Investor Sentiment and the Moderating Effect of Culture
Empirical Evidence for European Countries

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Abstract

This study initially investigates whether investors are influenced by sentiment in their financial decision-making, reflected in the stock returns. Further this study investigates whether culture moderates the relation between investor sentiment and stock returns.

According to behavioral finance, investors might be influenced by sentiment, which occurs when the intrinsic value differs from the market value. Investor sentiment could be reflected in the stock returns if investors trade on misinformation, there are limits to arbitrage and there is a high degree of correlation among the investors. To test this relation, between investor sentiment and stock returns, researchers have applied different proxies for investor sentiment. One of these include investor mood, which can be measured in different ways, e.g. by sunshine, sport results etc. Inspired by Edmans et al. (2007) this study uses soccer games played by European national teams as a measure of investor mood. The results are statistically significant and imply that investors might be influenced by sentiment. The findings indicate that if a national team wins (loses) a game it generates a positive (negative) abnormal return in the given country on the first trading day following a soccer game. The results are in line with theory, which state that a win (loss) will induce a positive (negative) mood. The investors are therefore more optimistic (pessimistic) when evaluating investment opportunities, which could make them overvalue (undervalue) these. Hence, they are willing to pay a higher (lower) price. The results are in line with earlier studies, however less robust.

A number of studies have indicated that the relation between investor sentiment and stock returns is moderated by culture, as specific behavioral biases, which impact financial decision-making, are link to some cultural dimensions. This makes investors evaluate information differently across cultures. To investigate whether culture moderates the investor sentiment-return relation this study applies a moderation model, where Hofstede’s cultural dimensions are used as a measure of culture. The results indicate statistically significant moderating effects for five of Hofstede’s dimensions. Specifically, the cultural dimensions of individualism/collectivism, uncertainty avoidance, power distance, long/short-term orientation and indulgence/restraint moderate the relation. There is a tendency for countries of collectivism, high uncertainty avoidance, high power distance, short-term orientation and restraint to show a stronger
investor sentiment-return relation. The explanation for these findings might be due to different behavioral factors attached to some of these dimensions and correlations among the dimensions. In relation to collectivism there is a tendency for individuals in these countries to have a herd-like behavior, which makes them base their decisions on the opinion of the group. This could thereby increase the level of correlated decisions among the investors. Moreover individuals in high uncertainty avoidance countries have a tendency to overreact, which might make the change in their mood after a soccer game even more pronounced than in other countries. These two dimensions are correlated and the stronger investor sentiment-return relation might therefore be explained by a herd-like overreaction in these countries. This is in line with the findings of Schmeling (2009). Individuals in countries of collectivism, high uncertainty avoidance and high power distance also tend to be more risk-averse. This could increase the limits to arbitrage, due to noise trader risk, and thereby increase the level of investor sentiment.

Trimming the sample by 1 percent makes the results statistically insignificant. The results are therefore very sensitive to extreme observations. However, the findings still indicate a relation between investor sentiment and stock returns and they might therefore still have a practical use. When investors become aware of the behavioral biases, affecting their investment decisions, it could make them able to take this into account and adjust. This study is a way of making investors aware that they might be influenced by investor sentiment in financial decision-making. Countries with specific cultural characteristics are even more affected by investor sentiment and would probably benefit further from becoming aware of this fact.
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Part I

Introduction, Theory and Literature Review
1 Introduction

Sunday the 13th of July 2014 more than one billion people around the world watched the World Cup soccer final between Germany and Argentina. As we know today the game resulted in a win for the German national team after extra time (fifa.com). In Germany the game attracted the largest TV audience in history (The 2014 FIFA World Cup in Numbers and 2014 FIFA World Cup Brazil Television Audience Report). But would this affect the sentiment of the audience and would it influence the investing behavior and thereby stock returns in Germany? Moreover, could the German culture moderate the effect of investor sentiment? These are some of the questions, which the current study is investigating, but in a broader scale by focusing on more European countries.

The standard finance literature does not incorporate the effect of investor sentiment. This finance perspective would therefore not consider a change in the German stock market after the World Cup final to be due to investor sentiment. Standard finance literature focus on rational investors in efficient markets, and Fama’s market efficiency theory has been proved beyond doubt. The underlying assumptions of standard finance include rational preferences, utility maximization and the use of full information (Weintraub 1993). The market efficient theory moreover assumes that valuations of securities are based on rational expectations. If some investors are irrational their trades will be random and thereby not affect stock prices and lastly there will be rational arbitrageurs, who will eliminate the effect of the irrational investors (Shleifer 2000).

