The Influence of the Media Reports Framework on the Stock Price Information Content under the Investor’s Heterogeneous Belief

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Keywords. Media reports framework, Information content, Investor's heterogeneous belief.

Abstract: This paper analyzed the influence of the media report framework on the information content in the stock price and the influence of the investor's heterogeneous belief on this effect. The empirical results showed that: The number of media reports would increase the company's characteristic information content in the stock price, and negative reports had a stronger effect. The higher the degree of investors' heterogeneous beliefs, the more significant the media report had on the improvement of information content in stock price.

Introduction

The basic function of capital market is to use the signal mechanism of stock price to realize optimal allocation of resources. In an efficient securities market where information can be adequately reflected, prices can guide scarce capital to achieve its maximum return. In the mature capital market, the stock price can reflect more specific information of listed company, so the resource guidance function of stock price can get better played. But in the emerging capital market, the stock price often cannot reflect the information of company well, and this causes difficulty for stock price to play a guiding role for the allocation of resources effectively. One of the most important differences in the efficiency of the capital market is the stockprice synchronicity. Stockprice synchronicity is the relationship between the fluctuation of the stock price of each company and the market average. The higher the stockprice synchronicity, the lower the company's unique information content reflected in stock price and the lower the resource allocation efficiency of the capital market. Therefore, it is of great theoretical and practical significance for the improvement of the pricing efficiency of the capital market to raise the stock price information content and explore effective ways to reduce the share price synchronism.

As an important information intermediary, media has the function of digging and spreading the internal information of the company. Information at the macroeconomic level, industrial level and corporate level, will be spreaded through the media and reflected in the share price. The framework adopted by media reports will influence investors' understanding of information. Different investors interpret the information differently based on heterogeneous beliefs, so that they have different judgment on the trend of stock price, which can also affect the synchronization of stock price. Therefore, this paper analyzes the influence of media attention on the volatility of stock price volatility.

However, there are few studies on the relationship between media coverage and share price. Will media reports affect share price synchronization? If so, what are the effects of media coverage on share price synchronization? And so on. The answer to these questions is very important to explore the operation efficiency of China's capital market. This paper used the data of listed companies from 2014-2016 to examine the impact of media coverage on the pricing efficiency of China's capital market with heterogeneous beliefs.

Theory Analysis and the Research Hypothesis

As a medium of information, media has an important function of information dissemination. Bushee et al. (2010) found that the media will not only transmit information from various sources, but also analysis information and create new information which can significantly improve the transparency of the accounting information of the listed companies so as to improve the pricing efficiency of the
capital market. Luo et al. (2013) use news search engine to obtain the data reported in the media as the sample, and their study showed that media reports could significantly improve the information content of stock price. Huang et al. (2014) used China's securities market price “up or down” phenomenon as a starting point and found that media reports could increase the information content of stock price.

There are two kinds information in the stock price: one is the information of the market and the other is the characteristic information of the company. The more information of the market in the stock price, the higher is the synchronicity of the stock price. The more the information of the stock in the stock price, the lower is the synchronicity of the stock price. The synchronization of stock prices is the relationship between the change of the stock price of a company and the average change in the market. China's stock market is often known as the “policy market”, which means that the capital market is greatly influenced by the state and macro policies. This is mainly because China is still an economic transition country. The government plays an important role in the allocation of social resources. Government regulation is still normal (Luo et al., 2009). As a result, there is more information on the market level included in the stock price, which brings high share price synchronicity.

The existing research provided that the media affected investment decisions by providing relevant information of the company. Tan et al. (2014) found that the trading behavior of both institutions and individual investors will be affected by media reports. Media reports provide investors with some information related to the company which helps investors understanding the company's basic information, forecasting company's future profitability and determining the company's value accordingly. Therefore, media reports can reduce the information asymmetry of the capital market (Xiong Yan et al., 2014), prompting the related information to integrate into the stock price faster and drive the stock price up or down (Johnson, 2005). So, with the increase of news media coverage of the company, more company's quality information is integrated into the stock price, and the share price will be less synchronous.

In addition, the existing research showed that the tone of media report will have an impact on asset price movements, and this effect is asymmetric. Investor sentiment is more easily affected by the negative tone in media report and asset price will decline with the increase in media coverage of negative words. But positive and neutral tone will not raise the make price easily. Therefore, compared with non negative tone reports, the information of negative tone reports will be more reflected in the volatility of the stock price. According to this, the hypothesis of this article is put forward. Accordingly, this paper proposes a hypothesis:

H1: The more media reports, the higher the company's quality information is in the stock price. Compared with non negative tone reports, negative tone media reports has stronger effect on the increase of stock price characteristic information content.

