ERASMUS UNIVERSITY ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS
MSc Economics & Business
Master Specialization Financial Economics

Investor Sensitivity to Stock Analyst Recommendations' Revisions, Comparing the United States and Germany

Author: J.S. Wismeijer
Student number: 433191
Thesis supervisor: Dr. J.J.G. Lemmen
Finish date: January 2017

PREFACE AND ACKNOWLEDGEMENTS

I would like to acknowledge Dr. Lemmen for the supervision while writing my master thesis. Particular helpful for me were the personal meetings as well as the discussions. Next to that, I want to show appreciation to Mr. Alserda for co-reading my thesis. Also, I am grateful for the support of Simon de Bruijn and Emiel de Groot who provided me with comments and read through my master thesis.
Furthermore, I would like to thank Svenja Heyen for her assistance in formatting this thesis

ABSTRACT

The effect and information value of stock recommendations have been extensively studied in previous literature with only marginal research being directed towards the behavioral workings of analyst' stock recommendations. This thesis combines the standard finance theory with the relatively newer behavioral finance theory to determine the sensitivity of investors towards stock recommendations in the United States and Germany. This thesis shows that investors in Germany are more influenced by negative recommendation revisions than by positive recommendation revisions. The reverse holds true for investors from the United States. Furthermore, the results on investor sensitivity to recommendation revisions indicate that investors in the United States are more sensitive to positive recommendation than investors in Germany while the latter is more sensitive to negative recommendation revisions than the former. Lastly, evidence is found on the reputation hypothesis of analysts from the United States regarding stock recommendation upgrades in Germany. No evidence is found for the reputation hypothesis in the case of stock recommendation downgrades in Germany.

JEL Classification: G02, G14.

Keywords: analyst recommendations, behavioral finance, international comparison, sensitivity to recommendations.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. Introduction

Since the early work of Cowles (1933) on analyst forecasts, a significant amount of interest has focused on forecasts made by sell-side analysts. Especially during the last decades, a large body of empirical studies has tried to analyze the effect of recommendations in the market. Sell-side analysts or brokerage firms use labels such as “buy, hold, or sell” to indicate their prediction of the future path of the stock price. A “buy” should indicate that the stock price is currently undervalued and is expected to rise significantly in the near future whereas a “sell” should result in a significant drop in share value. The majority of financial studies on this topic try to assess the information value and the performance of the recommendations given by brokerage firms to certain stocks. However, much less attention has been focused on the behavioral segment of changes in analyst stock ratings. This thesis will study the behavioral side of stock analyst recommendations.

Specifically, this thesis will try to determine the sensitivity of investors to the stock recommendations given by analysts in both the United States and Germany and make a comparison between the two. Both the United States and Germany are economic leaders in the world and therefore make up a perfect base to study the effect of investor sensitivity in two different markets. Therefore, the focus of this thesis lies with the individual investors and not with equity researchers nor with the value of stock recommendations. These stock recommendation revisions are used to determine and measure the sensitivity effect of individual investors in the United States and Germany. Current research has shown financial investing differences in the United States and Europe, more specifically Germany, but none have ever combined the finding. As will be shown in the literature review, German investors are significantly different from investors in the United States on several characteristics such as risk-tolerance and required return but also in household stock market participation. The knowledge of the sensitivity level of different investors is relevant in several ways. More recently, academic studies recognized the fact that there are more factors influencing the decision making of investors and managers than was theorized in previous literature. Individuals are not as rational as the standard literature states. The answer to the research helps academics to a great extent in further research into behavioral characteristics.

The focus of this thesis is different from the majority of literature on brokerage recommendation in three different ways. First, as mentioned before, the behavioral rational behind the stock recommendations has been studied far less than the analyst side. Deepening the behavioral finance story on recommendations can give us further inside about the psychology that goes to work after processing the inputs given and see the ex-post outcome.

Second, this thesis has an international focus whereas the majority of the literature on this topic only studies the effect per country. The only exception is Jegadeesh and Kim (2006), which performed a similar cross-border study that included the G7 economies to determine the value of analyst recommendations. However, they do not touch upon the topic of behavioral finance. Thus, this study adds to the literature in cross-border studies in stock recommendation revisions.

Third, this thesis does not take standard investor characteristics for granted. Standard finance theory speaks of "the investor" in an international context where it uses the same characteristics across different countries. This, however, foregoes that cultures and habits in one market can be significantly different than in other markets. Only a handful of literature tries to develop models that show the different behavioral and cultural characteristics of different investors in different markets. Hofstede (1980, 1993) was the first to notice that there are cultural differences around the world and that there is no such thing as endogenous behavior. This thesis collects theories and results from other papers to put together the behavioral differences between investors in the two nations. Putting the theory together allows for the development of hypotheses that help compare the sensitivity levels of investors in the United States and Germany. The behavioral finance literature goes beyond the international investor and tries to analyze the different characteristics that play a significant role in financial markets such as overconfidence, risk-tolerance.

The empirical study investigates the sensitivity of investors in two different markets through looking at the fluctuation in the stock price around a revision of recommendations. The meaning of a stock recommendation revision is the change in opinion of a certain analyst about a stock rather than a change in the mean consensus of that same company. A comparison will be made between stocks that are listed on

the German DAX index and the three indices on Wall Street. Since there are more companies listed on the equity markets in the United States than there are on the DAX, the research will match a German listed company with one on Wall Street based on factors such as size, market-to-book-value and risk to be able to make an unbiased comparison between the two markets. Through an event-study, abnormal return will be calculated for four different states; Buy recommendations in the United States, Buy recommendations in Germany, Sell recommendations in the United States and Sell recommendations in Germany. A significant difference between the two markets can signal that one group of investors is more sensitive to analyst recommendations. To add to that, this thesis will look at whether German investors are more sensitive to revisions of American brokerage services than to German brokerage services. Data on stock recommendations is from Bloomberg while stock prices are retrieved from Thomson Reuters and CRSP.

The study surrounding the stock recommendation revisions will be conducted through a timeframe of 5 days surrounding the event [-2, -1, 0, +1, +2]. Choosing a small timeframe is not in line with most studies where a monthly time period is more common. However, a larger timeframe makes it harder to examine the real effect of revisions in recommendations. As the standard finance theory regarding the Efficient Market Hypothesis describes, new public information will be incorporated in the stock price in a matter of minutes. Therefore, the five day timeframe was chosen to optimally reflect possible ex-post effects while also incorporating leakage effects for stock recommendations. Due to the trading of stocks surrounding recommendations, active portfolio management is assumed. Investors try to balance their portfolio according to stock recommendations, hence they buy and sell in a continuous manner.

The contribution of this paper is to add to the scares amount of literature on behavioral characteristics by giving more insight in the sensitivity of investor reactions to changes in stock recommendations in two different markets. To my knowledge, no paper has attempted such study and therefore the result can help to further determine differences in behavioral investing. Several papers such as Stickel (1992, 1995), Womack, (1996), Boni and Womack (2004) and Jegadeesh and Kim (2006) have studied the effect of stock recommendations. Since the financial crisis in 2008, the financial markets have changed significantly. Previous literature that studies stock recommendations before

the 2008 financial crisis finds that equity analysts issue recommendations that are optimistically biased. Since investors base the majority of their investments on the information provided by equity analysts, investors are also indirectly optimistically biased. The empirical literature on the information value of stock recommendations after the financial crisis is limited. This research therefore also adds to the body of literature after the financial crisis. It is highly possible that due to the financial crisis, investors became more careful in investing, thereby possibly contradicting the results found in the pre-financial crisis capital markets. Furthermore, the empirical literature is clearly limited in topics on the behavioral differences between investors around the world.

This thesis contributes to the excising body of literature by studying the behavioral difference in two capital markets and pinpointing these differences. Therefore, this study first performs a brief literature study on the previously literature on investor behavior in order to determine the behavioral investor differences between the United States and Germany. This literature study can thereafter be used to determine the relative sensitivity level of investors towards stock recommendation revisions. The findings based on the reviewed literature help to understand that there exist differences in investor behavior. Also, with the findings in this thesis, empirical research can develop a different and broader view of investor behavior. Next, players in the financial markets such as analysts and institutional investors can use the findings of this paper to provide different signals to different groups of investors in order to support or attract individual investors more efficiently.

The results indicate that evidence exists in differences in investor behavior. By means of abnormal returns surrounding stock recommendation revisions, investors show different sensitivity levels to stock recommendations in relative terms. First of all, the study shows that German investors are more influenced by negative stock recommendations than by positive stock recommendations. Conversely, investors from the United States appear to be more influenced by positive stock recommendation revisions than by negative revisions as projected by the cumulative average abnormal returns. Furthermore, this thesis finds evidence that investors from the United States are more influenced by, hence more sensitive, to positive stock recommendations as compared to German investors. The result on negative stock recommendation

revisions show the reverse, German investors are more sensitive to negative stock recommendation revisions than their United States counterpart. Lastly, this thesis finds that analysts from the United States generate larger abnormal returns in the German stock market than German analysts following a positive stock recommendation revision. This finding supports the reputation hypothesis of Stickel (1992). No evidence can be found on the reputation hypothesis for United States analysts in the German market surrounding negative recommendation revisions.

To advice the reader, it is important to state what this thesis does not touch upon. This thesis studies the sensitivity of investor reaction towards revisions in stock recommendations across two capital markets. Due to the continuous portfolio rebalancing, the investors are not assumed to be passive investors who try to hold an efficient portfolio. Next, the only asset class that is used to determine an effect is stocks. No other assets such as bonds, second generation or third generation assets are used in this study. Also, the scope of this research focuses on the short term. Hence, the effect of long term stock recommendation fluctuation is left out of this study[1]. Lastly, the effect of stock recommendations is studied through up- and downgrades in stock recommendations. This research does not make a distinction in the level of recommendation revisions, hence, whether a stock received an upgrade from buy to strong buy or from sell to neutral. Both cases count as one upgrade where the same measure holds for stocks that receive a stock recommendation downgrade[2]. Also, this research does not look into target price revisions of stock recommendations which is a second component of stock recommendations[3].

The remainder of this thesis is continued as follows: section 2 will cover previous papers and theory in a literature review, section 3 describes the methodology behind the performed study and the data, section 4 reports the results found and discusses the outcomes, section 5 will conclude this thesis.

[1] For results on the long term effect of stock recommendations the reader is advised to look at papers such as Womack (1996), Jegadeesh and Kim (2006).
[2] The paper written by Jegadeesh and Kim (2006) studies different recommendation levels and therefore the reader is advised to the paper of the above-mentioned authors for results on effect of different recommendation levels.
[3] Huang, Mian, and Sankaraguruswamy (2009) study the information content of target price revisions together with stock recommendations.

2. Literature review

2.1 The efficient market hypothesis

In 1970 Fama published the paper "*efficient capital markets: a review of theory and empirical work"* in which he developed the theory of the Efficient Market Hypothesis (EMH). This theory states that in the long run no single individual is able to beat the market using public information and generate excess returns in doing so. This is due to the fact that the stock price of public firms should incorporate all relevant information that can influence the stock price. Fama (1970) made a distinction between three relevant information subsets of the EMH: the weak form, the semi-strong form and the strong form. In the weak form, capital markets reflect all the historical information and cannot be used to predict the future path of the market. Therefore, techniques such as technical stock analysis and most forms of fundamental analysis cannot produce excess returns. Since the estimate of future stock prices cannot be determined by using historical data, the stock price follows a "random walk", a term that is closely related to the EMH.

The random walk broadly states that future stock prices are represented by random departures from previous prices. The logical reasoning behind the random walk is that when new information enters the market, the distribution occurs almost instantly without any delay and is reflected in the stock price. Therefore, tomorrow's stock price can only be determined by tomorrow's news and is not correlated with news flows of today. Since news by definition is unpredictable, tomorrow's stock price is unpredictable (Fama, 1970; Malkiel, 2003).

The semi-strong form of the EMH states that stock prices adjust to fundamental information that is publically available to all investors. These fundamentals can be derived from annual reports, conference calls, or other related information sources. The main concern of the semi strong market hypothesis is the speed at which the market reacts to news streams of information (Fama, 1970; Malkiel, 2003).

The strong form characterizes itself by the fact that next to fundamental information, private information is also incorporated in the stock price. Some groups of investors have the availability of private information and could use this to their own advantage.

However, strong regulation against trading on private information is in place, this form of market efficiency should in practice be impossible (Fama, 1970; Finnerty, 1976; Jensen, 1978; Hussin, Ahmed, Ying, 2010).

Fama (1970) has received strong support for his work on the EMH. Due to the impact of the EMH by Fama (1970), economic and financial literature broadly accepted the view that capital markets are extremely efficient with new information generally incorporated in the prices quickly without delays. The book "*a random walk down Wall Street"* written by Malkiel (1973) argues that due to the unpredictability of news events, randomly selecting different stocks while being blindfolded should result in a nearly similar rate of return as can be realized by experts. Due to the broad support the EMH has received, economic and finance students are being taught in school that capital markets are efficient. Jensen (1978) states that the EMH is probably the most solid proposition made in economics. He, however, developed a more sensible and economical version of the efficient hypothesis in which prices reflect information up to a point where the marginal benefit of acting on information does not exceed the marginal costs (Jensen, 1978; Fama, 1991).

However, more work has appeared that criticizes the EMH. Capital markets might not be as efficient as is generally believed and being taught. Grossman and Stiglitz (1980) argue that in a world with perfect efficient markets, brokerage services that use public information to generate revenue can simply not exist. This is due to the fact that brokerage houses would not receive compensation for their services since investors have access to all relevant information. DeBondt and Thaler (1985) find inconsistencies in the weak form of EMH by testing for investor overreaction to dramatic news events. The authors conclude that overreaction is predictive and abnormal returns can be generated by constructing portfolios on this matter. Jegadeesh (1990), Lo and MacKinlay (1990, 1999) and Jegadeesh and Titman (1993) perform similar studies on the predictability of stock fluctuation and draw the same conclusions. Other studies on the inefficiency of markets include but are not limited to: possibility for technical analysis (Lo, Mamaysky, Wang, 2000); psychological contagion (Shiller, 2000); stock return reversal (Fluck, Malkiel, Quandt, 1997); the January effect (Keim, 1983; Haugen and Lakonishok, 1988) and the Monday effect (French, 1980).

2.2 Stock markets sell-side recommendations

Sell-side brokerage houses spent millions of dollars every year examining stocks around the world using valuation methods to price shares of different companies (Womack, 1996). These analysts go through annual reports, company conference calls, market forecasts and all other types of public information to find the fundamental value of a certain company. If the analyst finds that the current share price is lower than the outcome of the valuation method, the company receives a share "upgrade" which states that the stock price is undervalued and should be higher. If the value of the company is lower than the current stock price it will receive a "downgrade" which indicates that the stock price is overvalued. Sell-side analysts or brokerage firms use labels such as "strong sell, sell, underperform/underweight, hold, overweight/outperform, buy, strong buy" as such indicators (Jegadeesh, Kim, Kirsche, Lee, 2004; Womack, 1996).

2.2.1 Biases in stock recommendations

Previous literature shows that the majority of ratings given by analysts are positively biased towards buy recommendations. Over the period of 1985 to 1999, only five percent of the ratings given by analysts were sell or strong sell and the average rating over this time period was close to a buy rating (Jegadeesh et al, 2003). Jegadeesh and Kim (2006) further elaborate on this topic by examining the value of recommendations by the revisions of such over the time period 1993 to 2002. The study performed by the above-mentioned authors is the first in its kind that extends the scope to an international focus[4] where the majority of literature is country focused. Jegadeesh and Kim (2006) find that similarly to the 1985-1999 period, buy and strong buy ratings far exceed the sell and strong sell recommendations. The authors also conclude that the frequency of sell recommendations is four to five times lower in the United States than it is for other G7 countries in the study. Womack (1996) adds to the existing literature that there are seven strong buy recommendations for every strong sell. Furthermore, Jegadeesh and Kim (2010) shows that analysts' tend to herd around consensus recommendations, meaning that they issue recommendations that are close to recommendations of other equity analysts. Not only equity analysts tend to herd.

[4] Jegadeesh and Kim (2006) examine the effect of a revision of recommendations by analysts in the G7 countries. The G7 countries are by definition the U.S., Japan, Great Britain, Canada, France, Germany, and Italy.

Brown, Wei and Wermers (2014) find that United States mutual funds tend to herd around stock recommendations. The authors find that the herding effect is larger for negative stock recommendations than for positive stock recommendations.

Another bias in the stock recommendations is found when lead underwriters are involved in issuing new equity. A conflict of interest arises since these lead underwriters, for the majority of times, employ the analysts that give recommendations to the newly issued equity (Jackson, 2005; Agrawal and Chen, 2012). Recently, this problem has been overcome with a settlement between the top ten largest investment banks and the United States regulators. The investment banking and advisory business needs to be clearly separated in order to overcome this conflict of interest. With the separation of the two business structures a new conflict of interest arises, where the investment banking business is replaced by the incentive of generating business through advisory services (NYSE Rule 472 & NASD Rule 2210) (Jackson, 2005; Agrawal and Chen, 2012). Needless to say, stocks that receive higher ratings are more favored by investors than similar stocks that receive lower recommendations (Lin and McNichols, 1998; Mickealy and Womack, 1999). Balboa, Gómez-Sala and López-Espinoso (2009) examine investment strategies that look into the optimism recommendation bias across eight different countries[5]. The authors conclude that there are significant differences across countries where the United Kingdom and the United States are most optimistically biased. Furthermore, they find that countries with the lowest bias achieve the highest risk adjusted abnormal returns.

