Market reaction to internet news: Information diffusion and price pressure

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ABSTRACT

A number of researchers have documented the market response to various recommendations from the mass media over different periods and summarised two main hypotheses for the underlying mechanisms: price pressure hypothesis (PPH) and information diffusion hypothesis (IDH). However, few studies have investigated the underlying mechanisms of the market reaction to Internet news. This paper uncovers the underlying mechanisms by examining the market reaction to Internet news mentioned in the daily "Investment Focus" and "Announcement Interpretation" in the column of "Ahead of Stock Market". The empirical results show a significantly positive abnormal return and excessive trading volume on the event date. The cumulative abnormal return of "Announcement Interpretation" completely reverses within 50 trading days, which supports the PPH. The cumulative abnormal return of "Investment Focus" partially reverses within 50 trading days, which supports the IDH. By partitioning each sample into high information and low information subgroups, the empirical results further suggest that the PPH and IDH are not mutually exclusive. Taken together, the results provide some explanations for the market reaction to Internet news.

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1. Introduction

According to the report released by China Internet Network Information Center (CINIC), the Internet has surpassed the mass media and became the mainstream channel for information acquiring. Therefore, there is no doubt that the Internet is playing an increasing role in gathering, processing and diffusing information from the public to individual investor. Thus, the Internet has changed the way in which information is diffused and how investors may react to it e.g., investors can post their comments about certain stocks on the stock message boards through which the readers will be influenced. Specifically, the stock market is mostly driven by information, the characteristic of individual investor that relies on their searching behaviour to fetch information from the Internet (Da et al., 2011; Zhang et al., 2013a; Da et al., 2015), and mutual funds that develop new product based on the sentiment extracted from the social network (Bollen et al., 2011) and online information interaction channels have been created for individual investor to learn about the listed companies (Tumarkin and Whitelaw, 2001; Antweiler and Frank, 2004; Mizrach and Weerts, 2009; Jin et al., 2016). Given all these findings on the relations between Internet news and stock market performance, in this paper, we further explore the underlying mechanisms that cause market reactions to Internet news.

To address this question, we investigate the variations in stock returns and trading volume after the information mentioned in the daily "Ahead of Stock Market" column in NetEase, which is one of largest Chinese Internet content providers. This column mainly provides us two kinds of Internet news: the "Investment Focus" and the "Announcement Interpretation". The "Investment Focus" can be viewed as the anonymous recommendation from the Internet. And thus, to some extent, it may contain some relevant information to the fundamentals. The "Announcement Interpretation" is the summaries of announcements which are released in stock exchanges during the trading period. According to the efficient market hypothesis, the price should have reflected the information contained in announcement. Since the NetEase publishes next day's "Ahead of Stock Market" column after the stock market is closed in the previous night. The stock market should have no reaction to the information in "Announcement Interpretation". This unique column allows us to simultaneously examine the market reaction to different kinds of Internet news, i.e., the first-band and the second-hand information. In particular, the literature on the market reaction to mass media has documented two prevailing theories in explaining the underlying mechanisms. The price pressure hypothesis (PPH) claims that headlines or recommendations in the newspaper can create temporary buying pressure and the changed prices will reverse to the fundamental value in a relatively short period. Conversely, the information diffusion hypothesis (IDH) that considers the price changes are driven by information diffusion and naturally no price reversal would be observed in a relatively short period. In this paper, we find that stock market reacts to Internet news with both PPH and IDH.

Our paper contributes to the literature in the following three aspects. Firstly, to the best of our knowledge, we are the first to examine the underlying mechanisms, i.e., the PPH and IDH, of market reaction to Internet news. Precious studies either focus on the market reaction to the newspapers, e.g., the "Dartboard" column of the *Wall Street Journal* (Barber and Loeffler, 1993 and Albert and Smaby, 1996) or investigate the predictive or explanatory power of the Internet information on price changes and volatility clustering without mentioning the underlying mechanisms (Da et al., 2011 and Shen et al., 2016). We hereby investigate the underlying mechanisms of market reaction to the newly emerged information diffusion channel, i.e., the Internet news. Secondly, we provide alternative evidences on the underlying mechanisms in the Chinese stock market, which possesses a huge number of irrational individual investors (Xu, 2000 and Zhang et al., 2016). A recent report[1] conducted by the Shanghai Stock Exchange shows that the individual investors account for 93.20% in A shares at the end of 2012. Meanwhile, the corresponding figures are about 33% and 11.5% for the U.S. equity market[2] and London Stock Exchange,[3] respectively. In this sense, examining such issues in the Chinese stock market is necessary since a completely different picture may be drawn. Thirdly, given this unique online column, we can simultaneously investigate the market reaction to first-hand information (information in "Investment Focus") and second-hand information (information in "Announcement Interpretation"). This clean setting allows us to examine the market reaction to first-hand and second-hand information in the scenario of identical information environment (Morck et al., 2000; Kevin and Yuan, 2004; Jin and Myers, 2006) as well as rules out the potential differences generated by some macroeconomic factors, e.g., interest rate and exchange rates (Engle and Rangel, 2008 and Zhang et al., 2013b). Therefore, the empirical results are more convincing.

