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Impacts of Investor Sentiment and Price Limit Rules on IPO Returns

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Abstract

The price limit rules on the first day of IPO new shares started implementing since 2013 in China. The essence of the rules is to prevent and control speculation on new shares, safeguard normal trading order, and protect investors' legal rights and interests in China. However, the price limit rules violate the efficient market hypothesis which may encourage the speculative trading behaviors and cause the prices of the new shares in IPO market difficult to predict. Therefore, this study emphasizes on analysis of the impact of investor sentiments and price limit rules on the IPO returns in China. Meanwhile, this study distinguishes the sentiment of the individual investors and the sentiment of the institutional investors to verify the impacts from different types of investors. The results show that the sentiment of the institutional investors has a significant impact on the first-day return of IPO shares after the implementation of the price limit rules. The results of this study provide important enlightenments for the practice of the improvement in China's IPO market. The uncertainty and complexity of investors' behaviors are the factors that policymakers must consider to avoid the speculative trading behaviors in the market.

Keywords: price limit regulation, IPO returns, institutional investor sentiment, individual investor sentiment

1. Introduction

Price limits on the first day of IPO can cool investors' optimism to a certain extent, gradually release the pressure of new shares premium, play a role in stabilizing prices. In fact, however, most share price surges can be achieved the upper price limits of subsequent trading days, and IPO share price limits have led to higher IPO premiums and returns in the short term. Most scholars believe that the price limit rules may exacerbate investor speculative trading behaviors Therefore, this study attempts to investigate the impact of the implementation of the price limit rules on IPO returns and also to distinguish the impacts from the individual investors and institutional investors on IPO returns.

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According to the efficient market hypothesis, the intrinsic value of the IPO new shares will be equal to the closing price of the secondary market on the first day of the listing of the shares, so the trading mechanism on the first day of IPO listing is an important way to release the uncertainty of the value. Lu et al. (2010) argues that uncertainty about information prevents investors from accurately assessing the true value of the companies they invest in. Therefore, the first-day price limit rules may increase the uncertainty of the value of IPO new shares.

The main contributions of this study are as follows. First, analyze and verify the impact of price control on the first day of IPO on the actual return of new shares on the first day. Second, because of the different status of individual investors and institutional investors in the capital market, the impact on the stock market is also different, so this study divides investor sentiment into individual investor sentiment and institutional investor sentiment on the first day of new stock market

return. Third, this study revises the calculation of the return on the first day of an IPO.

2. Literature Review

2.1 Price limits

Price limits on the first day of IPO is a policy to limit the volatility of the stock price on the day and to make it fluctuate within a certain range in order to curb excessive trading and speculation and prevent the stock market from surging and plummeting. Goldman and Sosin (1979) argue that in the case of high stock market uncertainty, the improvement in market efficiency can be achieved by suspending trading.

Greenwald and Stein (1988) point out that price limit rules reduce the impact of information asymmetry and market price uncertainty on investors' trading behaviors since the price limit rules provide a period of time for the investors to gather information for analysis of the shares. Kim and Rhee （1997） find the price limit rules cause at least three problems including volatility spillovers, price discovery delays and trading intervention.

Price limit advocates claim that price limits decrease stock price volatility, counter overreaction, and do not interfere with trading activity. Conversely, price limit critics claim that price limits cause higher volatility levels on subsequent days (volatility spillover hypothesis), prevent prices from efficiently reaching their equilibrium level (delayed price discovery hypothesis), and interfere with trading due to limitations imposed by price limits (trading interference hypothesis). Empirical research does not provide conclusive support for either positions.

Chan et al. (2005) pointed out that the price limit rules expands the unbalance of quotes, leading to delays in trading by information traders and hindering the price discovery process. Subrahmanyam (1994) explains this phenomenon from the perspective of investor behavior, arguing that when the stock price approaches the limit price, the investor accelerates trading the stock for fear that the stock will lose liquidity, causing the share price to accelerate towards the day's limit price.

Wu et al. (2018) investigate the IPO returns in different price limit systems in China, and find that the price limit rule causes the delay of the IPO price change. Li et al. (2020) examine the relation of institutional constraints and IPO anomaly in China.

