Investor attention and block chain concept stock earnings correlation research

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Abstract

With the continuous development of the Internet, information becomes more and more, which makes people's attention become a scarce resource. The stocks of hot industries or companies will attract more attention from investors. In this case, concept stocks have become the focus of investors' attention. This paper takes baidu index as the proxy variable of investors' attention, and empirically studies the impact of investors' attention to blockchain concept stocks on the stock returns of this sector. By Stata15 makes the empirical analysis, analysis shows that investors' attention to the relationship between stock returns, investors are drawn attention to research on the effects of block chain stocks yields some conclusion, embodied in: investors and stock returns are related concern, at the same time lag attention will lead to price inversion. The above empirical research will help small and medium-sized investors make better investment decisions and provide theoretical reference for the regulatory authorities to formulate the system and the whole layer to protect the interests of small and medium-sized investors.

Keywords

Investor attention, Stocks, Stock returns, Block chain.

1. Introduction

With the progress of communication technology and the increasingly open communication environment, the amount of information in today's society is constantly increasing and showing a geometric multiple growth. In the past 30 years, the information produced by human beings has exceeded the total amount of information produced in the past 5,000 years. But for ordinary people, everyone's ability to process information is limited, and the supply of information is unlimited, which makes people's attention become a scarce resource. Traditional financial theory assumes that markets are efficient, asset prices already reflect all information, this hypothesis needs investors for an asset (such as a stock) reaction in time, all the information in real life, however, it is almost impossible, especially when faced with a variety of assets, investors can only selectively to pay attention to the information they need, this is what investors limited attention.

The research object concept stock in this paper refers to a stock with specific concept and connotation that is hyped in advance on specific events or the business prospect of the industry in which the company is located. The concept or connotation usually comes from a major event, a new technology or a development prospect of an industry. For example, the 2008 Beijing Olympic Games has promoted the development of real estate, tourism, catering and other industries. The stocks of these industries are called Olympic concept stocks. Unlike performance shares, due to its depend on the particular concept or connotation, has good development prospect and a high degree of uncertainty, so leaves more space to the speculation, the attention of investors in stocks at the same time it essentially represents a speculative psychology of investors, this kind of psychology will produce certain effect to stock market performance.

From the perspective of individual investors, the research of this paper has certain guiding significance for investors' investment decisions. Investors in China, especially individual investors is limited by the information sources and analysis ability, easy to follow and the influence of public opinion guide and hype, especially for stocks, investors often lack the fundamental judgment and chasing their subject matter or industry development prospects, easy to cause bad decisions, by studying the concept and its huge market, hope to be able to help individuals to improve its investment decisions, effective asset allocation and risk management. For listed companies, investors pay close attention to the research can help them better understand the interest of investors pay close attention to, in order to better for investor relations management, for example, in the timing of the announcement choice, investors pay close attention to the research can understand the different times the strength of the attention, so that it can be released when investors high concern of good news, and released at the low investor attention when bad news. At the same time, for the regulatory authorities, by studying the impact of investors' attention on concept stocks on the market, they can know the hot spots of the market, so as to supervise these hot industries or stocks, improve the transparency of the stock market, and promote the healthy and orderly development of the financial industry.

2. Literature review

With the vigorous development of behavioral finance, more and more psychological factors of investors have been included in the study of stock market performance, and a large number of scholars have conducted in-depth discussions in this field and achieved rich results. Chan collected the number of headlines in his empirical research and found that the more the number of headlines, the higher the investors' attention, and the more violent the stock price fluktuation [1]. Peng and Xiong found that investors pay more attention in the stock market level, rather than the information on the level of company, accordingly, they found that if the attention of investors is limited, is focusing on shock occurs on the day the company synergy volatility of asset returns and market volatility will increase, and the following day reversal will happen again [2]. Cenwei, Li Shihao et al. took the interactive platform of shenzhen stock exchange as the sample object and found that the stock return rate was positively affected by investors' attention, and the improvement of investors' attention could reduce stock volatility risk and liquidity risk to some extent [3]. Da,Engelberg and Gao first proposed that search data is a valuable indicator to measure investor attention [4]. They used the indicator of Google trend search as the investor attention to study, and explained the short-term rise and reversal effect of stock prices. Dzielinski showed that the orientation of investors' attention can be reflected by Internet search engines, and found that there was a significant correlation between the volatility and returns of the entire stock market [5].