2.2.2 Value added by sell-side analysts

Since the financial literature found several biases in recommendations by sell-side analysts, the resulting question that can be asked is whether these analysts can in fact add value to the market. Extensive empirical studies have been performed on the matter of sell-side financial advice on stock recommendations. Previous literature states that analysts do make the market more efficient since these brokerage houses provide information that is more accurate and understandable which leads to more accurately valued companies (Schipper, 1991; Brown, 2000).

[5] Balboa et al. (2009) examine France, Germany, Japan, The Netherlands, Spain, Switzerland, the UK and US to study the optimism bias for analyst recommendations.

Furthermore, literature on the performance of analyst recommendation shows that there is in fact a significant change in stock prices around the time of the announcement. This could indicate that there is a possibility for investors to generate excess returns using the expertise of financial analysts (Stickel, 1995; Womack, 1996). Furthermore, studies show that stocks that had their buy recommendation published in "heard on the street" (HOTS), a section in the Wall Street Journal, display significant excess stock price increases (Liu, Smith, Syed 1990; Huth and Maris, 1992; Barber and Loeffler, 1993).

Barber, Lehavy, McNickols and Trueman (2001) elaborate on the findings of Stickel (1995) and Womack (1996) by investigating the value of recommendations through constructing two different portfolios, one that purchases stocks that have received the most favorable recommendations and one that shorts the stocks that have received the least favorable recommendations. The results show that short selling the least favorable portfolio and buying the most favorable portfolio generates an excess annual gross return of four percent excluding transaction costs. Frequent rebalancing of the portfolio is necessary to adjust for revisions in recommendation. When transaction costs are included in the study, the return does not significantly differ from zero. This indicates that the market is efficient when controlling for transaction costs, which is supported by the earlier work of Bjerring, Lakonishok and Vermealen (1983) (Barber et al. 2001). Barber et al. (2001) do not rule out that there do exist profitable investment strategies. Investors are only able to generate normal excess returns that violate the EMH. The cost of trading is too significant to generate real returns. Investors cannot exploit profitable investment strategies; hence inefficient capital markets are able to persist[6] (Pontiff, 1996).

Jegadeesh and Kim (2006) and Green (2006) find that excessive return can be made after incurring transaction costs. Albert and Smaby (1996) perform a study with analyst recommendations in the Wall Street Journal, in particular the so-called "Dartboard" column and conclude that recommendations have value. The authors add to the existing body of literature because the study proxies price pressures indicated by

[6] Others can interpret this as the market being indeed efficient while investors are not able to profit from publicly available information.

previous studies conducted on recommendation in the Wall Street Journal. The results show no significant effect of a price pressure thereby indicating that abnormal returns from stock recommendations are produced by the news event and not due to price pressures (Albert and Smaby, 1996). Conversely, Barber et al. (2003) find that for the years 2000 and 2001 the performance of stocks with high recommendation and low recommendations was reversed. During these years the low recommended stocks outperformed the higher recommended stocks by a significant amount. Before the 2000-2001 period, small growth firms were highly recommended in comparison to small value firms, which were least recommended (Barber et al., 2003). This for the simple reason that these small growth firms outperformed the small value firms during the period 1996-1999. Conversely, during 2000-2001, the small value firms outperformed the small growth firms. Barber et al. (2003) state that the reversal in recommendation performance is possible since equity analysts kept recommending small growth firms during 2000-2001 that by than had fallen out of favor.

It still remains contradictory that investors can make excess return while using public information in a market that we deem perfectly efficient, where the stock price should include all relevant information. Analysts use their expertise and have more knowledge about certain stocks that the general investment public does not have. Most likely, a certain analyst follows a handful of companies and can filter the relevant fundamental value from certain corporate news events (Kang, Madureira, Wang, Zach, 2012; Boni and Womack, 2006).

An important factor regarding stock recommendations is the reputation of the analyst. The reputation effect for stock analysts is of great importance regarding the earlier described conflict where analysts currently generate commission through advisory services. Stickel (1992, 1995) shows that analysts, who have a better reputation among other stock analysts, have a larger influence in the market. Stickel (1992, 1995) calls this the reputation hypothesis. Hence, there is a positive relationship between the performance of the analyst and its reputation in the market. Stickel (1995) finds that only buy recommendations given by the top ten best brokerage firms produce higher returns. This is not the case for sell recommendations. If the analyst issues a series of misleading stock recommendations, the market can penalize the issuer of the stock recommendations as being unreliable and will therefore lose advisory business. The

analyst needs to weigh the short term business against the long term reputation he creates (Jackson, 2005). Agrawal and Chen (2005) state that recommendations are not as easily evaluated as other forecasted estimates. Therefore, the authors conclude that there is only a limited pressure on the reputation effect through the market. Jackson (2005) conversely states that analysts should in fact care more about their reputation. The author finds that analysts who have a better reputation realize a higher trading volume and thereby thus a higher commission. Jackson (2005) further states that investors do pay attention to the reputation of analysts. Desai, Liang and Singh (2000) report similar results to Stickel (1995) regarding stock recommendations. Jegadeesh and Kim (2006) study the impact of stock recommendations given by analyst in the United States as well as foreign analysts. They conclude that analysts from the United States see larger price fluctuations than foreign analysts.

2.2.3 Earnings surprises and stock returns

The best moment for equity analysts to determine the value of a company is around earnings announcements. Analysts and investors consider the earnings reports to be one of the most important financial documents provided by companies. Most companies publish quarterly earnings reports which state the results generated during the last quarter of the financial year. In these statements, companies also state the expectations for the upcoming year(s). With these earnings statements, analysts can determine both the short term and the long run projected performance of these companies (Degeorge, Patel, Zeckhauser, 1999). With this information, analysts can specify whether the company will under- or outperform the upcoming year and thereby indirectly state if the shares of the company are under- or overvalued. Degeorge, Patel and Zeckhauser (1999) study the earnings manipulation of executives in order to reach a certain threshold. The authors state the psychological importance of positive numbers. Furthermore, the two other important thresholds for investors are meeting past performance and meeting the projected earnings of analysts. Positive earnings surprises can be quantified as earnings exceeding analysts' expectations whereas negative earnings surprises falling below the above-mentioned thresholds. When these projections are not met, investors' behavior portrays disappointment. Degeorge, Patel and Zeckhauser, (1999) call this the threshold mentality. Pfaffer, Pollock and Rindova (2010) state that in both cases of earnings surprises investors' expectations about predictable earnings is violated. As a result, the accuracy of the

financial evaluation of investors to these earnings surprises is negatively affected (Kasznik and Lev, 1995; Degeorge, Patel, Zeckhauser, 1999; Pfaffer, Pollock, Rindova, 2010). Next to the violation of expected predictability, negative earnings surprises also signal disappointment in firm performance resulting in a large decrease in stock price (Kasznik and Lev, 1995; Brown, 2001; Skinner and Sloan, 2002). Conversely, positive earnings surprises result in inconsistent results. Even though this violates the predictability of performance, the result is still positive, usually generating positive but smaller returns (Kasznik and Lev, 1995; Brown, 2001; Skinner and Sloan, 2002). Skinner and Sloan (2002) study the effect of earnings surprises on both growth and value stocks. They conclude that positive earnings surprises are the same for all firms. Negative earnings surprises lead to larger price drop for growth firms as compared to value companies. The reason for this is that investors expect the earnings to grow with the firm. If this is not the case, the disappointment of investors can cause the stock price to drop. This is also an explanation for large decreases in stock prices when negative earnings announcements are only relatively small. Kasznik and Lev (1995) found that companies who warn their investors about negative earnings surprises see an even larger decline in share value than companies who refrain from warning their investors. La Porta (1996) states that naive investors can cause share undervaluation if earnings announcements repeatedly fall short of the expectations thereby creating investor pessimism.

Analysts' earnings forecasts are important to investors since they use these forecasts of firm performance to value the shares of a firm (Pfaffer, Pollock, Rindova, 2010). This states that investors use the forecast made by analysts to base their investment decisions upon the information received from analysts (Gegeorge, Patel, Zeckhauser (1999). La Porta (1996) finds that investors' believes about earnings growth is too extreme, calling it the extrapolate hypothesis. The over expectations of earnings growth may be the result of overreaction to good or bad news. Even though investors tend to have extreme expectation about earnings growth, it is still representative for investors' expectations. (La Porta, 1996)

2.3 Behavioral finance as extension to standard finance theory

A new field of studies has recently emerged out of the shortcomings of the standard finance theory that cannot explain certain decision making theory. Behavioral finance theory tries to explain the psychological workings of decision making by investors by assuming that investors are not fully rational and that emotional factors do play a large role. Behavioral finance distinguishes itself from the traditional finance-choice literature in a way that it does not assume characteristics of investor behavior but attempts to describe this behavior. "The economic man – is very unlike a real man" (Edwards, 1954, p. 382). This indicates that the fundamentals of decision making theories such as the utility framework, Bayesian learning and such are not an adequate basis for a descriptive theory (Bondt, 1998). For the reason stated above, behavioral theorists introduced the term 'bounded rationality' a term that cannot be easily defined since it is a problem that needs to be explored (Gigerenzer and Selten, 2002). Herbert Simon was the first to challenge the model of rational decision making and was later joined by work of Kahneman and Tversky. Under bounded rationality, people make decisions according to certain limitations such as time, computational abilities, and limited knowledge. In models of rational decision making, these limits do not occur and the mind of humans is provided with an unlimited supply of time, knowledge information and computational might (Gigerenzer and Selten, 2002).

2.3.1 Cultural differences matter

Since there are cultural differences around the world, investors cannot be seen as the same and a distinction needs to be made between the different cultures and different investors. Hofstede (1980, 1993) saw this problem in the field of management. The term 'management' is developed in the United States and is most used and studied in this country as well. However, this does not mean that it is applicable around the world with the same meaning. Hofstede (1980) first created a model with four dimensions, which he later extended to a five dimension model (1993) that determines the national culture in a country and helps to explain the differences in management.

2.3.2 Differences in risk preferences

The model created by Hofstede (1980) is extended to the financial world and tries to determine the differences in investor behavior. Weber and Hsee (1998) try to examine

the cultural differences that affect the risk perception of investors in four countries[7] as measured by buying prices for risky financial options. Markowitz (1959) developed a Willingness To Pay formula that can determine how much an individual is willing to pay for an option X regarding the value of the option and its perceived risk. Differences in the willingness to pay can arise due to differences in the perceived risk or the perceived value tradeoff (Weber and Hsee, 1998), given that the value cannot be distinguished differently between individuals or groups as argued by Weber, Anderson and Birnbaum, 1992. Weber and Hsee (1998) find that there are small differences among investors from the United States, Germany and Poland but they are *not* significantly more risk averse. Bontempo, Bottom and Weber (1997) examine cross-cultural differences in risk perception by using a Conjunct Expected Risk model of lottery outcomes. The authors study university students from four different countries[8] plus security analysts from Taiwan. The results show that the Netherlands and the United States differ only in the parameter k_, the coefficient that determines the impact of negative outcomes, indicating that Dutch students are less influenced by negative outcomes. This outcome is supported by the work of Rieger, Wang and Hens (2015). Furthermore, Rieger, Wang and Hens (2015) state that risk preference is a key element in economic behavior. The authors therefore study a large sample consisting of 53 countries where participants are surveyed on their risk preferences. They conclude that risk attitude does also depend on the cultural factors developed by Hofstede (1993) and not only on the economic conditions of the country. The result of the survey shows that the effect of gains is similar in the United States and Germany but that negative effects are greater for German investors. Vieider, Chmura and Martinsson (2012) show that German university students are more risk-averse than their United States counterparts. This is in line with the evidence found by Statman and Klimek (2008) after controlling for income per capita and individualism.

2.3.3 Different capital markets require different returns

Manigart et al. (2002) examine the required return demanded by venture capitalists in

[7] Weber and Hsee (1998) study investors in the People's Republic of China, United States of America, Germany and Poland.

[8] Bontenpo, Bottom and Weber (1997) analyze the risk perception of university students in the Netherlands, Taiwan, United States and Hong Kong.

a five-country study[9]. The authors' state that Anglo-American countries, that is, the countries where English is the first language and that have the British culture, have more mature and dominant capital markets and are more market-oriented. Conversely, the Germanic countries such as Germany, Netherlands, Austria and Switzerland, are more network oriented. That can be seen in the public listing of the largest companies of each country (Moerman, 1995; Manigart et al., 2002). The authors conclude that in the United States and the United Kingdom, venture capitalists require a lower return than Germanic countries (Manigart et al., 2002). Furthermore, The United States can be characterized as equity centered having an equity culture (Guiso, Haliassos, Jappelli, 2002). Guiso et al. (2002) study the stock holdings of households across Europe with the United States as comparison. The United States has a higher stock market participation rate than any country in the European Union where Germany has one of the lowest stockholding rates. Furthermore, the United States has a significantly higher stock market capitalization compared to Germany measured in stock market capitalization to GDP. As illustration, the United States had in 2002 a market capitalization of 110% against 37% in Germany (Giannetti and Simonov, 2006) An article by Enskog (2015) states that the United States has the highest amount of "ego-traders" in the world. They tend to seek quick gains and tolerate higher losses. This is in contrast with Germanic investors, which are more patient when it comes to trading and are more concerned with value trading.

2.3.4 Investor behavior and overconfidence

An important behavioral factor that leads to trading and most likely overtrading is overconfidence (Barber and Odean, 2011). A significant body of literature is written on the matter of overconfidence that extends far beyond trading (Peng and Xiong, 2006; Scheinkman and Xiong, 2006). People tend to overestimate their abilities, their knowledge or the amount of information they have to make good predictions. Three factors are responsible for overconfidence: the self attribution effect, the illusion of knowledge and the illusion of control. The self attribution effect causes humans to think that the successes they achieved are due to their own abilities even in cases when that is unjustified (Miller and Ross, 1975; Libby and Rennekamp, 2012). When people are given more information about a certain topic they generate the illusion of

[9] The countries studied in the paper were: United States, United Kingdom, France, Belgium and the Netherlands.

knowledge. They believe they have the knowledge to process all the data even though that is not the case. Subsequently, this leads investors to believe that they can influence the outcome of chance effects, hence the illusion of control (Gervais and Odean, 2001; Barker and Odean, 2001; 2002). The term "better-than average" is related to overconfidence and states that most individuals think they are better than average (Larwood and Whittaker, 1977; Svenson, 1981). A survey of drivers that were asked showed that 80% of the people think they are better drivers than others (Malmendier and Tate, 2005). This clearly shows that people tend to think that they are better than others thereby showing overconfidence.

The relationship between overconfidence and trading is quite clear, " the more certain you are of your view, the less credence you will accord to those of others and the more likely you will be to transact at a price perceived favorable to your view" (Deaves, Lüders and Luo, 2008, p. 556). Theory states that rational investors trade to increase their expected utility, they simply buy and hold a well-diversified portfolio (Dorn and Huberman, 2002). Overconfident investors, however, lower their expected utility by trading unreasonably to new information they receive. They think they have the knowledge to process the new information accordingly and start trading excessively. Hence, greater overconfidence leads to greater trading volumes and a lower expected utility (Barber and Odean, 2001; 2002). The logical result of overconfidence is excessive trading and that is what has been found by previous studies on overconfidence and trading. Odean (1998), Barber and Odean (2001), Deaves, Lüders and Luo (2008) find that overconfidence does lead to the excessive trading of stocks. Glaser and Weber (2003) show that next to excessive trading, overconfident investors do also trade in larger volumes than less confident investors. This effect is larger for men than it is for their women counterpart. Indeed, men trade on average 45% more than women do (Barber and Odean, 2001). Menkhoff, Schmeling and Schmidt (2008) show indirectly that individual investors in the United States are more overconfident than individual investors in Germany. Scott, Stumpp and Xu (2003) study overconfidence of investors in five[10] countries by looking at the lagged response to news and P/E ratios of growth stocks. The authors conclude that German investors

[10] Scott, Stumpp and Xu use the United Kingdom, Japan, Germany, France, and the United States to examine the overconfidence bias of investors.

have a lower overconfidence bias than investors from the United States. Menkhoff (2010) studies professional technical analysts on overconfidence in five[11] different markets. He finds evidence that professional technical analysts from the United States see themselves as better than average, are less surprised by news and lower predicting ability than German technical analyst professionals. This indicates that technical analysts in the Unites States are more overconfident than German technical analysts.

2.3.5 Over- and underreaction to news events

In continuation on investor overconfidence, in particular the illusion of knowledge, investors have a limited supply of attention that needs to be allocated to different information flows correctly (Hirshleifer, Lim, Teoh, 2007; Barber and Odean, 2011). The key mechanism in this problem is the limited supply of attention. When an investor needs to spread his attention over multiple tasks at the same time, his performance will decline[12]. The limited attention that can result in the alteration of information signals can lead to the mispricing of certain securities (Hirshleifer, Lim, Teoh, 2007; Barber and Odean, 2011).

The behavioral finance literature created two contradicting models of irrational investors' behavior to news events: over- and underreaction. Barberis, Shleifer and Vishny (1998) propose a model consisting of two biases, conservatism and representativeness, that make up investor behavior. Conservatism states that investors change their beliefs of new information very slowly whereas the representativeness bias gives too much weight to recent events. As shown by Daniel, Hirshleifer and Subrahmanyam (1998) individuals that are overconfident overweight the private signals they receive, which causes the stock market to overreact. Kahneman and Tversky (1982) already stated earlier that recent events receive more weight while prior events are typically underweighted. This leads to long term reversal of corporate news events. When new public information enters the market, the price of securities will change in order to incorporate this information. Investors will underreact to the new public information stream since they created their own believes. In short, private

[11] Menkhoff studies technical analyst professionals on overconfidence in Germany, Switzerland, the United States, Italy and Thailand.