With the observation of anomalies in the finance research, it became evident that finance should be understood in a broader perspective to better reflect the real world. Consequently, the finance research evolved and started to include aspects from other social sciences including psychology and sociology to understand the actual financial behavior (Shiller 2003). The psychological literature further stated that all humans are influenced by psychological and emotional factors referred to as behavioral biases. Evidence proved that people are also subject to these behavioral biases when making decisions and so are investors in financial decision-making, in which they are not fully rational. This was the foundation of behavioral finance (Shiller 2003). In accordance with behavioral finance investors might be influenced by sentiment, which affects stock prices if investors value securities based on misinformation, investor errors are to some
degree correlated and there are limits to arbitrage (Nofsinger 2005, Baker & Wurgler 2007). The presence of investor sentiment therefore questions the efficient market theory.

Investor sentiment have earlier been linked to mood in the literature (Corredor et al. 2013, Baker & Wurgler 2007), which has moreover been used as a proxy for investor sentiment when analyzing the impact on stock returns. Different measures of mood have been applied, e.g. Yuan et al. (2005) found evidence of a relation between lunar phases and stock market returns. Hirschleifer & Shumway (2003) found evidence of a relation between sunshine and stock returns. Edmans et al. (2007) showed a relation between stock returns and soccer games played by national teams. Edmans et al. (2007) explained their results using the following relations. Winning (losing) a soccer game would lead investors to become more optimistic (pessimistic), which therefore would create a positive (negative) return in the national stock indices.

Behavioral finance literature also found a relation between investor sentiment and national culture, where culture could moderate the impact of investor sentiment (Corredor et al. (2013), Chui et al. (2010)). Chui et al. (2010) provided indications of an effect on stock return patterns due to cultural differences. Further, they stated their findings to be consistent with the idea that investors are subject to different behavioral biases as they interpret information differently across cultures.

1.1 Problem Statement

Earlier studies have found that standard finance theories might not be able to explain abnormal stock market returns. Instead they have found that investor sentiment can provide some explanation. E.g. lunar phases, sunshine and soccer results have been used to explain these returns. The aim of this paper is therefore to investigate the stock market reaction to investor sentiment derived from behavioral biases in the decision-making process. A critical parameter in studying investor sentiment is to find the right measure, as no clear and valid proxy is available. As stated above one type of proxy is investor mood. Motivated by the link between soccer results and mood found in the behavioral and psychological research and addressed by Edmans et al. (2007), this study uses the results from games played by European national teams as a mood variable.
Additionally, this study links investor sentiment to cultural differences. Previous studies argue that investor sentiment might vary across countries due to cross-country differences in culture. Further specific cultural characteristics are correlated with some behavioral biases, which can impact the financial decision-making and in turn stock returns (Corredor et al. 2013, Chui et al. 2010).

Hence, the two main research questions for this study are:

**Are investors influenced by their sentiment when investing in stocks?**

**Do cultural dimensions moderate the effect of investor sentiment?**

The present study contributes to the behavioral finance literature in three important ways. First, using the same methodology as Edmans et al. (2007), this study seeks to detect if the impact on the stock market returns, due to changes in investor mood, also is present when only analyzing European countries. Second, this study expands the sample period with 10 years going from 1974 to 2014 compared to Edmans et al. (2007). Third, motivated by the link between investor behavior and culture, this study investigates whether investor sentiment, measured using soccer results, are moderated by differences in national cultures. To the authors’ knowledge no earlier studies have related investor sentiment to culture using sport results as a proxy for investor sentiment. Corredor et al. (2013) found evidence of a link between investor sentiment and culture, but states sensitivity in the results due to the proxy for investor sentiment, which motivates the use of another investor sentiment proxy in this study compared to earlier studies.

### 1.2 Purpose of the Study

This study is motivated by theoretical and practical interests. Theoretically it is interesting to investigate whether or not investor sentiment, measured using soccer results, exists in the European markets. Practically the study does not seek to find a trading strategy based on investor mood and cultural differences. The main implication of the research is to benefit investors by making them aware of their investor errors in order to reduce or avoid behavioral biases in their decision-making. Thus, by allowing behavioral biases to influence investment decisions, investors might damage their own wealth. By understanding investor errors, they might be able to take appropriate actions to correct them. This could reduce their influence on decision-making and potentially...
give better investment results (Baker & Nofsinger 2002). To this Pompian (2012, pp. 13) states: “By understanding how investors and markets behave, it may be possible to modify or adapt to these behaviors in order to improve economic outcomes”.

