The Attention-Weighted Asymmetric Stock Message Board Effect

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Proposal submitted for Indiana University’s Faculty Research Grant
Feb. 20th, 2014

Abstract

This study is the first to investigate the renowned stock message board effect by controlling for both firm effects and board effects. Presently it is the most comprehensive study on how online stock discussion forums affect stock performance. More specifically, firm effects include firm size, earning growth rate, and media coverage intensity. Board effects include sentiment, number of messages, poster’s credibility, average message length, poster’s credibility, and most importantly, the drastically different levels of attention attracted by different websites. Stock performance factors include stock return, volatility, turnover, and bid-ask spread. First, by conducting event studies, I will look for a significant and positive market reaction on the discussion day for growth and small-cap stocks, and a smaller market reaction for large cap and value stocks on the heavy online discussion day. Second, by controlling for the attention level of each web forum, I will test if a stronger impact will be shown for posting activities on stock trading for all stocks, especially small-cap and growth stocks. Finally, I will test to see if a well-constructed index of firm styles and investors’ attention combined can be used to form a sound trading strategy.
The Asymmetric Stock Message Board Effect

Objective and Significance

The Internet has been one of the most revolutionary technologies in history. While the Internet has shown a significant impact on investing, this effect has been largely ignored in the existing studies. This research builds on several previous studies I have conducted since 2007 and aims to contribute significantly in this field. This research is also the first study in this field to weight different message boards with users’ attention level.

As a major type of social media, online message boards have profound influence on people’s decision making in general. Thus, it is unsurprising that stock message boards are changing the way investors make trading and investment decisions (Barber and Odean (2001), Litan and Rivlin (2001)). Other than sending trade orders, online investors often seek information from stock message boards, which serve as the most popular place for retail investors to discuss, share, and learn from other investors’ opinions and sentiments about specific stocks and the market (Zhang et al. (2012)). In addition to an increasing number of stock message boards, growth in the number of participations on major stock forums has exploded (Loh and Ong, 1998; Teich, et al. 1999; and Hong, 2000). For example, within a single month, TheLion.com, a message board aggregator web site tracked over 100 million message postings from stock message boards and attracted over 250 million page views and two million monthly visitors (Sabherwal, et al. (2011)) in June 2007.

I strongly believe that studying stock message boards helps both practitioners and researchers to better understand investors’ decision-making and behavioral patterns. First, to practitioners, participating in online discussions with other traders can be seen as an extended learning experience out of their MBA classrooms and would certainly help improve their trading skills. Anterweiler and Frank (2004) show that online talk is not just noise but exerts substantial influences on trading activities. Therefore, trading strategies based on stock message board information are logically and practically feasible. For example, Gu, et al. (2006) suggest that sentiments of investors who have correctly predicted recent stock movements are more negatively associated with future stock movements and therefore propose a trading strategy that involves buying stocks with low sentiments while selling stocks with high sentiments.

Second, to researchers, studying stock message board activities helps us understand whether online messages contain valuable information that is not available from other traditional media. Besides, studying posting activities helps researchers learn how and why day-traders
make stock recommendations online. With rich stock message board data accompanied by effective artificial intelligent tools, stock message boards offer a fruitful area of research with important implications to investor behaviors, price discovery process and market efficiency.

Last but not least, study in this field has recently been strongly encouraged by policymakers, who are especially interested in tracking the activities on the stock message boards in order to prevent securities fraud and to protect investors’ interests. Of specific interest to policymakers is the growing significant impact of online postings has on stock prices. In particular, policymakers, such as the Securities and Exchange Commission (SEC), the Federal Trade Commission (FTC), and the Commodity Futures Trading Commission (CFTC), are especially interested in tracking the activities on the stock message boards in order to protect investors’ interests. Unfortunately, we have seen numerous cases related to online securities fraud and many of these crimes were committed on stock message boards. Thus, conducting research on stock message boards helps policymakers monitor online frauds and stock price manipulation.

In summary, it now becomes very important for all financial market participants to enhance our understanding of the impact of message board posting activities on stocks and even the financial market as a whole. In this study, I will extend previous literature and discern the true effect of posting activities on trading behaviors on the stock message board effect by using an attention-weighted method the first time for this topic and controlling for all necessary firm effects and board effects. I plan to conduct a comprehensive study to examine how posting activities measured by sentiment, disagreement, number of messages, and average message length influence the stock return, volatility, volume, and bid-ask spread.

