International Review of Financial Analysis 19 (2010) 270–280

Contents lists available at ScienceDirect

International Review of Financial Analysis

The effect of attention on buying behavior during a financial crisis: Evidence from the Taiwan stock exchange

Hsin-Yi Yu [a,1], Shu-Fan Hsieh [b,*]

[a] Department of Finance, National University of Kaohsiung, Taiwan
[b] Department of Money and Banking, National Kaohsiung First University of Science and Technology, Taiwan

ARTICLE INFO

Article history:
Received 22 March 2010
Received in revised form 7 August 2010
Accepted 17 August 2010
Available online 22 August 2010

Keywords:
Trading volume
Buy–sell imbalance
Financial crisis

ABSTRACT

We confirm that investors in different categories have different trading patterns caused by attention-grabbing factors. Stocks with extreme one-day returns catch the attention of both individual and institutional investors. Individual investors are net buyers of losers whereas institutional investors are net buyers of winners. Unlike institutional investors, individual investors also regard volume as a conditional attention-grabbing factor. We also find that attention-driven buying behavior is mitigated by the financial crisis of 2007, which indicates that the buying behavior of investors is less emotional during a period of financial crisis.

1. Introduction

This paper examines the attention-driven buying behavior of different types of investors. When there are many choices, options that attract attention are more likely to be considered and chosen. Investors are more likely to buy the stocks which grab their attention. Barber and Odean (2008) find that individual investors are net buyers of stocks with extremely high volume and extreme returns, whether positive or negative. However, is there an interaction between attention-grabbing factors? Is the attention-driven buying behavior strengthened or mitigated by the market situation? We first examine the attention-grabbing behavior of different types of investors by observing the relationship between buy–sell imbalances and the prior day's volumes and returns and further investigate whether the financial crisis has influenced such behavior.

The term 'attention-grabbing' was first coined by Barber and Odean (2008). Attention-grabbing stocks refer to those in the news, those experiencing high abnormal trading volume, and those with extreme one-day returns. Previous research tends to view individuals and institutions differently. Institutions are commonly viewed as informed investors, and individuals are believed to have psychological biases and are often thought of as proverbial noise traders (Black, 1986; Kyle, 1985). Barber and Odean (2008) confirm that individual investors are net buyers of attention-grabbing stocks, while institutional investors are least influenced by attention.

However, it is interesting to note that Barber and Odean (2008) find that both extreme positive and extreme negative returns lead to significant buying behavior. Based on the work of Barber and Odean (2008), we analyze a complete dataset, which contains all trading records of all investors on the Taiwan Stock Exchange (TSE). Our sample covers trading from 3rd January 2005 to 31st December 2009, which includes the pre-crisis and in-crisis periods. The dataset contains the entire transaction data and the identity of each trader in the Taiwan stock market, which means that our data allow us to identify trading of individuals and different kinds of institution. Compared to the US, the stock market in Taiwan possesses four characteristics. First, the TSE operates in a consolidated limit-order book environment in which only limit orders are accepted. Orders are executed according to strict price and time priority. Second, the turnover rate in the TSE is very high — averaging 184% annually during our sample period[2]. In contrast, annual turnover on the New York Stock Exchange (NYSE) averaged 128% annually from 2005 through 2009. Additionally, the majority of trades are made by individual investors, which account for over 70% capitalization. Third, day trading[3] is prevalent in Taiwan (Barber, Lee, Liu, & Odean, 2008). Virtually all day trading (97.5%) can be traced to individual investors in Taiwan (Barber et al., 2008). Lastly, compared to the US stock market, in which institutional trades account for the majority of total trades, individual investors are very active in the Taiwanese stock market. High turnover and prevalent individual trading provide us

* Corresponding author. Tel.: +886 7 6011000x3110; fax: +886 7 6011039.
E-mail addresses: hyyu@nuk.edu.tw (H.-Y. Yu), shufan@nkfust.edu.tw (S.-F. Hsieh).
[1] Tel.: +886 7 5919709; fax: +886 7 5919329.

[2] We calculate turnover as half the sum of buys and sells in each year divided by the average daily market capitalization for the year.
[3] Day trading is defined as the purchase and sale of the same stock on the same day by an investor.

1057-5219/$ – see front matter © 2010 Elsevier Inc. All rights reserved.
doi:10.1016/j.irfa.2010.08.002

with a good opportunity to observe the attention-driven buying behavior of individual investors.

We find that investors are contrarians in Taiwan. Since there is no officially designated market maker on the TSE, individual investors are more likely to indulge in de facto market making activity and act as liquidity providers of practitioners (Chui, Titman, & Wei, 2010; Kaniel, Saar, & Titman, 2008; Lee, Liu, and Subrahmanyam, 2004). In addition, we find that unusual trading volume only encourages individual investors to be net buyers when the stock returns are negative.

We further explore whether the behavior of different investor clientele is influenced by the market situation (Bateman, Islam, & Louviere, 2010; Chiang & Zheng, forthcoming; Karolyi, 2002; Lim, Brooks, & Kim, 2008). The impact of the global financial crisis from 2007 to 2009 on the stock markets has been severe. The literature on the financial crisis, especially the massive falling of stock prices in several Asian countries during late 1997, is extensive; however, one facet of the financial crisis that did not receive much attention is its impact on investor behavior Chiang and Zheng (forthcoming)). Given this, we empirically investigate the effects of the financial crisis from 2007 to 2009 on attention-driven buying behavior.

