Manipulated markets

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Chapter 1

General introduction

It is hard to imagine a day nowadays without coming across some sort of news. According to the *Chartbeat*, 92,000+ news articles are published each day just on the web. Needless to say that this number is much larger if we consider printed newspaper articles and broadcast news. With the emergence of the internet the news spread across the world within seconds. We are continuously exposed to newly coming information via multiple channels such as social media, broadcast news, printed news, etc. Checking news becomes our daily activity and being up to date with the latest developments in the world is thought to be a must for an accomplished and inquisitive person.

On the financial markets, the news media are a crucial player as it is the most important source of information for professional investors (McCombs and Shaw, 1972). Traditional finance theory is based on the assumption that market prices reflect all publicly available news and any changes in prices are driven by newly available information, which implies that market prices are always at the equilibrium and follow a random walk. Any deviation from the price equilibrium is immediately arbitraged away by professional traders and there is no possibility to earn a sure gain with the existing set of information without taking an additional risk (Fama, 1965).

However, this assumption has been widely criticized by the recent academic literature. Antweiler and Frank (2004); Da, Engelberg, and Gao (2014); García (2013); Goetzmann, Kim, and Shiller (2016); Tetlock (2007) show evidence of the short-term

predictive activity of the news media on future market returns. They analyze the content of news and show that higher frequency of negative news is associated with lower market returns.

A typical explanation of the observed relation is found in the theory of investor sentiment. Baker and Wurgler (2007) define investor sentiment as the irrational belief about future cashflows that is not justified by the information at hand. Shleifer and Summers (1990) argue that the sentiment of "noise traders" is often driven by irrational pseudo-signals that are not justified by fundamentals, but thought to contain extra information about future market prices. De Long, Shleifer, Summers, and Waldmann (1990) show in their model that such irrational beliefs by "noise traders" allow market prices to deviate from the equilibrium for an extended period of time. Unpredictable behavior of "noise traders" creates an additional risk and encourages arbitrageurs to abstain from betting against it.

The news media appear to be able to influence investor sentiment and change investor's expectations about the future price developments on the financial markets. The change in sentiment, in turn, causes investors to adjust their portfolios. The news media do not only disseminate new information to the public, but also influence the way this information is perceived by providing interpretations and expressing opinions (Nelson, Clawson, and Oxley, 1997; Price, Tewksbury, and Powers, 1997). The same content of news can be framed in such a way that it activates certain ideas and thoughts in readers' minds and leads to predictable conclusions. This effect is achieved by salient stimuli such as journalistic style of writing. Dougal, Engelberg, García, and Parsons (2012) present evidence of the fixed effect of journalistic style and identity on future market returns. Goidel and Langley (1995) suggest that the perception of economic news is often driven by the "impression" rather than "hard" economic information in the newspaper article. Despite seeming importance of news frames and investor sentiment, this effect is completely ignored by the traditional finance models.

In this dissertation I would like to unveil the effect of salient stimuli in the news

media on the performance of the financial markets. In the subsequent three chapters I will show how the news media are able to influence the performance of the financial markets in the short as well as in the long run by manipulating investor sentiment with the salient stimuli such as the journalistic style of writing. In particular, I perform a textual analysis of the content of news by investigating the usage of positive, negative, modifier, modal strong and modal weak words as defined by Loughran and McDonald (2011) and Quirk, Greenbaum, Leech, and Svartvik (1985). I argue that by analyzing the salient content of news it is possible to predict the direction of investor sentiment and the future price development on the financial markets.

The remainder of this introductory chapter presents a short summary of each essay in this dissertation, which covers motivation, hypotheses, the methodological approach, the main findings and the contribution to the existing literature.

Media, sentiment and market performance in the long run

Chapter 2 is based on the article by Kräussl and Mirgorodskaya (2017) and investigates the effect of media sentiment on the performance of the financial markets in the long run. It contributes to the existing academic literature by showing that the news media do not only have the short-term effect on market returns as documented by Tetlock (2007) and García (2013), but are able to influence market performance over a longer time span of one to one-and-a-half year in advance.

The effect of investor sentiment has a long-term nature (Brown and Cliff, 2004). Barberis, Shleifer, and Vishny (1998) argue that, as a result of conservatism, investors are reluctant to change their sentiment immediately in response to newly available information. Consequently, market prices are slow in reflecting new information, which results in a positive autocorrelation of returns. In this chapter I suggest that, as a result of underreaction and conservatism, the change in media sentiment impacts investor sentiment and market returns gradually and becomes apparent over one to one-and-a-half years.

In order to test this hypothesis, I collect monthly data on the number of news-

paper articles published in three most prominent financial newspapers, the *Wall Street Journal*, the *New York Times*, and the *Financial Times*, which contain the predetermined positive or negative words in the lead paragraph, for a time span of more than 20 years. Based on this data, I construct a monthly media pessimism indicator and analyze its causal effect on the *MSCI World* and *S&P 500* returns and volatility by estimating a Vector Autoregressive model with 36 lags and performing Granger causality tests.

The results show that the increasing proportion of negative relative to positive words in the lead paragraph of a newspaper article is associated with negative MSCI World and S&P 500 returns 14 to 17 months in advance. The effect reverses 24 to 25 months later. Similarly, the increasing media pessimism is associated with the positive MSCI and S&P 500 volatility 1 to 24 and 12 to 24 months in advance, respectively. Additionally, I report evidence of the causal effect of media pessimism on market returns and volatilities in the long run. The results are statistically and economically significant and robust after controlling for various exogenous variables.