In theory, investors’ heterogeneous beliefs leads to abnormal fluctuations in the stock price. With heterogeneous beliefs, different investors will take different transactions; these transactions will transfer investors’ heterogeneous beliefs on media reports to stock price. Therefore, it can be considered that the higher the degree of heterogeneous belief in the capital market, the higher the information content of the company's stock price. Accordingly, this paper proposes another hypothesis:

H2: The stronger the investor's heterogeneous belief, the more significant effect the media reports has on the increasing information content of the stock price.

**Empirical Study Design**

**Sample Selection and Data Sources**

The sample of this paper is the A - share listed company in Shenzhen from 2014 to 2016. The following companies are eliminated: (1) since the synchronicity of stock price volatility is the linkage relationship between stock returns and the market returns, in order to avoid the influence of IPO on the stock and the stock price synchronicity, this paper eliminated newly listed companies;
financial listed companies; (3) companies with A, B and H shares; ST, PT companies; (4) company that lack of the related data. At the end of this paper, we get panel data of 677 companies for 3 years. The media reports data used in this paper was obtained by manual search of the Chinese important newspaper database, and the rest of the data are from the CSMAR database.

Model and Variables

Media reports: This paper used Media to measure media reports. For media reports, this paper used the number of negative reports and non negative reports reported by media in every sample year. The number of negative reports is Media1, and the number of negative reports is Media2. In order to ensure the comprehensiveness and authority of news reports, this paper used the number of news that were included in China's important newspaper database. In addition, Media=Ln (the number of media reported by the listed companies +1) is taken as a reference to other studies.

Stock price information content: in this paper, the information content of stock price is expressed in Inf. The calculation method of stock price information content characteristics is according to Roll (1988) and Morck (2000), by calculating the R2 of CAPM and gave it logarithmic transformation then get the final index of Inf1. For robustness considerations, this paper used the method of Campbell and Lettau (1999) to divide stock return into income from the market level, income from the industry level and income from company level then get the final index of Inf. At present, most studies use the stock price volatility synchronization to measure the company's characteristic information content in the stock price, and the synchronization of stock price volatility is often measured by R2. The smaller the R2, the more company's characteristic information is in the stock price, and vice versa.

Investors' heterogeneous beliefs: according to previous studies, combined with the characteristics of Chinese capital market, this paper used the annual turnover of stock (Turnover) to measure investors' heterogeneous beliefs. Exchange rate reflects stock trading volume and the total amount of tradable shares, and reflects the fluctuation of investors' decision in a certain extent. The formula is: turnover=∑ turnoverd t=n t=1. In this formula, turnoverd is the daily turnover rate of stock, turnover is the annual turnover rate of stock, and n is the actual trading day of stock in one year.

Control variables: (1) the number of listed companies (Age); (2) the book market ratio (BM), is equal to the market value of shareholders' equity and liquidity ratio; (3) asset liability ratio (Lev) the size of the company; (4) (Size); (5) ownership concentration (Herf), square of the top 10 shareholders the proportion; (6) the proportion of state-owned shares (State).

In this paper, model 1 is used to test hypothesis 1:
\[
\text{Inf}_{it} = \gamma_0 + \gamma_1 \text{Media}_{it} + \gamma_2 \text{Age}_{it} + \gamma_3 \text{BM}_{it} + \gamma_4 \text{Lev}_{it} + \gamma_5 \text{Size}_{it} + \gamma_6 \text{Herf}_{it} + \gamma_7 \text{State}_{it} + \delta_{it} 
\]

(1)

In this paper, model 2 is used to validate hypothesis 2:
\[
\text{Inf}_{it} = \gamma_0 + \gamma_1 \text{Media}_{it} + \gamma_2 \text{Turnover}_{it} + \gamma_3 \text{Media}_{it} \times \text{Turnover}_{it} + \gamma_4 \text{Age}_{it} + \gamma_5 \text{BM}_{it} \\
+ \gamma_6 \text{Lev}_{it} + \gamma_7 \text{Size}_{it} + \gamma_8 \text{Herf}_{it} + \gamma_9 \text{State}_{it} + \delta_{it} 
\]

(2)

Empirical Results Analysis

For hypothesis one, this paper used model (1) to carry out regression analysis. Table 1 is the test results of hypothesis one. Whether media reports were measured by Media1 or Media2, Media was significantly negative, and significant at the level of 1%. Because this article used R2 to measure the stock price information content, and the small the R2, the higher the corporate trait information content in the stock price. This result showed that: the number of media reports would increase the company's trait information content, and negative reports would enhance the company's characteristic information content in stock price. This may since that when the media make negative reports, they will dig deeper into the related events, so there will be more information inside the company. Hypothesis one was proved.
Table 1. Regression results of model 1.

