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Highlights

- Build a binary Logit model to analyze the impacts of media effect on investor sentiment.

- Contain five categories of financial news, Economic Policy, Industrial Development, Index Forecast, Stock Market Reform, and International Economics, as independent indicators.

- Conduct empirical analysis using data from a micro-level survey.

- Show that the media effect produced by media reports will affect the investor sentiment and evaluation about the asset prices.

- Show that the impact of media reports on the market is asymmetric in a bull market and a bear market.

Impacts of the Mass Media Effect on Investor Sentiment

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Impacts of the Mass Media Effect on Investor Sentiment

Based on one set of micro-level survey data, we examine impacts of the mass media effect on investor sentiment. The financial information is distributed through three mass media channels. The study reveals that the mass media effect leads to investor sentiment fluctuation, and significantly affects investors' trading decisions. Moreover, the impacts of media reports are asymmetric: in a rising market, investors pay more attention to optimistic reports and ignore those with a negative signal; by contrast, in a declining market, investors are more vulnerable to pessimistic reports, and reports with active information do not bring a significant effect.

Key words: mass media; media effect; investor sentiment; Logit model

JEL codes: G02

1.   Introduction

Many scholars believe that the stock price surge follows rules of the economy itself. No matter whether it is a bull or a bear market, assets shall ultimately return to their appropriate values. However, historical data show that Chinese investors (either individual or institutional) seldom transact based on the inherent assets evaluation. Instead, they rely more on outside information or mass media reports for investment decisions. For instance, at the early stage of a bull market, stock prices are relatively low and investors are quite conservative in trading, and hence, the number of new accounts is small; while at the later stage, stock prices are overvalued and investors become activated, and hence the number of new accounts is obviously increased. The bull market soar and the bear market plunge are hence not just driven by capital market fluctuation. There are investor-sentiment factors which also influence investors' decisions and lead to price fluctuations in stock market (Baker et al. 2012; Stambaugh et al. 2012; Stambaugh et al. 2014). As examples, Baker and Wurgler (2007) point out that investor sentiment has a clear effect on the company and the stock. Baker and Wurgler (2006) examine how investor sentiment affects the cross-section of stock returns and predict that investor sentiment more significantly affects securities with valuations highly subjective and difficult to arbitrage.

In the Internet era, specifically, the mass media plays the role of sources for most financial information. It disseminates specialized knowledge, solves the problem of information asymmetry between stock investors and listed companies, and strengthens regulation and development of the stock market. However, a considerable fraction of the current media reports deviates from the truth and is full of subjective color. Hence, as a market information system, the mass media sometimes fails to play a normal function, and the investor sentiment as well as investment decisions are unavoidably misled (Meng and Bo, 2010; Li et al. 2014; Sul et al. 2016; Zhang et al. 2016).

In the prior literature, Shiller (2015) finds that the popular media optimism is more likely to attract investors to enter the market, and promote the stock market bubble. By examining the relationship between mass media reports and stock returns, Fang and Peress (2009) find that the breadth of information dissemination and stock returns are correlated. Taking the Standard & Poor's 500 index as a sample, Engelberg and Parsons (2009) show that mass media reports have a strong driving force for investors. According to Tetlock (2007), the higher the degree of pessimism over the mass media, the more active the trading behavior in the market.

As listed above, most scholars empirically analyze the impacts of mass media on the stock market from the macro perspective or using macro-level data. However, this paper argues that it is difficult to generalize the conclusions to all individual stock investors only from the macro-based views. We instead focus on the impacts of media effect on investor sentiment and trading behavior from a micro perspective of view. It is conducted by building a binary Logit model and making empirical analysis using data from a micro-level survey with a considerable sample size. By doing so,

we reveal those categories of financial information that impose significant impacts on investor sentiment and highlight differences in these impacts between a bull market and a bear market.

More concretely, we obtain the following findings through analysis in this paper: First, the media effect produced by media reports will affect the investor sentiment and evaluation about the asset prices. Due to the asymmetric information and the media reports with subjective color, investors may make irrational investment decisions, and eventually make asset prices deviate from the reasonable valuation. Second, the impact of media reports on the market is asymmetric. In a rising market, stock investors are more sensitive to the optimistic reports and insensitive to negative ones; in a declining market, stock investors are more easily affected by pessimistic reports, and active market reports do not work too much.

2. Data and Methodology

This study is based on a micro-level survey in April 2016, whose respondents are students with stock investment experience in xxx University.[1] The survey collects a total of 166 questionnaires, which consists of 42 females and 124 males. In terms of the respondents' subject distribution, 85 of them are on a financial subject and 81 are not. As a result, the sample distribution is not biased due to respondents' subject differences. Each respondent is required to report whether and to what extent he or she is influenced by mass media. Further, for three types of mass media, News Media, Social Media and Specialist Media, they are asked to report their sensitivity level to various categories of financial information in a bull market and a bear market, respectively.