**Theoretical Framework and Literature Review**

Although it has been more than a decade after the first stock message board paper conducted by Wysocki (1998), stock message board study is still in its infancy. Wysoki (1998) reports that changes in overnight posting activity contain valuable information and that increases in overnight posting volume generally indicate positive change in stock price. Later, Barber and Odean (2001) and Litan and Rivlin (2001) show that the Internet message board is changing the way investors invest, trade and acquire information. Since then, many studies focus on whether information content of message boards can explain and more importantly, predict future stock trading. Gu et al. (2006) argue that there are informed posters on stock message boards whose information is not fully incorporated into market prices and therefore message board sentiments can predict future stock returns. Saberwal et al. (2008) find that the number of messages posted about a stock on a given day is not only positively related with the stock’s abnormal return on that day but it also positively predicts the next day’s abnormal return. Saberwal et al. (2011) further report that when there is no market news, online traders’ sentiment causes positive contemporaneous return and negatively predicts the next day return. In addition, both Clarkson et al. (2006) and Bettman et al. (2011) find that online “rumors” significantly predict abnormal returns and trading volumes. Oh and Sheng (2011) reveal that stock micro blog sentiments have predictive power for simple and market-adjusted stock returns.
Many studies that report little predictive power of online talk used author-selected sample, which contains mostly large stocks. Among the scholars who believe no predictive power of online talk, Tumarkin and Whitelaw (2001) investigate 73 Internet services companies in the Zacks’ Internet services sector group with a median market cap of $1.12 billion. Antweiler and Frank (2004) select 45 stocks among which 30 are blue chip stocks are in DIA (Dow Jones Industrial Index) and 15 are large Internet stocks in XLK (Dow Jones Internet Index). Koski et al. (2008) chose the NASDAQ 100 stocks that are the largest 100 domestic and international non-financial securities listed on the Nasdaq stock market. Das et al. (2005) study four large firms in the late 1990s: Amazon.com, Delta Airlines, General Magic, and Geoworks Corp. Bird and Thapa (2010) study component stocks in the Ordinaries Index which is comprised of the 500 largest companies listed on the Australian Stock Exchange (ASX). All of these studies find no evidence of message posts having significant predictive power on future stock returns.

As a stark contrast, scholars who document significant message board effect tend to adopt message-board-generated sample to avoid self-selection bias and most of these samples contain smaller cap or even micro cap stocks. Realizing self-selection bias and then using message-board-generated sample, Clarkson et al. (2006) study takeover “rumors” posted on Hotcopper and Bettman et al. (2011) study messages that are classified as takeover “rumors” on the Yahoo! Finance boards. Sabherwal et al. (2008) study 135 most actively discussed small stocks on Thelion.com. Sabherwal et al. (2011) further study 64 fringe stocks that are included in the daily top 10 list of most heavily discussed stocks by online investors. Zhang et al. (2012) select 1,083 stocks that were heavily discussed on the message board and a large portion of these stocks are small stocks with low trading price. Oh and Sheng (2011) focus on the top 10 stocks which have the highest online postings from Stocktwits.com and Yahoo! Finance, a large portion of their sample consists of small stocks. Therefore, it is clear that there exists an asymmetric stock message board effect on different size stocks.

Samples used in aforementioned studies are neither identical nor similar so that previous inconsistent results are possibly due to different sample selection. For example, Antweiler and Frank (2004) collect messages from both Yahoo! Finance and RagingBull.com, and Zhang et al. (2012) use messages from thelion.com. It is reasonable to believe that one message should generate more attention and reaction if being posted to a heavily visited website like Yahoo! Finance than to a much less popular website like RagingBull.com. No previous study has never discussed nor controlled for this difference of data sources. Google Trend provides various series of data for researchers to measure the users’ attention level. Many previous studies in other fields have found it very useful. Ginsberg et. al (2008) conclude that, “harnessing the collective intelligence of millions of users, Google web search logs can provide one of the most timely, broad-reaching influenza monitoring systems available today.” Choi and Varian (2009) support this claim by providing evidence that user data can predict home sales, automobiles sales and tourism. Lu, Holzhauer, and Wang (2014) suggest using the user data from the Google Trend as a proxy for investors’ attention level in their study of seasoned equity offerings. They find that different levels of attention lead to different levels of reaction in the market. Da, Engleberg, and Gao (2011) also find a similar effect in the IPO market. In this study, I will employ user data collected from the Google Trend to weight the impact of messages from different forums. It is the first time that an attention-weighted method is used in studying message board effect.
Methods and Data Analysis Plan

In this study, to avoid aforementioned self-selection bias, I will investigate message-board-generated sample stocks that have been actively discussed by online posters. More importantly, the rich data will allow me to study the message board effect on demarcated (growth versus value) samples to reconcile previous inconsistent findings. Another aspect I plan to investigate is how stock message board effect is different on different size stocks when it is weighted by user attention. I will demarcate my sample based on attention level (high versus low). In sum, to reconcile the extant controversy about predictive power of online talk in the stock message board literature, I will investigate the message board effect by controlling for both company growth rate and attention level.