[12] For evidence on performance decline see Kahneman (1973), Pashler (1998) and Baddeley (1990).

information has to do with overreaction while underreaction stems from public information entering the market (Daniel, Hirshleifer, Subrahmanyam, 1998). Griffin and Tversky (1992) make the suggestion that investors might underreact to news that enters the market sporadic, but overreact to prolonged performance, either good or bad. Typically, overreaction is characterized by a long term trend that shows a reversal whereas underreaction conversely shows a long term pattern in stock returns (Kadiyala and Rau, 2004). Hong and Stein (1999) argue that investors are divided into two groups that both react to different information streams. The first group "news watchers" use only the private information they have about a stock without incorporating the believes of other "news watchers". When this information becomes public, the stock prices underreact to the new information stream. The second group called 'momentum traders' can profit from this underreaction by following the trend. This causes overreaction of the stock price in the long run.

The three main behavioral finance models[13] on investor behavior differ in assumptions regarding investor behavior but agree upon the finding that investors underreact to public information and overreact to past trends (Kadiyala and Rau, 2004). Peng and Xiong (2006) design a model where they measure the attention constrain investors face while making investment decisions. The authors conclude that due to the attention constrain, investors are unable to focus on firm specific information and focus more broadly on market wide and sector wide information. This implies that investors underreact to stock recommendations since they have a limited amount of attention to process all the information (Peng and Xiong, 2006). The inattention based explanation for underreaction needs to be combined with a short sell constrain. Otherwise one single investor with no capital constrains can drive the price back to its fundamental value (Hirshleifer and Teoh, 2003; Loh, 2010). Amir and Ganzach (1998) find that there is an overreaction to forecasts changes by analysts, an overreaction to positive forecast modification but an underreaction to negative forecast modification.

Frazzini (2006) shows with the disposition effect, consisting of mental accounting and the prospect theory, that investors tend to sell stocks that have gone up in value too

[13] The first model is the Barbaris, Shleifer and Vishny (1998) model, the second the Daniel, Hirshleifer and Subrahmanyam (1998) model and third the Hong and Stein (1999) model.

early while keeping the stocks that have gone down in value, hence selling the stocks too late. This disposition effect can lead to underreaction to stocks that go down in value. This results that investors keep their securities because they are unwilling to sell, thereby limiting the supply of the security resulting in a drop in share price that is not as big as it should be (Frazzini, 2006; Barber and Odean, 2011). Baytas and Cakici (1999) find no evidence for the overreaction hypothesis in the United States. However, the authors do find signs of stock market overreaction in Germany, a finding that is also found by Stock (1990).

2.3.6 Proxy for investor sentiment

Overconfidence can be seen as a proxy for investor sentiment, broadly defined as " a belief about future cash flows and investment risks that is not justified by the facts at hand" (Baker and Wugler, 2007, p. 129). Researchers have been working on a model that puts the standard finance model of capital market pricing together with two critical assumptions about investor behavior. Delong, Shleifer, Summers, and Waldmann (1990) made the first fundamental assumption that investors are subject to sentiment. A second assumption is based on the finding by Shleifer and Vishny (1997) that betting against sentimental investors is costly and risky. Baker and Wurgler (2007) developed a widely recognized measure for investor sentiment by using a "top down" approach together with macroeconomic factors. Models that try to capture the behavioral aspect of capital markets typically have two participants; the sentiment free arbitrageurs and the noise traders that are prone to sentiment (Delong, Shleifer, Summers, Waldmann 1990). Chui, Titman and Wei (2008) find that countries that are more collectivist show more herd behavior and consequently tend to overreact more to news events. Since arbitrageurs are not affected by sentiment, the herding behavior of noise traders' causes overreaction in financial markets thereby also driving the sentiment returns. (Chui, Titman, Wei, 2008). Recent academic literature found that high sentiment, or optimism, is correlated with low stock returns. Schmeling (2008) finds evidence that consumer confidence, a proxy for investor sentiment, for German investors is significantly less optimistic than investors in the United States. Baker, Wurgler and Yuan (2012) find comparable results.

3. Methodology and Data

Previous literature on the behavioral differences between investors across the world is limited. Hofstede (1980, 1993) saw that there exist cultural differences between different regions and therefore constructed a five-dimension model that could define these differences. Still, most studies in behavioral finance lack in scope, that is, the comparison between countries. The majority of work that has been written on behavioral finance the last decades was mostly focused on finding effect in a single country rather than performing a cross-country study. Since behavioral finance is still relatively new compared to standard finance theory, much more has yet to be examined. Stock recommendation given by sell-side analysts can be used, in combination with behavioral and psychology theory, to determine the sensitivity levels of German investors and Unites States investors. Since there is an apparent limitation in the scope of previous studies, no clear results can be found between stock recommendations across countries and behavioral finance in an international setting. As a result, previous literature needs to be carefully combined in order to generate hypotheses that are reliable.

Stock recommendations per country can be used as a fair proxy for sensitivity levels of individual investors towards stock recommendation revisions. One can argue that due to the internationalization of capital markets, investors are better able to invest in different capital markets than was the case several decades ago. Therefore, if investors can invest more easily in different markets, the abnormal returns following stock recommendation revisions can be partly generated by investors that are located overseas. However, evidence still shows that international portfolio diversification is, while slowly increasing, still limited. Investors tend to prefer to hold a disproportionately large amount of their portfolio in domestic stocks. This is also known as the home bias puzzle. Investors tend to have a clear favor for domestic securities due to behavioral explanations such as patriotism, familiarity and overconfidence (Lewis, 1999; Karolyi and Stulz, 2003; Sercu and Vanpée, 2012). Due to the home bias puzzle and the disproportionate amount of domestic equity holdings, domestic stock recommendations are a good proxy to measure investor sensitivity to stock recommendations in a certain country.

3.1 Assumption development

The groundwork for the hypotheses has been developed in the literature review. Differences in culture have been found to affect the decision making of individuals. As stated earlier, Hofstede (1980, 1993) pioneered in this field and his five-dimensional model helped assessing the first cultural differences across the world. The differences he found are regarding managerial decision making in different markets suggesting that culture is of importance. This was later extended to the behavioral finance research but is limited in the comparison between investors. The distinction between cultural differences in decision making is crucial for this study. The international investor cannot be used interchangeably across the world when differences in behavior have been found in different markets. As is shown in the literature review, there is enough evidence that there exits behavioral differences between investors in the United States and investors from Germany.

As Guiso et al. (2002) states, the Unites States is characterized by having a significant equity culture that is different to that in the European Union. Giannetti and Simonov (2006) show that the share of households that participate in the stock market is significantly higher in the United States than it is in Europe. Manigart et al. (2002) state that Anglo-American countries have more developed capital markets and are more market oriented as compared to Germanic countries that are more network oriented. Enskog (2015) writes that investors from the United States tolerate more losses and are less patient when it comes to investors from the European Union. The findings described above show that there are differences in investor behavior across two capital markets in the United States and Europe. To add to that, the United States is more market capitalized than Germany (Giannetti and Simonov, 2006). These findings can be used to develop assumptions about investor behavior and hypotheses. Furthermore, the financial crisis had a large impact on the capital market possibly also changing the investment behavior of individual investors. The crisis resulted in less optimism in the financial market therefore not only the distribution of stock recommendation can have changed, but also the way investors react to stock recommendations.

Now that differences between individual investors is shown, different assumption can be made about the state individuals are in in each market. Investors from Germany

will be referred to as GI while investors from the United States will be referred to as UI. Weber and Hsee (1998) investigated risk preferences of investors in the United States and several European countries. The authors concluded that there exist differences in risk perception between GI and UI but that the GI are *not* significantly more risk averse than UI. From a survey study of 53 countries, Rieger et al. (2015) show that the risk preferences of GI towards economic gain is similar to that of UI. However, GI show more sensitivity towards losses than UI. Vieider, Chmura and Martinsson (2012) perform a study among university students in 30 countries and find evidence of higher risk averse levels among German students than students from the United States. Statman and Klimek (2008) also study the risk averse level in several countries among finance professionals and find that, after controlling for income per capita and individualism, German professionals show higher risk averse levels than professionals from the United States. More recent literature finds evidence that investors and financial students in the United States are less risk averse than German investors or financial students. Therefore, the following assumption is made:

Assumption 1: UI are less risk averse than GI
This assumption would indicate that GI will refrain from risky investments and tend to be more affected by losses than UI.

A study performed by Guiso et al. (2002) shows that venture capitalists in the United States require a lower rate of return than venture capitalists in Germany. Requiring a lower rate of return indicates either that investors are more risk seeking or that the capital market is more developed. In the former case, venture capitalists with a capital surplus seek investment opportunities to generate a higher return. Venture capitalists in the United States require a lower rate of return for venture capital. Thereby stating that venture capitalists in the United States are more risk seeking than investors in Germany. One could argue that venture capital investing is not the same as investing into mature businesses. Investing in a new company is considered to be more risky than investing in mature businesses of which statements are readily available. The purpose of this comparison is not about the investment itself, but merely to show the return venture capitalists require and thereby their risk levels. On the other hand, lower required return could be the result of a more transparent capital market signaling a better developed capital market than Germanic countries. In countries with more

developed and transparent capital markets, investors tend to focus more on equity markets. Guido et al. (2002) state that the United States is characterized as an "equity culture". The authors find that the Unites States has higher household participation rates in the stock market compared to the participation rate of German households in the stock market. Other evidence on this matter is the higher market capitalization of the United States (Giannetti and Simonov, 2006). Enskog (2015) states that investors in the United States have the highest amount of "ego-traders" in the world, who are more impatient and accept higher losses than German investors. Due to the above findings, the second assumption in this study:

Assumption 2: UI show higher levels of stock market participation as compared to GI and require lower returns.

As is described in section two, trading levels are closely related to overconfidence and optimism in the stock market. More overconfident investors tend to trade more since their judgment is biased. Overconfidence is hard to measure since it is highly subjective. Evidence shows that men are more overconfident than women (Barber, Odean, 2001). International evidence on overconfidence shows that UI are more overconfident than GI. Menkhoff, Schmeling and Schmidt (2008) find indirect evidence that individual investors from the United States are more overconfident than individual investors from Germany. The same conclusion is made by Scott, Stumpp and Xu (2003) who study the overconfidence bias of investors in five countries. They conclude that GI have a lower overconfidence bias than UI. Menkhoff et al. (2008) find evidence of higher overconfidence levels among technical analyst professionals in the United States compared to German technical analysts. To add to that, Jegadeesh and Kim (2006) find that the United States has four to five times fewer sell recommendations than Germany has, a clear sign of optimism in the United States. The evidence on investor overconfidence leads to the third assumption:

Assumption 3: UI are more biased by overconfidence than are GI.

If we look at investor sentiment, which partly consists of investor confidence, two types of investors are distinguished. The arbitrageurs are not affected by investor sentiment in the market but noise traders are. Higher levels of investor sentiment result

in lower stock returns. This comes from the fact that noise traders start buying or selling more stocks according to the market. Higher trading levels include higher transaction cost with subsequently lower stock returns. Schmeling (2008) tests for consumer confidence, which indicates individual investor sentiment. The results show that GI are significantly less optimistic than UI. Baker and Wurgler (2006) also find evidence that UI have higher investor sentiment levels than GI. Therefore, the last assumption states:

Assumption 4: Investor sentiment for individual investors is higher in the United States than it is in Germany.

3.2 Hypothesis development

Several assumptions have been made regarding the states of investors in two different markets, hypotheses can be created that can answer the research question regarding the sensitivity of the individual investors towards stock recommendation revisions in both the United States and Germany. Summarizing: investors in the United States are less risk averse, are more active in the stock market, require lower returns, are more overconfidently biased and investor sentiment is higher in the United States. Hence, the reverse is true for German investors who tend to be more influenced by risk, consequently require higher returns, are less overconfident in their judgment and investor sentiment is lower in Germany.

Previous literature found that positive stock recommendation revisions occur more frequently than negative stock recommendation revisions. Only five percent of the recommendations were a sell or a strong sell while the average was a buy recommendation. Furthermore, seven strong buy recommendations are given for every strong sell recommendation given by sell-side analysts. This is evidence for optimism in the market. On the other hand, due to the infrequency of strong sell recommendation, one given by an analyst could signal a fundamental flaw thereby carrying a heavier weight. Balboa et al. (2009) elaborate on this finding by studying the optimism in different countries. The results show that the United States and Germany with several other countries are optimistically biased.

The optimism in the market needs to be combined with under- and overreaction to public news events. As has been found, investors tend to show sensitivity towards corporate news events. When investors are overconfident, they believe they are more skilled in forecasting the market compared to their counterparts. If the investor receives a confirmation on his believe about a certain stock, he will tend to overreact to this news event. Adversely, underreaction typically occurs to public news events that enter the markets. As is known from the prospect theory, individuals are more influenced by losses than they are by gains. When overconfidence and the prospect theory are combined together, the effect towards negative stock recommendation could be larger since the investor could incur losses, while at the same time needing to admit their incorrect estimation. Also, the herding effect of mutual funds is larger for negative recommendations than for positive stock recommendations. This finding by Brown, Wei and Wermers (2014) can suggest that negative stock recommendations see larger relative price fluctuations than positive stock recommendations revision due to the herding behavior. Therefore, the first hypothesis:

Hypothesis 1: Negative stock recommendation revisions generate larger abnormal returns in absolute value than positive stock recommendation revisions.

Hence, $H(1)_0$: |Negative revision| – positive revision ≥ 0

$H(1)_1$: |Negative revision| – positive revision < 0

A crucial element of this study is the difference in investor culture between Germany and the United States. Looking deeper in the matter, differences are also found at the investor level. If we look at the assumptions that are made in the previous section, a distinction can be made between the two markets. First of all, the market participation rate of households in the United States is significantly higher than of Germany. Hence, the higher stock market participation rate results in more trading in the Unites States than in Germany. Secondly, the investors from United States are less risk averse than German investors and therefore seek more investing. Thirdly, investors in the United States have a bigger overconfidence bias than German investors. This bias results in the overestimation of the judgment skill the investor actually has. Furthermore, the capital market in the United States shows higher levels of optimism together with a higher investor sentiment. Lastly, as is stated by Moerman (1995) and Manigart et al.

(2002), German investors are more network oriented than investors from the United States. German investors will therefore hold their stocks longer than investors from the United States who are less patient and are looking for a quick profit. This results in a larger positive bias for UI than for GI and therefore the following hypothesis regarding positive stock recommendation:

Hypothesis 2: Investors from the United States are more sensitive to positive stock recommendations than German investors.

Hence: $H(2)_0$: Positive revision United States – positive revision Germany ≤ 0
$H(2)_1$: Positive revision United States – positive revision Germany > 0

The reverse of the assumptions that derived the second hypothesis is true for German investors. Since GI are more risk averse than UI, news entering the market will have a greater impact on the stock price and consequently on the fluctuation of the price. Furthermore, the GI tolerate lower losses than UI. While investor sentiment and optimism is lower in Germany, negative stock revision will presumably have a bigger impact in Germany than in the United States. Lastly, as is shown by Rieger et al. (2015), GI are more sensitive to losses than UI. Thus, the third hypothesis states:

Hypothesis 3: German investors react more sensitive to downward revisions than investors from the United States.

Hence, $H(3)_0$: Negative revision Germany – negative revision United States ≤ 0
$H(3)_1$: Negative revision Germany – negative revision United States > 0

Stickel (1992; 1995) and Jegadeesh and Kim (2006) find that the reputation of analysts is of great importance to investors. Analysts that perform better than their peers in the field of estimates see greater stock price fluctuations when they make a recommendation about a company. The results also show that recommendations given by analysts that are of origin from the United States see greater stock price fluctuations than from foreign analyst companies. This study is however performed in the United States and could therefore be influenced by the home bias effect. To test whether the

reputation effect for analysts in the United States also holds in Germany, the following hypothesis is created:

Hypothesis 4: German investors react more sensitive to revisions of analysts from the United States than from German analysts.

Hence, $H(4)_0$: Revision United States analyst –Revision German Analyst ≤ 0

$H(4)_1$: Revision United States analyst –Revision German Analyst > 0

3.3 Methodology

The methodology of this paper is similar to that of Jegadeesh and Kim (2006) who performed an international study on the value of stock recommendations. However, several changes are made to the methodology since the scope of the paper by Jegadeesh and Kim (2006) is slightly different from the study performed in this thesis. The above-mentioned authors study the fundamental value of stock recommendation across several countries. What the authors do not touch upon is the behavioral finance of stock recommendation. I continue on the work of Jegadeesh and Kim (2006) by taking their methodology and combining it with behavioral finance in order to be able to find results about the sensitivity of investors to stock recommendations.