To test this, we separate the whole period into two sub-periods — pre-crisis and in-crisis. The results demonstrate that compared to the pre-crisis period, attention-driven buying behavior and the interaction between returns and volume are all weaker during the in-crisis period. This finding implies that investors are less emotional during a financial crisis. Specifically, we also find evidence that foreign institutional investors sold off their holdings during the crisis, which indicates that they are less likely to be long-term investors.

This paper differs from previous research in three respects. First, the dataset used by Barber and Odean (2008) in their investigation of attention-grabbing behavior is restricted to a few brokerages. Our study contains all the trading records of individual investors and institutional investors of different types. Second, we document that there is an interaction between different attention-grabbing factors. Individual investors are more attracted by returns than volume. Third, we identify the role of the financial crisis in testing attention-grabbing behavior. The evidence shows that both individual and institutional investors are less attracted by extreme returns and volume during a financial crisis. Investors are less emotional when the market falls.

The reminder of the paper is organized as follows. Section 2 describes the data and sorting methodology. Section 3 presents the main empirical results of the attention-grabbing behavior of investors of different types. Section 4 tests whether the financial crisis has influenced attention-grabbing behavior. Section 5 concludes.

2. Data and variable construction

2.1. The trading environment in Taiwan

The TSE is managed by a consolidated limit-order book environment in which only limit orders are accepted. There is no designated market maker in Taiwan. During the regular trading time, from 9.00 to 13.30, buy and sell orders interact to determine the executed price subject to applicable auto-matching rules. In TSE, trades can be matched once or twice times every 90 s throughout the trading day. Orders are executed according to strict price and time priority. Although market orders are not permitted, traders can submit an aggressive price-limit order to obtain matching priority. There is a daily price limit of 7% in each direction. The TSE charges commissions at 0.1425% of the value of a trade. Some brokers offer lower commissions for larger traders. Taiwan also imposes a transaction tax on stock sales of 0.3%. Capital gains (both realized and unrealized) are not taxed, while cash dividends are taxed at ordinary income tax rates for domestic investors and at 20% for foreign investors. Corporate income is taxed at a maximum rate of 25%, while personal income is taxed at a maximum rate of 40%.

2.2. Return and volume sorts

Our data include all orders submitted to the Taiwan Stock Exchange (TSE) from January 2005 through December 2009. The available data were collected from the Taiwan Economic Journal Database (TEJ). Based on the data provided by TEJ, we categorize traders to four groups–individuals, dealers, foreign investors, and mutual funds. The latter three groups are institutional investors.

Investors are more likely to notice when stocks have extreme one-day returns, because such returns are often reported in the news and subsequently drive the attention-grabbing behavior of some investors (Barber & Odean, 2008). For example, the media and the trading system constructed by brokerage firms routinely sift the previous day's big gainers and losers out of the market. Therefore, we can expect that those investors whose trading behavior is influenced by attention will tend to purchase or sell in response to price changes. To test the extent to which each of our two investor groups – individual and institution – are net purchasers of stocks in response to large price moves, we sort stocks based on lagged day returns and then calculate the buy–sell imbalances (BSI) for the following day. Like Barber and Odean (2008), we calculate the buy–sell imbalances for the day following the extreme returns rather than the same day as extreme returns. For each time point $(t-1)$, we sort all stocks for which returns are reported in the TEJ database daily returns file into 10 deciles and calculate the BSI in each partition for each investor group as:

$$BSI_{pt}^{idv} = \frac{\sum_{i=1}^{n_{pt}} \left[\frac{Buy_{it}^{idv} - Sell_{it}^{idv}}{The\ number\ of\ shares\ traded_{it}} \right]}{n_{pt}} \quad (1)$$

$$BSI_{pt}^{int} = \frac{\sum_{i-1}^{n_{pt}} \left[\frac{Buy_{it}^{int} - Sell_{it}^{idv}}{The\ number\ of\ shares\ traded_{it}} \right]}{n_{pt}} \quad (2)$$

where n_{pt} is the number of stocks in partition p on day t, Buy_{it} is the number of shares purchased of stock i on day t, and $Sell_{it}$ is the number of shares sold of stock i on day t. BSI_{pt}^{idv} is the buy–sell imbalance for individual investors and BSI_{pt}^{int} is for institutional investors. For the days that we have trading data, we calculate the time series mean of the daily BSI for each partition on the day following the return sort for each investor type.

In addition to returns, volume is another attention-grabbing factor argued in prior studies (Barber & Odean, 2008; Chordia, Roll, & Subrahmanyam, 2002). On the days when a stock experiences high volume, it is likely that investors pay more attention to it than other stocks. Therefore, we also sort stocks into 10 deciles on each day on the basis of the prior day's volume. To consider the influence of firm size on the trading volume, we adjust the volume by dividing the number of shares traded for each stock on each trading day by the total number of outstanding shares for that stock to be the sorting basis. For each day, $(t-1)$, we sort all stocks into 10 deciles based on the prior day's adjusted volumes. We then calculate the time series mean of the daily BSI for each partition on the day following the volume sort. This calculation is analogous to that for our sorts based on returns.

3. Attention-driven buying behavior

3.1. Returns sorts

The sample covers all transaction data from 3rd January 2005 to 31st December 2009. Our data allow us to identify trading of individuals and different kinds of institution. Table 1 reports the descriptive statistics and serial correlation of buy–sell imbalances