The Private Banking department of the bank Credit Suisse has recently published the report *Behavioral Finance: The Psychology of Investing* to benefit their investment customers. The purpose of the report is to make customers aware of the emotional and psychological factors that might influence financial decision-making and result in irrational behavior. Credit Suisse argues for the fact that if their customers understand their subjection to these behavioral biases, they might be able to correct them and in turn avoid financial pitfalls. Further, the implications of behavioral finance are used as the basis for advisory services, asset management and financial product development (Credit Suisse Report 2015). A publication of this kind of report from Credit Suisse indicates the practical importance of the findings within this research area.

### 1.3 Scope

The study investigates whether the results found by Edmans et al. (2007) also holds only for the European market. Therefore, the study is limited to European countries compared to Edmans et al. (2007), which include countries from all over the world. Chen et al. (2013) states that less developed markets are less liquid. This makes it more difficult to use arbitrage-trading strategies. Hence, these less developed markets are more prone to investor sentiment. By only focusing on European markets, most of the less developed markets from Edmans et al. (2007) study are removed from the sample, which might make the results less significant. However the results would be more useful to the European investors.

Part of the literature, investigating the relation between sport results and stock returns, addresses two possible explanations for the market reactions to game results. They state that the abnormal returns either reflect rational expectations or investor sentiment (Palomino 2009). This study does not seek to provide such a stringent explanation for the market reactions, but instead indicates that investors might not act fully rational due to their behavioral biases, which might induce investor sentiment. Therefore, test of rationality will not be provided in this study.
1.4 Research Method

The current study is based on the quantitative research methodology, as the study uses statistical methods for analyzing numerical data (Muijs 2011). This study will present a number of hypotheses, which will be tested using the econometric method; Ordinary Least Squares. Quantitative research is often linked to realism, as the researchers believe they can observe an external reality. In order to do so, it is necessary for the researchers to be as objective as possible. Positivism is the most extreme view in relation to objectivism. This viewpoint states that the world is built on laws of cause and effect. These laws can be tested objectively. This might be problematic, as all humans are a part of the world they are studying, which implies that they cannot be completely objective. This has led to a post-positivistic view that acknowledges this critic. However, post-positivism still believes in an external reality (Muijs 2011). The post-positivistic view is applied in this study, as the authors acknowledge that complete objectivity is not possible. However, the study still investigates a cause and effect relation.

The study further applies logical reasoning. Firstly, the inductive reasoning is applied, as findings from earlier research have been used to state specific hypotheses and the expectations in regard to these. Secondly, the deductive reasoning has been applied to test the hypotheses (Bryman & Bell 2003). This combination of the two approaches can be referred to as abductive reasoning (Walton 2005).
1.5 Structure

Figure 1.1 gives an overview of the thesis structure.

Figure 1.1 Thesis Structure

Part I: Introduction, Theory and Literature Review
- Introduction
- Standard Finance
- Behavioral Finance
- Literature Review

Part II: Research Design
- Detecting Investor Sentiment
- Hypotheses
- Methodology
- Data

Part III: Results
- Analysis of Investor Sentiment
- Analysis of the Moderating Effect of Culture
- Robustness Analyses

Part IV: Discussion and Conclusion
- Discussion
- Conclusion

Source: Authors’ own making

Part I of the study includes a brief introduction, which outlines the motivation, problem statement, main research questions and contribution. Part I also addresses the underlying theory of this study, which include standard finance and behavioral finance. Lastly, a literature review of earlier empirical evidence is included. Part II outlines the research design. This is a way of linking the problem statement of this study to the outcome of the study. Thereby it becomes a way of generating new knowledge, as it outlines how this specific research is structured to generate the results. Part III presents the results of the empirical study. These are related to theory and earlier empirical evidence. Part IV includes a discussion of the main results and the implications of these. Moreover proposals for future research are stated. Lastly, part IV states the overall conclusion of the thesis.
Throughout the thesis, sub-conclusions will be applied to state the most important contributions of each section.
2 Standard Finance

Firstly, it seems necessary to understand classical economic and finance, as behavioral finance is a reaction to these theories. The following sections outline different theories that have laid the foundations of standard finance including approaches on individual behavior, financial decision-making and market outcomes. Section 2.1 introduces the basic theory of how individuals make rational decisions. Section 2.2 introduces the theory of market efficiency, which is based on the assumption of rational investors.

2.1 Rational Preferences

Neoclassical economic includes basic assumptions in regard to the behavior of individuals. These contain: 1) Individuals have rational preferences, 2) They maximize their utility and 3) They make independent decisions by using information (Ackert & Deaves 2010).