The timeframe that is used in this thesis is similar to the one used by Jegadeesh and Kim (2006) but differs to a small extent. The authors use a set of timeframes in the paper. The authors first pick a short timeframe (0, 1, 2 days) next to a longer perspective that reaches out to 22 days and 44 days (3 and 6 months). The reader needs to be advised that the timeframe contains trading days only. Hence, weekends and days that the stock market is closed do not count towards the timeframe. Womack (1996) uses a timeframe that reaches from -20 days to +20 days, the equivalent of one month. Several other papers that determine the value of analyst recommendations use similar timeframes as Jegadeesh and Kim (2006) and Womack (1996). This since previous literature has found that there is a post drift effect that can last up to six months. Since the scope of this thesis is more focused on the short term rather than the long term, some adjustments have been made. A longer timeframe means that more noise can enter the performed study in the form of other news events. Furthermore, Jegadeesh and Kim (2006) state that some analysts revise their recommendation with

clients and therefore a significant price effect occurs before that recommendation is given at t=0. The authors study the period leading to the recommendation (-10 to -1) and show that the largest ex-ante effect for the United States occurs at day -1 for both up and downgrades. The effect for Germany is rather steady through the -10 to -1 timeframe. Due to the above reasoning, this study uses a timeframe of -2 day to +2 in order to capture the private event leading to the recommendation while on the other hand keeping the post recommendation period short in order to keep the noise in the sample as low as possible. Hence, this timeframe can still be compared to that of Jegadeesh and Kim (2006).

When an equity analyst makes a stock recommendation revision, whether it is an upgrade or a downgrade, something fundamental has changed that will impact the companies future profitability. Since investors carefully following analysts' opinions, changes in stock recommendations leads investors to rebalance their portfolios. Since this rebalancing leads to the buying and selling of stocks, abnormal returns that are generated caused by the recommendation revision. These abnormal returns can be used to study the sensitivity of investors to stock recommendation revisions. The behavioral characteristics determine how investors react to stock recommendation revisions. The meaning of a recommendation revision can be interpreted differently. This research describes a recommendation revision as a change in opinion by one or more analysts about a certain stock. This does not necessary imply that the mean consensus about that particular stock changes with the recommendation revision.

By means of an event study, this thesis will determine the sensitivity level between GI and UI. The independent variable in this study is the event itself, or the revision in stock recommendation. The dependent variable is the stock price reaction coming from the independent variable. The abnormal returns (AR) will be calculated through the following formula:

$$AR_{k,t} = RR_{k,t} - NR_{k,t} \quad (1)$$

Where AR_k is the abnormal return for firm *k*, $RR_{k,t}$ is the realized return of firm *k* on *t* and $NR_{k,t}$ is the normal return of company *k* on time *t.* The normal return of the company is different from the realized return due to the effect or the revision of a

stock recommendation. This event study uses the market-adjusted form where the normal return is substituted by return that is realized by the market.

The return of the market is dependent on the listing of the stock, the NYSE for the United States and the DAX for companies in Germany. Due to the substitute of the normal return with the return of the market, noise of other events in the market other than the revision of the stock recommendation is taken into account and is adjusted for. The abnormal return measure gives the opportunity to look at the pattern of fluctuations in the stock price. The average abnormal return is calculated through the following formula which gives the mean of the abnormal returns on the according day:

$$AAR_t = \frac{1}{N}\sum_{k=1}^{N} AR_{k,t} \quad (2)$$

Following on the abnormal returns, the cumulative abnormal return (CAR) can be calculated by a summation of the realized returns from the time period -2 days to +2 days minus the normal return of the market over the chosen timeframe.

$$CAR_k(T) = \prod_{t-2}^{5}(1 + R_{k,t}) - \prod_{t-2}^{5}(1 + R_{mkt,t}) \quad (3)$$

where at t=0 the recommendation revision is given to stock k. $R_{k,t}$ and $R_{mkt,t}$ are the realized return of both the company and the market respectively at time *t*. The return of the market is dependent on the listing of the stock, the S&P500, the Dow Jones or the Nasdaq for stocks listed in the United States and the DAX for companies in Germany. As follows from Jegadeesh and Kim (2006), time is measured as trading days rather than calendar days. Formula 2 gives the opportunity to see the fluctuation over the chosen five day time period and is needed for the conclusion.

The model of Jegadeesh and Kim (2006) simply uses the return of the market as the normal return in the study. However, more commonly is the market model of event studies that uses an estimation period to determine the normal return of the market. The correct formulation of this would be that the market model uses an estimation period that does not overlap with the sample period in order to generate the predicted return of the market on $t_{=0}$. This is the return of the index under normal circumstances thus excluding any events. By making the estimation period sufficiently large, the events in the sample will disappear in the average. The estimation window in this

study is $t_{=-250}$ until $t_{=-3}$. The normal return of the market according to the market model is determined with the following formula:

$$R_{it} = a_i + b_i R_{mt} + u_{it} \quad (4)$$

In this model R_{it} is the predicted return of the market or the normal return, the parameter a_i represents the constant influence of firm specific factors with time, the b_i parameter, or the slope parameter can be interpreted as part of the stock return that can be influenced by the market. This leads to the following formulation of abnormal returns:

$$AR_{it} = R_{it} - a_i - b_i R_{mt} \quad (5)$$

This event study will refrain from the constant mean adjusted model since this model can produce noise in the estimate. The mean adjusted model calculates the normal return by averaging subsequent returns over *x* days where a larger estimation window is more reliable. In this case, a larger estimation window is less reliable since a certain estimation period contains a significant amount of recommendation changes, the constant mean adjusted model will produce an output that is biased upwards. In a market model this is not the case. The datastream event study tool is used to determine the market model adjusted return. This tool collects data on the company stock price from several well known databases such as CRSP. The event study tool calculates the normal return and subtracts this from the realized return in the event window. The abnormal return is calculated according to formula (5).

As previous literature states, there is a significant difference between positive and negative stock recommendations. Research has found that positive stock recommendations lead to significant positive stock price fluctuation while negative recommendations lead to significant negative stock price fluctuations. Consequently, both upgrades and downgrades cannot be put in the same sample since that would bias the results on investor sensitivity. Hence, the negative abnormal return in hypothesis 1 needs to be put in absolute value in order to be able to compare the effect of positive and negative stock recommendation revisions. This thesis will therefore perform two different event studies. The first will only consider upgrades in stock recommendations while the second event study will only consider downgrades in stock recommendation. Recommendations that are a reiteration from an old revision are excluded from the sample.

A third test will determine whether GI are more sensitive to revision of American brokerage houses compared to their German competitors. The reputation of brokerage houses will be of importance for this test. The recommendations given by analysts will be split up into two groups, one consisting of recommendations given by analysts from the United States. The second group contains the recommendations given by German brokerage houses. The effect of both groups will be tested on stocks listed to the German DAX in the same matter as is done in the two event studies. This provides the opportunity to find evidence on the reputation effect of brokerage houses from the United States and Germany on GI.

Jegadeesh and Kim (2006) additionally examine the effect of strong buy and strong sell recommendation separately from the remainder of the recommendations. Since strong buy and strong sell are the highest and lowest possible rank, it is possible that these recommendations send a stronger message about the analyst opinion, and lead to greater fluctuations. Since this thesis looks into the sensitivity of investors to recommendation rather than the value contained in these recommendations, no distinction will be made between types of upgrades or downgrades.

The validity of the hypothesis will be determined by a statistical significance test. In the case of an event study, this is done by a t-test to measure the normal distribution of the sample. By the use of a t-statistic, it can be determined whether the two sets of data are significantly different from each other. If the CAAR is not significantly different from 0, the H_0 hypothesis cannot be rejected, thereby finding no significant support for the effect of the event. Since this thesis attempts to find differences in sensitivity levels to stock recommendations across the United States and Germany, a two sampled independent mean t-test needs to be performed t test for statistical significance between the samples. This can be done according to the following statistical formula:

$$t_c = \frac{(X_1 - X_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \quad (6)$$

where t_c stands for the t-statistic for the two sample comparison, X_1 and X_2 are the means of the two samples, $\mu_1$and μ_2 represent the outcome of the hypothesis, s_1 and

s_2 are the standard deviation of sample one and sample two and n_1 and n_2 signify the sample size of sample one and sample two. The resulting t-statistic can be compared according to the student t distribution to determine the significance level of the sample.

3.4 Data

To measure the sensitivity of investors in Germany and the United States, data on stock recommendation and stock prices are collected from Bloomberg, Thomson Reuters and CRSP from 2010 to 2016. The sample is created from the 29 companies that are listed on the German stock exchange next to 29 companies from the United States. Fresenius Se & Co is dropped from the sample since it is similar to Fresenius medical care AG & Co. Since the DAX contains far less companies than are listed on the stock exchanges in the United States, a suitable equivalent needs to be found in order to generate unbiased results. Several factors helped to select companies from the United States as a comparable equivalent for the German DAX listed companies. Most importantly, the equivalent company in the United States needs to be in the related sector and provide the same services or products. Other factors include market capitalization, beta, P/E ratio and earnings per share. Through these factors, companies are compared whether they are of the same size, as well as whether they are value or growth companies. A sample bias can possibly occur when growth firms are compared to value firms. Therefore, selecting factors such as P/E ratio and EPS can overcome this problem. Also, beta helps to select firms that have an equal volatility to the market. If the beta of the firms would not be comparable, one can expect larger fluctuations of companies that have larger betas. The appendix shows the list with the German companies and their United States equivalent.

Next to equivalent United States companies, suitable brokerage houses need to be selected that are widely known and can therefore affect the selected companies in a similar way. This is a difficult task since the majority of big brokerage houses are from United States origin. This study follows the reasoning of Boni and Womack (2004) who use the largest equity research firms based on market capitalization as well as numerous smaller firms. The top ten largest equity research firms are used to determine the sample. Since the majority of these firms are of American origin, German and European Brokerage houses are added to this sample in order to generate

an unbiased recommendation sample. Furthermore, equity research coverage is rather limited in the United States, especially for smaller companies, also smaller United States equity research firms are added to enlarge the sample. From the ten largest equity research firms, Citigroup, Deutsche Bank and Bank of America Merrill Lynch are excluded since no information could be obtained through either Bloomberg or Thomson Reuters. The selected equity research firms can be found in the appendix.

The data on recommendations for the selected companies is collected from the Bloomberg terminal under the section analyst stock recommendations which has the ticker ANR. The stock prices of the selected companies are collected through Thomson Reuters and the CRSP database. The stock price is corrected for dividends in order to produce discrete returns. The selected timeframe in this study reaches from January 2010 to November 2016. This time period reflects the recovery after the financial crisis. 2009 is excluded on purpose since a chance exists that the year following the 2008 financial crisis could create bias in the sample. Reiterations of recommendations are excluded from the sample since this study assumes that only revisions of stock recommendation move investors to buy or sell certain stocks.

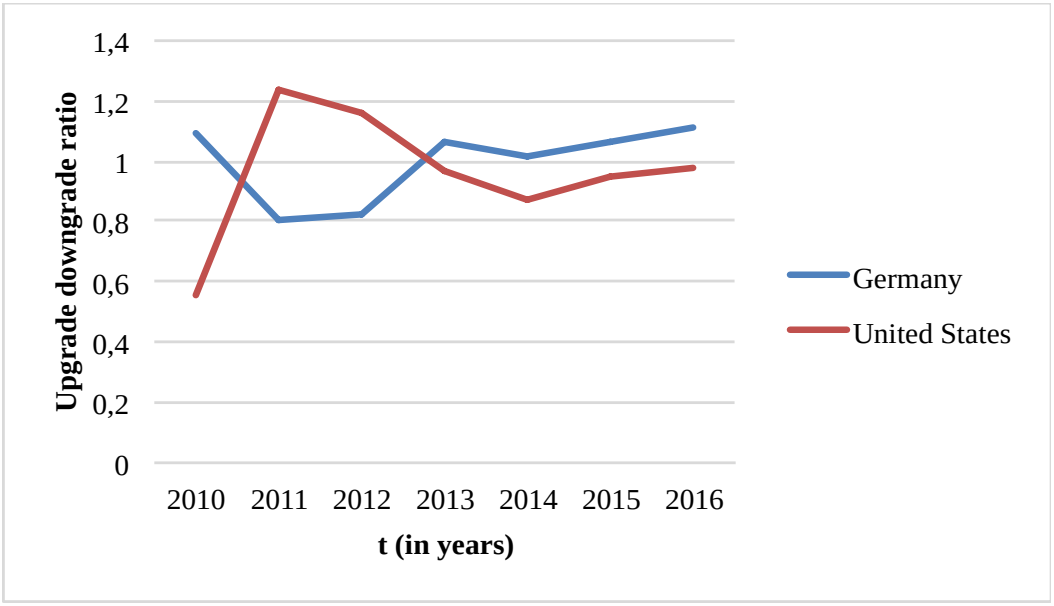
It is possible for equity analysts to keep the same recommendation but to increase the target price of a company. Revision of the target price is beyond the scope of this thesis, hence reiterations with a different target price are excluded from this sample. Furthermore, it is possible for sell-side analysts to drop coverage of companies during the sample period. When this is the case, the first recommendation given by the analyst when coverage is reinstated is therefore omitted from the sample. This for the simple reason that investors have no frame to base their believes on. Only the second recommendation and further will be included in the sample. Also, outliers are excluded from the sample when stock returns are larger than ten percent either positive or negative. With such high abnormal returns, it is highly likely that something fundamental to the company has changed or published highly surprising earnings. As a result, investors buy shares for the reason of the fundamental change or earnings surprise rather than the stock recommendation. This results in omitting 18 stock recommendation revisions, 7 and 11 for German up and downgrades respectively. The omitted recommendation for the United States companies are 25, 5 being stock upgrades and 20 being a negative recommendation revision. In order to be able to

answer the fourth hypothesis, the sample needs to be divided into recommendations given by analysts from the United States and recommendations given by German analysts. Table 1 shows the distribution of stock recommendation revisions through 2010-2016. As can be clearly seen in Table 1, equity analysts' issued fewer recommendations in 2010 as compared to 2016. The number of stock recommendations steadily increases year-to-year reaching the highest numbers in 2015 and 2016. Companies for the United States receive more negative stock recommendation revisions in 2010, possibly being an ex-post effect of the financial crisis meaning that equity analysts' are more conservative. Also, the uncertainty of the Greek debt crisis in the European capital market can be seen in the table. During the years 2011 and 2012, more negative stock recommendations are issued for German companies. Contrariwise, the selected companies in the United States see more stock recommendation upgrades during the same time period. Figure 1 shows the Upgrade/Downgrade ratio during the sample period.

Table 1: Distribution stock recommendation revisions.

		2010	2011	2012	2013	2014	2015	2016	Total
Germany	Upgrades	34	33	50	50	62	82	82	393
	Downgrades	31	41	61	47	61	77	74	393
United States	Upgrades	10	26	37	32	21	41	40	207
	downgrades	18	21	32	33	24	43	41	212

Figure 1: Upgrade/ Downgrade ratio sample period.



4. Results

This section serves to present the results generated by the empirical analysis in this thesis. The first section will discuss the general findings regarding the sample. The second section reports the relative impact of abnormal returns generated by both up and downgrades. The third section discusses and compares the finding of abnormal returns generated by positive stock recommendation revisions and the sensitivity of investors to these revisions in both markets. The fourth section shows the impact of negative stock recommendation revisions and sensitivity levels to these negative revisions in both markets. The fifth section reports results on the abnormal returns for German stocks created by recommendation revisions of both German and United States analysts. The sixth section provides a robustness test on the results by using the Mackinley (1997) method of corporate events studies.

4.1 Main results

The main focus of this thesis is the sensitivity of investors towards stock recommendation across two markets measured by an event study. Table 2 reports the summary statistics of both samples. As is explained in the literature review, previous literature found an optimism bias in the recommendations given by sell-side analysts, issuing more buy recommendations than sell recommendations. This however, is not the case in this sample. The total amount of positive recommendation upgrades in the sample for German companies is 393 observations. The sample of negative recommendations revision for the sample companies results in a sample of 393 observations. The comparable sample for companies from the United States resulted in 207 upgrade revisions against 212 negative recommendation revisions. The sample of up- and downward recommendation revisions is considerably smaller than the one used by Womack (1994) and Jegadeesh and Kim (2006) but is still large enough to produce reliable results. For the fourth hypothesis, the German sample is subdivided into 3 groups; recommendation revisions made by German, United States or European equity research firms. Table 2 shows the summary statistics of the variable in study.

Table 2: Descriptive statistics of the variables under study

This Table presents the descriptive statistics of the event study for both Germany and the United States. The revisions are categorized into two groups, upgrades in recommendation revisions and downgrades in recommendation revisions. Upgrades are reported in the columns 2-6, downgrades are reported in the columns 8-12. Both recommendations samples are categorized according to their event window t_{-2} through t_{+2} with $t_{=0}$ being the event date or recommendation revisions. Columns 1 and 7 report the amount of recommendations given by analysts in the sample. The abnormal returns reported in the columns 1-7 and 8-12 are raw returns minus the return of the market index respectively of the companies listing. The rows are divided into two sections, the German and the United States sample. The German sample is again subdivided into three groups according to origin of the analyst. In this sample, the E.U. analysts are excluding German analysts.