2.2 Investor sentiment and IPO first-day return

Previous studies find the high return on the first day of IPO and the long-term market performance downturn mostly attributed to information asymmetry and investor rationality cause the market underprice the IPO's issue price. Due to the asymmetric information, the issuers and underwriters may issue the price of the IPO shares lower than the instinct value.

Purnanandam and Swaminathan (2004) find that the IPO price was overvalued with an average of 14% to 50% and suggested that overvaluation of the IPO first-day trading price may be the cause of the high IPO return. Dorn and Daniel (2009) find that investor sentiment diverts share prices from their instinct value, which is an important reason for the IPO abnormal return.

Zhang (2006) finds that the IPO's first-day returns are generally high phenomenon is an important factor in investor sentiment, the implementation of price controls increased uncertainty about the value of new shares will affect investor behavior, and thus play a role in the first-day IPO returns.

2.3 Divergence of investors' opinions and stock return

Divergence of investors' opinions will make investors behave different in the market. Under the constraints of short selling restrictions, the pessimistic investors cannot influence the stock price through short sales on stocks. Miller (1977) finds that under the short selling constraints, investors' different expectations of stock performance are a prerequisite for the stock premium and the short-term impact on the stock price is optimistic investor sentiment. Brown and Cliff (2005) find that when institutional investor sentiment is optimistic, they generally over-estimate the companies' value. Meanwhile, the optimistic investors play a decisive role in the stock price, the greater the divergence among investors, the higher the market equilibrium price of stocks under the influence of optimistic investor sentiment (Miller, 1977). The greater the divergence of investors' opinions, the greater the impact of investor sentiment on the return on investment is premised on the irrational existence of market trading. According to the theory of behavioral finance, sheep, excessive trading and speculation are irrational.

Greenwald and Stein (1991) find that noise trading tends to dominate the market when market uncertainty is high, as irrational traders of new information tend to overreact, behave herds, over-trade, and other behaviors to amplify the impact of noise trading on the stock market. Due to the asymmetric information and the lack of professional investment knowledge, individual investors tend to

make irrational decisions in trading and are often regarded as noise traders. Chuang and Susmel (2011) demonstrate that institutional investors are overconfident in trading and behave more clearly when market sentiment is high. However, the later studies have proved that not only individual investors, institutional investors also have cognitive bias and noise trading behavior.

3. Data Selection

3.1 Sample selection

The implementation of the IPO first-day price limits starts from December 13, 2013, therefore, this study selects the IPO listed companies from December 31, 2010 to December 31, 2015. The related financial data and information of these IPO companies are included. Data are derived from Wind database.

3.2 Definition of the variables

3.2.1 IPO return (R_{IPO})

IPO first-day return (R_{FD}) is defined as

$$R_{FD} = \frac{P_{FD} - P_I}{P_I} \tag{2}$$

where P_I is the issue price of IPO share, P_{FD} is the closing price of the first-day of IPO share. The effective order price during consecutive auction should neither be 144% higher nor 64% lower than the issue price in the first-day. Later on, the price limit of each share will be 10% of the previous trading day. Most of the IPO shares are with the IPO premium and will take few days after the IPO day to reach the reasonable price of the IPO share. Therefore, with the consideration of the price limit rules, the IPO return (R_{IPO}) shall include the next consecutive trading days which the share price reaches the price limit of that trading day.

$$R_{IPO} = \frac{P_{FD}\left(1+10\%\right)^{T+1} - P_I}{P_I} \tag{3}$$

3.2.2 Divergence of investors' opinions (DIO)

As a result of the first day's ups and downs, the share price of new shares does not truly reflect the value of the stock, increasing uncertainty, and investor disagreements are significantly related to uncertainty about the value of the stock (Miller, 1977).

DIO is defined as follows (Baker and Wurgler, 2007):

$$DIO = \frac{1}{\overline{P_i^F}} \sqrt{\sum_{n=1}^{N} \frac{\left(P_{n,i}^F - \overline{P_i^F}\right)}{N-1}} \tag{1}$$

where $\overline{P_i^F}$ is the mean of the forecast prices of IPO firm *i* from *N* institutional investors and $P_{n,i}^F$ is the forecast prices of IPO firm *i* from each institutional investor.

