Journal of Business Research 86 (2018) 166–178

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

What does investors' online divergence of opinion tell us about stock returns and trading volume?☆

Alya Al-Nasseri[a], Faek Menla Ali[b,*]

[a] Salalah College of Technology, Oman
[b] School of Business Management and Economics, University of Sussex, Brighton BN1 9SL, UK

ARTICLE INFO

JEL classification:
C21
G02
G14

Keywords:
Disagreement
Online tweets
Stock returns
Trading volume

ABSTRACT

We analyse 289,443 online tweets from StockTwits and construct a divergence of opinion (disagreement) indicator for investigating the impact of disagreement on stock returns and trading volume. We find that the impact of disagreement on returns is asymmetric; it is negative (positive) during bull (bear) market periods. We also find that higher online disagreement increases trading volume; this effect is detected irrespective of whether the market is bullish or bearish. Moreover, portfolio strategies that are designed on the basis of our disagreement indicator are shown to generate abnormal profits. Overall, our results confirm the important role of belief dispersion in financial markets.

1. Introduction

The impact of heterogeneity in investors' beliefs or opinions on stock market behaviour has attracted considerable attention in recent years. However, the available theoretical and empirical evidence is inconclusive. On the one hand, in the presence of short-sale constraints, lower expected returns are associated with divergence of opinion (Berkman, Dimitrov, Jain, Koch, & Tice, 2009; Chen, Hong, & Stein, 2002; Diether, Malloy, & Scherbina, 2002; Miller, 1977; Yu, 2011; among others). On the other hand, several studies argue that differences in opinions can lead to higher risk premia (e.g., David, 2008; Garfinkel & Sokobin, 2006; Varian, 1985). Disagreement has also been linked to the trading volume in asset markets. While the "no-trade theorem" of Milgrom and Stokey (1982) finds that it causes revisions of beliefs without affecting volume, subsequent studies that use different proxies for disagreement conclude that it increases the trading volume (see, e.g., Bamber, Barron, & Stober, 1997; Banerjee & Kremer, 2010; Carlin, Longstaff, & Matoba, 2014; Harris & Raviv, 1993; Kandel & Pearson, 1995; among others).

The present study aims to shed new light on the effects of disagreement on stock market behaviour by addressing the following specific questions: Does divergence of opinion among stock-related tweets affect stock returns and trading volume? Are returns and volume effects of divergence of opinion asymmetric? Does the divergence of opinion among tweets help to predict stock returns? Since the rise of social media platforms in recent years, a rapidly growing body of research has examined whether sentiment and disagreement indicators that are constructed from microblogging posts are associated with stock market features (for a comprehensive overview, see Bukovina, 2016).[1] For instance, Antweiler and Frank (2004) construct a disagreement indicator from Internet message boards and show that disagreement among messages increases trading volume. Zhang, Fuehres, and Gloor (2011) find that the percentage of emotional tweet posts is negatively correlated with various US stock market indices. Bollen, Mao, and Zeng (2011) show that the accuracy of Dow Jones Industrial Average (thereafter DJIA) predictions is significantly improved when certain public mood dimensions from Twitter are included. Sprenger, Tumasjan, Sandner, and Welpe (2014) use stock-related messages (from the so-called StockTwits) and find linkages between tweet sentiment and stock returns; message volume and trading volume; and disagreement and volatility. Giannini, Irvine, and Shu (2015) also construct a disagreement measure from Twitter posts and show that both

☆ We would like to thank the Editor-in-Chief (Professor Anders Gustafsson), the Associate Editor (Professor Karthik Krishnan) and the anonymous referee for the valuable comments and suggestions on an earlier draft of this manuscript. We are also grateful for their useful comments and suggestions to Professor Guglielmo Maria Caporale and participants of the Portsmouth-Fordham Conference on Banking and Finance, 24–25 September 2016, the University of Portsmouth.