Modifier words in the financial press and investor expectations

Chapter 3 is based on the article by Bosman, Kräussl, and Mirgorodskaya (2017) and investigates experimentally the priming effect of modifier words in newspaper articles on investor price expectations, beliefs, and actions. This chapter contributes to the existing literature as the first experimental study to date that investigates the impact of journalistic style of writing on investor price expectations, sentiment, and actions.

The news are not only the media that disseminates new information to the public, but also an individualistic craft that allows journalists to inject their opinions, perceptions and views into the news content via salient stimuli such as the style of writing (Dougal et al., 2012). Readers, in turn, perceive news content in accordance with the impression they obtain after reading a newspaper article. Goidel

and Langley (1995) argue that the evaluation of the economy based on economic news is often "impression-driven" rather than "data-driven". Shiller (2005) suggests that readers tend to avoid individual assessment of quantitative data and rely on the interpretation by the celebrity source. Shleifer and Summers (1990) argue that "noise traders" often form their sentiment based on the pseudo-signals that are not justified by fundamentals, but believed by some investors to contain information about future returns. Journalistic style can be one of such pseudo-signals.

In this chapter I suggest that journalists are able to frame news in such a way that it activates certain ideas and thoughts in readers' minds and leads to predictable conclusions (Price, Tewksbury, and Powers, 1997). As a result of different framing, readers may arrive to opposite conclusions, extrapolate this information to their price expectations and sentiment, and, as a consequence, adjust their investment actions accordingly.

In order to test these hypotheses, I designed an experiment where I manipulated the journalistic style of writing by using modifier words. The experiment was conducted on bachelor and master students at *VU University Amsterdam*. Subjects were asked to predict a next period price of 12 real stocks after observing a historical performance of each stock and reading a newspaper article. Subjects were divided in two treatment groups. In each treatment subjects were given to read news that either emphasized positive and attenuated negative news (positive news frame condition) or attenuated positive and emphasized negative news (negative news frame condition) by using modifier words. The underlying assumption of this Chapter is that modifier words such as *significantly, dramatically, etc.* do not contain any factual information, but rather serve to enhance the content of news (Quirk et al., 1985).

The results show that subjects in a positive (negative) news frame condition tend to expect higher (lower) next period stock price. The effect appears to be asymmetrical and is only pronounced for stocks with the downward and horizontal historical trends. Additionally, subjects appear to feel positively (negatively) about

the economic outlook and the potential of each stock, perceive stock markets safer (riskier), and state that they are going to buy (sell) additional shares in the positive (negative) news frame condition.

A century of journalist uncertainty and market returns

In the last Chapter 4 of my dissertation I investigate the effect of journalist uncertainty expressed in newspaper articles on the short-term DJIA returns for a time span of more than one century. This chapter closely relates to the study by García (2013) as it replicates its data, methodology, and results, but also contributes to the existing literature by extending its empirical analysis with the journalist uncertainty index, which is constructed based on model strong and weak words as defined in Loughran and McDonald (2011) dictionaries.

Kahneman and Tversky (1984, 1986) argue that investors tend to avoid uncertainty when making financial decisions. Hirshleifer (2001) and Daniel, Hirshleifer, and Subrahmanyam (1998, 2001) suggest that psychological biases are exacerbated when there is more uncertainty. On contrary to risk, uncertainty is unpredictable (Chuliá, Guillén, and M., 2016). Therefore, increasing uncertainty is associated with the declining stock prices as investors tend to abstain from market participation and demand a higher equity discount (Cao, Wang, and Zhang, 2005; Veronesi, 1999).

Increasing uncertainty on the financial markets is perceived differently during different economic states. Veronesi (1999) and Beber and Brandt (2010) find a stronger reaction to the increasing uncertainty during economic expansions than recessions. On the financial markets, the VIX index, which is considered to be a barometer of investors' fear of the downside of investors' excitement in a market rally, tends to spike during periods of market turmoil and falling stock prices and is associated with lower market returns (Whaley, 2000).

A number of empirical studies use news to construct measures for political and economic uncertainty (Manela and Moreira, 2013; Alexopoulos and Cohen, 2015). In this chapter I suggest that financial journalists are able to exacerbate the feeling

of uncertainty on the financial markets by manipulating the tone of their narratives.

To test this hypothesis I perform a textual analysis on two daily financial columns in the *New York Times* newspaper: "Financial markets" and "Topics in Wall Street"; and the daily "Abreast of the Market" column in the *Wall Street Journal* by counting the frequency of occurrence of model strong and model weak words in each newspaper article for a time span between 1900 and 2014. Model strong (weak) words are words that express a strong (weak) degree of certainty of an opinion or argument. I construct a journalist uncertainty media measure by following the approach by García (2013).

The results show a negative and statistically significant relation between the journalist uncertainty measure and the contemporaneous daily DJIA returns. The effect of journalist uncertainty appears to be asymmetrical and is more pronounced during economic expansions, which is in line with my predictions and the results in the previous literature. It appears from my findings that the negative effect of journalist uncertainty on the financial performance is more pronounced during economic expansions, while the negative effect of media pessimism is more pronounced during recessions.

To summarize all said above, the news media appear to manipulate investor sentiment by using salient stimuli, and, as a result, affect the price development on the financial markets. News contain not only solid facts, but also an interpretation, the journalistic opinion, and the way to perceive information. Everything else than factual content is subjective, if not justified, and thus, should not influence a rational reader. This dissertation identifies some of the clues that may help a reader to differentiate between objective and subjective content of news and form an unbiased opinion about presented facts.