We adopt a binary Logit model to analyze the impacts of media effect on investor sentiment. The binary Logit analysis basically examines the relationship between a categorical variable and a set of independent indicators.[2] In our model, it explicitly builds connection between investor sentiment and various categories of financial information in mass media. The investor sentiment is characterized by whether the investor is affected by mass media for investors. Two categories are included, i.e., being affected and not being affected. According to McFadden (1973), the corresponding random outcome follows a Logistic distribution. The model is concretely formulated as follows:

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[1] University name is removed for the blind review purpose.

[2] The binary Logistic model is used to estimate the probability of a binary response based on several independent indicators. The regression coefficients are usually estimated using maximum likelihood estimation. For more detailed information on Logit analysis, please refer to McFadden (1973).

$$\text{Logit}(P) = \ln \frac{p}{1-p} = \alpha_0 + \alpha_1 EP + \alpha_2 ID + \alpha_3 IF + \alpha_4 SMR + \alpha_5 IE + \varepsilon,$$

where *p* reflects the odds of being affected by mass media for investors. Then, *1-p* corresponds to the odds of not being affected by mass media for investors. As such, a logarithm transformation of *p/(1-p)*, which is called Odds Ratio, quantitatively measures the relationship between the independent variables and dependent variables. The problem of predicting the probability of a random outcome is transformed to predict the Odds Ratio. The strength of the relationship is characterized by the coefficients α_i, which are to be estimated based on the survey data. Further, this model contains five categories of financial news as indicators. The corresponding definitions and descriptions are stated as below:

(1)Economic Policy (EP).This indicator mainly reflects the overall economic policy, which is usually at a macro level. Examples include but are not limited to fiscal and monetary policies. In our survey, in the bull market, EP is set as "On the weekend, the People's Bank of China will cut the benchmark interest rate of RMB loans and deposits in financial institutions"; in the bear market, ID is set as "On the weekend, the people's Bank of China will increase the benchmark interest rate of RMB loans and deposits in financial institutions".

(2)Industrial Development (ID).This indicator refers to the economic situation of industries that the listed companies belong to. It generally measures the development trend for one specific industry. In our survey, in the bull market, ID is set as "One Belt and One Road – Dig for gold in five regions and six industries"; in the bear market, ID is set as "The reform of the supply side will be pushed, and focus will be on shares in five industries".

(3)Index Forecast (IF). This indicator refers to the prediction of the Shanghai composite index and the Shenzhen component index, by either professional financial institutions or scholars in the field of stock investment. In our survey, in the bull market, IF is set as "the bull market is not yet on top and the 4000-points is just the beginning of the A shares of the bull market"; in the bear market, IF is set as "the 3000-points is the policy at the end and the reform of bull will be open in 2015".

(4)Stock Market Reform (SMR). This indicator refers to the stock market reform measures such as new IPO policies, introduction of registration system and circuit-break mechanism, etc. In our survey, in the bull market, SMR is set as "China Securities Regulatory Commission will consider the timely introduction of registration system"; in the bear market, SMR is set as "China Securities Regulatory Commission will restart IPO shares next week".

(5)International Economics (IE). This indicator measures the overall international economic situation, which is reflected by factors such as trading behaviors and capital flows between

countries. In our survey, in the bull market, IE is set as "The Federal Reserve is to raise interest rates soon, and a showdown is to come on between the gold bull and gold bear"; in the bear market, SMR is set as "The Federal Reserve confirms that it will raise interest rates in December".

3.   Empirical Results

Through three rounds of Logit regression analysis, we find that in the bull market (Table 1), regardless of the mass media type, four categories of financial information, EP, ID, IF and IE, have significant impacts on investor sentiment (5% level), viz., investors are highly sensitive to these categories of financial information. More specifically, News Media's influence is greater than Social Media and Specialist Media, which can be easily observed from the distinct significance levels, the varied regression coefficients, or the different values of pseudo R^2. This is because News Media itself has stronger public credibility, wider spread and more authority than the other two counterparts, i.e., Social Media and Specialist Media. In addition, the influence of Specialist Media is stronger than Social Media due to the professional quality of experts and scholars in the field of stock investment. In terms of impacts of the five categories of financial news, we find that EP more significantly affects investor sentiment than other indicators, regardless of the mass media type. It well reflects the policy-leading fact of the Chinese stock market in reality. We also note that SMR information distributed by News Media and Specialist Media significantly affects investor sentiment at 5% and 10% levels respectively, while that distributed by Social Media does not have significant effect on investor sentiment.

Table 1   Impacts of three types of mass media on investor sentiment in a bull market:

coefficients, z-values, significance, and Pseudo R^2 values for these regressions[3]

Media Ind. Var.	News Media	Social Media	Specialist Media

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[3] When analyzing data with a Logistic regression, an equivalent statistic to R^2 does not exist. However, to evaluate the goodness-of-fit of Logistic models, several pseudo R^2 have been developed (McFadden 1973). These look like R^2 in the sense that they are on a similar scale, ranging from 0 to 1 with higher values indicating better model fit.