* Corresponding author at: 207 Jubilee Building, School of Business Management and Economics, University of Sussex, Brighton BN1 9SL, UK.
E-mail address: F.Menla-Ali@sussex.ac.uk (F. Menla Ali).

[1] There is also a large body of literature in which the impact of indicators that are extracted from news articles on stock market features is examined (see, for example, Fang & Peress, 2009; Tetlock, 2007; Yuan, 2015; among others).

https://doi.org/10.1016/j.jbusres.2018.01.006
Received 13 March 2017; Received in revised form 3 January 2018; Accepted 5 January 2018

divergence and convergence of opinion generate abnormal trading volume at the time of and after earnings announcements.[2]

This paper contributes to this area of the literature by providing further evidence for the role of online divergence of opinion in the prediction of stock returns and trading volume. For example, Antweiler and Frank (2004) extract their disagreement indicator from Internet message boards; however, as Sprenger et al. (2014) note, such boards require users to actively access the forum for up-to-date developments on a particular stock and the information becomes outdated in the absence of new posts. More recent studies analyse instead the impact of online tweets that are posted on Twitter. However, most of them employ a randomised subsample of all posted tweets and/or focus on stock market feature effects of microblog-extracted indicators (i.e., sentiment, attention, and mood) other than disagreement (e.g., Bollen et al., 2011; Mao, Counts, & Bollen, 2011; Zhang et al., 2011; Zhang, Li, Shen, & Teglio, 2016; among others). By contrast, we analyse 289,443 online tweets that are directly related to stock features (e.g., posted on the microblogging website StockTwits) and construct a disagreement or divergence of opinion indicator among these tweets to examine its effect on the returns and trading volume of stocks. Specifically, we use different classification algorithms from computational linguistics to classify the collected messages into three distinct classes M^c, where $c \in$ {Buy, Hold, Sell}. Then, a disagreement indicator among messages is constructed and used in the empirical analysis. The data set includes the 30 DJIA stocks over the period from April 4, 2012 to April 5, 2013. These stocks are highly liquid and characterised by high market capitalisation and institutional ownership, and their short-sale transactions represent a high percentage of their daily volume. That is, they are likely to be free from short-sale constraints and other market frictions and, therefore, particularly suitable for analysing the impact of disagreement on stock returns and trading volume.[3] Moreover, they generate a great buzz and are discussed very frequently on StockTwits; hence, extracting a disagreement indicator from the collected messages is particularly appropriate since they may contain valuable information about investors' divergence of opinion and sentiment.[4]

To the best of our knowledge, the only studies to date to have used a disagreement indicator that was constructed from StockTwits messages are those by Sprenger et al. (2014) and Giannini et al. (2015)[5]; however, this paper differs from them in various crucial ways. Specifically, Sprenger et al. (2014) carry out the analysis for the companies that are listed on the S&P 100 index over the period from January 1, 2010 to June 30, 2010, while the present study examines a longer sample period using a different empirical approach and focuses on the 30 highly liquid stocks in the US that are most frequently discussed in online stock forums. Moreover, our disagreement indicator is more informative than that constructed by Giannini et al. (2015) since it (i) excludes the neutral (hold) and re-tweet messages, which may contain a certain amount of noise and, hence, distort the indicator, and (ii) reflects the true opinions of investors who are engaged in the decision-making process, rather than the impact that each post has through its followers (which may not reflect the actual opinions of the platform's participants).

Our findings are as follows: The effect of our online disagreement indicator on stock returns appears to be insignificant, which is consistent with the findings of Antweiler and Frank (2004). However, it does affect trading volumes, as was also found by Harris and Raviv (1993), Kandel and Pearson (1995), Antweiler and Frank (2004), Sprenger et al. (2014) and Carlin et al. (2014), among others.