3.2.3 Investor Sentiment

The main channel for the individual investors to obtain effective information on IPO shares is the Internet. The online cumulative effective subscription multiplier can be regarded as a direct reflection of individual investors' sentiment for IPO shares subscriptions, the greater the value equivalent to the higher the optimism of individual investors. On the other hand, the institutional investors' subscriptions of IPO shares are mostly off-net trading, so the offline cumulative effective subscription multiplier is directly related to the institutional investor sentiment. Therefore, this study adopts the online cumulative effective subscription multiplier as the individual investor sentiment (*SentP*) and the offline cumulative effective subscription multiplier as the institutional investor sentiment (*SentI*).

Since *SentP* is significantly influenced by *SentI*, this study regresses the equation (4) to eliminate this effect and to explore the extent of the pure effect from the individual investor sentiment.

$$SentI_i = \alpha + \beta \cdot SentP_i + \varepsilon_i \tag{4}$$

where ε the residual of the regression can capture the pure individual investor sentiment ($SentP_p$). Therefore, $SentP_p$ can express as follows.

$$SentP_{p,i} = \varepsilon_i = SentI_i - \alpha - SentP_i \tag{5}$$

3.2.4 Control Variables

This study selects the information of the IPO company such as age, debt ratio, market capitalization, return on assets, underwriters' reputation as the control variables. Table 1 summarizes the definition of these control variables.

Table 1 Definition of Control Variables

Variable	Definition
RULE	Dummy variable to classify the period of before and after the implementation of the IPO first-day price limit rules. *RULE*=0 represents the period before the implementation (pre-limit period) and *RULE*=1 represents the period after the IPO-first day price limit implementation (post-limit period).
AGE	AGE is the company's age used as one of the determinants of the company's performance.
SIZE	The market capitalization of the company.
ROE	The return on equity (*ROE*) is used to measure of financial performance calculated by net income divided by shareholders' equity.
LEV	The debt ratio is a leverage ratio (*LEV*) calculated by total debts divided by total assets.
UW	The dummy variable represents the reputation of the underwriter. *UW*=1 while the underwriter is the top 10 with highest IPO sales this year, otherwise *UW*=0.
INDU	The dummy variable to classify the industry category. *INDU*=1while the IPO company belongs to the manufacturing industry, otherwise *INDU*=0.
BOARD	*BOARD*=1 while the IPO company listed in the main board, otherwise *BOARD*=0.
PPI	The producer price index (*PPI*) is used as the proxy to reflect the macroeconomic condition.

4. Empirical Analysis

Table 2 summarizes the descriptive statistics of the variables. Table 3 shows the regression results of impacts of investor sentiment on IPO return during the whole sample period. The coefficients of *SentI ×RULE* are 1.106 and 1.099 in model (1) and in model (3) respectively which shows the institutional investors in the post-limit period are significant positive with the R_{IPO}. The coefficients of *SentP ×RULE* are 0.621 and 0.609 in model (2) and in model (3) respectively which shows the individual investors in the post-limit period are significant positive with the R_{IPO}. Compared with the coefficients of *SentI ×RULE* and $SentP_p$ *×RULE*, the results show that the institutional investor sentiment has larger impacts on R_{IPO} than individual investor sentiment. The coefficients of *SIZE* are negatively correlated with R_{IPO} which indicate that the company with smaller market capitalization may with higher IPO return consistent with the size effect of Fama and French (1993). The coefficients of PPI are significant negatively R_{IPO} which indicate the macroeconomic condition will affect the R_{IPO}.

To compare and understand the impact of price limit rules on R_{IPO}, this study divides the whole sample into pre-limit period and post-limit period. Table 4 summarizes the regression results of the pre-period and post-period. In Model (4) and Model (5), the institutional investor sentiment is significantly positive related with R_{IPO}. Compared with the coefficients of *SentI*, the coefficient increased from 0.067 to 1.063, indicating that the impact of *SentI* on R_{IPO} after the implementation of IPO price limit rules has significantly increased. In Model (6) and Model (7), the individual investor sentiment is significantly positive related with R_{IPO}. Compared with the coefficients of $SentP_p$, the coefficient increased from 0.125 to 0.460, indicating that the impact of $SentP_p$ on R_{IPO} after the implementation of IPO price limit rules has significantly increased. During the pre-limit period, *ROE* and *LEV* are significant negatively with R_{IPO} in Model (4), Model (6) and Model (8). During the post-limit period, *SIZE*, *BOARD* and *PPI* are significant negatively with R_{IPO} in Model (5), Model (7) and Model (9). The results suggest that after the implementation of IPO first-day price limit, the companies listed in the main board and in the manufacturing industry are negatively related with R_{IPO}.

