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Investor Sentiment and Firms' Investment: An Empirical Study Based on Catering Channel

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Abstract: It is suggested that investor sentiment can affect firms' investment through "catering channel" directly. The study tests the "catering channel" of investor sentiment impact on firms' investment decision in China. Using a sample contains the listed firms of 2003- 2010, the study tests the catering channel and suggests that the firms' management do cater investor sentiment in their investment decision-making and they will cater more when the capital market is turbulent. A further analysis suggests that managers may cater investor sentiment through different types of investment and fixed assets investment may be the most important channel for managers to cater investor sentiment while intangible investment is used to cater investor sentiment only in turbulence period.

Key words: Investor sentiment, stock mispricing, investment, catering channel

INTRODUCTION

The market efficiency hypothesis seeks to understand financial markets using models in which agents are "rational" and the stock prices fully reflect available information. Yet, psychological theory suggests that the investors have the heterogeneous beliefs and they are not "rational" but "normal". So, the systematic biases in their beliefs induce the investors to transact not based on the fundamentals but on their "beliefs" which will induce the investors forecast cash flow optimistically or pessimistically (Edelen *et al.*, 2010) and then over or under value the asset pricing significantly (Yang and Yan, 2011; Chau *et al.*, 2011). The researchers called such systematic errors "investor sentiment".

It is well documented that investor sentiment can play a large role in the movement of stock prices (Edmans *et al.*, 2007). And such systematic deviations are having a significant impact on the decision-making behavior of the real economy. Fictitious economy is no longer just a passive reflection of the real economy it can even affect the investment behavior of the real economy (Polk and Sapienza, 2009; Hua *et al.*, 2011). The investment decision-making is the most important part of the company's decisions (Tan and Xia, 2011). Nevertheless, despite the growing importance and interest, there has been little research on the direct impact of investor sentiment on firms' investment, especially about the burgeoning and developing capital market. The investors of the Chinese capital market are with great irrational and

immature and there are dramatic rises and falls of the stock markets in recent years it is of great theoretical value and practical significance for us to study whether and how the investor sentiment affect firm's investment decision in China.

LITERATURE REVIEW: STOCK PRICES AND FIRMS' INVESTMENT

The existing studies about investor sentiment focus more on its roles in evaluating the financial asset prices and its impact on stock returns, such as Brown and Cliff, (2004), Schmeling (2009), Yang and Yan (2011), Yang and Xie (2011) and so on.

However, from the network investment head of 1999, biotechnology investment trend, to the 2007's financial crisis and its rapid spread to the real economy, researchers have increasingly turned their attention to the impact of investor sentiment on corporate investment behavior, in order to explore whether and how the behaviors of the non-rational traders or noise traders in capital markets have impacts on the listed companies.

Of course it is not that time to raise the question of whether and how stock market inefficiencies affect firms' investment decision. This question dates back at least to (Stein, 1996), who raises the possibility that "certain classes of investment are governed by the average expectation of those who deal on the stock exchange are revealed in the price of shares, rather than by the genuine expectations of the professional entrepreneur". That is,

the stock prices contain an important element of irrationality and such non-rational factors will change the cost of equity capital and the pattern of equity issues and in turn firms' investment decision. The above Keynes assertion, have be developed and formed a theory of "equity financing channel" for the stock market mispricing does influence firms' investment, which suggests that if the firms' stock is mispriced, a manager can issue overvalued stock or buy back undervalued equity. So, when stock prices are above fundamentals, rational managers of equity-dependent firms will find it more attractive to issue equity, while when stock prices are below, managers will not invest, because investment requires the issuance of stocks at too low price (Stein, 1996; Baker *et al.*, 2003).

According to the theory of "the equity financing channel", non-fundamental component of the stock prices is an important determinant of investment for the firms that are equity-dependent. Nevertheless, (Polk and Sapienza, 2004, 2009) ask a complementary question, whether there is an alternative direct channel that affects investment decisions that is not linked to equity issuance decisions, because seasoned equity offerings are rarely used to finance investment and it is important to assess whether firms change their investment policies according to the valuation of their stock, even if they are not issuing equity to finance these investments. They test a "catering" channel, through which deviations from fundamentals may affect investment decisions directly. The "catering channel" suggests that the market misprices firms' managers may try to boost short-run stock prices by catering to current sentiment, that is, they may invest heavily in order to stimulate or cater to optimistic market expectations, vice versa. Mispricing of the stock can affect firms investment directly (Hua *et al.*, 2011; Tan and Xia, 2011; Dong *et al.*, 2007; Wu and Wang, 2009).