Can be seen from the research development of scholars, in examining investors pay close attention to the stock market, the influence of the Internet by the data by some scholars application in financial field, but there are shortcomings, take the market measure investors ignore the concern of investors in the psychological and behavioral differences between each other in the face of the market investors differ in thousands ways, do not have sufficient explanatory power and persuasion.

At the same time, for the selection of research samples, most of the stocks selected are in the long-established sectors, and there is a lack of research on those sectors with a short history, especially on concept stocks. By studying the impact of investor attention on the stock yield of blockchain concept board, the research in the field of investor attention and stock market performance can be further improved.

3. Research hypothesis

Due to the limitation of time and energy, it is impossible for investors to obtain and process all the information. Due to the scarcity of attention, individuals must allocate limited cognitive resources to the information they consider valuable. Since investors' attention to one event will inevitably lead to the reduction of attention to other events, which will inevitably affect investors' behavior and asset prices.

Barber and Odean found that individual investors are net buyers of highly regarded stocks, but when they sell stocks, they are not affected by the attention, because they only need to sell a few stocks they own [6]. Investors' attention will exert pressure on stock prices, so investors' attention to high stocks will obtain excess returns in the short term. However, they further point out that such short-term excess returns are unsustainable in the long run. On the one hand, individual investors will gradually realize that previous excessive attention is irrational, and thus tend to reduce their allocation to such stocks. Institutional investors, on the other hand, will sell at a profit if they find that these stocks contain a attention premium.

Da,Engelbeg and Gao found through empirical research that the attention of Russell 3000 stocks with a 3-week lag had a positive impact on the excess return of individual stocks, while the attention with a 4-week lag had a negative impact, and the complete reversal occurred within one year [4]. This proves the conclusion of Barber and Odean.

To sum up, the following two hypotheses are proposed:

Hypothesis 1: investor attention based on baidu index is positively correlated with the current stock yield.

Hypothesis 2: the rate of return increased based on the pressure of investor attention will reverse in a certain period in the future.

4. Data selection and variable setting

4.1 Sample Selection

The sample selected in this paper is 36 stocks of listed companies that are publicly listed and issued in the blockchain concept board, and the sample data is the trading data between January 1, 2017 and December 31, 2018.

4.2 Proxy variable selection of investor attention

Google launched its publicly available search index service, Google Trends, in July 2006. Globally, the company has strong data support and technical expertise, but its servers are unstable in China and Google Trends is unable to provide search volume data for most of China's gem stocks due to its small search volume. In China, baidu's market share is much higher than that of other search engines, and it provides open search index service, namely baidu index. This paper USES the keyword search volume provided by baidu index as the proxy indicator of investor attention.

For search keywords, stock codes or stock names are generally adopted in relevant researches. Chinese stock names and company names have a high degree of overlap. When users search for stock names, they may only query the basic information of the company, so the data is noisy. Users searching for stock codes are generally potential investors of the company, so this paper selects the daily search volume between January 1, 2017 and December 31, 2018.

In addition to manual collection of search volume, the stock transaction data used in this paper comes from RESSET financial research database and Wind database. Some variables are calculated using Excel2016 and Stata15.0, and the empirical regression analysis is completed using Stata15.0.

4.3 Variable design

4.3.1 Independent Variable Design

Based on the Search Volume of stock code, the following attention index is constructed as the independent variable (where SV is Search Volume, which refers to the Search Volume of keywords in the current period obtained through baidu index query). SV* is Search Volume in non-trading days; Avg_SV is the average annual search volume of stocks:

BDIt = investor attention =Ln(SVt)

ExBDIt excess attention =Ln(SVt)-Ln(Avg_SV)

AbnBDIt abnormal attention =Ln(SVt)-Ln[Med(svt-1... svt-10)]

4.3.2 Dependent Variable Design

Dret= stock return = (current closing price - last closing price) / last closing price

4.3.3 Control variable design

Size = total market value of individual shares = total number of shares issued * closing price

Mret = market return rate = weighted average return rate of all stocks on the blockchain concept board

PB = price to book ratio = closing price of trading day/book value per share

It should be noted that all the above data are daily data.