The results show that the institutional investor sentiment has a stronger impact on the first-day return of an IPO under the influence of first-day price restrictions than individual investor sentiment. The implementation of the price limit rules on the first day of IPO new shares will hinder the uncertainty of the first day price of the IPO shares and amplify the divergence of investors' opinions which cause the impact of the investors' sentiment on the IPO first-day return. This leads to investor sentiment has a stronger impact on the IPO first-day return after the implementation of the price limit rules on the first day of IPO new shares.

The influence of institutional investors on stock pricing is that the market share they hold and

institutional investors have a larger and more concentrated shares and play a leading role in herding behaviors, therefore, the individual investors may follow the institutional investors' trading behaviors.

Table 2 Descriptive Statistics

	mean	st. dev.	minimum	maximum
Panel A: Whole Sample Period (December 31, 2010 to December 31, 2015)				
R_{IPO}	1.60	2.61	-0.26	21.73
DIO	0.25	0.47	0.01	10.20
SentI	0.00	0.82	-1.16	4.44
SentP	0.00	0.70	-1.98	3.80
AGE	12.55	4.86	4.00	56.00
SIZE	11.16	0.96	9.18	16.31
ROE	27.97	12.82	4.42	103.95
LEV	43.61	16.71	4.56	90.55
UW	0.48	0.50	0.00	1.00
INDU	0.72	0.45	0.00	1.00
BOARD	0.25	0.43	0.00	1.00
PPI	100.79	4.85	94.10	107.09
Panel B: Pre–Limit Period (December 31, 2010 to December 12, 2013)				
R_{IPO}	0.22	0.32	-0.26	2.21
DIO	0.19	0.32	0.01	3.76
SentI	-0.18	0.43	-0.99	0.40
SentP	0.03	0.68	-0.86	3.04
AGE	11.54	4.38	4.00	28.00
SIZE	10.98	1.00	9.18	16.31
ROE	33.38	13.27	8.97	103.95
LEV	45.25	16.15	4.65	90.55
UW	0.52	0.50	0.00	1.00
INDU	0.70	0.46	0.00	1.00
BOARD	0.14	0.35	0.00	1.00
PPI	104.43	3.42	98.47	107.09
Panel C: Post–Limit Period (December 13, 2013 to December 31, 2015)				
R_{IPO}	3.26	3.15	0.14	21.73
DIO	0.33	0.60	0.01	10.20
SentI	0.22	1.08	-1.16	4.44
SentP	-0.03	0.73	-1.98	3.80
AGE	13.78	5.14	6.00	56.00
SIZE	11.38	0.87	9.65	15.92
ROE	21.42	8.50	4.42	59.60
LEV	41.63	17.19	4.56	82.15
UW	0.45	0.50	0.00	1.00
INDU	0.74	0.44	0.00	1.00
BOARD	0.38	0.49	0.00	1.00
PPI	96.38	1.52	94.10	99.10

Table 3 Impacts of Investor Sentiment on IPO Return during the Whole Sample Period

Dependent Variable：R_{IPO}			
Model	（1）	（2）	（3）
SentI	-0.004		0.009
	(-0.30)		(0.93)
SentI ×RULE	1.106		1.099
	（6.780）		（6.780）
$SentP_p$		0.008	0.033
		(0.722)	(0.593)
$SentP_p$ *×RULE*		0.621	0.609
		(2.891)	(2.980)
RULE	2.266	2.233	2.247
	(8.261)	(7.822)	(8.263)
AGE	-0.02	-0.027	-0.024
	(-1.271)	(-1.624)	(-1.541)
SIZE	-0.283	-0.29	-0.206
	(-2.542)	(-2.464)	(-1.793)
ROE	-0.011	-0.014	-0.01
	(-1.553)	(-1.912)	(-1.381)
LEV	0.002	0.001	0.001
	(0.443)	(0.261)	(0.602)
UW	-0.003	0.008	0.001
	(-0.022)	(0.051)	(0.014)
INDU	-0.147	-0.277	-0.146
	(-0.881)	(-1.602)	(-0.881)
BOARD	-0.293	-0.12	-0.247
	(-1.402)	(-0.551)	(-1.193)
PPI	-0.111	-0.107	-0.109
	(-4.001)	(-3.712)	(-3.981)

Note: Values in parentheses are t-values of corresponding coefficients.

