statistic view. For investors who bought IPOs at the first day trading price, they suffer a loss in the long run as the short run overvaluation is corrected. These results support our separation of underpricing and overvaluation in the short run again.

Table 11 presents the univariate tests on the divergence of opinion and long run valuation of IPOs. We can see from Table 8 that when we use the first day turnover rate (*TR*) as proxy for divergence of opinion, IPOs with high degree of heterogeneous beliefs underperforms the market most when measuring the long run performance from the first day closing price. The long run return of IPOs with high turnover rate on the first day has a mean (median) of -25.21% (-34.10%), is much lower than the mean (median) of -10.23% (9.81%) for IPOs with low turnover rate. However, when we measure long run performance of IPOs from the offer price, we find that IPOs with higher turnover rate have higher long run return when measured from the offer price. But when we use dispersion of financial analysts' forecast price and volatility of aftermarket returns as proxies of divergence of opinion, the relation is not so robust.

Table 12 reports multivariate regression results for the long run valuation of IPOs. We use the average earnings per share in the three years after listing (*AEPS*), the

average sales growth rate in the three years after listing (*AGROWTH*), the firm size (*LnTA*) and industry as control variables.

The results show that *Under* is positively related to $CAR_{36,P0}$ with a coefficient of 1.854, significant at 1% level. This positive relation supports that in the short run, IPOs are really underpriced as compensations for high inherent risk of IPOs. In the long run, investors who bought IPOs underpriced at the offer price can earn a positive return. IPOs with higher inherent risk will be underpriced more and investors who bought IPOs with higher degree of underpricing will have higher long run return.

Over is negatively related to $CAR_{36,P1}$, with a coefficient of -0.569, significant at 1% level. IPOs are overvalued on the first trading day will convert to the fair value in the long run. Henceforth, the higher the level of overvaluation on the first day, the lower the long run returns are. Investors who bought IPOs at a higher first day closing price will lose more of his wealth after three years. The relation between the short run and long run valuation of IPOs supports our hypothesis that IPOs are really both underpriced and overvalued in the short run.

Consistent with our hypothesis H5, we find that the long run performance of IPOs measured from the offer price is positively related to the turnover rate (*TR*), with a coefficient of 2.593, significant at 1% level. The results indicate that the divergence of opinion captures the inherent risk of the firms. The IPO firms with higher divergence of opinion are firms with higher uncertainties in the future; investors will earn higher returns for these IPOs. In this way, divergence of opinion affects the deliberate underpring in the primary market, showing that divergence of opinion will affect the asset price in a reasonable way in a rational world. The turnover rate on the first trading day absorbs the impacts of dispersion of analysts' forecast and aftermarket volatility. These two variables are not significantly related the long run performance of IPOs when we use all the three proxies of divergence of opinion in the model.

Table 11 Univariate tests: Divergence of opinion and long run valuation of IPOs

$CAR_{36,P1}$ is three years cumulative abnormal return for IPO firms measured from the first day closing price. $BHAR_{36,P1}$ is three years buy-and-hold abnormal return for IPO firms measured from the first day closing price. $CAR_{36,P0}$ is three years cumulative abnormal return for IPO firms measured from the offer price. $BHAR_{36,P0}$ is three years buy-and-hold abnormal return for IPO firms measured from the offer price. We use the dispersion of financial analysts' forecast of the reasonable price of IPO firms (*Dispersion*), the first day turnover rate (*TR*) and the 25 days excess volatility of IPO firms to measure the divergence of opinion. ***, significant at 1% level; **, significant at 5% level; *, significant at 10% level.

