The Impact of News and Social Media on Stock Markets

Masterarbeit

zur Erlangung des akademischen Grades „Master of Science (M.Sc.)" im Studiengang Wirtschaftswissenschaft an der Wirtschaftswissenschaftlichen Fakultät der Leibniz Universität Hannover

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Hannover, den 15.11.2017

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1 Introduction and Relevance of the Research Field

In recent years, financial markets have attracted much attention. The financial crisis of 2010/ 2011, induced by the Lehman Brothers crash in 2008, showed the detrimental effects of bubbles and crashes on stock markets. Historically, the US stock market crash in October 1987 influenced the financial markets enormously. Within one day, the US stock market incurred losses of 20% (Burton & Shah, 2013); (Daxhammer & Facsar, 2012); (Statman, 2008). Empirical studies have shown that the correlation between stock prices and fundamental value is weak (Shiller, 1981); (Roll, 1988); (Roßbach, 2001). Past events such as bubbles and crisis lead to a decrease in stock shares for private investors, however (Klug, 2014).

The stock price is determined by supply and demand. More precisely, the stock price is the intersection of the supply and demand curve. In equilibrium, the stock price thus equals the fundamental value (Rau, 2010). If we accept the efficient market hypothesis, all market participants are rational and react to new information accurately and precisely. Such a world with rational investors and no frictions unfortunately, does not exist in reality (Barberis & Thaler, 2003). In particular, the relationship between the arrival of news and the stock price reaction is not strong. This weak linkage is attributable to over-or underreaction of market participants (Tetlock, 2014, 2016).

Psychology can explain these market reactions. At this point, behavioural finance becomes useful for explaining behavioural biases (Byrne & Brooks, 2008); (Roßbach, 2001). In recent years, some researchers have begun to quantify the impact of mood (investor sentiment) on stock prices (Tetlock, 2007); (Baker & Wurgler, 2006); (Byrne & Brooks, 2008). Furthermore, technological transformation and new innovations in the age of the Internet, and social platforms, such as Facebook and Twitter, allow for better communication and information sharing among people (Asur & Huberman, 2010); (Brown, 2012).

Against this background, this thesis analyses the impact of news and social media on stock prices. As traditional explanatory approaches have failed to explain the variation of stock returns, and capital market anomalies show a fundamental derivation between stock price and its fundamental value, it is necessary to look for additional explanatory approaches. Fama & French (1996), for example, extend the capital asset pricing model (CAPM) to two more variables to capture the market capitalisation and the book-to-market value of firms. This three-factor model illustrates an attempt to eliminate anomalies on one side, and also to provide better economic explanatory power. All researchers have in common the desire to find a solution for this imperfectness, and in particular behavioural finance has recently sought an explanation through consideration of human behaviours (Roßbach, 2001); (Fama & French, 1996).

The contribution of this thesis is to give an overview of the current status of research regarding to the impact of news and social media on stock markets. Firstly, I will examine and synthesize the impact of news on financial markets under classical and behavioural approaches. As social media is a young field, however, I merely illustrate some empirical evidence for the role of social media on stock markets. I will demonstrate the status quo of researches done so far. The thesis is structured as follows. After the introduction in chapter 1, neoclassical capital market

theory and behavioural finance are contrasted in chapter 2. I illustrate the efficient market hypothesis (EMH) as the main pillar of traditional finance, whereas behavioural finance is based on the limited arbitrage and psychology. In chapter 3, the EMH is tested and capital market anomalies are described in detail. This chapter also provides a literature review concerning the relationship between news and social media on stock prices. Chapter 4 continues with a discussion of the findings and the limitations of this study. The thesis ends with a conclusion and outlook in chapter 5.

2 Theoretical Background

This chapter explains the approach, theories and limitations of the traditional neoclassical capital market theory, then introduces behavioural finance and its aims. Behavioural biases are examined in detail.