		Upgrades						Downgrades				
		Trading days						Trading days				
		t-2	t-1	t=0	t+1	t+2		t-2	t-1	t=0	t+1	t+2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
German Sample	393						393					
German analysts	200						184					
Mean		-0,08%	0,10%	0,28%	-0,11%	0,13%		0,21%	-0,31%	-0,97%	-0,40%	-0,11%
Standard deviation		1,55%	1,63%	1,98%	1,87%	1,78%		1,42%	1,51%	2,38%	2,22%	1,70%
U.S. analysts	76						75					
Mean		-0,09%	0,31%	1,03%	0,03%	0,06%		0,26%	-0,36%	-0,91%	-0,33%	-0,03%
Standard deviation		1,20%	1,43%	1,52%	1,74%	1,34%		1,20%	1,58%	1,52%	1,63%	1,32%
E.U. analysts	117						134					
Mean		0,07%	0,37%	1,19%	0,21%	0,16%		0,06%	-0,41%	-0,85%	-0,08%	-0,30%
Standard deviation		1,41%	1,58%	1,98%	1,77%	1,60%		1,43%	1,39%	1,78%	2,05%	1,61%
Mean sample		-0,04%	0,21%	0,70%	0,01%	0,13%		0,17%	-0,35%	-0,92%	-0,28%	-0,16%
Median sample		-0,12%	-0,03%	0,65%	-0,01%	0,15%		0,15%	-0,32%	-0,56%	-0,17%	-0,09%
CAAR		-0,04%	0,18%	0,88%	0,89%	1,01%		0,17%	-0,18%	-1,10%	-1,38%	-1,53%
U.S. Sample	207						212					
Mean sample		0,01%	0,11%	0,96%	0,12%	0,18%		0,00%	-0,24%	-0,83%	-0,16%	-0,02%
Median sample		-0,05%	0,05%	0,63%	0,05%	0,01%		-0,04%	-0,18%	-0,49%	-0,17%	0,01%
Cumulative abnormal returns		0,01%	0,12%	1,07%	1,20%	1,38%		0,00%	-0,24%	-1,07%	-1,24%	-1,26%

As is no surprise, the majority of recommendations (51%) in this sample are given by German sell side analysts. The remainder of recommendations is given by European (30%) analysts and analysts from the United States (19%). Both in the total sample and the separation of region, revisions of positive and negative recommendations seem to be evenly distributed. This clearly contradicts the previous finding regarding stock recommendations. This shows evidence that equity researchers became less optimistic when issuing stock recommendations. It is possible that the financial crisis of 2008 caused the reversal of optimism in stock recommendations. Due to the financial crisis, the financial sector was seen as the reason for the crisis and therefore lost its reputation. Next to that, regulation on financial services became stricter, making the possible conflict of interest harder, resulting in possibly more fairly priced stock recommendations. Since a clear separation of investment banking activities and advisory services is now mandatory, income generated through advisory commissions rather than the investment banking business. If analysts are too optimistic in their stock recommendations, analysts can benefit in the short term, while harming their reputation in the long run. This long run reputation deterioration could be an incentive mechanism for analysts to rate stocks fairly. Remarkably little information can be found on the scatter of stock recommendation following the financial crisis. The far majority of empirical research selects a time period prior to the financial crisis. This however, biases the results for comparison for research that is done after the financial crisis. Since the financial crisis of 2008 was of such a large magnitude, many institutional regulations have changed for the financial markets. Therefore, a comparison can be made with previous results but also needs to keep in mind the current state of the financial institutions. Table 2 reports the mean and the median of all samples. By comparing the mean and median, one can determine whether there is skewness in the model. This study shows that both the positive stock recommendation revisions samples have a mean larger than the median. This implies that the positive stock recommendation revisions samples are skewed to the right. Contrariwise, the negative stock recommendations revision samples have a mean that is smaller than the median, implying that there is some skewness to the left.

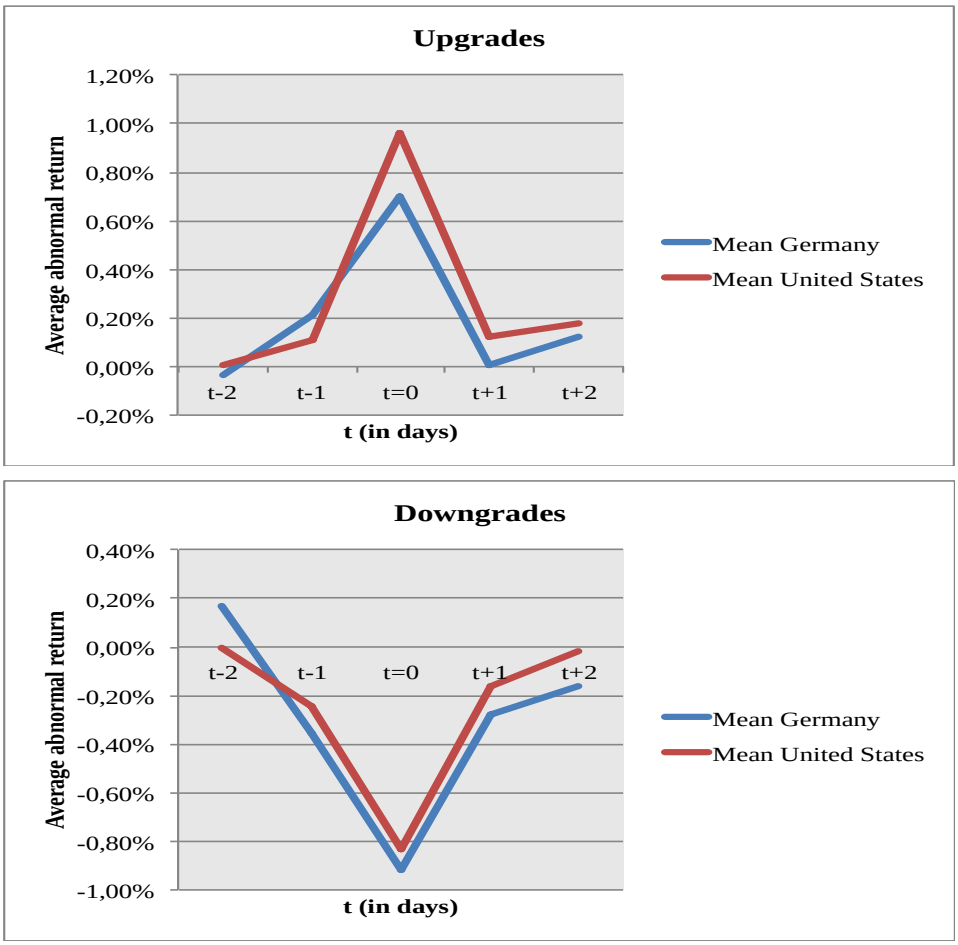
4.2 Positive stock recommendations vs. negative stock recommendations

The first effect that this thesis examines is the effect of positive recommendations compared to negative recommendations. From earlier findings and the assumptions

made in the methodology section, negative stock recommendation revisions are assumed to have a larger impact on investors than positive recommendation revisions, hence downgrades are predicted to have greater abnormal returns than upgrades. As can be seen in Figure 2 and Table 2, the largest price movement occurs on $t_{=0}$ or the day of the recommendation revision. The ex-ante results are similar for both samples. For German companies, the largest movement on t_{-2} can be seen in the downgrade. Surprisingly, the signs of both the positive and negative recommendation revisions are the opposite of what is expected. The average abnormal return following an upgrade for German companies on t_{-2} is -0.04% against 0.17% for a downgrade. For t_{-1}, the results also show a greater fluctuation for stock recommendation downgrades than for upgrades. The sign is as expected with an average abnormal return of 0.21% for the upgrade in the German sample versus -0.35% for a downgrade in the German sample. On the day of the event, the stock price of a German company increases on average with 0.7% following a stock upgrade. A downgrade in stock recommendation results in an average decrease of -0.92% in stock price. The results on ex-post effects for revisions of stock recommendations are different than the ex-ante results. On t_{+1}, almost no effect can be observed for upgrades in the German sample. German stocks show an average abnormal return of 0.01% following a positive recommendations revision. For a negative recommendation revision, German companies see an average abnormal return of -0.28% the day following the revisions. The second day preceding the event, the average abnormal return is 0.13% following an upgrade versus -0.16% for a downgrade. The average abnormal return for an upgrade in the German sample is 0.20% in the selected timeframe. A downgrade in the German sample results in an average abnormal return of -0.31%. The cumulative average abnormal return (CAAR) for German stocks following a positive recommendation revision is 1.01% against -1.53% following a negative recommendation revision. This indicates that negative stock recommendation revisions lead to a greater stock price fluctuation than positive stock recommendation revisions in the German sample.

Figure 2: Mean abnormal returns following recommendation upgrades and downgrades

This Figure presents the mean abnormal returns generated following a recommendation upgrade and a recommendation downgrade. A recommendation upgrade is characterized as a higher recommendation than the previous recommendation while a downgrade is characterized as a lower recommendation. The abnormal return is the raw return of the stock minus the realized return of the index to which the company is listed. The sample period is from January 2010 to November 2016.



The results for recommendation revisions in the United States differ to a small extent to the results found in the German sample. On t_{-2}, an abnormal return of 0.01% can be seen for positive recommendation revisions, while a 0.00% abnormal return can be seen for negative recommendation revisions. This is against the expectations but similar to the results in the German sample. On the day leading to the event, an upgrade revision in the Unites States sample results in an abnormal return of 0.11% whereas a downward revision shows a -0.25% abnormal return. Like the German sample, the sample in the United States also shows the largest abnormal return on the day of the event. A company that receives an upgrade sees an average abnormal return

on $t_{=0}$ of 0.96%. A downgrade is followed by an average abnormal return of -0.83%. On the days following the event, the abnormal returns are 0.12% and 0.18% for stocks receiving an upgrade versus -0.16% and -0.02% for a downgrade. The average abnormal return for the timeframe of the event is 0.28% for a stock that receives an upgrade in the United States sample against -0.25% abnormal returns for a downward revision. The CAAR for United States stocks following a positive recommendation revision is 1.38% against -1.26% following a negative recommendation revision. The results show that the fluctuation in the German sample is in line with the stated hypothesis. The fluctuation in the United States sample is however contradicting the expected findings reported by Jegadeesh and Kim (2006) and Loh (2010). An explanation for this finding is that investors in the United States tolerate higher losses than investors from Germany. If the investor tolerates higher losses, shares will be held longer in the portfolio, absorbing the effect of a negative stock recommendation revision. This is in line with the disposition effect of Frazzini (2006), which states that investors tend to sell stocks that have decreased in value too late. Another explanation for the finding is also linked to the disposition effect. If an investor is too optimistic about the stock market, one can believe that the decrease in stock price is a temporary setback and that recovery will follow. This can be linked to overconfidence. If the investor is certain about his believes in the stock market, the investor will believe that the analyst is wrong and that recovery will follow. Therefore, the investor will hold the shares in his portfolio, showing lower abnormal return for negative stock recommendation revisions.

A statistical significant test determines the validity of the results. Table 3 shows the standard deviation and the t-statistics found in this study. As can be seen from Table 3, the standard deviation of upgrades in the German sample is approximately constant during the event window. Only on the day of the event there is a small increase in the standard deviation of the abnormal returns. This indicates a large dispersion in abnormal returns on the event date. Similar results can be observed for the standard deviation of the United States upgrade sample and for both the negative recommendation revisions samples. On the day of the event, there is an increase in the standard deviation that also persists the day following the event. The larger standard deviation signals that there is more movement in stock prices on the day of the event and the following day. For all samples, the day of the event shows statistically

significant results at the 1% level. Therefore, the study shows evidence of statistical abnormal return on the event date. Table 3 reports that all samples are statistically significant at the 1% level. To determine whether the results are statistical significant between the two different samples, formula (6) is used. The t-statistic for the comparison between German downgrades minus German upgrades is 4.189 indicating a highly significant result for the German sample comparison. For the United States, the effect of positive recommendation revisions is larger than the effect of negative recommendation revisions, hence H_0 cannot be rejected. Therefore, the results on the first hypothesis is mixed. In line with expectations, German investors are more influenced by negative stock recommendations than by positive stock recommendations. Conversely, this study does not find evidence that investors from the United States are more influence by negative stock recommendation revisions.

Table 3: T-statistics event window

This Table reports the t-statistics for the event window of the event study for individual dates as well as the event window t-statistic. The statistics are categorized into two samples, upgrades, columns 2-6 and downgrades column 8-12. All t-statistics are categorized according to their event window t_{-2} through t_{+2} with $t_{=0}$ being the event date or recommendation revisions. Columns 1 and 7 report the amount of recommendations given by analysts in the sample. The first row of the Table reports the standard deviation of the event date of the German sample. The second row reports the mean on the event date. The corresponding t-statistic to the standard deviation and mean is reported in row 3. Row 4 reports the t-statistic of the whole event window. Rows 5, 6, 7, 8 report the corresponding standard deviation, mean, t-statistic and the event window t-statistics for the United States sample.

		Upgrades						Downgrades				
		Trading days						Trading days				
		t-2	t-1	t=0	t+1	t+2		t-2	t-1	t=0	t+1	t+2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
German Sample	393						393					
Standard deviation sample		1,45%	1,58%	1,94%	1,81%	1,65%		1,38%	1,48%	2,04%	2,06%	1,60%
Mean		-0,04%	0,21%	0,70%	0,01%	0,13%		0,17%	-0,35%	-0,92%	-0,28%	-0,16%
T-statistic		0,546	2.631***	7.144***	0,109	1.559*		2.439***	4.680***	8.929***	2.691***	1.980*
T-statistic event window (-2, 2)						11.709***						17.136***
U.S. Sample	207						212					
Standard deviation sample		1,63%	1,25%	2,00%	1,96%	1,52%		1,10%	1,25%	1,90%	1,97%	1,12%
Mean		0,01%	0,11%	0,96%	0,12%	0,18%		0,00%	-0,24%	-0,83%	-0,16%	-0,02%
T-statistic		0,088	1,263	6.889***	0,879	1.700**		0	2.796***	6.361***	1.,183*	0,260
T-statistic event window (-2, 2)						11.477***						11.836***

*** 1% significance, ** 2% significance, * 5% significance.

4.3 Sensitivity level to positive stock recommendation revisions

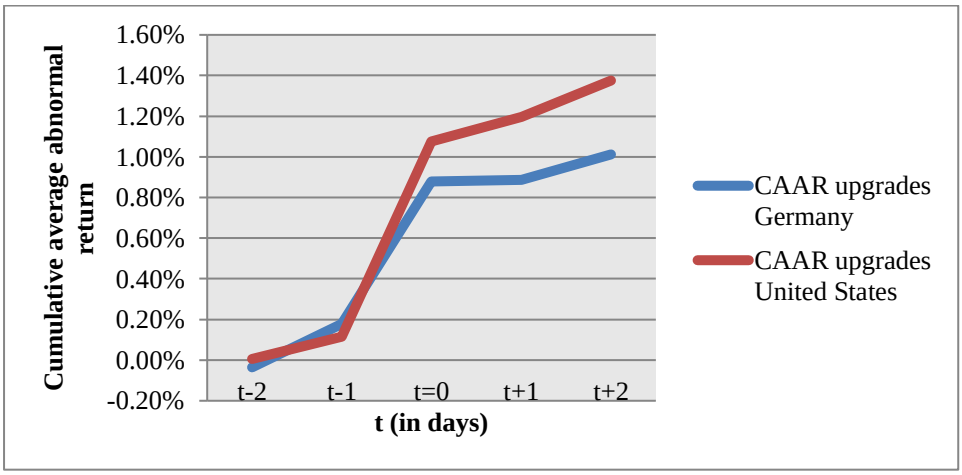
In section 3 it is argued that there in fact exist cultural differences that influence the investment decision making of investors. Factors such as risk aversion, overconfidence, and higher levels of investor sentiment create a dispersion between the two capital markets in the United States and Germany. The second hypothesis states that investors from the United States are more influenced by positive stock recommendation revisions than are investors in Germany. As summarized earlier, investors for the United States are less risk averse, are more overconfident and seek faster gains rather than holding stocks as compared to German investors.

Table 2 shows the results for the positive recommendation revisions in both the United States and Germany. As already mentioned, the results show that the largest price fluctuation occurs on the day of the event itself. As can be clearly seen in Figure 3, abnormal returns fluctuations show the same pattern. First, there is a small increase in abnormal returns in the days leading up to the event. The days following the recommendation revisions, the abnormal returns are again lower causing the CAAR to increase modestly. Notice that for t_{-2}, the average return on the German sample is slightly negative indicating a small decrease in share value leading to the event. Again, in the days leading to the event a small increase in abnormal returns can be noticed. The ex-ante effect is larger for the German sample (+0.17%) than for the United States sample (+0.12%). On the day of the event, the return of the United States sample spikes causing it to pass the CAAR of the German sample. The ex-post results show that the realized abnormal returns only modestly increase following the stock recommendation revisions. The CAAR for the United States during the five day timeframe is 1.38% whereas the CAAR for the German sample is 1.01%.

Table 3 reports the results regarding the t-statistics for the significance test. The statistical significance test shows that both upgrade samples are significant at a 1% level with the event date also being significant at a 1% level. Formula (6) determines the statistical significance between the United States and the German positive recommendation revisions sample. The resulting t-statistic is 2.500, which indicates that the sample is statistically significant at a 1% level. Therefore, this study finds evidence that investors from the United States are more sensitive to positive recommendation revisions than German investors.

Figure 3: Cumulative average abnormal returns upgrades

This Figure shows the cumulative average abnormal returns following recommendation upgrades for both the German and United States sample. An upgrade in stock recommendation is characterized by a higher recommendation than the previous. The cumulative average abnormal return is the sum of the raw abnormal returns minus the realized return of the corresponding market index through the event window. The sample period is January 2010 to November 2016.



The result is similar to the result found by Stickel (1995), Womack (1996) and Jegadeesh and Kim (2006) of which only the latter provide international evidence. In the ex-ante period leading to the event, the papers report results in the United States that show a slight increase of the stock price in the two days leading up to the stock recommendation revisions. The above-mentioned papers find the largest price effect is noticeable on the day of the event $t_{=0}$. The days following the event the abnormal returns decreases leading the CAAR to stagnate. This is all in line with the finding of this thesis. The only surprising finding in the German sample is the negative stock return the days before the event. This contradicts the finding of Jegadeesh and Kim (2006). Reasons for this finding could be as simple as that it is less common for analysts that cover German companies to discuss recommendations with clients. The ex-post results for positive revision of stock recommendations are in line with the earlier findings. The United States shows a greater price fluctuation on the day of the event and the two days following the event.