Then, we extend the analysis to distinguish between (possibly asymmetric) disagreement effects on returns and volume in bull and bear markets. Although the behavioural finance literature has widely debated whether investors behave differently in different states of the economy or the market (e.g., Chung, Hung, & Yeh, 2012; Lee, Jiang, & Indro, 2002; Verma & Verma, 2007; among others), the existing empirical studies on disagreement effects on stock market features have only considered linear dependence (e.g., Antweiler & Frank, 2004; Sprenger et al., 2014; among others). We find that returns respond negatively (positively) to disagreement during bull (bear) periods. Moreover, a positive disagreement effect on volume is detected regardless of market conditions (i.e., bull vs. bear periods). To the best of our knowledge, our paper is the first to explore the asymmetric disagreement effects on returns and volume. It shows that, unlike disagreement effects on volume, which are found to be symmetric, such effects on returns are asymmetric.

Finally, we find that abnormal profits can be obtained when portfolio strategies are designed according to our disagreement indicator. The returns of portfolios of low to medium disagreement are higher than those of other portfolios, and this difference is highly significant in the case of stocks with relatively lower trading volume, which is consistent with the evidence that was reported by Sadka and Scherbina (2007). Previous empirical studies investigate profitable predictability in the cross-section of stock returns based on a wide range of measures for the divergence of opinion (for example, higher trading volume in Lee & Swaminathan, 2000, breadth of mutual fund ownership in Chen et al. (2002), dispersion in analysts' earnings forecasts in Diether et al. (2002), Doukas, Kim, and Pantzalis (2006), Verardo (2009), Yu (2011), and Banerjee (2011) among others, and unexpected trading volume in Chen, Qin, and Zhu (2015), among others). This paper is the first to provide evidence on this issue using a disagreement indicator that is constructed from online tweets.

Our findings have important implications for practitioners. In particular, portfolio strategy design should take into account the asymmetric effects of disagreement in bull vis-à-vis bear markets and for stocks with different trading volumes.

The paper is organised as follows: Section 2 presents the data, the classification methods that were employed, and the measurement of the online divergence of opinion. Section 3 outlines the empirical methodology. Section 4 discusses the empirical results and some robustness checks. Section 5 examines the role of the online divergence of the opinion indicator in predicting the cross-section of stock returns. Finally, Section 6 presents the conclusions of the paper.

2. Data description, tweet classification and divergence of opinion indicator

2.1. StockTwits data

In this study, we construct a divergence of opinion indicator from StockTwits data and analyse its effect on stock returns and trading volume. More specifically, one year of StockTwits data on the companies listed on the DJIA index are downloaded from the Application Programming Interface (API) website for the period April 4, 2012–April 5, 2013, which consists of 251 days.[6] Over 3.5 million stock microblog

[2] Microblogging messages have also been analysed to establish whether they are associated with macroeconomic indicators (see, e.g., Bokányi, Lábszki, & Vattay, 2017). There is an ongoing stream of research that examines whether Internet search data (e.g., Google queries) operate as economic indicators - see, for example, McLaren and Shanbhogue (2011) for predicting housing and labour markets, D'Amuri and Marcucci (2017) for predicting the unemployment rate, Saxa (2014) for predicting mortgage lending, and Choi and Varian (2012) for predicting automobile sales, to name a few.

[3] Indeed, the general conclusion of the literature on short-sale activity is that short-sale constraints are more binding for stocks with low institutional ownership and low market capitalisation (see, e.g., D'Avolio, 2002; Diether, Lee, & Werner, 2009; among others).

[4] The recently emerged StockTwits forum has various distinct features, such as a high volume of message posts, messages are posted in real time, and an efficient diffusion mechanism of information and opinions among investors.

[5] Note that Sprenger and Welpe (2011) use such data in a different context, i.e., to analyse whether S&P 500 stock prices are associated with different company-specific news events that are published on Twitter (e.g., corporate governance or legal issues).

[6] To manage the high volume of tweet posts, we focus on a one-year period, which is still longer than the six-month period that was considered by Sprenger et al. (2014).