A rational investor is a person, who is able to choose between various options to maximize his utility and at the same time acts within constraints of example wealth and liquidity (Burton & Shah 2013). The utility theory is a theory of how people should make rational decisions based on a number of rules (Fishburn 1968). In theory each individual has a utility function, which identifies different investment choices that would make him or her e.g. more or less happy (Burton & Shah 2013). In basic economic theory the choice is made between bundles of goods (Fishburn 1968). The rational investor is able to choose between these bundles due to the assumption of complete preferences, which ensures that the investor is able to make preferences between two options at any time (Neumann & Morgenstern 1953). These choices are however constraint based on e.g. the wealth of the individual. If investors maximize their utility in accordance to theory this should lead to a behavior, which can be predicted (Burton & Shah 2013).

Investors are able to maximize their utility by incorporating all available information about their optional choices. Therefore neoclassical economics assume full information availability (Fishburn 1968).
The utility theory described above does not take risk and uncertainty into account. In the expected utility theory these factors are included in an attempt to make the theory more realistic (Neumann & Morgenstern 1953). However, the theory applies mainly to risk, as it is possible to assign probabilities to the outcome of risky events, whereas it is not possible to assign probabilities to the outcome of uncertain events (Knight 1964). Based on these probabilities, investors are able to rank alternative choices even under risk (Fishburn 1988).

*Sub-conclusion:* This section outlines how rationality in theory influences decision-making, also when situations are risky. Based on their rational preferences and the availability of information, investors are able to maximize their profits. This rationality assumption is an important condition of the efficient market theory and the pricing of stocks in the efficient market, which will be introduced in the following section.

### 2.2 Market Efficiency Theory

In the 1970s the market efficiency hypothesis [EMH] became one of the most important theories in finance. The EMH is based on the assumptions of neoclassical finance mentioned in section 2.1. Fama (1970, p. 383) defined market efficiency as: "*A market in which prices always ‘fully reflect’ available information*." If investors are rational they will value securities based on rational expectations created by using all available information. Thereby stock prices will reflect all available information and in that sense be priced correctly.

Fama (1970) has previously identified three levels of market efficiency defined below (Fama 1970, Pompian 2012):

1. **Weak form efficiency:** The prices reflect all historical information about prices. In this setting technical analysis has no or limited value.
2. **Semi-strong form efficiency:** The prices reflect all historical and publicly available information. In this setting fundamental analysis has no value.
3. **Strong-form efficiency:** The prices reflect all historical, public and private information. In this setting insider information has no value.
In the last two settings, prices of securities will reflect all available public information. This includes information of past events and expectations in regard to upcoming events. In efficient markets security prices will therefore be similar to the intrinsic value of a given security, as rational investors will value each security to its intrinsic value (Pompian 2012). The intrinsic value is defined as the present value of the expected future cash flows of the security (Brealey et al. 2009). When markets are efficient it will therefore not be possible constantly to create abnormal returns using any form of information or analysis (Pompian 2012).

The theoretical foundations of the efficient market hypothesis are based on three key arguments. Firstly, investors are rational and value securities rationally in accordance with their rational expectations for the future cash flow, which is based on the use of relevant information (Shleifer 2000). Moreover, they make investment decisions based on these valuations in accordance with their wish to maximize profits, as mentioned in section 2.1. Secondly, in the case some investors are irrational; their trades are random and cancel each other out without affecting stock prices. Thirdly, rational arbitrageurs eliminate the influence of irrational investors (Shleifer 2000).

Sub-conclusion: The efficient market theory argues, that if the market is efficient, then the prices will reflect all relevant information at any time and market prices will equal intrinsic values. Moreover, irrational investors will not influence the stock prices, as their trades are either random or rational arbitrageur’s trade on their errors.

2.2.1 Evidence in Relation to the Efficient Market Theory

Different studies have tried to determine whether markets are in fact efficient or not. Some of these do find support for the efficient market hypothesis (Pompian 2012). Fama (1970) e.g. finds a general support for the weak form market efficiency and the semi-strong form efficiency.

Other studies have tested the EMH using event studies and finds evidence against the theory. These studies include studies of investor sentiment measured using different proxies, example lunar phases, sunshine, soccer results (Yuan et al. 2006, Hirshleifer & Shumway 2003, Bernile & Lyandres 2011).
Event studies have been further conducted to test how well the market incorporates new information. In accordance to the efficient market hypothesis prices should always fully reflect all information. However, evidence indicates that this is not always true. Figure 2.1 illustrates different market reactions to new information.