EP	4.2459***	1.9061***	2.2361***
	(2.78)	(3.16)	(2.64)
ID	1.6980***	1.1595***	1.3736**
	(1.71)	(2.51)	(2.11)
IF	2.5165***	1.2658***	1.2696**
	(2.52)	(3.48)	(2.25)
SMR	1.9734**	3.2882	1.1552*
	(2.02)	(0.67)	(1.76)
IE	2.0050***	1.4424***	1.5309***
	(2.73)	(2.79)	(2.66)
Pseudo R^2	0.867	0.632	0.762

Note 1: figures in brackets are z-values, and *** ,** ,* stand
for 1%, 5% and10% significance levels, respectively.

By conducting a similar analysis, we find in a bear market, as shown in Table 2, both EP and SMR have significant impacts on investor sentiment, through News Media, Social Media or Specialist Media, which can be seen from the distinct significance levels, the varied regression coefficients or the different values of pseudo R^2. It implies that investors are eager for new economic policies or active reforms when they lose confidence in stock investment in a bear market. For EP, Specialist Media's influence is higher than News Media and Social Media, which indicates that in a bear market investors rely more on experts' investment knowledge. For SMR, a bit differently, News Media's influence is greater than Social Media and Specialist Media. This is because News Media usually has stronger public credibility, wider spread and more authority than Social Media and Specialist Media. Besides, the influence of Specialist Media is stronger than Social Media for the reliable quality of its reports. In addition, ID has a relatively significant impact on investor sentiment only through Specialist Media, which shows that in a bear market, the impact of industrial economic information on investor sentiment is extremely dependent on expert knowledge. For IF, it does not provide a significant impact on investor sentiment. Besides, IE influences stock investors mainly through News Media and Social Media.

Table 2   Impacts of three types of mass media on investor sentiment in a bear market:

coefficients, z-values, significance, and Pseudo R^2 values for these regressions

Media Ind. Var.	News Media	Social Media	Specialist Media
EP	0.9143^{***}	1.1848^{***}	2.7654^{***}
	(2.97)	(3.58)	(4.40)
ID	0.5504	-0.3828	-0.8889^{*}
	(1.39)	(-0.74)	(-1.75)
IF	-0.5040	0.2702	-0.1456
	(-1.11)	(0.62)	(-0.23)
SMR	1.5118^{***}	0.7571^{**}	1.3779^{**}
	(4.19)	(2.23)	(2.18)
IE	1.1930^{***}	0.6954^{*}	0.5413
	(2.93)	(1.92)	(1.00)
Pseudo R^2	0.658	0.560	0.715

Note: figures in brackets are z-values, and *** ,** ,* stand for 1%, 5% and 10% significance levels, respectively.

Next, we compare empirical results of the bull and bear markets. In a bull market, investors are more sensitive to the media content with relatively positive and optimistic color. For instance, IF, which refers to "the bull market is not yet on top and the 4000-points is just the beginning of the A shares of the bull market" in our survey, significantly affects investor sentiment. By contrast, they are less sensitive to the information with relatively negative and pessimistic color. For instance, when SMR refers to "the Commission will consider the timely introduction of registration system", investor sentiment can be influenced by News Media and Specialist Media. However, in a bear market, impacts of the mass media effect on investor sentiment are largely discounted. Possible

reasons are as follows: investors are not satisfied with performance of the stock market and may lose confidence over reports from the mass media, in either form, in the bear market; investors curb their stock transactions in the bear market and some of them may even withdraw from the market. Moreover, investors are not sensitive to news content with positive and optimistic color. For example, when IF refers to "the 3000-points is the policy at the end and the reform of bull will be open in 2015" in our survey, the aid of a positive index forecast does not positively affect investor sentiment; instead they are more sensitive to negative and pessimistic information. For instance, when SMR refers to "the Commission will restart IPO shares next week", this news can obviously affect investor sentiment through mass media.

Finally, we highlight differences of our foregoing empirical study compared with previous ones. As one influential stream, scholars show whether and how investor sentiment imposes impacts on the stock performance (Baker and Wurgler 2007; Baker and Wurgler 2006). Another stream empirically analyzes the impacts of mass media on the stock market from the macro perspective or using macro-level data (Fang and Peress 2009; Engelberg and Parsons 2009). However, using a survey data set at a micro level, we find out categories of financial information that impose significant impacts on investor sentiment and contrast differences between a bull market and a bear market. So, obviously, we study the problem of investor sentiment from a different perspective.

4.   Conclusion

This paper studies the impacts of media effect on investor sentiment in stock market. Based on a micro-level survey data from students with stock investment experience in xxx University, we adopt the binary Logit model for the empirical analysis. The following conclusions are drawn: First, the media effect in the production and dissemination of information may lead to fluctuation of investor sentiment, and attach a substantial influence on the investors' trading decisions. Second, the impacts of mass media reports on the stock market are not symmetric. In a rising market, investors care more about the optimistic reports and ignore those with a negative and warning signal; in a declining market, investors are more likely to be affected by pessimistic reports, and active market reports do not have enough effect.

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