4.4 Sensitivity level to negative stock recommendation revisions

The second event study of this thesis looks at the sensitivity of investors to downward revisions of stock recommendation. The argumentation and the expectation of the third hypothesis is the opposite of the second hypothesis. Due to the established assumptions regarding investor behavior, German investors are said to be more risk averse, hence these investors are more affected by negative news than are United States investors. Furthermore, German investors tolerate lower losses thereby selling their shares faster when stock prices are declining.

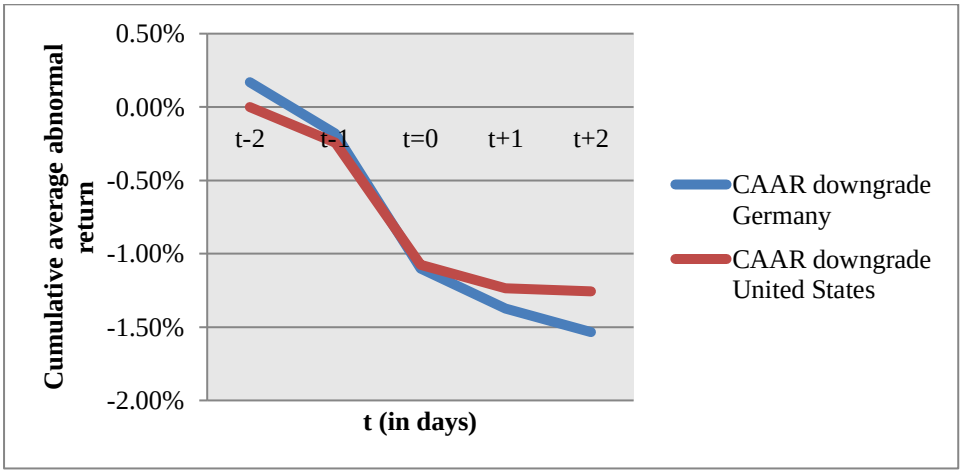
In table 2 the results on the abnormal returns for a stock recommendation downgrade can be found. As can be seen, the largest price reaction occurs on the day of the event. Figure 4 shows the CAAR for both the German and United States sample regarding stock recommendation downgrades. Figure 4 shows the expected movement of stock returns surrounding the event. On t_{-2}, the German sample shows a positive abnormal return, the opposite of what is expected from a negative recommendation revision. An explanation for this finding could be that investors slightly correct for the decrease in stock price that will happen on the day of the event. The ex-ante t_{-1} effect for German companies is an abnormal return of -0.18% compared to -0.24% for stocks in the United States. Table 2 shows that the largest abnormal returns for German companies can be seen on the day of the event. The days following the event show as expected a lower but negative abnormal return, indicating that the effect of a negative stock revision persists after the event. The German sample shows an average abnormal return decline of -0.44% following the event. Investors in the United States seem less affected by the negative revision in the days following the event. The average abnormal returns on t_{+1}, and t_{+2}, is -0.18%. The CAAR for downgrades in both samples is -1.53% for German stock against -1.26% for stock in the United States. The difference in CAAR implies that German investors are more influenced by negative stock recommendations than investors from the United States. Thereby H_0 can be rejected.

A statistical significance test determines the validity of the above found indication in this sample. Table 3 shows that both samples are statistically significant at a 1% level. Also, in both samples the event date itself is statistically significant at a 1% level.

Using formula (6) to determine the significance of the comparison of the negative stock recommendation revisions, a t-statistic of 1.884 is found. This indicates that the sample comparison is statistically significant at a 5% level. Hence, this result shows evidence, with the use of abnormal returns, that German investors are more sensitive to negative stock recommendations than investors from the United States. This contradicts the finding of Jegadeesh and Kim (2006). The authors report a lower CAAR for German stocks than for stocks from the United States following a negative stock recommendation revision. On the day of the event, the average abnormal return is -0.22% for German stocks compared to -3.19% in the United States. The abnormal return in the United States is more than three times as large as the finding in this sample. The financial crisis of 2008 could explain the divergence in the results. As a result of the financial crisis, the reputation of the financial sector has been damaged which could lead analysts to report fairer recommendation than was the case before the financial crisis when optimism dominated the market. This is in line with the equal number of positive and negative recommendations found in this sample. Another explanation could be the state of the two economies. Europe has seen more downturns after the financial crisis making the investors more aware and more sensitive towards negative news. For example, Europe has seen the instability of the Greek debt crisis that caused trouble throughout Europe. Since Germany was the largest contributor to the Greek stimulus package, any negative news surrounding Greece could influence the German stock market. Also, several indirect matters such as the refugee crisis and the increased amount of terrorist attacks influence the recovery of the European stock markets. More recent events such as Brexit or the rumors of the Italian banking crisis also slow the growth of the European economy while the indices on Wall Street are around their all time highs. The effects of these factors, while providing interesting material for future research, are beyond the scope of this thesis

Figure 4: Cumulative average abnormal returns downgrades

This Figure shows the cumulative average abnormal returns following recommendation downgrades for both the German and United States sample. A downgrade in stock recommendation is characterized by a lower recommendation than the previous. The cumulative average abnormal return is the sum of the raw abnormal returns minus the realized return of the corresponding market index through the event window. The sample period is January 2010 to November 2016.



4.5 German investor sensitivity

The fourth hypothesis is built on the finding surrounding the reputation hypothesis, which states that United State analysts see larger price fluctuations following a recommendation revision than foreign analysts. If the hypothesis were to be true, the study should find larger abnormal returns for the analysts from the United States in this sample. Due to the equity culture in the United States, the majority of equity analysts are from the United States with the largest and best skilled analysts also coming from the United States. Furthermore, Wall Street is seen as being the leader in financial capital markets around the world. This could indicate that investors put more weight on the happenings in the United States.

The results to this study can be found in Table 2. The German sample is split into three components, one for German analysts, one for European analysts and one for United States analysts. Unsurprisingly, analysts that originate from Germany and the European Union give the majority of recommendation to German stocks. In this sample, analysts from the United States give 76 upgrade revisions, which is less than the 200 revisions given by German analysts. If the hypothesis were to hold, this could indicate that analysts from the United States do in fact have a large reputation effect even with limited coverage in Germany. The same holds for downward revisions, 75

downward revisions by United States analysts as compared to 184 by German analysts.

The results for recommendation upgrades show that the largest effect coming from positive revisions given by United States analysts. As can be seen in Table 2, negative abnormal returns are generated for t_{-2}, following positive recommendation revisions for both analysts from the United States and Germany. The day leading to the event, a spike can be seen for both the United States and German, changing from negative to positive. United States analysts, changing by 0.4%, can observe the largest effect following an upward revision. This again could indicate that some investors have private information and anticipate the upward revisions. On $t_{=0}$, a remarkable result can be observed. The effect of an upward revision by German equity analysts is of a small magnitude (0.28%). The abnormal return generated by an upward revision of United States analysts is larger (1.03%). The ex-post effect of an upward revision is mixed for both groups. The abnormal returns for t_{+1} show a correction regarding upward recommendation revisions given by German analysts. This signals that German investors overreact to positive news given by German analysts. The abnormal returns for United States analysts on t_{+1} also drop but remains slightly positive. On t_{+2}, the abnormal returns are positive again for both German and United States analysts. The results of Jegadeesh and Kim (2006) show that analysts from the United States have the largest abnormal returns in both recommendation upgrades and downgrades. This contradicts the results found in this thesis regarding the reputation effect of United States analysts with negative stock recommendation revisions.

Table 4 shows the t-statistics for the fourth hypothesis. As can be seen form Table 4, the abnormal returns on $t_{=0}$, are statistically significant for both the German and the United States sample. The ex-ante abnormal returns show no significance indicating no significant ex-ante effect of positive revision in stock recommendation for German companies. Only United States analysts produce a significant abnormal return at t_{+1}. The ex-post abnormal returns created by positive recommendation revisions show no significant effect. This indicates that positive stock recommendation revisions do not have a significant effect after the event in this sample.

Table 4: T-statistics subdivided German sample

This Table reports the t-statistics of the subdivided German sample by the country of origin of the analyst. This Table reports the t-statistics for the event window of the event study for individual dates as well as the event window t-statistic. The statistics are categorized into two samples, upgrades, column 2-6 and downgrades column 8-12. All t-statistics are categorized according to their event window t_{-2} through t_{+2} with $t_{=0}$ being the event date or recommendation revisions. Columns 1 and 7 report the amount of recommendations given by analysts in the sample. The first row reports the cumulative abnormal returns generated by German analysts. The second and third row are the standard deviation and the related t-statistic of the individual days. The fourth row shows the event time windows t-statistic. Rows 5-8 reports the comparable variables but for analysts from the United States.

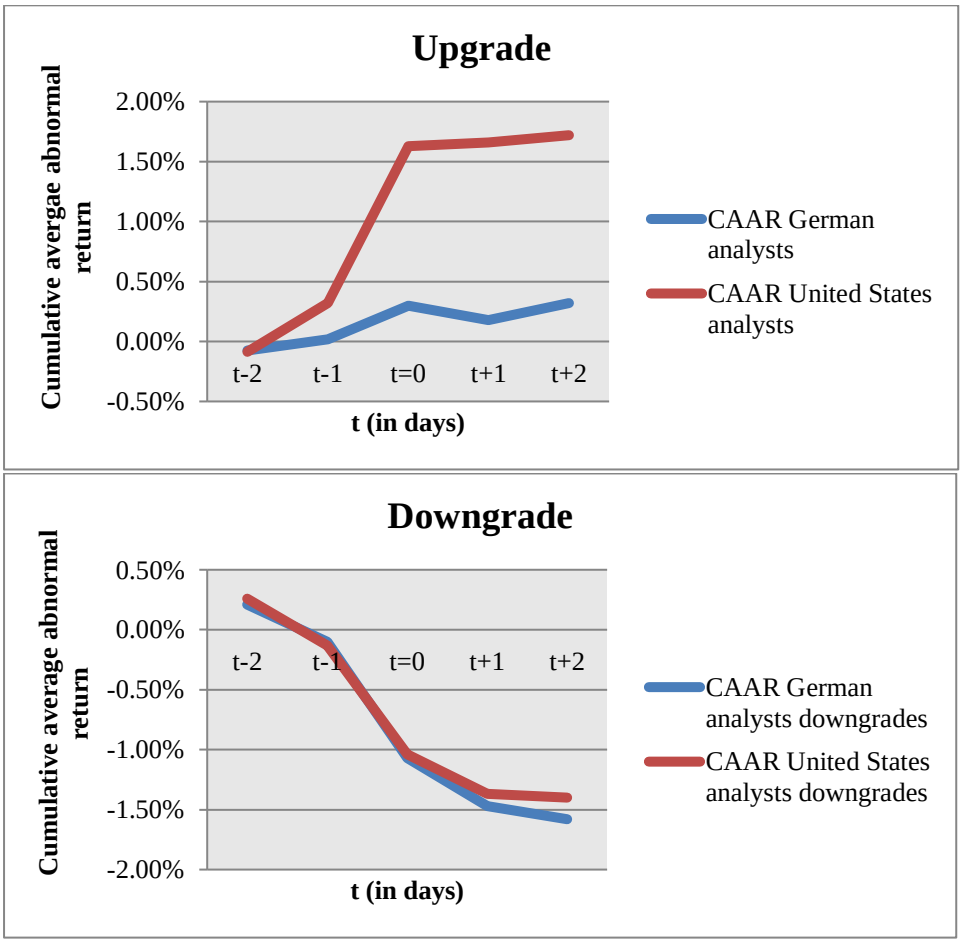
		Upgrades						Downgrades				
		Trading days						Trading days				
		t-2	t-1	t=0	t+1	t+2		t-2	t-1	t=0	t+1	t+2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
German Sample	393						393					
German analysts	200						184					
CAAR		-0,08%	0,02%	0,30%	0,18%	0,32%		0,21%	-0,10%	-1,07%	-1,47%	-1,58%
Standard deviation		1,55%	1,63%	1,98%	1,87%	1,78%		1,42%	1,51%	2,38%	2,22%	1,70%
T-statistic		0,730	0,868	2.000**	0,832	1,033		2.006*	2.785***	5.528***	2.444***	0,878
T-statistic event window (-2, 2)						2.557***						11.163***
U.S. analysts	76						75					
CAAR		-0,09%	0,23%	1,26%	1,29%	1,34%		0,26%	-0,13%	-1,04%	-1,37%	-1,40%
Standard deviation		1,20%	1,43%	1,52%	1,74%	1,34%		1,20%	1,58%	1,52%	1,63%	1,32%
T-statistic		0,654	1.89*	5.907***	0,150	0,390		1.876*	1.973*	5.184***	1.753*	0,197
T-statistic event window (-2, 2)						8.719***						8.083***

*** 1% significance, ** 2% significance, * 5% significance.

Figure 5 shows the CAAR for German and United States analysts for both upgrades and downgrades. Positive recommendation revisions by German analysts to German companies generate a CAAR of 0.32% across the time window in this sample being statistically significant at the 1% level. Table 5 shows that United States analysts generate a far higher CAAR for positive stock recommendation revisions. The CAAR from German companies that received a positive stock recommendation revision by United States analysts is 1.34% and statistically significant at the 1% level. The CAAR generated by United States analysts in the positive revision sample is larger than the CAAR generated by German analysts. This indicates that the reputation effect of analysts from the United States holds for positive recommendation revisions. Formula (6) tests the significance of the above-mentioned results. The resulting t-statistic from formula (6) is 4.794, which is statistically significant at the 1% level. Therefore, this shows evidence in favor of the United States analyst reputation effect. German investors are more influenced by positive recommendation revisions given by analysts' from the United States than by positive recommendations of German analysts. Conversely, negative stock recommendation revisions lead to different conclusions. Table 2 shows the abnormal return generated by German and United States analysts following a negative stock recommendation revision. As can be seen in Table 2, the average abnormal returns are larger, hence more negative for German analysts than for United States analysts. The ex-ante abnormal returns generated by negative stock recommendation revisions are similar for both analysts. At t_{-2}, both types of analysts see an unexpected positive abnormal return, 0.21% for German analysts against 0.26% for analysts from the United States. The days before the event, a small decrease in stock price is noticeable. All the ex-ante abnormal returns are statistically significant at the 5% with t_{-1}, for German analysts significant at the 1% level.

Figure 5: Cumulative average abnormal returns German and United States analysts

This Figure shows the cumulative average abnormal returns of both German and United States analysts for both recommendation upgrades and downgrades. The sample of German stock recommendations is subdivided into two groups, recommendations given by German analysts and analysts from the United States. The cumulative average abnormal return is sum of the raw abnormal returns minus the realized return of the corresponding market index through the event window. The sample period is January 2010 to November 2016.



The ex-post abnormal returns show an expected negative drift in stock returns of which only t_{+1} is statistically significant. Table 5 shows the standard deviations of the sample on the occurring days. Notice how the standard deviation of the German sample spikes on the days of the event. This indicates that at the day of the event a larger variation in abnormal returns can be traced. For negative stock recommendations for German companies, both the samples of negative recommendations given by German and United States analysts are significant at the 1% level. The CAAR generated by United States analysts in this sample is smaller than the CAAR generated by German analysts. This result is against the hypothesized result. Thereby the study shows that the reputation effect of analysts from the United

States does not hold for negative stock recommendation revisions. A possible reason for this finding is that German investors take the best advice from American analysts only for positive recommendations. However, when the trade turns against them, they prefer to have advice from an individual or in this case German analysts who have more experience about the German market. The home bias effect can play a role in this case.

4.6 Robustness test

A robustness test will verify whether the results found in this study are of good quality. The test will be based on the methodology of Mackinlay (1997) and Van der Sar (2001) of event studies in finance and corporate event pricing. The robustness method differs from the event study used by Jegadeesh and Kim (2006) in the sense that the normal return is a predicted return of the stock itself rather than the return realized by a benchmark index.

4.6.1 Robustness test positive and negative recommendations

Table 5 shows the summary statistics of the results of the robustness test of both samples. As can be seen in Table 5, similar results are obtained in the robustness test as in the event study. The largest abnormal returns in all samples can be observed on the day of the event or $t_{=0}$. The CAAR found in the German positive recommendation revisions sample is equal to the CAAR found in the event study. A similar observation can be made for the CAAR of a negative stock recommendation revisions in the German sample. The CAAR for negative revisions is -1.47%, slightly lower than the -1.53% found in the event study. Remarkably the robustness test does not show reversed signs for both samples for German companies on t_{-2} as was the case in the event study. The results of the robustness test for the comparable companies from the United States also show similar results. On $t_{=0}$, the largest abnormal returns can be observed in both the positive and negative revision sample. In the positive revision sample, the result found on t_{-2} and t_{+2} differs to a small extent from the event study. On t_{-2}, the result in the event study is only marginal, indicating that there is almost no effect of an abnormal return following a positive recommendation revision. The same result can be traced in the negative recommendation revisions sample where the abnormal return on t_{-2} is 0.00%. For t_{+2} in the positive revision

sample for the United States a correction in abnormal return occurs to adjust for the sharp increase in stock price during $t_{=0}$ and t_{+1}.