	Medians				Means			
	$CAR_{36,P1}$	$BHAR_{36,P1}$	$CAR_{36,P0}$	$BHAR_{36,P0}$	$CAR_{36,P1}$	$BHAR_{36,P1}$	$CAR_{36,P0}$	$BHAR_{36,P0}$
Low *Dispersion*	-0.1884	-0.2508	0.7095	0.3629	-0.1116	-0.1132	0.7355	0.5554
Mid *Dispersion*	-0.2180	-0.3424	0.7965	0.4837	-0.1453	-0.3959	0.8468	0.6897
High *Dispersion*	-0.3273	-0.3560	0.7987	0.4264	-0.2253	-0.6032	0.8112	0.7249
High -Low *Dispersion*	-0.1389*	-0.1053**	0.0892	0.0634	-0.1137	-0.4900***	0.0757	0.1695
t(Z)	(-1.74)	(-2.41)	(-0.79)	(-0.39)	(1.51)	(2.93)	(-0.70)	(-0.71)
Low *TR*	-0.0981	-0.2946	0.4311	0.1882	-0.1023	-0.3222	0.3824	0.2452
Mid *TR*	-0.3008	-0.3442	0.7090	0.3865	-0.1275	-0.3123	0.7506	0.8041
High *TR*	-0.3410	-0.2944	1.1309	0.5519	-0.2521	-0.4771	1.2561	0.9166
High -Low *TR*	-0.2429**	0.0002	0.6998***	0.3637***	-0.1498**	-0.1549	0.8738***	0.6714***
t(Z)	(-2.36)	(-0.65)	(-7.48)	(-3.77)	(2.02)	(0.94)	(-8.75)	(-3.04)
Low *VOL*	-0.1714	-0.17936	0.88064	0.480315	-0.102985	-0.02558	0.938884	0.66187
Mid *VOL*	-0.23346	-0.30638	0.81225	0.47967	-0.167018	-0.33086	0.854486	0.558032
High *VOL*	-0.31535	-0.72437	0.52836	0.28595	-0.211881	-0.75229	0.600985	0.749857
High -Low *VOL*	-0.1440**	-0.5450***	-0.3523***	-0.1944**	-0.1089	-0.7267***	-0.3379***	0.0880
t(Z)	(-1.92)	(-5.57)	(-3.98)	(-2.04)	(1.42)	(4.05)	(3.37)	-0.33
Total	-0.2200	-0.3008	0.7417	0.3952	-0.1608	-0.3707	0.7977	0.6566

Table 12 Multivariate regression results

$CAR_{36,P1}$ is three years cumulative abnormal return for IPO firms measured from the first day closing price. $CAR_{36,P0}$ is three years cumulative abnormal return for IPO firms measured from the offer price. *Under* is the underpricing in the primary market, measured by $Ln(V_R/P_0)$. *Over* is the overvaluation in the secondary market, measured by $Ln(P_1/V_R)$. V_R is the average price of the financial analysts' forest of the reasonable price of IPOs. *Dispersion* measures the divergence of opinion among investors, measured as the standard deviation of analysts' forecast price divided by the average of the forecast price. TR_1 is the turnover rate on the first trading day. VOl_{25} is the difference between the standard deviation of the first 25 daily returns of IPOs and the standard deviation of the daily returns of the market index in the same period. *LnTA* is natural logarithm of the total assets in the prior fiscal year of IPO. *AEPS* is the average earnings per share in the three years after listing. *AGROWTH* is the average growth rate of sales in the three years after listing. *Industry* is a dummy variable, for IPO firm in the manufacturing industry, it equals to 1; If otherwise, it equals to 0.

Model	（1）	（2）	（3）	（4）
Dependent Variable	$CAR_{36,P1}$	$CAR_{36,P1}$	$CAR_{36,P0}$	$CAR_{36,P0}$
N	314	314	314	314
Constant	-0.371***	0.109	-0.475***	-0.285
	(-3.75)	（0.61）	（-2.84）	（-1.15）
Under			1.854***	
			(15.85)	
Over	-0.569***			
	(-2.72)			
Dispersion		0.129		1.053
		（0.22）		（1.33）
TR		-0.771***		2.591***
		（-3.27）		（7.97）
VOL		-5.23		-2.017
		（-1.32）		（-0.37）
LnTA	-0.005	-0.005	-0.012	-0.055***
	(-0.83)	(-0.65)	（-1.60）	（-5.50）
AEPS	0.953***	0.938***	0.870***	0.415***
	(10.01)	(9.80)	（7.73）	（3.15）
AGROWTH	0.332***	0.361***	0.470***	0.527***
	(4.16)	(4.54)	（5.18）	（4.80）
Industry	-0.134***	-0.129**	-0.145**	0.022
	(-2.46)	(-2.38)	（-2.33）	（0.30）
A-R^2	0.339	0.349	0.583	0.393
F	33.05***	24.98***	88.51***	29.66***