<table>
<thead>
<tr>
<th></th>
<th>Media1</th>
<th>Media2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media</td>
<td>-0.0520***</td>
<td>-0.0483***</td>
</tr>
<tr>
<td></td>
<td>(8.71)</td>
<td>(8.30)</td>
</tr>
<tr>
<td>Age</td>
<td>0.1207***</td>
<td>0.1183***</td>
</tr>
<tr>
<td></td>
<td>(20.61)</td>
<td>(18.29)</td>
</tr>
<tr>
<td>BM</td>
<td>1.0410***</td>
<td>1.3874***</td>
</tr>
<tr>
<td></td>
<td>(34.68)</td>
<td>(29.12)</td>
</tr>
<tr>
<td>Lev</td>
<td>0.0105*</td>
<td>0.0271*</td>
</tr>
<tr>
<td></td>
<td>(0.70)</td>
<td>(0.62)</td>
</tr>
<tr>
<td>Size</td>
<td>-0.1510****</td>
<td>-0.1439***</td>
</tr>
<tr>
<td></td>
<td>(-6.26)</td>
<td>(-6.21)</td>
</tr>
<tr>
<td>Herf</td>
<td>1.3092***</td>
<td>1.1841***</td>
</tr>
<tr>
<td></td>
<td>(6.55)</td>
<td>(6.73)</td>
</tr>
<tr>
<td>Stastock</td>
<td>-0.4308***</td>
<td>-0.4197***</td>
</tr>
<tr>
<td></td>
<td>(-5.61)</td>
<td>(-5.03)</td>
</tr>
<tr>
<td>Wald</td>
<td>232.85***</td>
<td>209.17***</td>
</tr>
<tr>
<td>R²</td>
<td>0.1601</td>
<td>0.1695</td>
</tr>
</tbody>
</table>

For hypothesis two, this paper used model (2) to carry out regression analysis, and the regression results were shown in Table 2. Whether the media reports were measured by Media1 or Media2, Media was significantly negative, and significant at the level of 1%. This was in accordance with the test results for the hypothesis one. The regression coefficient of investor heterogeneity belief (Turnover) was significantly negative, which indicated that the higher the degree of heterogeneous belief of investors, the more information content of the firm was in the stock price. The coefficient of intersection of stock price information and heterogeneous belief of investors was significantly negative. It showed that the higher the investor's heterogeneous belief was, the stronger the media reports had on enhancing the company's characteristic information content. This role was stronger in negative media reports. Hypothesis two was proved.

Table 2. Regression results of model 2.

<table>
<thead>
<tr>
<th></th>
<th>Media1</th>
<th>Media2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media</td>
<td>-0.0498***</td>
<td>-0.0462***</td>
</tr>
<tr>
<td></td>
<td>(7.57)</td>
<td>(7.20)</td>
</tr>
<tr>
<td>Turnover</td>
<td>-0.1350***</td>
<td>-0.1185***</td>
</tr>
<tr>
<td></td>
<td>(14.28)</td>
<td>(12.97)</td>
</tr>
<tr>
<td>Turnover×Media</td>
<td>-0.0613**</td>
<td>-0.0531**</td>
</tr>
<tr>
<td></td>
<td>(2.43)</td>
<td>(2.13)</td>
</tr>
<tr>
<td>Age</td>
<td>0.1041***</td>
<td>0.1263***</td>
</tr>
<tr>
<td></td>
<td>(15.59)</td>
<td>(17.10)</td>
</tr>
<tr>
<td>BM</td>
<td>1.7073***</td>
<td>1.5258***</td>
</tr>
<tr>
<td></td>
<td>(21.69)</td>
<td>(20.64)</td>
</tr>
<tr>
<td>Lev</td>
<td>0.0019*</td>
<td>0.0021*</td>
</tr>
<tr>
<td></td>
<td>(0.30)</td>
<td>(0.36)</td>
</tr>
<tr>
<td>Size</td>
<td>-0.1305***</td>
<td>-0.1246***</td>
</tr>
<tr>
<td></td>
<td>(-5.12)</td>
<td>(-5.37)</td>
</tr>
<tr>
<td>Herf</td>
<td>1.0153***</td>
<td>1.1859***</td>
</tr>
<tr>
<td></td>
<td>(5.44)</td>
<td>(6.02)</td>
</tr>
<tr>
<td>Stastock</td>
<td>-0.3619*</td>
<td>-0.3375*</td>
</tr>
<tr>
<td></td>
<td>(-7.85)</td>
<td>(-7.17)</td>
</tr>
<tr>
<td>Wald</td>
<td>221.15***</td>
<td>203.27***</td>
</tr>
<tr>
<td>R²</td>
<td>0.1685</td>
<td>0.1733</td>
</tr>
</tbody>
</table>

Conclusion
This paper analyzed the influence of the media report framework on the information content in the stock price and the influence of the investor's heterogeneous belief on this effect. The empirical
results showed that: first, the number of media reports would increase the company's characteristic information content in the stock price, and negative reports had a stronger effect. This may be that when the media were making negative reports, they would dig deeper into the related events, so there would be more information of the company. Secondly, the higher the degree of investors' heterogeneous beliefs, the more significant the media report had on the improvement of the company's characteristic information content in the stock price. This role was stronger in negative media report.

Acknowledgement
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References