The question of whether investor sentiment affects financial asset prices has received a considerable attention in the academic literature (Chau *et al.*, 2011) but there's no consensus about how stock market mispricing influence individual firms' investment decisions. The majority of existing researches based on market timing, i.e., equity financing channel. Though the studies are focusing on the catering channel recently, they just analyze and test the integrate impact effect of investor sentiment on firm's total investment. The main purpose here is to probe the economic sources of these effects through testing the distinctive predictions of the mispricing hypothesis for different types of firms' investment.

DEVELOPMENT OF HYPOTHESES

Investor sentiment and firms' investment: hypotheses based on catering channel: It is difficulty and subjectivity to determine the stock's true values (Baker and Wurgler, 2007) because of the asymmetry of information, so the potential investors of capital market will make a judgment on the value of a firm and its development by observing the firm's investment behavior. When they are optimistic about the future of a firm, they will overvalue the firm's stock value and promote the firm's stock price, which will influence other investors in the capital market and promote the stock price more, vice versa.

On the other hand, the firm's managers have the strong motivation to keep firm's stock price, because of the short-term stock price-linked incentives, private benefits of control, or the motivation to keep their post. They "know" the market will misprice a firm's value according to the level of the firm's investment. So, the managers who try to boost short-run stock prices may cater to investor sentiment in investment decision making. That is, the firm may have an incentive to waste resources in negative NPV projects when their stock price is overpriced and to forgo positive investment opportunities when their stock price is undervalued. So, the following hypothesis can be deduced:

- **H1:** The stock mispricing induced by investor sentiment has a positive relationship with the firm's investment level

In order to test the economic sources of the above effects, the study then classified the firms' investment to compare whether investor sentiment has different impacts on different types of investment; the study classified the firms' investment into three types: tangible investment (fixed assets investment), intangible investment and Long-term Equity Investment and therefore three sub-hypotheses are putted forward:

- **H1-1:** The stock mispricing induced by investor sentiment has a positive relationship with the firm's tangible investment level
- **H1-2:** The stock mispricing induced by investor sentiment has a positive relationship with the firm's intangible investment level
- **H1-3:** The stock mispricing induced by investor sentiment has a positive relationship with the firm's long-term equity investment level

The moderating effect of market turbulence: Though the investors in capital market try to invest rationally but most

of them are limited rational because of the asymmetric information, the uncertainty of the capital market and their limited cognitive processing capacity, investors are often limited rational. When the capital market is quiet, the information asymmetry is the dominant factor affecting the investors' decision-making; while the capital market is turbulent, uncertainty is the dominant factor affecting the decision-making. The greater the information complexity, ambiguity and uncertainty to be, the greater the decision-makers make decisions based on their sentiment. So, in periods of upheaval, there may be more cognitive bias induced by uncertainty and then induce more serious stock mispricing. On the other hand, the firms' investment risks and uncertainties increase in the periods of upheaval and so they that same increase, more needs to cater to investor sentiment. Therefore, managers may have stronger motivation and necessary to cater more turbulent investor sentiment when the market is more turbulent. So, the study proposes the second hypothesis and three sub-hypotheses:

- **H2:** The sensitivity of firm's investment to stock mispricing is stronger in periods of upheaval than what in periods of quiet
- **H2-1:** The sensitivity of firm's tangible investment to stock mispricing is stronger in periods of upheaval than what in periods of quiet
- **H2-2:** The sensitivity of firm's intangible investment to stock mispricing is stronger in periods of upheaval than what in periods of quiet.
- **H2-3:** The sensitivity of firm's long-term equity investment to stock mispricing is stronger in periods of upheaval than what in periods of quiet

DATA AND METHODOLOGY

Sample: The study's initial data sample include all Chinese firms listed on Shanghai Stock Exchange and Shenzhen Stock Exchange that are covered by CSMAR (<http://www.gtarsc.com/>) and CCER except the listed firms of GEM (Growth Enterprise Market) during 2001 to 2010 but the firms used to test hypotheses contain firms during 2003 to 2010, because calculation of some variables needs previous data. The following firms is eliminated: (1) The finance and insurance firms which have special accounting data, (2) The Special Treatment (ST) and Particular Transfer (pt) firms which may have different motivation in investment, (3) The incomplete and abnormal samples. Therefore, the study's sample is composed of 6612 firm-years and winsorizing has been conducted to remove the effect of outliers.