Consistent with our expectation in H6, the turnover rate on the first trading day (*TR*) is negatively related to the long run performance of IPO measured from the first

day trading price ($CAR_{36,P1}$), with a coefficient of -0.771, highly significant in a statistical view. Divergence of opinion will affect the asset pricing in a market with short sales constraints. When there are heterogeneous beliefs among investors, short sales constraints keep the pessimistic investors outside the market and the optimistic investors determine the asset price in the short run. The higher the divergence of opinion, the more optimistic the investors are. And in the long run, the investors will suffer a large loss for overvalued IPO. The turnover rate on the first trading day also absorbs the impacts of dispersion of analysts' forecast and aftermarket volatility. These two variables are not significantly related the long run performance of IPOs when we use all the three proxies of divergence of opinion in the model.

The average earning per share (*AEPS*) and the average growth rate of sales (*AGROWTH*) are positively related to the long run performance of IPOs in all our models. Since IPOs in small size have higher underpricing in the primary market, they also have longer returns in the long run when measured from the offer price.

6 Conclusions

The special data set in Chinese IPO market allows us to separate the abnormal initial return of IPOs into the underpricing in the primary and overvaluation in the secondary market. Using the average forecast price of financial analysts, we find interesting results that IPOs in China are both underpriced and overvalued. The mean *AIR* is 0.6880 for IPOs going public in the year of 2001 to 2009. The mean of underpricing is 0.5063, accounting for 73.59 percent of the total initial return. Although the underpricing in the primary market accounts for a large percentage of initial return, the overvaluation in the secondary market is important: The mean overvaluation is 0.1818, accounting for 26.41 percent of the total initial return. The long run performance of IPOs supports our separation. In the long run, investors who bought IPOs at the offer price can earn an abnormal return of 79.77% since the offer price is set below the intrinsic value and IPOs are underpriced. However, investors who bought IPOs at the first day closing price will suffer an abnormal loss of 16.08% because the first day closing price of IPOs is above the intrinsic value and IPOs are

overvalued in the secondary market.

Although the data set for our research is unique, the idea is not unique. The separation of underpricing and overvaluation is possible for stock markets outside China. The comparable firm's multiples are also good ways for such separation. Separation of underpricing and overvaluation in initial returns helps us to understand the literature better.

Following the separation of underpricing and overvaluation, this paper examines how the divergence of opinion will affect the IPO valuation both in the short run and long run. We find that divergence of opinion affects the underpricing as an inherent risk factor. A higher degree of divergence of opinion indicates higher uncertainties for the IPO firm, thus IPOs are underpriced at a higher degree to compensate the higher risk of the investors. The long run performance of IPOs measured from the offer price is positively related to the divergence of opinion. In this view, the divergence of opinion affects the deliberate underpricing in a rational way.

However, in the secondary market where there is short sales constraints and heterogeneous beliefs, the optimistic investors determines the asset price in the short run and leads to the overvaluation of assets in the short run and underperformance in the long run. It is just the case in the Chinese IPO market. The divergence of opinion affects the trading behavior of the optimistic investors and the first day trading price only reflects the valuation information of these investors. IPOs are overvalued in the short run and the overvaluation is positively related to the divergence of opinion. But the long run performance of IPOs is negatively related to the divergence of opinion since the overvaluation in the short run is corrected. In this way, divergence of opinion affects the asset price in an irrational way.

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