5. The empirical analysis

5.1 Model building

According to the fama-french three-factor model, this paper obtained the model (1), where $RE_{f,t}$ was the risk-free rate of return at time t. $RE_{m,t}$ is the market rate of return at time t; $RE_{i,\ t}$ is the rate of return at time t.

$$RE_{i,\ t} - RE_{f,t} = \alpha + \beta_m\left(RE_{m,t} - RE_{f,t}\right) + \beta_s SMB_t + \beta_h HML_t + \varepsilon_{i,t} \quad (1)$$

Assumes that investors (BDI) concern for the three factors in the model has yet to be explained, Fama-French for multiple stock trading data of panel data regression, assuming that all stocks have the same at the same time assume that all stock has a beta, the stocks of the company Size (Size) and price-to-book (PB) instead of model (1) the SMB and HML, so as to get (2) model:

$$RE_{i,\ t} - RE_{f,t} = \alpha + \beta_0 BDI_{i,t} + \beta_m\left(RE_{m,t} - RE_{f,t}\right) + \beta_s Size_{i,t} + \beta_p PB_{i,t} + \varepsilon_{i,t} \quad (2)$$

The effect of $RE_{f,t}$ on the model was incorporated into intercept item, and the modified model was simplified to model (3):

$$RE_{i,\ t} = \alpha + \beta_0 BDI_{i,t} + \beta_m RE_{m,t} + \beta_s Size_{i,t} + \beta_p PB_{i,t} + \varepsilon_{i,t} \quad (3)$$

5.1.1 Correlation analysis

$$RE_{i,\ t} = \alpha + \beta_0 BDI_{i,t} + r_1 Size_{i,t} + r_2 PB_{i,t} + r_3 Mret_t + \varepsilon_{i,t} \quad (4)$$

According to the above model, model (4) is used to test the correlation between investor attention and stock return rate, in which the price-to-book ratio (PB), market return rate (Mret) and daily stock total market value (Size) are the control variables.

In 5.4 on the basis of the model, the model of (5) a comprehensive attention of the investors and the lag of variables within two weeks for the influence of the stock yield, $\frac{1}{5}\sum_{k=6}^{n=10} BDI_{i,t-k}$ for lag stage 6 to lag 10 investors attention (BDI) average.

$$RE_{i,\ t} = \alpha + \beta_0 BDI_{i,t} + \beta_1 BDI_{i,t-1} + \beta_2 BDI_{i,t-2} + \beta_3 BDI_{i,t-3} + \beta_4 BDI_{i,t-4} + \beta_5 BDI_{i,t-5} + \beta_6\left(\frac{1}{5}\sum_{k=6}^{n=10} BDI_{i,t-k}\right) + r_1 Size_{i,t} + r_2 PB_{i,t} + r_3 Mret_t + \varepsilon_{i,t} \quad (5)$$

5.1.2 Price reversal effect

The model (6)-(11) was obtained by regression of the stock return rate (Dret) with (5) lag variables of the model, and the influence of this lag variable on the current return rate can be determined according to the positive and negative coefficients of each regression equation and the value:

$$RE_{i,\ t} = \alpha + \beta_1 BDI_{i,t-1} + r_1 Size_{i,t} + r_2 PB_{i,t} + r_3 Mret_t + \varepsilon_{i,t} \quad (6)$$

$$RE_{i,\ t} = \alpha + \beta_2 BDI_{i,t-2} + r_1 Size_{i,t} + r_2 PB_{i,t} + r_3 Mret_t + \varepsilon_{i,t} \quad (7)$$

$$RE_{i,\ t} = \alpha + \beta_3 BDI_{i,t-3} + r_1 Size_{i,t} + r_2 PB_{i,t} + r_3 Mret_t + \varepsilon_{i,t} \quad (8)$$

$$RE_{i,\ t} = \alpha + \beta_4 BDI_{i,t-4} + r_1 Size_{i,t} + r_2 PB_{i,t} + r_3 Mret_t + \varepsilon_{i,t} \quad (9)$$

$$RE_{i,\ t} = \alpha + \beta_5 BDI_{i,t-5} + r_1 Size_{i,t} + r_2 PB_{i,t} + r_3 Mret_t + \varepsilon_{i,t} \quad (10)$$

$$RE_{i,\ t} = \alpha + \beta_6 (\frac{1}{5}\sum_{k=6}^{n=10} BDI_{i,t-k}) + r_1 Size_{i,t} + r_2 PB_{i,t} + r_3 Mret_t + \varepsilon_{i,t} \quad (11)$$