Table 5: Robustness test descriptive statistics of variables in study

This table presents the descriptive statistics of the robustness test for both Germany and the United States. The revisions are categorized into two groups, upgrades in recommendation revisions and downgrades in recommendation revisions. Upgrades are reported in the columns 2-6, downgrades are reported in the columns 8-12. Both recommendations samples are categorized according to their event window t_{-2} through t_{+2} with $t_{=0}$ being the event date or recommendation revisions. Columns 1 and 7 report the amount of recommendations given by analysts in the sample. The abnormal returns reported in the columns 1-7 and 8-12 are raw returns minus the return of the market index respectively of the companies listing. The rows are divided into two sections, the German and the United States sample. The German sample is again subdivided into three groups according to origin of the analyst.

		Upgrades						Downgrades					
		Trading days						Trading days					
		t-2	t-1	t=0	t+1	t+2		t-2	t-1	t=0	t+1	t+2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
German Sample	387						386					
German analysts	192						187					
Mean		0,12%	-0,17%	0,23%	0,15%	-0,06%		-0,14%	-0,34%	-0,87%	-0,30%	0,17%
Standard deviation		1,61%	1,88%	2,07%	1,61%	1,40%		1,63%	2,15%	2,30%	1,19%	1,33%
U.S. analysts	73						75					
Mean		0,13%	0,02%	1,00%	0,29%	0,03%		-0,10%	-0,12%	-0,68%	-0,31%	0,15%
Standard deviation		1,35%	1,64%	1,39%	1,36%	1,04%		1,18%	1,56%	1,39%	1,51%	1,31%
Mean sample		0,15%	0,00%	0,67%	0,20%	0,00%		-0,21%	-0,21%	-0,87%	-0,33%	0,15%
Median sample		0,08%	-0,01%	0,58%	0,01%	-0,05%		-0,14%	-0,12%	-0,57%	-0,25%	0,12%
CAAR		0,15%	0,14%	0,82%	1,02%	1,01%		-0,21%	-0,42%	-1,28%	-1,61%	-1,47%
U.S. Sample	199						208					
Mean sample		0,30%	0,07%	1,05%	0,11%	-0,08%		-0,09%	-0,08%	-0,86%	-0,14%	-0,05%
Median sample		0,04%	0,06%	0,62%	0,04%	-0,06%		-0,01%	-0,14%	-0,56%	-0,12%	-0,01%
CAAR		0,30%	0,37%	1,41%	1,52%	1,44%		-0,09%	-0,17%	-1,03%	-1,17%	-1,22%

Table 6 shows the statistical significance of all samples. As can be seen from Table 6, $t_{=0}$ is highly statistical significant for all samples. However, the results for individual days in both United States samples show no significant ex-post results. The time window of all four samples is highly significant. Following formula (6), a statistical test is performed on the results of the robustness test regarding the first hypothesis. For the German sample, the t-statistic generated by formula (6) is 3.783, which is highly significant. This result is also found in the event study of hypothesis 1, concluding that the results found is accurate. The sample of the United States conversely shows that positive recommendation revisions have a larger effect than negative recommendation revisions. The CAAR in the positive revision sample is 1.44% compared to a -1.22% CAAR for the negative recommendation revision sample. H_0 can however, not be rejected since the CAAR of positive recommendation revisions is larger than the CAAR of negative recommendation revisions. The robustness test shows the same results as the event study on stock recommendations. Therefore, this thesis finds evidence that investors from Germany are more influenced by negative stock recommendation revisions than by positive stock recommendation revisions. No evidence is found for investors from the United Stated being more influenced by negative stock recommendation revisions than positive stock recommendation revisions.

Table 6: Robustness test t-statistics event window

This table reports the t-statistics for the event window of robustness test for individual dates as well as the event window t-statistic. The statistics are categorized into two samples, upgrades, column 2-6 and downgrades column 8-12. All t-statistics are categorized according to their event window t_{-2} through t_{+2} with $t_{=0}$ being the event date or recommendation revisions. Columns 1 and 7 report the amount of recommendations given by analysts in the sample. The first row of the table reports the standard deviation of the event date of the German sample. The second row reports the mean on the event date. The corresponding t-statistic to the standard deviation and mean is reported in row 3. Row 4 reports the t-statistic of the whole event window. Row 5, 6, 7, 8 report the corresponding standard deviation, mean, t-statistic and the event window t-statistics for the United States sample.

		Upgrades						Downgrades				
		Trading days						Trading days				
		t-2	t-1	t=0	t+1	t+2		t-2	t-1	t=0	t+1	t+2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
German Sample	387						386					
Standard deviation sample		1,56%	1,81%	2,06%	1,58%	1,37%		1,46%	2,00%	1,95%	1,31%	1,36%
		0,15%	0,00%	0,67%	0,20%	0,00%		-0,21%	-0,21%	-0,87%	-0,33%	0,15%
T-statistic		1.892*	0	6.398***	2.490***	0		2.826***	1.967*	8.777***	4.956***	2.170**
T-statistic event window (-2, 2)						11.619***						17.294***
U.S. Sample	199						208					
Standard deviation sample		1,91%	2,01%	1,92%	1,30%	1,75%		1,18%	2,08%	1,98%	1,28%	1,13%
		0,30%	0,07%	1,05%	0,11%	-0,08%		-0,09%	-0,08%	-0,86%	-0,14%	-0,05%
T-statistic		2.216**	0,491	7.715***	1,194	0,645		1,100	0,555	6.264***	1,577	0,638
T-statistic event window (-2, 2)						11.040***						10.929***

*** 1% significance, ** 2% significance, * 5% significance.

4.6.2 Robustness test positive recommendation revisions

Table 6 contains the statistics used to determine the robustness of the second hypothesis. As is already stated in the previous section, the results found in the robustness test are similar to the results in the event study. For positive stock recommendation revisions in the German sample, no abnormal returns is generated in the day leading to the event with a small effect two days before the event. The ex-post results show that at t_{+2} also no abnormal returns are generated in the robustness test. This indicates that a positive stock recommendation has no significant effect on abnormal returns generated on the day leading to the event and the second day after the event. This result is reported in Table 6. The abnormal return for comparable companies in the United States shows a larger effect on t_{-2} than on t_{-1}. During the event study, a small abnormal return is observable on t_{-2} but is insignificant. The robustness test shows however that t_{-2} is significantly influenced by a positive stock recommendation on $t_{=0}$. The ex-post results in the United States sample shows that a correction follows on t_{+2}. Both abnormal returns following the day of the event are insignificant however. A significance test on both samples following formula (6) yields a t-statistic of 2.743, which is statistically significant at the 1% level. Therefore, the robustness test shows that investors from the United States are more influenced by positive stock recommendation revisions than investors from Germany.

4.6.3 Robustness test negative recommendations

During the initial event study, both the German and United States negative recommendation samples show abnormal returns that are zero or positive on t_{-2}. Table 6 shows that for the robustness test the signs are all as expected. The German sample has a negative coefficient on t_{-2} as well as the sample from the United States. The ex-ante results are significant for the German sample but insignificant for the United States sample. This indicates that a negative recommendation revision does not have a significant effect on the ex-ante period in the United States. The ex-post abnormal returns indicate that a negative drift follows the negative recommendation revisions. However, for the German sample, a recovery can be traced on t_{+2}. The ex-post abnormal returns are not statistically significant for the United States sample as can be seen in Table 6. For the United States sample, only the event date is statistically significant, this id different from the event study where the day leading to and following the event are significant. Both the event windows are statistically significant

at the 1% level for the German sample and 2% for the United States sample. A statistical comparison between the two samples following formula (6) results in a t-statistic of 1.782 being statistically significant at the 5% level. This finding is in line with the results found in the initial event study. Therefore this thesis finds evidence that German investors are more sensitive to negative stock recommendation revisions than investors from the United States.

4.6.4 Robustness test German sensitivity

For the last robustness test the sample of German positive and negative recommendation revisions is separated into 2 samples, recommendations given by German analysts and recommendations given by United States analysts. The results in Table 7 show a great similarity with the initial event study but differ to a small extent. For all samples, the abnormal returns generated on the day of the event is comparable to the abnormal returns in the initial event study. For an upgrade in stock recommendations in the robustness test, German analysts see a negative abnormal return on t_{-2} followed by a positive abnormal return on t_{-1}. This result is the opposite from the results found in the event study, which found a positive abnormal return for t_{-2} followed by a negative abnormal return. For downgrades in stock recommendations given by German analysts, the abnormal returns on t_{-2} and t_{+2} differ in sign from the initial event study. On t_{-2} the abnormal return is -0.14%, which is more likely, than the 0.21% in the initial sample. For the t_{+2} abnormal returns, the robustness test reports a return of 0.17% compared to -0.11% for the initial study. The robustness test indicates that recovery follows while the event study contradicts this finding since it reposts a further negative drift following the event. The CAAR for German analysts is similar in both the event study and the robustness test. The abnormal returns generated by United States analysts for German companies are also similar to the earlier found abnormal returns but differ slightly. For positive recommendation revisions, the United States analysts see a negative abnormal return on t_{-2}. In the initial study this return was positive. On t_{-1}, the abnormal return is moderately larger than the abnormal return that is found in the event study. These results indicate that in the robustness test, the effect of an upgrade in a recommendation given by a United States analyst has no significant effect on t_{-2} but does have an effect on t_{-1}. The ex-post effect shows a slight but insignificant positive drift in stock prices. A downgrade in stock recommendation given by a United States

analyst shows a negative abnormal return in the days leading to the event. This result is different from the results in the event study, which showed a positive abnormal return prior to a negative recommendation revision. In the robustness test the sign is as expected. On t_{+2} the sign changes in the robustness test from negative to positive, showings signs of recovery following a negative revision.

Table 7 shows the statistical significance of the abnormal returns in the robustness test. No individual statistical significant results can be found for German analysts for recommendation upgrades. For recommendation downgrades, German analysts only see significant abnormal returns on t_{-1} through t_{+1}. For analysts from the United States, only significant individual results are found for the days of the event and the day following the event. The significance test indicates that in the robustness test, recommendation revisions have no significant effect on abnormal returns generated prior to the event besides t_{-1} for a downgrade of German analysts. Furthermore, no significant results can be found for t_{+2} indicating that a recommendation revision has no ex-post effect for t_{+2}. To determine whether investors in Germany are more sensitive to recommendation revisions from analysts from the United States than from German analysts, formula (6) is again used to determine the t-statistic. For a recommendation upgrade the t-statistic is 5.799, which is statistically significant at the 1% level. As can be seen for a negative recommendation revision, the CAAR is larger for German analysts than for analysts from the United States. This rejects the reputation hypothesis of analysts from the United States regarding negative stock recommendation revisions. The results found in the robustness test are comparable to the results found in the initial event study. Therefore, this thesis finds evidence for the reputation effect for analysts from the United States for stock recommendation upgrades. No evidence is found for the reputation effect of analysts from the United States regarding negative stock recommendations.

Table 7: Robustness test subdivided German sample

This Table reports the t-statistics of the subdivided German sample by the country of origin of the analyst. This Table reports the t-statistics for the event window of the event study for individual dates as well as the event window t-statistic. The statistics are categorized into two samples, upgrades, column 2-6 and downgrades column 8-12. All t-statistics are categorized according to their event window t_{-2} through t_{+2} with $t_{=0}$ being the event date or recommendation revisions. Columns 1 and 7 report the amount of recommendations given by analysts in the sample. The first row reports the cumulative abnormal returns generated by German analysts. The second and third row are the standard deviation and the related t-statistic of the individual day. The fourth row shows the event time windows t-statistic. Rows 5-8 reports the comparable variables but for analysts from the United States.

		Upgrades						Downgrades				
		Trading days						Trading days				
		t-2	t-1	t=0	t+1	t+2		t-2	t-1	t=0	t+1	t+2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
German Sample	387						386					
German analysts	192											
CAAR		0,12%	-0,05%	0,17%	0,32%	0,27%	187	-0,14%	-0,48%	-1,35%	-1,65%	-1,48%
Standard deviation		1,61%	1,88%	2,07%	1,61%	1,40%		1,63%	2,15%	2,30%	1,19%	1,33%
T-statistic		1,032	1,253	1,540	1,291	0,594		1,175	2.163**	5.173***	3.447***	1,439
T-statistic event window (-2, 2)						2.163**						11.244***
U.S. analysts	73											
CAAR		0,13%	0,14%	1,14%	1,43%	1,47%	75	-0,10%	-0,22%	-0,90%	-1,21%	-1,06%
Standard deviation		1,35%	1,64%	1,39%	1,36%	1,04%		1,18%	1,56%	1,39%	1,51%	1,31%
T-statistic		0,823	0,104	6.147***	1.822*	0,246		0,734	0,666	4.237***	1.778*	0,990
T-statistic event window (-2, 2)						8.908***						6.449***

*** 1% significance, ** 2% significance, * 5% significance.

5. Conclusion

This thesis aimed to test the sensitivity level of investors in the United States and Germany towards stock recommendations. In particular, this thesis looked at revisions of recommendations given to 29 companies in the United States and 29 companies in Germany and the abnormal returns generated following a recommendation revision. The underlying motive for the study is the lack of empirical research performed on the behavioral finance side of stock recommendations. To add to that, the term investor cannot be used interchangeably across the world for investors that have different investment cultures. Furthermore, the influence of the financial crisis in 2008 had a substantial impact on the financial market. Due to this, many things have changed such as the investing behavior of individuals. Financial practitioners became more careful, hence less optimism in the market.

Stock recommendations were collected from Bloomberg while stock prices were collected from Thomson Reuters and CRSP. Furthermore, the event study tool is used for the robustness test in order to determine the quality assurance of the performed event study. In line with previous literature, this thesis finds mixed results on the abnormal returns generated by revisions in stock recommendations. The first hypothesis stated that negative stock recommendation revisions generate larger abnormal returns than positive recommendation revisions. This thesis finds evidence in favor for the first hypothesis, stating that the abnormal return generated by negative stock recommendation revisions is larger than the abnormal return generated by positive recommendation revisions. Conversely, this finding does not hold for comparable companies in the United States where the abnormal returns are larger for positive recommendation revisions than for negative recommendation revisions. This finding contradicts the earlier finding of Jegadeesh and Kim (2006). The second hypothesis stated that investors from the United States are more influenced by positive recommendation revisions than German investors. The result shows that the generated CAAR for United States sample is larger than that CAAR in the German sample. This indicates that investors from the United States are more sensitive to positive stock recommendations than German investors with the result being highly significant. The third hypothesis examined whether German investors are more sensitive to negative stock recommendation revisions than investors from the United States. This thesis finds evidence that German investors are more sensitive to downward revisions. The CAAR of the German sample is more negative than the CAAR of the United States sample while being statistically significant at the 5%. Lastly, the reputation effect of

United States analysts is studied. The hypothesis states that German investors react more sensitive to revisions made by United States analysts than by German analysts. The results show a mixed finding. In line with previous literature, analysts for the United States produce the largest abnormal return for positive stock recommendation revisions. Hence, this thesis finds evidence on the reputation effect of United States analysts in the German stock market. However, the opposite result is found for negative stock recommendation revisions. The study shows that for negative recommendation revisions, German analysts see larger abnormal returns than their American peers, indicating that investors are more sensitive to German analysts when they receive negative news.

Since the research conducted is the first in its kind, there are several limitations in the research to sensitivity level of investors to recommendation revisions. First, stock recommendations are highly subjective and not an absolute measure. This means that recommendations are open to different interpretations by individual investors. One investor could believe that recommendations are a stand alone advice. This means that a buy recommendation is seen as an absolute value leaving the investor with a higher probability of buying the security. Conversely, some investors believe that recommendations are not stand alone and compare the buy recommendation with looking at the development of the market. Thereby the investor can conclude that with a weakening of a certain industry, a buy recommendation is relatively not as good as is possibly interpreted with only a buy recommendation. Second, recommendations are not merely a categorized word that is given to a certain company. Stock recommendations also consist of a second part namely a target price. This means that a stock can receive a buy recommendation with a target of $45 as well as a strong buy or neutral recommendation with the same target price of $45. It is possible that the revision of target prices also have a significant effect on investor investment behavior. Third, this thesis calculates abnormal returns according to stock recommendation revisions. However, no distinction between different events is made. During earnings seasons, the possibility exists that investors are more sensitive due to the amount of information they need to process. Fourth, it is possible that the results in this research are at random rather than systematic. Even though companies were selected based on pre-determined factors, the sample size of 58 companies is relatively small. Including the companies listed on the MDAX and the SDAX in the sample would enlarge the sample size. However, obtaining stock recommendations for those firms is rather difficult. Fifth, the model found skewness in the abnormal returns generated by stock recommendation revisions. Due to the skewness of the Therefore, accounting for skewness in the model would

further enhance the reliability of the abnormal returns, the statistical significance of the t-statistics might be overstated. Last, this thesis only examines the sensitivity effect of stock recommendations and not the cause of the sensitivity. It could be the case that several factors do play a large role while other factors have a relative small input towards the sensitivity level of investors to stock recommendation revisions.

Stemming from the limitations in this thesis, future research should aim to further study the behavioral effect of stock recommendations. Consequently, a paper that determines the factors which have a significant impact on the sensitivity levels would help to better understand the behavioral workings of sensitivity levels to stock recommendation revisions. Furthermore, a larger sample size consisting of more companies would determine whether the results in this thesis are not by chance but rather systematic. Also, incorporating the target price into the research would enhance the study since it is highly possible that investors influenced by target price revisions as well as recommendation revisions. By leaving the target price out of the sample, a possible bias may occur.