2.1 Neoclassical Capital Market Theory and the Efficient Market Hypothesis

From a historical viewpoint, the classical economic theory, which had its early beginnings in the 18th century, exhibits the first analyses for a behaviour-orientated capital market research. This early attempt to capture the psychological aspects of financial decision-making was pushed back by the dominant idea of rational behaviour among investors. Adam Smith, the father of the economics, initiated the notion of the classical national economy. In 1759, in *"The Theory of Moral Sentiments"* he presented the basic foundations of psychological behaviours. In particular, he discusses the primary importance of human sympathy and morality. Whereas here Smith underlines the sympathy, his other famous work *"The Wealth of Nations"* focuses on the self-interest of human beings. Additionally, Smith put forth the idea of the *invisible hand* in a free market. In such a market, supply and demand are driven by this *invisible hand* and in this way the market is able to self-regulate. These basic considerations result from the rational behaviours of human beings (Daxhammer & Facsar, 2012); (Baddeley, 2013).

Over the next century, the neoclassical economic theory came into the foreground and psychological aspects lost importance and relevance for explaining market activities. Classical assumptions of this period are the models of a *homo oeconomicus* and the *random walk theory* (Daxhammer & Facsar, 2012). Baddeley (2013) describes *homo oeconomicus* as a rational and intelligent people (Baddeley, 2013)*.* Underlying the model of homo oeconomicus are three central assumptions. The first is that people act rationally. This encompasses the idea that people take decisions in ways that are fully rational and invariably optimal. Second is the indefinite strength of will. In this view, it would be appear that people act without any emotion or restrictions. The third presumption is the maximisation of self-interest. In this view, self-interest and utility is prioritised over the interest of others. It is obvious, that these three assumptions exist only in theory, however. In reality, no *homo oeconomicus* exists as an actual person. For

the model developed by Barberis, Shleifer and Vishny (1998) explains PEAD, momentum, mean reversion and ratio anomalies. They argue that, while investors underreact to earnings announcements, they overreact to good/bad news. Another study by Daniel, Hirshleifer and Subrahmanyam (1998) focuses on the overconfidence and self-attribution biases (Barberis, Shleifer & Vishny, 1998); (Daniel, Hirshleifer & Subrahmanyam, 1998); (Roßbach, 2001); (Jaunich, 2008). Regarding the disposition effect, Frazzini (2006) tests underreaction of investors to news (Frazzini, 2006); (Kaustia, 2010). However, Fama (1998) claims that anomalies tend to disappear when a different model is applied (Fama, 1998); (Malkiel, 2003). In general, however, BF is able to explain the market anomalies based on the heuristics that investors apply (Roßbach, 2001).

Returning tothe question of media, Tetlock (2014, 2016) first suggested that the influence of media on stock prices may be enormous. However, the evidence has shown that this effect remains small. The second issue addressed by Tetlock is the weak linkage between stock price arrival and stock price reaction. Further research is required to generate more precise results (Tetlock, 2014, 2016). Since here is a lack of studies regarding insider information, it would be useful to apply research to this field as well (Bodie, Kane, & Marcus, 2014). In any case, the role of attention in the effect of media on stock price is an important subject (Tetlock, 2014, 2016).

The limitations of this thesis refer to the empirical part. However, the focus was to give an overview about current literature dealing with news and social media and to analyse its impact on stock markets. Social media follows us everywhere in the age of globalisation and social networking. Future research should give more attention to social media, since it inconceivable.

5 Conclusion and Outlook

This thesis has analysed and summarised empirical research addressing the impact of news and social media on stock prices. As the present work has shown, the research on the effect of news on stock prices is a broad field and has been discussed for decades. It is now often accepted that behavioural aspects influence stock markets because the decision-taking process is strongly affected by psychological aspects. The studies discussed in this thesis include both neoclassical and behavioural aspects. In the main part of this thesis, I have described the main factors impacting stock prices. While firm-specific and macroeconomic news certainly do impact stock price, I have shown that, on the other hand, psychology and investor sentiment also play an important role.

In particular, media can influence investors' beliefs and attention. I reviewed studies showing that with growing attention the trading volume of stocks also increased (Tetlock, 2014, 2016). In the age of social media, when everyone is connected over social platforms, it is necessary to invest more in this direction. Other emerging fields include neuro-finance, the discovery of human brain, and emotional finance, and these provide further potential areas of research (Daxhammer & Facsar, 2012).