5.2 Research on the correlation between investors' attention and stock returns

5.2.1 Variable descriptive statistics

Table 1 Descriptive statistical table of investor attention and stock return rate of blockchain concept stocks

Variable types	Variable	Number of samples	Mean value	Median	Minimum value	Maximum value	Standard deviation
Dependent variable	Dret	16473	-0.0010	-0.0005	-0.1014	0.1016	0.0295
Independent variable	BDI	16811	6.5289	6.5554	4.1431	9.2009	0.6727
	exBDI	16811	-0.0544	-0.0773	-1.7728	1.6296	0.3197
	abnBDI	16809	0.0095	-0.0205	-1.1802	2.7118	0.2356
	Mret	17133	-0.0007	0.0001	-0.0685	0.0527	0.0125
	Size	16476	22.7788	22.6897	21.0425	24.8252	0.6841
	PB	16755	3.8437	3.2477	0.7270	16.5606	2.4196

The descriptive statistics of investors' attention to blockchain concept stocks and the variables related to their stock return rate model are shown in Table 1. It can be seen that:

The mean and median returns of Mret and Dret are very small and close to 0, which reflects the characteristics of the block chain concept board. The maximum value of individual stock yield is 0.1016, the minimum value is -0.1014, and the standard deviation is 0.0295. The maximum market return is 0.0527, the minimum is -0.0685, and the standard deviation is 0.0125. The standard deviation of individual stock return is significantly greater than that of the market return, indicating that the volatility of individual stock return is significantly greater than that of the market return.

The maximum value, minimum value and standard deviation of the independent variable investor concern index BDI obtained based on the logarithm of the daily search volume of baidu index are 9.2009, 4.1431 and 0.6727, respectively. Abnormal excess attention and interest in investors' attention to deduct the average attention attention with history data, so that a maximum of two variables are less than the maximum of investors BDI concern, its minimum value is negative, the standard deviation is much less than investors BDI concern, the extra attention and abnormal data compared to the huge investor attention more smooth.

The mean, median and standard deviation of the market Size of independent variables are 22.7788, 22.6897 and 0.6841 respectively. The difference between the mean and the median is very small, and the standard deviation is far less than the mean, indicating that there is a small difference in the Size of listed companies in the block chain concept stocks.

The maximum value of PB is 16.5606, the minimum value is 0.7270, the mean value is 3.8437, and the median value is 3.2477. The large difference between the mean value and the median value indicates that the distribution of the price-to-book ratio of each company in the blockchain concept board is not uniform, and there is a situation that the price-to-book ratio of some companies is much higher than that of other companies. The standard deviation of 2.4196 is also a good proof of this phenomenon.

5.2.2 Correlation analysis

Firstly, multiple linear regression was conducted on the return rate of individual stocks (Dret) with three independent variables of investor daily attention (BDI), excess attention (exBDI) and abnormal attention (abnBDI), respectively. The regression results are shown in Table 2.

Table 2 Influence of investors' attention on stock returns of blockchain concept stocks

	(1)	(2)	(3)
	Dret	Dret	Dret
BDI	0.00139***		
	(4.18)		
exBDI		0.00662***	
		(10.46)	
abnBDI			0.0173***
			(20.75)
Mret	1.252***	1.253***	1.254***
	(80.98)	(81.26)	(82.12)
Size	0.000458	0.000414	0.000595**
	(1.46)	(1.35)	(1.96)
PB	-0.0000794	-0.0000227	0.0000293
	(-0.87)	(-0.27)	(0.35)
_cons	-0.0195***	-0.00932	-0.0141**
	(-2.82)	(-1.35)	(-2.08)
N	16086	16086	16086
R-sq	0.291	0.295	0.309

Note: the values in brackets are t-statistic values, *** means significant level of 1%, ** means significant level of 5%, and * means significant level of 10%

As can be seen from the results in the table, the coefficients of investors' daily attention (BDI), excess attention (exBDI) and abnormal attention (abnBDI) are all significant at the level of 1%, and the coefficient of Mret, the control variable, is also significant at the level of 1%, while the influence of company size and price-book ratio on individual stock return (Dret) is not significant.