Figure 2.1 Stock Price Reactions to New Information

(A)

(B)

Sources: Authors’ own making inspired by the power point show for chapter 13 in the book “Principles of Corporate Finance” (Brealey et al. 2011)

Figure 2.1.A illustrates the reaction after a positive event and Figure 2.1.B illustrates the reaction after a negative event. In both figures the blue line illustrates the efficient market reaction, where the new information is incorporated in the stock price immediately. The green line illustrates when investors react to slow and the orange line illustrates when investors overreact, which will be elaborated below.
Rendleman et al. (1982) have shown that stock markets react to quarterly earnings announcements. This is in line with the EMH, as the prices have to reflect the new information and therefore adjust. Instead of prices stabilizing after this announcement they find a continued drift in prices for up until three month after the announcement, which conflicts with the theory of market efficiency. This is an example of the delayed reaction pictured by the green line in Figure 2.1.

Howe (1986) finds evidence of overreactions especially after good news. He shows that the returns are below average for the following 50 weeks. However this reaction does not follow the event immediately. This is evidence of the overreaction picture by the orange line in Figure 2.1.A.

Sub-conclusion: This evidence identifies the difference between efficient and inefficient markets, which is clearly pictured in Figure 2.1.

2.2.2 Critique of the Efficient Market Theory

Hirshleifer (2001) states different oppositions to the efficient market theory. Some of these will be stated in this section. Firstly, rationality in finance theory requires that the investors have a tremendous calculation power. This might be possible for the largest investors using special software, but not for all investors. Secondly, evidence has provided indications of irrational behavior, e.g. investors are influenced by their mood (Hirshleifer & Shumway 2003, Yuan et al. 2006). Thirdly, irrational investors take on more risk and earn higher returns (Long et al. 1990). Fourth, the accurate investors will learn how to make bad decisions. Lastly, apparent return predictability is considered to be false, which makes the rational models of predictability unable to use. These points indicate some problems of the efficient market theory and that irrational investors to some degree will influence the market.

Pompian (2012) states that the assumptions discussed in section 2.1 and 2.2 have been used to simplify reality and thereby making it easier to model in theory. However these assumptions are criticized for oversimplifying reality and thereby not taking into account how investors actually behave (Pompain 2012). This has been incorporated in behavioral finance, which recognizes that investors might not be completely rational all
the time (Baker & Nofsinger 2002). Shiller (2003) further states that the efficient market theory is not able to explain market anomalies.

Sub-conclusion: This critique indicates that the stock market is expected to be inefficient at times. This is directly related to this study, as it tries to reveal whether markets are affected by sentiment in relation to soccer games. If so it could question the efficient market theory and thereby support the critique mentioned in this section and the evidence from section 2.2.1.
3 Behavioral Finance

Recent empirical evidence has identified a series of anomalies, which challenges the theory of market efficiency and further laid the ground for behavioral finance (Shiller 2003). Some of these key anomalies and empirical evidence are addressed in section 3.1.

Most of the standard finance discussed in section 2 has often been applied in isolated systems. Behavioral finance acknowledges that finance, in the practical sense, is not an isolated system. Instead it is influenced by e.g. human interactions (Nofsinger 2005). In that sense, the behavioral theory tries to give the standard finance theory a real world perspective. The main differences between standard and behavioral finance are outlined in section 3.2. This section reveals that behavioral finance incorporates aspects from both psychology and sociology. This will be further reviewed in section 3.3, which tries to link psychology and financial theory.

Researchers have been challenging the standard finance literature by addressing investor sentiment, which are present when stock prices deviate from the intrinsic values (Bernile & Lyandres 2011). The concept of investor sentiment and the underlying factors will be outlined in section 3.4. Investor sentiment stem from underlying behavioral biases, which impact investors’ decision-making. The main aspects of behavioral biases will be outlined in section 3.5.

3.1 Anomalies

Anomalies can be defined as “empirical results that appear, until adequately explained, to run counter to market efficiency” (Ackert & Deaves 2010). A number of studies find that there are anomalies. These anomalies can, according to Pompian (2012), be categorized in the following way:

*Fundamental anomalies* arise, when the stock performance is evaluated based on the fundamental value of a stock. The fundamental value is found by evaluating a given firm’s future prospect based on financial reports, news etc. This is used to calculate the intrinsic value of a firm. Fundamental anomalies arise as investors have irrational
expectations for the future. In that sense investors interpret information in a false way making them misevaluate the underlying firm. Studies have, e.g., found a difference between value and growth stocks. Basu (1977) states that Price-earnings (P/E) is a measure of the bias in security prices. This study finds empirical evidence, that low P/E portfolios (value stocks) have higher returns relative to high P/E portfolios (growth stocks). P/E ratios can therefore be used to forecast future investment performance and thereby it might be used to create abnormal returns. This indicates that security prices do not reflect the information in the P/E ratios, which is not in line with the EMH (Basu 1977).