Methodology: In order to test the above hypotheses, the following regression analyses are conducted:

$$IN = \beta + \beta_1 QS + \beta_2 QC + \beta_3 KZ + \beta_4 CF + \beta_5 CFP + \beta_6 SIZE + \beta_7 LEV + \beta_8 ROE + \beta_9 GROW + \varepsilon$$

Dependent variable: The dependent variable in the study is the level of investment (IN), which include the level of total investment (TOIN = FIN+IIN+EIN), tangible investment (Fixed assets investment, FIN = increment of fixed assets/opening balance of assets), intangible investment (IIN = increment of intangible assets/opening balance of assets) and long-term equity investment (EIN = increment of long-term equity investment/opening balance of assets).

Independent variable: The independent variable is the level of stock mispricing induced by investor sentiment (QS). The value of Tobin's Q ratio may contain mispricing and information about the profitability of investment (Baker *et al.*, 2003) and so the non-fundamental components decomposed from the Q ratio can be taken as proxy for investor sentiment. As (Goyal and Yamada, 2004) did, the study take annual cross-sectional regressions of the Q ratio on firm's fundamental index, such as return on equity, equity debt ratio, sales growth and industry dummies. The fitted values from this regression are proxies for the fundamental component of stock values (QC), while the residual components are proxies for mispricing (QS = Q-QC).

Control variables: The main control variable in this study is investment opportunity (QC) of the previous year. Here, QC is the fundamental components of Q ratio and represents the opportunity and profitability of investment. Besides QC, the firm's current cash flow (CF = operating cash flow/opening balance of assets) and previous (PCFt = CFt-1), the size of the firm (SIZE= natural logarithm of opening balance of assets), assets liability ratio (LEV), Return on Equity (ROE) and profit growth rate (GROW = (sales of the current year-sales of the previous year)/sales of the previous year) are taken as control variables.

EMPIRICAL STUDY AND RESULTS

How does investor sentiment affect firm's investment?: Descriptive analysis suggests that the mean of stock mispricing is -0.0213 and its median is -0.2088, which indicates that China's stock market short bull and long bear with prolonged slump of the investor sentiment. The most correlation between independent variables are less than 0.4 (Table 1), indicating that the independent

Table 1: Correlation coefficient between independent variables

	QS	QC	CF	CFP	SIZE	LEV	ROE	GROW
QS	1							
QC	0.0605	1						
CF	0.0582	0.1891	1					
CFP	0.0660	0.2965	0.2977	1				
SIZE	-0.0813	0.0134	0.0840	0.1349	1			
LEV	-0.0222	-0.6058	-0.0805	-0.0897	0.3244	1		
ROE	0.0612	0.4021	0.3367	0.3159	0.2401	-0.0634	1	
GTOW	-0.0141	0.0073	0.1188	0.0019	0.1013	0.1100	0.2479	1

Table 2: Regression results of the total samples during 2003-2010

Variables	Model 1 (dependent variable = TOIN)		Model 2 (dependent variable = FIN)		Model 3 (dependent variable = IIN)		Model 4 (dependent variable = EIN)	
	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
QS	0.0729***	6.82	0.0529***	6.45	0.0073***	3.09	0.0170***	4.82
QC	0.2224***	5.39	0.2080***	6.54	0.0278***	3.06	-0.0190	-1.38
CF	0.4538***	8.53	0.3258***	8.17	0.0405***	3.41	0.0521***	3.05
CFP	-0.0702	-1.37	-0.0215	-0.55	-0.0130	-1.14	-0.0175	-1.05
SIZE	0.1466	10.87	0.0928***	9.16	0.0260***	8.78	0.0332***	7.62
LEV	0.2504***	4.92	0.2954***	7.84	0.0262**	2.37	-0.0804***	-4.96
ROE	-0.0167	-0.24	-0.1230**	-2.28	0.0164	1.06	0.0793***	3.40
GROW	0.0708***	4.51	0.0744***	6.24	0.0052	1.50	-7.06E-05	-0.01
N ^a	5919		6612		6194		6387	
R ²	0.3395		0.3300		0.1800		0.1637	
F	3.073***		3.2417***		1.3645		1.2498**	

***p<0.01; **p<0.05; *p<0.1,^aThe total sample is composed of 6612 firm-years but there are some data missing in some firm-years, so the real sample used may smaller than 6612

variables do not exist multicollinearity; Variance Inflation Factor (VIF) test results show that the average of the VIF tests are about 1.43-1.44, which are all far smaller than 10, there is no multicollinearity.

Then, a series of regression analyses using the above model are conducted to test the above hypotheses. The Hausman Test results reject random effects and fixed effects models are chose in the study. Table 2 shows the results of regression analyses use the total samples during 2003 to 2010.