Then, the lag variables of BDI, exBDI and abnBDI from the 1st to the 10th phases were used to conduct multiple linear regression for the individual stock return rate (RE), and the results are shown in Table 3. BDI_2week namely $\frac{1}{5}\sum_{k=6}^{n=10} BDI$i,t-k, for lag stage 6 to 10 average BDI, exBDI_2week namely $\frac{1}{5}\sum_{k-6}^{n-10} exBDI$ i,t-k, abnBDI_2week namely $\frac{1}{5}\sum_{k-6}^{n-10} abnBDI$ i,t-k. According to the regression analysis results in the table, it can be seen that the lagged variables of investor attention (BDI), excess attention (exBDI) and abnormal attention (abnBDI) within two weeks have a significant impact on individual stock return (Dret) on the whole, and investor attention has a significant positive correlation with the company's current yield.

Table 3 The impact of investor attention with lagging variables on stock returns

	(1)	(2)	(3)
	Dret	Dret	Dret
(ex/abn)BDI	0.0390***	0.0381***	0.0383***
	(32.22)	(31.44)	(32.20)
(ex/abn)BDI_1	-0.0254***	-0.0252***	-0.0227***
	(-17.22)	(-17.13)	(-16.02)
(ex/abn)BDI_2	-0.00698***	-0.00698***	-0.00498***
	(-4.78)	(-4.81)	(-3.56)
(ex/abn)BDI_3	-0.00111	-0.00124	0.000868

	(-0.76)	(-0.86)	(0.62)
(ex/abn)BDI_4	-0.00414***	-0.00423***	-0.00356**
	(-2.87)	(-2.94)	(-2.56)
(ex/abn)BDI_5	-0.00285**	-0.00291**	-0.000271
	(-2.00)	(-2.05)	(-0.20)
(ex/abn)BDI_2week	0.000913	0.00186	0.00422***
	(0.72)	(1.39)	(3.06)
Mret	1.242***	1.242***	1.246***
	(82.86)	(82.81)	(83.15)
Size	0.000743**	0.000684**	0.000676**
	(2.44)	(2.28)	(2.27)
PB	0.000101	0.0000473	0.0000357
	(1.13)	(0.56)	(0.43)
_cons	-0.0138**	-0.0160**	-0.0160**
	(-2.06)	(-2.38)	(-2.39)
N	15924	15924	15922
R-sq	0.338	0.337	0.338

Note: the values in brackets are t-statistic values, *** means significant level of 1%, ** means significant level of 5%, and * means significant level of 10%

In conclusion, hypothesis 1 is true.

5.2.3 Price reversal effect

It can be seen from the regression analysis in the previous part that there may be a negative correlation between the lagged variables of investor attention (BDI), excess attention (exBDI) and abnormal attention (abnBDI) and stock return rate (Dret). In the following part, separate regression analysis is carried out for each phase of lagged variables. The regression results are shown in Table 4, Table 5 and Table 6.

Table 4 Price reversal effect of investor concern BDI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ret	ret	ret	ret	ret	ret	ret
BDI	0.00139***						
	(4.18)						
BDI_1		-0.00130***					
		(-3.92)					
BDI_2			-0.00163***				
			(-4.93)				
BDI_3				-0.00158***			
				(-4.78)			
BDI_4					-0.00173***		
					(-5.25)		

BDI_5						-0.00148***	
						(-4.49)	
BDI_2week							-0.00118***
							(-3.50)
Mret	1.252***	1.250***	1.250***	1.250***	1.249***	1.249***	1.249***
	(80.98)	(80.80)	(80.77)	(80.74)	(80.62)	(80.63)	(80.59)
Size	0.000458	0.00102***	0.00109***	0.00106***	0.00107***	0.00104***	0.000972***
	(1.46)	(3.25)	(3.47)	(3.38)	(3.40)	(3.30)	(3.08)
PB	-0.0000794	0.000174*	0.000201**	0.000200**	0.000233**	0.000209**	0.000183**
	(-0.87)	(1.91)	(2.20)	(2.19)	(2.53)	(2.27)	(1.98)
_cons	-0.0195***	-0.0157**	-0.0152**	-0.0149**	-0.0142**	-0.0150**	-0.0153**
	(-2.82)	(-2.27)	(-2.20)	(-2.15)	(-2.04)	(-2.17)	(-2.21)
N	16086	16054	16024	15994	15962	15928	15929
R-sq	0.291	0.291	0.292	0.292	0.292	0.292	0.292

Note: the values in brackets are t-statistic values, *** means significant level of 1%, ** means significant level of 5%, and * means significant level of 10%