REFERENCES

Agrawal, A., Chen, M., 2012. Analyst conflict and Research quality. *Quarterly Journal of Finance* 2 (2).

Albert, R., Smaby, T., 1996. Market response to analyst recommendations in the dartboard column: the information and price-pressure effects. *Review of Financial Economics* 5 (1), 59-74.

Alicke, M., Klotz, M., Breitenbecher, D., Yurak, T., Vredenburg, D., 1995. Personal contact, individuation, and the better-than-average effect. *Journal of Personality and Social Psychology* 68, 804-825.

Amir, E., Ganzach, Y., 1998. Over and underreaction in analysts' forecasts. *Journal of Economic Behavior and Organization* 37, 333-347.

Baker, M., Wurgler, J., 2007. Investor sentiment in the stock market. *Journal of Economic Perspectives* 21 (2), 129-151.

Baker, M., Wurgler, J., Yuan, Y., (2012). Global, Local and contagious investor sentiment. *Journal of Financial Economics* 104 (2), 272-287.

Balboa, M., Gómez-Sala, J., López-Espinosa, G., 2009. The value of adjusting the bias in recommendations: international evidence. *European Financial Management* 15 (1), 208-230.

Barber, B., Odean, T., 2001. Boys will be boys: gender, overconfidence and common stock investment. *The quarterly Journal of Economics* 116 (1), 261-292.

Barber, B., Odean, T., 2002. Online investors: do the slow die first? *Review of Financial Studies* 15 (2), 455-487.

Barber, B., Odean, T., 2011. The behavior of individual investors. *Handbook of Economics of Finance* 2 (B), 799-1612.

Barber, B., Lehavy, R., McNichols, M., Trueman, B., 2001. Can investors profit from the prophets? Security analyst recommendations and stock returns. *Journal of Finance* 56 (2), 531-563.

Barber, B., Lehavy, R., McNichols, M., Trueman, B., 2003. Reassessing the returns of analists' recommendations'. *Financial Analysts Journal* 59 (2), 88-96.

Barber. B., Loeffler. D., 1993. The Dartboard Column: Second-Hand Information and Price Pressure. *Journal of Financial and Quantitative Analysis* 28, 273-284.

Barberis, N., Shleifer, A. and Vishny, R. W., 1998. A model of investor sentiment. *Journal of Financial Economics* 49, 307-343.

Baytas, A., Cakici, N., 1999. Do markets overreact: International evidence. *Journal of Banking & Finance* 23, 1121-1144.

Bjerring, J., Lakonishok, J., Vermaelen, Y., 1983. Stock prices and financial analysts' recommendations. *Journal of Finance* 38 (1), 187-204.

Boni, L., Womack, K., 2006. Analysts, industries and price momentum. *Journal of Financial and Quantitative Analysis* 41, 85-109.

Bontempo, R., Bottom, W., Weber, E., 1997. Cross-Cultural differences in risk perception: a model-based approach. *Risk Analysis* 17 (4), 479-488.

Brown, L., 2000. IBES Research Bibliography. I/B/E/S International Inc., New York City.

Brown, L., 2001. A temporal analysis of earnings surprises: profit versus losses. *Journal of Accounting Research* 39, 221–241.

Daniel, K., Hirshleifer, D., Subrahmanyam, A., 1998. Investor psychology and security market under- and over reactions. *Journal of Finance* 53 (6), 1839-1885.

Deaves, R., Lüders, E., Luo, G., 2008. An experimental test of the impact of overconfidence and gender on trading activity. *Review of Finance* 13, 555-575.

DeBondt, W., 1998. A portrait of the individual investor. *European Economic Review* 42, 831-844.

DeBondt, W., Thaler, R., 1985. Does the stock market overreact? *Journal of Finance* 40, 793–808.

Degeorge, F., Patel, J., Zeckhauser, R., 1999. Earnings manipulation to exceed thresholds. *Journal of Business* 72, 1–33.

DeLong, J., Shleifer, A., Summers, J., Waldmann. R., 1990. Noise trader risk in financial markets. *Journal of Political Economy* 98 (4), 703–38.

Desai, H., Liang, B., Singh, A., 2000. Do all stars shine? evaluation of analyst recommendations. *Financial Analysts Journal*, 20–29

Dorn, D., Huberman, G., 2005. Talk and action: what individuals say and what they do. *Review of Finance* 9, 437-481.

Enskog, D., 2015, February 18. How culture impacts investor behavior. Retrieved from https://www.credit-suisse.com/us/en/articles/articles/news-and-expertise/2015/02/en/how-culture-impacts-investment-behavior.html.

Fama, E., 1970. Efficient capital markets: a review of theory and empirical work. *Journal of Finance* 25, 383-217.

Fama, E., 1991. Efficient capital markets I1. *Journal of Finance* 46 (5), 1575-1617.

Finnerty, J., 1976. Insiders and market efficiency. *Journal of Finance* 31 (4), 1141-1148.

Fluck, Z., Malkiel, B., Quandt, R., 1997. The predictability of stock returns: A Cross-Sectional Simulation. *Review of Economics and Statistics* 79 (2), 176-183.

Frazzini, A., 2006. The disposition effect and the underreaction to news. *Journal of Finance* 61 (4). 2017-2046.

French, K., 1980. Stock Returns and the weekend Effect. *Journal of Financial Economics* 8, 55-69.

Gervais, S., Odean, T., 2001. Learning to be overconfident. *Review of Financial Studies* 14 (1), 1–27.

Giannetti, M., Simonov, A., 2006. Which investors fear expropriation? Evidence from investors' portfolio choices. *Journal of Finance* 61 (3), 1507-1547.

Gigerenzer, G., Selten, R., 2002. Bounded rationality: the adaptive toolbox. MIT University Press Group Ltd, Cambridge.

Glaser, M., Weber, M., 2004. Overconfidence and trading volume. *The Geneva Risk and Insurance Review* 32 (1), 1-36.

Green, C., 2006. The value of client access to analyst recommendations. *Journal of Financial and Quantitative Analysis* 41, 1-24.

Griffin, D., Tversky, A., 1992. The weighing of evidence and the determinants of confidence. *Cognitive Psychology* 24, 411–435.

Grossman, S., Stiglitz, J., 1980. On the impossibility of informationally efficient markets. *American Economic Review* 70, 393-408.

Guiso, L., Haliassos, M., Jappelli, T., 2002. Household stockholdings in Europe: where do we stand and where do we go. *Economic Policy* 88, 123-170.

Haugen, R., Lakonishok, J., 1988. The incredible January effect: the stock market's unsolved mystery. Irwin Professional Pub, Homewood.

Hirshleifer, D., Teoh, S., 2003. Limited attention, information disclosure, and financial reporting. *Journal of Accounting and Economics* 36, 337-386.

Hirshleifer, D., Lim, S., Teoh, S., 2007. Driven to distraction: extraneous events and under reaction to earnings news. *Journal of Finance* 64 (5), 2289-2325.

Hofstede, G., 1980. Motivation, leadership and organization: do American theories apply abroad. *Organization Dynamics* 9 (1), 42-63.

Hofstede, G., 1993. Cultural constraints in management theories. *Academy of Management Executive* 7 (1), 81-94.

Hong, H., Stein, J., 1999. A unified theory of underreaction, momentum trading, and overreaction in asset markets. *Journal of Finance* 54 (6).

Huang, J., Mian, G., Sankaraguruswamy, S., 2009. The value of combining the information content of analyst recommendations and target prices. *Journal of Financial Markets* 12, 754-777.

Hussin, B., Ahmed, A., Ying, T., 2010. Semi-Strong form of market efficiency: market reaction to dividends and earning announcements in Malaysian stock exchanges. *Journal of Applied Finance* 16 (5), 36-60.

Huth, W., Maris, B., 1992. Large and small firm stock price response to heard on the street recommendations. *Journal of Accounting, Auditing and Finance* 7, 27-44.

Jackson, A., 2005. Trade generation, reputation and sell-side analysts. *Journal of Finance* 60 (2), 673-717.

Jegadeesh, N., 1990. Evidence of predictable behavior of security returns. *Journal of Financ*e 45, 881–898.

Jegadeesh, N., Kim, W., Kirsche, S., Lee, C., 2004. Analyzing the analyst: when do recommendations add value? *Journal of Finance* 59 (3), 1083-1124.

Jegadeesh, N., Kim, W., 2006. Value of analyst recommendations: International evidence. *Journal of Financial Markets* 9, 274-309.

Jegadeesh, N., Titman, S., 1993. Returns to buying winners and selling losers: implications for stock market efficiency. *Journal of Finance* 48, 65–91.

Jensen, M., 1978. Some anomalous evidence regarding the market efficiency. *Journal of Financial Economics* 6 (2-3), 96-101.

Kadiyala, P., Rau, P., 2004. Investor reaction to corporate event announcements: under or overreaction? *Journal of Business* 77 (2), 357-386.

Kahneman, D., Tversky, A., 1982. Judgment under uncertainty: heuristics and biases. Cambridge University Press, London.

Kang, O., Medureira, L., Wang, R., Zach, T., 2012. Analyst' industry expertise. *Journal of Accounting and Economics* 54 (2-3), 95-120.

Karolyi, G., Stulz, R., 2003. Are financial assets prices locally or globally? *Financial Markets and Asset Pricing* 1 (B), 975-1020.

Kasznik, R., Lev, B., 1995. To warn or not to warn: management disclosures in the fear of earnings surprises. *The Accounting Review* 70 (1), 113-134.

Keim, D., 1983. Size-related anomalies and stock return seasonality: further empirical evidence. *Journal of Financial Economics* 12, 13-32.

La Porta, R., 1996. Expectations and the cross-section of stock returns. *The Journal of Finance*, 51 (5), 1715-1742.

Larwood, L., Whittaker, W., 1977. Managerial myopia: self-serving biases in organizational planning. *Journal of Applied Psychology* 62, 94-198.

Lewis, K., 1999. Trying to explain home bias in equities and consumption. *Journal of Economic Literature* 37, 571-608.

Libby, R., Rennekamp, K., 2012. Self-serving attention bias, overconfidence and the issuance of management forecasts. *Journal of Accounting Research* 50 (1), 197-231.

Lin, H., McNichols, M., 1998. Underwriting relationships, analysts' earnings forecasts and investment recommendations. *Journal of Accounting and Economics* 25, 101-127.

Liu, P., Smith, D., Syed, A., 1990. Stock price reactions to the wall street journal's securities recommendations. *Journal of Financial and Quantitative Analysis* 25, 399-410.

Lo, A., MacKinlay, A., 1990. When are contrarian profits due to stock market overreaction? *Review of Financial Studies* 3, 175–205.

Lo, A., MacKinlay, A., 1999. A non-random walk down Wall Street. Princeton University Press, Princeton.

Lo, A., Mamaysky, W., Wang, J., 2000. Foundations of technical analysis: computational algorithms, statistical inference, and empirical implementation. *Journal of Finance* 55, 1705-1765.

Loh, R., 2010. Investor inattention and the under reaction to stock recommendations. *Financial Management* 39 (3), 1223-1252.

Mackinlay, A., 1997. Event studies in economics and finance. *Journal of Economic Literature* 35, 13-39.

Malkiel, B., 1973. A random walk down Wall Street. W. W. Norton & company inc., United States.

Malkiel, B., 2003. The efficient market hypothesis and its critics. *Journal of Economic Perspectives,* 17 (1), 59-82.

Malmendier, U., Tate, G., 2005. CEO overconfidence and corporate investment. *Journal of Finance* 60(6), 2661-2700.

Manigart, S., Waele, K., Wright, M., Robbie, K., Desbrières, P., Sapienza, H., Beekman, A., 2002. Determinates of required return in venture capital investments: a five country study. *Journal of Business* 17 (4), 291-312.

Markowitz, H., 1959. Portfolio selection. Wiley, New York.

Menkhoff, L., 2010. The use of technical analysis by fund managers: international evidence. *Journal of Banking & Finance* 34 (11), 2573-2586.

Menkhoff, L., Schmeling, M., Schmidt, U., 2013. Overconfidence, experience and professionalism: an experimental study. *Journal of Economic Behaviour* 86, 92-101.

Michaely, R., Womack, K., 1999. Conflict of interest and the credibility of underwriter analyst recommendations. *Review of Financial Studies* 12, 653-686.

Miller, D., Ross, M., 1975. Self-serving biases in the attribution of causality: fact or fiction? *Psychological Bulletin* 82, 213–225.

Moerland, P., 1995. Alternative disciplinary mechanisms in different corporate systems. *Journal of Economic Behavior and Organization* 26, 17-34.

Peng, L., Xiong, W., 2006. Investor attention, overconfidence, and category learning. *Journal of Financial Economics* 80, 563-602.

Pfaffer, M., Pollock, T., Rindove, V., 2010. A tale of two assets: the effects of firm reputation and celebrity on earnings surprises and investors' reactions. *Academy of Management Journal* 53 (5), 1131-1152.

Pontiff, J., 1996. Costly arbitrage: evidence from closed-end funds. *Quarterly Journal of Economics* 111, 1135-1152.

Rieger, M., Wang, M., Hens, T., 2015. Risk preferences around the world. *Management Science*, 1-12.

Ryan, P., Taffler, R., 2006. Do brokerage houses add value? The market impact of UK sell-side analyst recommendation changes. *The British Accounting Review* 38 (4), 371-386.

Scheinkman, J., Xiong, W., 2006. Overconfidence and speculative bubbles. *Journal of Political Economy* 111, 1183–1219.

Schipper, K., 1991. Analysts' forecasts. *Accounting Horizons* 5, 105-121.

Schmeling, M., 2008. Investor sentiment and stock returns: some international evidence. *Journal of Empirical Finance* 16 (3), 394-408.

Scott, J., Stumpp, M., Xu, P., 2003. Overconfidence bias in international stock prices. *Journal of Portfolio Management* 29 (2), 80-89.

Sercu, P., Vanpee, R., 2012. Home bias in international equity portfolios: a review. International finance, a survey. Oxford University Press, Oxford.

Shiller, R., 2000. Irrational exuberance. Princeton University Press, Princeton.

Shleifer, A., Vishny. R., 1997. The Limits of arbitrage. *Journal of Finance* 52 (1), 35–55.

Skinner, D., Sloan, R., 2002. Earnings surprises, growth expectations, and stock returns or don't let an earnings torpedo sink your portfolio. *Review of Accounting Studies* 7, 289–312.

Statman, M., Klimek, G., 2008. Countries and culture in behavioral finance. *CFA Institute Conference Proceedings Quarterly* 25 (3).

Stickel, S., 1992. Reputation and performance among security analysts. *Journal of Finance* 47 (5), 1811-1836.

Stickel, S., 1995. The autonomy of the performance of buy and sell recommendations. *Financial Analysts Journal* 51 (5), 25-39.

Stock, D., 1990. Winner and loser anomalies in the German stock market. *Journal of Institutional and Theoretical Economics* 146, 518-529.

Svenson, O., 1981, Are we all less risky and more skillful than our fellow drivers? *Acta Psychologica* 47, 143-148.

Van der Sar, N., 2011. Stock pricing and corporate events. Unpublished manuscript.

Vieider, F., Chmura, T., Martinsson, P., 2012. Risk attitudes, development, and growth: macroeconomic evidence from experiments in 30 countries. Discussion paper SP II 2012-401.

Weber, E., Anderson, C., Birnbaum, M., 1992. A theory of perceived risk and attractiveness. *Organizational Behavior and Human Decision Processes* 52, 492-523.

Weber, E., Hsee, C., 1998. Cross-cultural differences in risk perception, but cross-cultural similarities in attitude towards perceived risk. *Management Science* 44 (9), 1205-1217.

Womack, K., 1996. Do brokerage analysts' recommendations have investment value? *Journal of Finance* 51, 137-167.

APPENDIX

German companies and their United States equivalent:

DAX	Wall Street
Addidas AG	Nike Inc.
Allianz SE	Metlife, Inc.
BASF SE	The Dow Chemical Company
Bayer AG	Eli Lilly & Co
Beiersdorf AG	The Estee Lauder Company
Bayerische Motoren Werke AG	Tesla
Commerzbank AG	Capital One Corporation
Continental AG	Goodyear Company
Daimler AG	Ford
Deutsche Bank AG	Citigroup Inc.
Deutsche Boerse AG	Nasdaq Inc.
Deutsche Lufthansa AG	Virgin America
Deutsche Post AG	FEDex
Deutsche Telekom AG	Verizone
E.on SE	FirstEnergy
Fresenius Medical Care AG & Co KGaA	Baxter International Inc.
HeidelbergCement AG	Vulcan Materials
Henkel AG & Co KGaA	Kimberly Clark Comp
Infineon Technologies AG	Analog Devices
Linde AG	Praxair
Merck KGaA	Mylan NV
Munich RE	Berkshire hathaway
ProSiebenSat.1 Media SE	News Corporation
RWE AG	Scana
Sap SE	Adobe
Siemens AG	3m Company
ThyssenKrupp AG	United States Steel Corp
Volkswagen AG	General Motors
Vonovia SE	CBRE Inc.

Equity research firms

United States	German
Morgan Stanley	Commerzbank
Goldman Sachs	DZ Bank
J.P. Morgan	Nord LB
Standard & Poors	Berenberg
Wells Fargo	LB Baden Wutenberg
Jefferies	European
Piper Jaffray	RBC
Stifel	Societe General
Oppenheimer	HSBC
Evercore ISI	UBS
	Credit Suisse
Edward Jones	
Cowen	
Guggenheimer	
Argus Equity Research	
B riley & Co	