As Table 2 shows, the stock mispricing induced by investor sentiment has a strong positive relationship with the firm’s investment level ($\beta = 0.0729$, $t = 6.82$), that is, firms may have an incentive to “catering” investor sentiment and waste resources in negative NPV projects when their stock price is overpriced and to forgo positive investment opportunities when their stock price is undervalued, H1 is confirmed.

The regression results of the different types of investment suggest that H1-1, H1-2, H1-3 are confirmed all. In order to maintain high stock price, managers may cater investor sentiment through fixed assets investment, intangible investment and long-term equity investment but the QS in model 2 has the biggest t statistic ($\beta = 0.0529$, $t = 6.45$, $p = 0.0000$), that is, the stock mispricing may have greater impact on firm’s tangible investment than intangible investment and long-term equity investment.

The moderating effect of market turbulence: It is in June 2001, China’s stock market reached a high point and five ministries and commissions of the State Council of China State issued the "Interim procedures of reduction of state-owned shares to raise social security funds” on June 22, 2001. Then, China’s stock market came into the longest bear market which bottomed in 2005 and rose steadily and slowly. It surged until the end of 2006 to early 2007 and experienced the international financial crisis in 2008. Such trend can be found clearly in the Fig. 1. Therefore, the study defines the duration from 2003 to 2006 as quiet period, while from 2007 to 2010 is defined as a period of upheaval. The regression results of the different market period are shown in Table 3-6.

From Table 3 it can be found that QS have significant positive relation with the level of firms’ total investment both in quiet and turbulence period but the later has the bigger t statistic ($t = 2.70$, $p = 0.0070$ in year 2003-2006 and $t = 6.37$, $p = 0.0000$ in year 2007-2010), firms’ investment may be more sensitive to the investor sentiment during the turbulence period.

According to Table 4, investor sentiment has strong impact on firms’ fixed assets investment ($t = 6.36$, $p = 0.000$) in upheaval period, while it has some weak impact in quiet period ($t = 2.42$, $p = 0.0156$). Table 5 shows, there’s strong correlation between QS and IIN in upheaval period ($t = 4.06$, $p = 0.0001$) but no significant correlation in quiet period ($t = -0.40$, $p = 0.6873$). And the last table (Table 6) shows, QS have significant positive relation with EIN both in quiet and

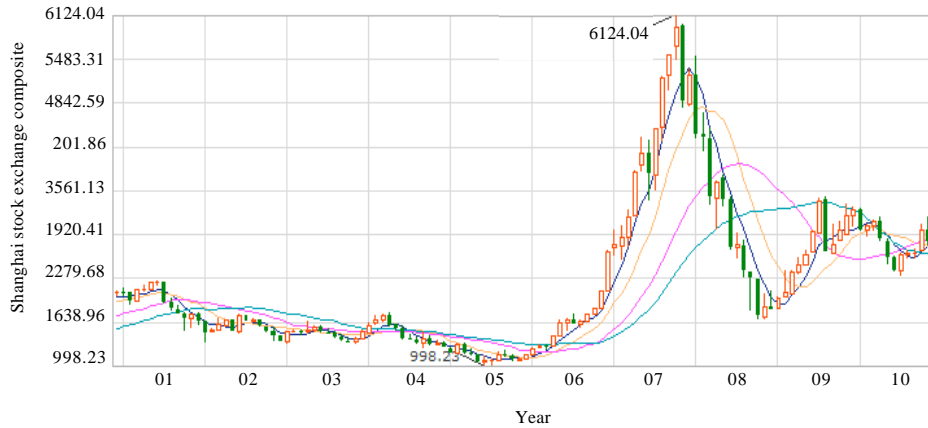


Fig. 1: The trend of China's stock market from 2001-2010 (source: <http://quote.eastmoney.com/>)

Table 3: Regression results of the samples in different periods (dependent variable = TOIN)

Variables	2003-2006		2007-2010	
	Coefficient	t	Coefficient	t
QS	0.0524***	2.70	0.1118***	6.37
QC	0.3213***	6.57	0.1746**	2.24
CF	0.4265***	7.11	0.5731***	5.63
CFP	-0.1208**	-2.17	0.0120	0.12
SIZE	0.0749***	2.58	0.2409***	7.11
LEV	0.5532***	6.99	0.1834	1.61
ROE	0.1391	1.59	0.1635	1.19
GROW	0.0332**	2.08	0.0366	1.18
N ^a	2846		3073	
R ²	0.4669		0.4212	
F	2.235***		1.9785***	