Table 5 Price reversal effect of exBDI with excessive attention

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dret	Dret	Dret	Dret	Dret	Dret	Dret
exBDI	0.00662***						
	(10.46)						
exBDI_1		-0.00320***					
		(-5.06)					
exBDI_2			-0.00440***				
			(-6.96)				
exBDI_3				-0.00415***			
				(-6.58)			
exBDI_4					-0.00461***		
					(-7.31)		
exBDI_5						-0.00353***	

						(-5.60)	
exBDI_2week							-0.00253***
							(-3.55)
Mret	1.253***	1.250***	1.249***	1.250***	1.249***	1.249***	1.250***
	(81.26)	(80.81)	(80.74)	(80.78)	(80.70)	(80.67)	(80.62)
Size	0.000414	0.000911***	0.000968***	0.000937***	0.000933***	0.000905***	0.000853***
	(1.35)	(2.95)	(3.14)	(3.04)	(3.02)	(2.93)	(2.75)
PB	-0.0000227	0.0000851	0.0000930	0.0000934	0.000114	0.000103	0.0000937
	(-0.27)	(0.99)	(1.08)	(1.08)	(1.33)	(1.19)	(1.08)
_cons	-0.00932	-0.0215***	-0.0229***	-0.0222***	-0.0222***	-0.0214***	-0.0202***
	(-1.35)	(-3.10)	(-3.30)	(-3.20)	(-3.19)	(-3.09)	(-2.90)
N	16086	16054	16024	15994	15962	15928	15929
R-sq	0.295	0.292	0.293	0.293	0.293	0.293	0.292

Note: the values in brackets are t-statistic values, *** means significant level of 1%, ** means significant level of 5%, and * means significant level of 10%

Table 6 Price reversal effect of abnBDI on abnormal attention

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dret	Dret	Dret	Dret	Dret	Dret	Dret
AbnBDI	0.0173***						
	(20.75)						
AbnBDI_1		-0.000651					
		(-0.78)					
AbnBDI_2			-0.00338***				
			(-4.06)				
AbnBDI_3				-0.00370***			
				(-4.46)			
AbnBDI_4					-0.00525***		
					(-6.37)		
AbnBDI_5						-0.00402***	
						(-4.89)	

AbnBDI_2week							-0.00263**
							(-2.43)
Mret	1.254***	1.251***	1.250***	1.251***	1.250***	1.251***	1.251***
	(82.12)	(80.83)	(80.72)	(80.82)	(80.76)	(80.81)	(80.73)
Size	0.000595**	0.000771**	0.000792**	0.000782**	0.000774**	0.000789**	0.000777**
	(1.96)	(2.51)	(2.58)	(2.54)	(2.51)	(2.56)	(2.52)
PB	0.0000293	0.0000496	0.0000485	0.0000528	0.0000703	0.0000683	0.0000687
	(0.35)	(0.58)	(0.57)	(0.61)	(0.82)	(0.79)	(0.80)
_cons	-0.0141**	-0.0180***	-0.0185***	-0.0183***	-0.0181***	-0.0185***	-0.0182***
	(-2.08)	(-2.61)	(-2.68)	(-2.65)	(-2.62)	(-2.68)	(-2.63)
N	16086	16054	16024	15993	15960	15926	15927
R-sq	0.309	0.291	0.292	0.292	0.293	0.293	0.292

Note: the values in brackets are t-statistic values, *** means significant level of 1%, ** means significant level of 5%, and * means significant level of 10%

Attention from investors and abnormal excess attention and concern three regression analysis results can be seen within two weeks of lag variable symbols are negative, shows current investor attention can bring temporary excess return, and the lag of investor attention makes the earnings drop steadily, proved this price reversal effect exists, and also explains the investor attention for individual stocks yield (Dret) and the influence of the market and individual stocks for the fundamental information for individual stocks yield (Dret) were independent of each other, Because if the effects are correlated then the positive effects of attention should be sustainable and not have a price reversal effect in the first lag period.

At the same time, it can be found from the regression results that the absolute value of the regression coefficient of the lagged variable that attracts investors' attention gradually decreases as a whole, and the corresponding t statistic also gradually decreases, which indicates that the influence of the lagged variable on individual stock yield (Dret) will continuously decrease as the lag period increases.