I will use the Patell (1976) Z test to examine the null hypothesis that the average abnormal stock return equals zero assuming asymptotically unit normal. To avoid the dependence on normality of return distributions as in the Patell parametric test, I also conduct the Cowan (1992) Z test, a nonparametric generalized sign test. Cowan (1992) Z-statistics are largely consistently with that of Patell (1976) Z-statistics. To conserve space, I report the significant level using Cowan (1992) Z-statistics. Abnormal trading volume is often used to assess the information content. Average abnormal volume (AAV) is computed in a similar manner as shown above, using the daily NYSE-AMEX log-transformed value-weighted volume as the benchmark. All volumes are also log-transformed for individual stocks.

Online messages will be retrieved from Yahoo! Finance and Thelion.com message boards, two of the largest online stock forums in the U.S., manually (Yahoo! Finance) and by using a self-developed VB based web crawler (Thelion.com). User visits data will be retrieved from Google Trend, by using a self-developed Python program. These data sources have been widely cited in the literature, such as Lu, Holzhauer, and Wang (2014), Da, Engleberg and Gao (2011), Leinweber (2001), Antweiler and Frank (2004) and Klein, et al. (2012), among others. My sample will cover a seven-year period, the longest in the literature, from January 1, 2007 to December 31, 2013. I consider messages posted from 4:00:01 p.m. ET from the previous trading day t-1 to 4:00:00 p.m. ET on the trading day t as the messages for day t.

Activities Planned

1. Browse and conduct a preliminary study of the forums. This step is for better understanding the format, main features, frequent posters and their posting patterns of different forums – April and May, 2014
2. Develop the web crawler application for my project by using Visual Basics. – May, 2014
3. Manually collect message data from Yahoo! Finance, as it doesn’t allow program downloading. – May and June, 2014
5. Results discussion will be written following the data analysis. June to August, 2014
6. Paper submission to at least 2 major finance conferences. – Sept. and Oct., 2014

**Outcomes Expected**

I expect three important findings. First, event study may reveal that there is a significantly large and positive market reaction on the discussion day for heavily discussed stocks. Second, I expect to see a stronger effect for growth stocks when the attention level is controlled. Finally, with lead-lag regressions, I will test if a sound trading strategy can be formed by using a well-constructed index of stock styles and investors’ attention level combined.

**Qualifications of the Grant Director**

This research is in the area of intersection between behavioral finance and investment. Therefore, my extensive research experience and recent publications in these fields should show that I am very well qualified for conducting research in both fields. I have maintained very active research streams in investment and behavioral finance since 2007. I have had four research papers accepted or published in the past two years, all by reputed finance journals, in these two research fields. My most recent accepted research paper, a behavioral finance study about the attention effect on the equity offering price discount, will be published on the Journal of Trading in this April. These four publications show that I have good skills in collecting and processing online data in investment research, and a proven background in behavioral finance research. I have also had many presentations of topics in both fields at some of the most important finance conferences, including two at FMA annual conferences, with three of my behavioral finance studies of topics closely related to this proposed research. I also keep frequent communication with other researchers in both fields, by attending at least two major finance conferences each year. In summary, due to my comprehensive understandings of the theories, methodologies, and quantitative data analysis models, as well as my enthusiasm in doing research in these fields, I am very confident with my capability of successfully finishing this research project with a significant contribution to the field and a high quality journal publication.

**Previous Grants Received**

I have never applied nor received this research grant in the past. The only grant that I have applied and received previously at IUSB is an one-time Faculty Travel Fund for presenting my behavioral finance research overseas. I have presented my research at the conference this past summer and received many great feedbacks and multiple invitations for journal submissions. After attending the conference and incorporating all good points into my research, I chose to submit this paper to the Journal of Trading, a good quality finance journal ranked by the world renowned Association of Business Schools (ABS) Journal Quality Guide. Now it has been accepted by the JOT and will be published in this April. This shows that I have effectively used the research assistance fund.
**Efforts underway to obtain additional funding**

I have not applied for additional funding for this project. But I will keep looking for other sources for research funding. And I will apply for additional travel funds in the future when I go present my paper at conference meetings.

**Budget**

The grant requested will provide the time necessary to conduct this research study. This time will be dedicated to manually collecting data from Yahoo! Finance, designing computer programs with VB and Python for Thelion.com data and Google Trend data, and processing all data with SAS and STATA after collection. These activities are very time consuming and will require at least two months of work. The budget is detailed below:

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References


Li, X. and Shi, Z. Innovating web page classification through reducing noise. *Journal of Computer Science and Technology*, 17(1), 9-17


* d 0.01, levels, respectively.