Technical anomalies arise due to technical analysis. Technical analysis are different ways of using past security prices to forecast future prices. However, sometimes these analyses identify inconsistencies to the efficient market hypothesis, as investors cannot only rely on past prices to estimate future prices. They also need to incorporate other information in their expectations, as earlier research has found that prices react to new information.

Calendar anomalies include different anomalies in relation to the calendar time. Haug & Hischey (2006) found a January effect for small-capitalization stocks in the US. The January effect states that these small-capitalization stocks earn an abnormal return in the month of January.

Pompian (2012) states that the markets are often neither completely efficient nor anomalous. Moreover, there seems to be some stocks, which are more informative and thereby more efficient than others. E.g. small stocks often seem to be less efficient than others.

Sub-conclusion: This section found that the efficient market theory cannot fully explain the stock returns. Other factors, called anomalies, also influence the stock returns making it possible in periods to identify abnormal returns. In this sense behavioral finance seems to incorporate factors, which are not identified by the efficient market theory, which will be outlined in the following section.
3.2 Behavioral Finance versus Standard Finance

Behavioral finance has relaxed the assumptions of standard finance by taking into account systematic differences from rationality (Baker & Nofsinger 2002). The field of behavioral finance questions the assumptions of standard finance as it raises doubt about market efficiency. Fundamentally, behavioral finance attempts to include psychology and sociology to understand and explain the actual behavior of agents contrary to the theoretical behavior of agents explained by the standard finance theory (Shiller 2003, Pompian 2012). In the discussion of these two conflicting theories, Meir Statman defined the difference as follows (Pompian 2012, pp. 13):

"People in standard finance are rational. People in behavioral finance are normal.”

– Meir Statman

Azjen (1991) discusses the ‘Theory of planned behavior’ and argues that actual behavior is determined by people’s intentions/motivation and their behavioral control. In this sense people can be able to create rational valuations, on which they also intend to base their decisions. However, due to behavioral control these intentions might not be completely reflected in the actual behavior of the investors, as they lack confidence in their abilities and lack control over their behavior. In this sense investors might base their valuations on fully rational thoughts; however this is not indicated in the stock returns, as their actual behavior (the investment decision) is also influenced by factors they might not control, as sentiment or emotions.

Sub-conclusion: This generally indicates that investors might be able to create rational valuation, but this might not be reflected in the stock returns, as aspects, which they cannot control, also influence their actual behavior. This is in line with the notion that standard finance deals with the theoretical behavior of investors, whereas behavioral finance focus on how investors actually behave.
3.3 Finance and Psychology

As mentioned by Shiller (2003), behavioral finance combines finance with other social sciences including psychology and sociology. This makes it possible to create a more profound understanding of the financial markets.

In 1940 Kurt Lewin stated that behavior (\(B\)) is determined by the factors person (\(P\)) and environment (\(E\)). Based on this he created what is known as Lewin’s equation:

\[
B = F(P, E)
\]

(3.1)

where \(P\) and \(E\) are interdependent. According to Kihlstrom (2013) \(B\) is the behavior of the individual, which can be observed publicly. This might therefore be an investors trading decision. \(P\) is covering all of the aspects inside a person, which can influence the behavior. These include a person’s mental state, personality, attitude etc., where the mental state is determined by cognitive, emotional and motivational factors. Lastly, \(E\) is including all of the factors outside the person, which might influence his or hers behavior. These factors include physical ecology and sociocultural ecology, where physical ecology is physical aspects of the environment, e.g. temperature. Sociocultural ecology on the other hand includes the social aspects of the environment, e.g. social roles, social incentives, behavior of other people and culture.

Sub-conclusion: This section illustrates how the person and the environment affect an individual’s behavior. In this study the focus is on the investors’ behavior in the stock market and how this influences financial decision-making and in turn the stock returns. The study includes both factors in Lewin’s equation, as soccer results are a measure of investor mood, which is included in Lewin’s \(P\) and further the study introduces culture as a moderating factor, which is included in Lewin’s \(E\).