Through the analysis of the results found that, starting from the lag issue of investor attention for individual stocks yield (Dret) is a significant negative impact, the results and foreign scholars about the U.S. stock market research conclusions are not consistent, Da, Engelbeg and Gao (2011) found that the Russell 3000 shares in the lag period less than three weeks, the influence of excess returns for individual stocks are positive, the lag and after 4 weeks, the attention of investors for individual stocks yield (Dret) began to appear the influence of the negative influence, It would take a year for the effect to reverse. Appear this kind of research results are the main reason is that the sample of the market environment is different, compared with the U.S. stock market, the investors in China's stock market maturity is relatively low, more and more people tend to be short-term trading to obtain profits, by subject hype that follow suit phenomenon occurred at the same time, this will lead to follow the purchase and sale, the result is caused by the excess of buying and selling at a premium tends to fall in the short term, this makes the price of reversal effect occurs in a very short time.

In conclusion, hypothesis 2 is proved.

5.3 Robustness test

The sample data for the robustness test in this section are randomly selected 10 companies from 36 listed companies in the block chain concept stock sector for testing. The randomly selected 10 sample companies are shown in Table 7 below.

Table 7 random sample companies for robustness test

Stock code	Short for security name
002400	Sheng Guang
002177	Yu Yin
002509	Tian Guang
002103	Guang Bo
300465	Gao Weida
300099	Jing Zhun
600571	Xin Yada
600446	Jin Zheng
002152	Guang Dian
002369	Zhuo Yi

5.3.1 Correlation test

The robustness test of correlation between investor concern (BDI) and stock return (Dret) is shown in Table 8 below.

Table 8 Robust test of correlation between investor attention and stock return rate

	(1)	(2)	(3)
	ret	ret	ret
BDI	0.000657***		
	(3.96)		
exBDI		0.00387***	
		(3.49)	
abnBDI			0.00796***
			(5.21)
Mret	1.250***	1.250***	1.249***
	(43.98)	(44.07)	(44.10)
Size	0.000268	0.0000174	0.000271
	(0.43)	(0.03)	(0.44)
PB	-0.000173	-0.000123	-0.000125
	(-1.07)	(-0.81)	(-0.83)
_cons	-0.0106	-0.000708	-0.00663
	(-0.76)	(-0.05)	(-0.48)
N	4340	4340	4340
R-sq	0.309	0.311	0.313

Note: the values in brackets are t-statistic values, *** means significant level of 1%, ** means significant level of 5%, and * means significant level of 10%

As can be seen from the regression analysis results in the table, the significance and coefficient symbols of the three proxy indicators of investor concern (BDI), excess concern (exBDI) and abnormal concern (abnBDI) are completely consistent with the results in the first section.

5.3.2 Price reversal effect test

The robustness test results of price reversal effect are shown in Table 9, Table 10 and Table 11.

Table 9 the robustness test of the price inversion effect under investors' attention

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ret	ret	ret	ret	ret	ret	ret
BDI	0.000657***						

	(2.96)						
BDI_1		-0.00221***					
		(-3.24)					
BDI_2			-0.00199***				
			(-2.92)				
BDI_3				-0.00138**			
				(-2.02)			
BDI_4					-0.00139**		
					(-2.04)		
BDI_5						-0.00105	
						(-1.55)	
BDI_2week							-0.000348
							(-0.50)
Mret	1.250***	1.246***	1.248***	1.246***	1.242***	1.244***	1.245***
	(43.98)	(43.92)	(44.03)	(43.83)	(43.54)	(43.58)	(43.51)
size	0.000268	0.000778	0.000724	0.000544	0.000416	0.000377	0.000225
	(0.43)	(1.24)	(1.16)	(0.86)	(0.66)	(0.60)	(0.36)
PB	-0.000173	0.0000581	0.0000233	-0.0000103	0.0000170	-0.0000149	-0.0000648
	(-1.07)	(0.36)	(0.14)	(-0.06)	(0.10)	(-0.09)	(-0.39)
_cons	-0.0106	-0.00428	-0.00441	-0.00418	-0.00135	-0.00254	-0.00354
	(-0.76)	(-0.31)	(-0.32)	(-0.30)	(-0.10)	(-0.18)	(-0.25)
N	4340	4331	4324	4317	4310	4302	4303
R-sq	0.309	0.311	0.312	0.309	0.307	0.308	0.306

Note: the values in brackets are t-statistic values, *** means significant level of 1%, ** means significant level of 5%, and * means significant level of 10%