Table 4 Comparison with the Impacts of Investor Sentiment on IPO Return during the Pre-limit and Post-limit Period

Dependent Variable：R_{IPO}						
	Pre-limit Period	Post-limit Period	Pre-limit Period	Post-limit Period	Pre-limit Period	Post-limit Period
Models	(4)	(5)	(6)	(7)	(8)	(9)
SentI	0.067	1.063			0.076	1.077
	(3.380)	(7.450)			(4.170)	(7.620)
$SentP_p$			0.125	0.460	0.133	0.508
			(6.510)	(1.590)	(6.770)	(1.850)
AGE	0.000	-0.040	0.000	-0.050	0.000	-0.040
	(0.390)	(-1.383)	(-0.402)	(-1.534)	(-0.605)	(-1.502)
SIZE	-0.020	-0.565	-0.010	-0.615	0.020	-0.415
	(-0.471)	(-2.952)	(-0.342)	(-2.893)	(0.930)	(-2.013)

ROE	-0.004	-0.017	-0.002	-0.030	0.000	-0.020
	(-3.602)	(-1.671)	(-2.253)	(-1.522)	(-2.351)	(-0.814)
LEV	-0.006	-0.022	-0.005	-0.025	-0.006	-0.023
	(-5.403)	(-1.814)	(-4.632)	(-1.942)	(-5.181)	(-1.872)
UW	0.010	0.280	0.010	0.300	0.010	0.270
	(1.220)	(0.900)	(1.450)	(0.920)	(0.500)	(0.890)
INDU	-0.069	-0.410	-0.094	-0.708	-0.069	-0.390
	(-1.921)	(-1.170)	(-1.782)	(-1.793)	(-2.211)	(-1.112)
BOARD	0.050	-0.698	0.121	-0.460	0.080	-0.654
	(0.950)	(-2.591)	(1.340)	(-2.563)	(1.510)	(-2.432)
PPI	0.000	-0.772	0.000	-0.756	0.000	-0.777
	(0.330)	(-9.722)	(0.440)	(-8.941)	(0.360)	(-9.872)

Note: Values in parentheses are t-values of corresponding coefficients.

5. Conclusions

The price limit rules on the first day of IPO new shares is an important policy implemented in China's stock market. This study found that this policy cannot restrain the investors' speculative trading behaviors on IPO shares.

This study analyzes the impact of price limit rules on the first day of IPO new shares from the perspective of value uncertainty and investor sentiment. Empirically results of this study show that the price limit rules promulgated at the end of 2013 did not reduce the high return on the first day of the IPO, but instead contributed to the IPO's first-day return increased, because the release of uncertainty on the day of the issuance of new shares and the price discovery process, leading to a amplification of investors' differences, in the absence of a short-selling mechanism in China, optimistic investor sentiment to raise the price of new IPO shares.

Second, this study explores the impact of individual and institutional investor sentiment on the real return on the first day of an IPO, and finds that although China's macroeconomic index declined during the sample period, institutional investors' new share subscription sentiment increased significantly after the implementation of the IPO's first-day price limit policy, and its impact on the real return on the first day of the IPO also increased significantly.

Third, although the number of individual investors accounts for a large proportion of the Chinese stock market, it plays an important role in the pricing of the stock market. However, after the first day of price control, the uncertainty of the market increased, 加 and the influence of institutional investor behavior on individual investor behavior increased significantly. Individual investors are more willing to follow the decisions of institutional investors (authority) in an environment of increased uncertainty, and individual investments increase in crowd behavior. After excluding the influence of institutional investors, the subscription sentiment of individual investors declined and the proportion of subscriptions decreased. "Pure" individual investor sentiment also had no significant impact on the first-day return on an IPO. As a result, the implementation of the first-day price limit policy has made the impact of institutional investor sentiment on the first-day returns of IPOs more prominent than that of individual investors.

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