3.4 Investor Sentiment

In the following sections, investor sentiment briefly will be presented. Section 3.4.1 defines investor sentiment and further presents various empirical evidences. Investor sentiment could influence stock returns if investors’ value stocks based on
misinformation, investor errors are correlated and there are limits to arbitrage (Nofsinger 2005, Baker & Wurgler 2007). The use of misinformation will be discussed in section 3.4.2. The limits to arbitrage will be presented in section 3.4.3. Lastly, the correlation of investor errors will be discussed in section 3.4.4.

3.4.1 Introduction to Investor Sentiment

Bernile & Lyandres (2011, pp. 357) defines investor sentiment as being present “whenever security prices deviate from present values of future cash flows”. Investor sentiment is in this view present when intrinsic values differ from market values. Corredor et al. (2013, p. 572) narrows the definition a bit, as they state investor sentiment to be: “Investor opinion, usually influenced by emotion, about future cash flows and investment risk”. The last definition thereby incorporates that investor sentiment is often related to emotions.

In accordance to Baker & Wurgler (2007) high investor sentiment is related to investors being optimistic about the future, which makes them trade stocks at a higher price, which in general leads to positive abnormal returns. Low sentiment is related to pessimism of investors, which make them pay a lower price for the stocks and thereby lead to negative abnormal returns. Baker & Wurgler (2007, p. 132) further found that the stocks, which are most influenced by investor sentiment, seem to have some specific characteristics: “younger, smaller, more volatile, unprofitable, non-dividend paying, distressed, or with extreme growth potential”. The study thereby concludes that the stocks, which are most difficult to value is also the ones most difficult to arbitrage. This indicates that investor sentiment is not equally present.

Fisher & Statman (2002) focus on the difference between investors, as they investigated sentiment among three groups of investors including individual investors referred to as small investors, newsletter writers referred to as medium investors and Wall Street strategists referred to as large investors. They found evidence of a negative and statistically significant relationship between sentiment among individual investors and future S&P 500 returns. The same was true for sentiment among large investors, but statistically insignificant for sentiment of medium investors. Investor sentiment can further be linked to the risk preference of the investors. Fong (2013) shows that the
investors, who buy lottery stocks are more risk seeking, as these stocks have a high volatility and a low return on average. Fong (2013) further states that these investors are more prone to investor sentiment. The stocks, which Fong (2013) defines as lottery stocks, are very similar to the stocks, which Baker & Wurgler (2007) find to be most influenced by investor sentiment.

In the review of Chen et al. (2013), they address that previous research also has studied investor sentiment across emerging and developed markets, where one found Asian stock markets to be more subject to investor sentiment than developed markets.

Sub-conclusion: This brief review of investor sentiment illustrates that it is present, when the EMH does not hold, as intrinsic value and market value varies. This can be due to investor sentiment. Investor sentiment differs in relation to the stock type, investor type, and whether the market is emerging or developed.

3.4.2 Misinformation

Black (1986) discusses trading on misinformation using the term noise trading: “*Noise trading is trading on noise as if it were information. People who trade on noise are willing to trade even though from an objective point of view they would be better off not trading*” (Black 1986, p. 531).

Sub-conclusion: This means that noise exists when investors base their trading on misinformation stated as information that is not relevant for the valuations of stocks (Ackert & Deaves 2010).

3.4.3 Limits to Arbitrage

A fundamental concept in financial theory is the concept of arbitrage, defined as: “*the simultaneous purchase and sale of the same, or essentially similar, security in two different markets for advantageously different prices*” (Shleifer & Vishny 1997, p. 35).

As stated in section 2.2, the market efficiency theory is based on the assumption of unlimited arbitrage and thereby rational arbitrageurs can eliminate the influence of
irrational investors. However, researchers have found potential problems which limit arbitrage and challenge the theory.

According to Shiller (1984) investors can be categorized as either smart-money investors (rational arbitrageurs), who are not influenced by sentiment and therefore trade rationally based on the available information but limited by their wealth, or ordinary investors (irrational investors/noise traders), who are not able to react as optimal to new information as smart-money investors. These investors may therefore be influenced by systematic biases. In earlier articles it has been argued that in this situation smart-money investors will identify arbitrage opportunities and trade on these. The market price will thereby return to the intrinsic value in the case of unlimited arbitrage (Fama 1965, Long et al. 1990).