Table 10 the robustness test of the price inversion effect of excess attention

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ret	ret	ret	ret	ret	ret	ret
exBDI	0.00387***						
	(3.49)						
exBDI_1		-0.00383***					
		(-3.46)					
exBDI_2			-0.00332***				

			(-3.00)				
exBDI_3				-0.00162***			
				(-1.46)			
exBDI_4					-0.00169		
					(-1.52)		
exBDI_5						-0.000842	
						(-0.76)	
exBDI_2week							0.00151
							(1.22)
Mret	1.250***	1.246***	1.247***	1.247***	1.243***	1.245***	1.245***
	(44.07)	(43.94)	(44.02)	(43.83)	(43.54)	(43.59)	(43.54)
Size	0.0000174	0.000778	0.000714	0.000479	0.000357	0.000297	0.0000512
	(0.03)	(1.24)	(1.14)	(0.76)	(0.57)	(0.47)	(0.08)
PB	-0.000123	-0.000124	-0.000142	-0.000126	-0.0000996	-0.000104	-0.0000945
	(-0.81)	(-0.82)	(-0.93)	(-0.82)	(-0.65)	(-0.67)	(-0.61)
_cons	-0.000708	-0.0181	-0.0166	-0.0113	-0.00870	-0.00731	-0.00173
	(-0.05)	(-1.30)	(-1.19)	(-0.81)	(-0.62)	(-0.52)	(-0.12)
N	4340	4331	4324	4317	4310	4302	4303
R-sq	0.311	0.311	0.312	0.309	0.307	0.307	0.307

Note: the values in brackets are t-statistic values, *** means significant level of 1%, ** means significant level of 5%, and * means significant level of 10%

Table 11 test of the robustness of price inversion effect with abnormal investor attention

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ret	ret	ret	ret	ret	ret	ret
abnBDI	0.00796***						
	(5.21)						
abnBDI_1		-0.00659***					
		(-4.32)					
aAbnBDI_2			-0.00624***				
			(-4.11)				
abnBDI_3				-0.00386**			

				(-2.54)			
abnBDI_4					-0.00471***		
					(-3.14)		
abnBDI_5						-0.00336**	
						(-2.24)	
abnBDI_2week							-0.000133
							(-0.07)
Mret	1.249***	1.248***	1.248***	1.247***	1.244***	1.245***	1.245***
	(44.10)	(44.04)	(44.08)	(43.88)	(43.62)	(43.63)	(43.52)
Size	0.000271	0.000504	0.000492	0.000382	0.000270	0.000265	0.000179
	(0.44)	(0.82)	(0.80)	(0.62)	(0.43)	(0.43)	(0.29)
PB	-0.000125	-0.000124	-0.000143	-0.000127	-0.000103	-0.000106	-0.0000945
	(-0.83)	(-0.82)	(-0.94)	(-0.83)	(-0.67)	(-0.69)	(-0.61)
_cons	-0.00663	-0.0117	-0.0114	-0.00904	-0.00663	-0.00651	-0.00465
	(-0.48)	(-0.85)	(-0.83)	(-0.65)	(-0.48)	(-0.47)	(-0.33)
N	4340	4331	4324	4317	4310	4302	4303
R-sq	0.313	0.312	0.313	0.310	0.308	0.308	0.306

Note: the values in brackets are t-statistic values, *** means significant level of 1%, ** means significant level of 5%, and * means significant level of 10%

From the test results, the significance and coefficient symbols of the lag variables of the three attention proxy indicators are basically consistent with the results in section 5.2, with good significance, and the price reversal effect is obvious.

In conclusion, the empirical results of hypothesis 1 and hypothesis 2 can be judged to be robust.

6. Research conclusions and implications

Through this study, the following conclusions can be drawn: there is a correlation between investor attention based on baidu index and stock returns of listed companies.

According to the empirical results show that investors (BDI), the excess interest concern (exBDI) and abnormal attention (abnBDI) three proxy variable yields a positive significant effect on stock, at the same time in the regression analysis results, the three indicators lag variables are significant, but the coefficient is negative, have a significant negative impact on yields, shows current investor attention will only bring temporary excess returns, but lag awareness will gradually reduce the excess returns, this means that the stock price will occur at a certain time price inversion.

Investors should correctly view the relationship between investors' attention and stock returns, which will be more conducive to making investment decisions with investors, avoiding blindly following the trend and market speculation, reasonably avoiding investment risks, and effectively maintaining the healthy development of the stock market.

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