***p<0.01, **p<0.05, *p<0.01

Table 4: Regression results of the samples in different periods (dependent variable = FIN)

Variables	2003-2006		2007-2010	
	Coefficient	t	Coefficient	t
QS	0.0379**	2.42	0.082***	6.36
QC	0.3063***	6.943	0.181***	3.17
CF	0.3345***	6.26	0.3737***	5.11
CFP	-0.0918*	-1.85	0.0723	1.02
SIZE	-0.0033	-0.15	0.132***	5.22
LEV	0.5533***	8.22	0.2786***	3.30
ROE	-0.0266	-0.34	0.0605	0.60
GROW	0.0737***	5.35	0.0368*	1.61
N ^a	3230		3382	
R ²	0.4178		0.4056	
F	1.9716***		1.98***	

***p<0.01, **p<0.05, *p<0.01

turbulence period but the later has a little bigger t statistic (t = 2.73, p = 0.0064 and t = 3.89, p = 0.0001, respectively).

According to these results it can be concluded that the sensitivity of firm's investment to stock mispricing is stronger in periods of upheaval than what in periods of quiet. Among the different investments, fixed assets

Table 5: Regression results of the samples in different periods (dependent variable = IIN)

Variables	2003-2006		2007-2010	
	Coefficient	t	Coefficient	t
QS	-0.0009	-0.40	0.0156***	4.06
QC	0.0263***	4.00	0.0393**	2.31
CF	0.0351***	4.37	0.0478**	2.12
CFP	-0.0214***	-2.70	-0.0055	-0.25
SIZE	0.0003	0.40	0.0568***	7.74
LEV	0.0207***	3.99	0.0137	0.56
ROE	-0.0158	-1.46	0.0499*	1.66
GROW	0.0041*	1.71	-0.0002	-0.03
N ^a	2928		3266	
R ²	0.0170		0.3201	
F	6.3182***		1.3524***	

***p<0.01, **p<0.05, *p<0.01

Table 6: Regression results of the samples in different periods (dependent variable = EIN)

Variables	2003-2006		2007-2010	
	Coefficient	t	Coefficient	t
QS	0.0084***	2.73	0.0231***	3.89
QC	0.0184	1.91	-0.0481*	-1.81
CF	-0.0130	-1.12	0.1036***	3.06
CFP	-0.0175	-1.54	-0.0276	-0.83
SIZE	0.0013	1.205	0.0681***	5.98
LEV	0.0045	0.60	-0.1876***	-4.96
ROE	0.0679***	4.27	0.0753*	1.60
GROW	-0.0030	-0.88	-0.0018	-0.17
N ^a	3127		3260	
R ²	0.0150		0.3033	
F	5.9411***		1.2323***	

***p<0.01, **p<0.05, *p<0.01

investment may be the most important channel for managers to cater investor sentiment and intangible investment is used to investor sentiment only in turbulence period. And according to Table 5 and 6 it is suggested find that during 2003-2006, the R² of the model 3 (dependent variable = IIN) is only 0.0170, while that of

model 4 (dependent variable = EIN) is only 0.015 which suggest that there're some important factors may affect firms' intangible investment and long-term investment besides investor sentiment and other variables used here.

CONCLUSION

The study tests whether and how the investor sentiment affects firms' investment decision in China and gets the following conclusion:

- The stock mispricing has a positive relationship with firms' investment level. In order to boost short-term stock price, managers may cater to investor sentiment in investment decision making and invest in negative NPV projects when their stock price is overpriced while forgo positive investment opportunities when their stock price is undervalued. Such cater effect is found in all types of investment. So the stock mispricing induced by investor sentiment will affect firms' investment directly through "catering channel"
- The sensitivity of firms' investment to stock mispricing is stronger in periods of upheaval than what in periods of quiet. When the capital market is turbulent, there may be more cognitive bias induced by uncertainty and then induce more serious stock mispricing.. Therefore, managers may have stronger motivation and necessary to cater more turbulent investor sentiment when the market is more turbulent
- Managers may cater investor sentiment through different types of investment such as tangible investment, intangible investment and long-term equity investment. Among the different investments, fixed assets investment may be the most important channel for managers to cater investor sentiment and intangible investment is used to investor sentiment only in turbulence period. This result is different with the results of Polk and Sapienza (2009) and Dong *et al.* (2007), which suggest that whose assets are more difficult to value should cater more. The possible reason is that the return of the fixed assets investment is more reliable and will bring confidence about the firm to investor

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