The remainder of the article is organised as follows. Section 2 discusses the related literature. Section 3 presents the description of NetEase and the capital data. Section 4 describes the empirical results. Section 5 is the analysis of the partitioned subgroups. Concluding remarks are briefly indicated in Section 6.

2. Literature review

The idea in this paper is related to two branches of the existing literature: the extensive literature on the relations between Internet news and stock market performance and the market reaction to information contained in mass media.

2.1. Impact of internet news

Using the Internet information for asset pricing studies in the stock market has emerged recently as a hot research interest for financial empiricists, computer scientists and practitioners. To the best of our knowledge, Wysocki (1999) firstly addresses this issue by examining the cross-sectional and time-series determinants of posting a volume of Yahoo! message boards, finding that the overnight posting volume can predict changes in the next day stock trading volume and stock returns. Contrary to these anecdotal findings, Tumarkin and Whitelaw (2001) further investigate the relations between message board activity and stock market behaviour on Raging Bull, finding that the message board activity has no predictive power for industry-adjusted returns or abnormal trading volume. Da et al. (2011) use the search frequency in Google as the direct measure of investor attention and find that this proxy can predict stock prices in the next 2 weeks. Zhang et al. (2014)

employ the number of news appeared in Baidu News as the proxy for information arrival and find that this kind of Internet information can explain the volatility persistence in the framework of mixture of distribution hypothesis (MDH). Dergiades et al. (2015) show that the key phrases related to the Greek debt crisis in Google Trends, Twitter and Facebook can provide significant short-run information primarily for the Greek–German government bond yield differential. The above-mentioned studies belong to the quantitative measurements of Internet information, which has gained popularity and is used in empirical studies, e.g., in Hanke and Hauser (2008); Vlastakis and Markellos (2012); Aouadi et al. (2013) and Zhang et al. (2013a, 2013b), among others. Another stream of literature focuses on the relations between the tonality or sentiment of Internet information content (positive or negative) and the trends in stock prices (upward or downward). Antweiler and Frank (2004) find that the information content of the postings on Yahoo! Finance and Raging Bull can predict market volatility. Das and Chen (2007) employ the voting algorithm to extract sentiment from the message board and document the relations between extracted sentiment and trading volume. Bollen et al. (2011) derive the collective mood from Twitter feeds and find that the mood index is correlated to the value of the Dow Jones Industrial Average (DJIA) over time. Kim and Kim (2014) use large dataset of more than 32 million messages in Yahoo! Finance to construct a proxy for investor sentiment and find no correlation between the sentiment and future stock returns. Siganos et al. (2014) provide international evidence that the Facebook's Gross National Happiness Index has positive contemporaneous relations to stock returns. All these studies have proved that the Internet has changed the way in which information is diffused and re-examined some financial theories with Internet-based new proxies.

2.2. Market reaction to mass media

Several studies have documented the stock market reaction to various kinds of mass media. Barber and Loeffler (1993) analyse the effect of second-hand information in the monthly "Dartboard" column of the *Wall Street Journal* and conclude that the positive abnormal return is a result of price pressure. Albert and Smaby (1996) also analyse the "Dartboard" column with the post-event estimation methodology and conclude that the information diffusion effect exists. The price pressure hypothesis and information diffusion hypothesis have gained increasing popularity and are frequently viewed as the theoretical foundations of investigating the market reaction to stock recommendations on mass media, e.g. in Mathur and Waheed (1995); Liang (1999); Ferreira and Smith (1999) and Kerl and Walter (2007). The price pressure hypothesis (PPH) poses that the Internet news creates temporary buying pressure in the highlighted stocks and this buying pressure causes the observed abnormal returns, which will reverse to their fundamental value in a relatively short period. The information diffusion hypothesis (IDH) poses that the Internet news reveals relevant information about the fundamentals and thus the observed abnormal returns will not reverse to their fundamental value in a relatively short period.

3. Data description

3.1. NetEase

NetEase is one of China's leading Internet content providers and is ranked as 27 by Alexa in April 2014. Its online communities and personalised premium services have established a large and stable user base for the NetEase websites, which has more than 120 million registered users and 40 million daily active users. Therefore, NetEase can reach a large number of potential investors through which their trading behaviour may be influenced. The "Ahead of Stock Market" is one of its popular columns, which has been published daily in the NetEase Financial Channel on the website since October 23, 2013. There are mainly two kinds of information: the "Investment Focus"

[1] For this report, see: http://2015.sse.com.cn/researchpublications/research/c/c_20140801_3828282.pdf.
[2] For this report, see: https://www.sec.gov/News/Speech/Detail/Speech/1365171515808#P18_1663.
[3] For this report, see: http://www.ons.gov.uk/economy/investmentspensionsandtrusts/bulletins/ownershipofukquotedshares/2012-02-28.