In behavioral finance there are limits to arbitrage (Baker & Wurgler 2007). Shleifer & Summers (1990) and Long et al. (1990) indicate that arbitrage is limited due to two types of risk. Firstly, there is fundamental risk, which arises when the rational investor has taken his position, e.g. short-selling a stock, which the investor considers to be overvalued. Before the position is closed new information about e.g. dividends appear, which makes the market perform better than expected. This could make the rational investor lose money on the position. Secondly, there is a noise-trader risk, which can be defined as: “the risk that noise traders’ belief will not revert to their mean for a long time and might in the meantime become even more extreme” (Long et al. 1990, p. 705). If, e.g., the noise traders are too pessimistic and make the stock price drop. Then the rational investor would believe that the price is too low and therefore buy stocks. However, if the investor only invests for a short time period, the investor might be forced to liquidate before the noise traders have changed their attitude or have become even more pessimistic. If this happens the rational investor would have to sell at a lower price, than he bought the stock for, which will result in a loss. These risks make arbitrage less attractive for risk-averse arbitrageurs. Moreover arbitrageurs, who have a short time-horizon, might tend to be less aggressive especially due to this noise-trader risk (Long et al. 1990).
Baker & Wurgler (2007) state that the most difficult stocks to arbitrage are also the ones most prone to investor sentiment. This indicates that sentiment is more pronounced when there are limits to arbitrage.

**Sub-conclusion:** These limits to arbitrage indicate that the anomalies mentioned in section 3.1 do not only arise due to irrational behavior by some investors. They are further induced by the limits to arbitrage, which mainly arises due to fundamental and noise-trader risk. This makes the arbitrageurs unable to correct the errors made by the irrational investors, and thereby market prices can deviate from the intrinsic value (Long et al. 1990). Long et al. (1990) further states that this deviation between market prices and intrinsic value can arise even in the absence of fundamental risk, if the arbitrageurs are risk-averse and have a short investment horizon.

### 3.4.4 Correlated Investor Errors

To observe investor sentiment in the stock market returns, the emotional condition of investors must translate into the mood of the market (Nofsinger 2005) and, in turn, impact market outcomes, as investors make biased investment decisions based on their current mood.

Nofsinger (2005) states, emotions are spread between humans through interactions. Further if these emotions of pessimism or optimism are correlated in the society it will generate what he calls a social mood. This will impact financial decisions and in turn be reflected in the market. Nofsinger (2005) further states that the financial decisions made by investors are affected by risk and uncertainty. In these situations emotions have a very important impact since cognitive evaluations and emotions interact. He moreover finds that emotions, which are not directly linked to the specific financial decision, have an impact. In relation to asset pricing, section 2.2 indicated that under the EMH security prices would equal the intrinsic value, where the intrinsic value was the present value of the expected future cash flows. These intrinsic values are therefore based on the investors’ expectations for the future. However, the individual investors will be influenced by the social mood when they make these expectations. Hence, they may not make completely rational valuations (Nofsinger 2005).
**Sub-conclusion:** Investor sentiment will only be reflected in the stock returns if it correlates the actions of a large number of investors. This happens if the emotional state of the investors turn into the mood of the market.

### 3.5 Behavioral Biases

The behavioral and psychological researchers have found cognitive and emotional weaknesses to affect all individuals, which challenge the standard finance theory in relation to the rational behavior of all individuals. Behavioral biases are considered to be the reason, that individuals do not make perfectly rational decisions (Pompian 2012). These cognitive and emotional weaknesses of individuals impact decision-making and in turn financial investment decisions. Baker & Nofsinger (2002, p. 98) state that: “*By allowing psychological bias and emotion to affect their investment decisions, investors can do serious harm to their wealth*”. Moreover, Breuer et al. (2012) argue that, due to the high complexity and uncertainty of the situations in which financial decisions are often made, investors lack formal rules in decision-making whereby many decisions are made on intuition. These intuitions may lead to systematic errors of judgement, referred to as biases.

Pompian (2012, pp. 25) defines behavioral biases as; “*biases that result in irrational financial decisions caused by faulty cognitive reasoning or reasoning influenced by emotions*”. Biases can thereby be divided into two categories including cognitive biases and emotional biases. The first type arises due to the wrong reasoning, which might happen while processing information or making statistical estimations. The second type arises when feelings influence the investors reasoning (Pompian 2012). Investor often find it easier to correct cognitive errors, as this might be done through further education, more information etc. It is however more difficult to control one’s feelings as these are often intuitive and spontaneous.

**Sub-conclusion:** Behavioral biases, including mood of the investor, are affecting the decision-making, as biases make investors decisions irrational. Behavioral biases can therefore serve as an explanation for some of the results found by behavioral finance. In section 4 the evidence from earlier studies will be discussed in relation to the biases,
which can explain them. Moreover this study will try to link behavioral biases to the results found in the empirical evidence.
4 Literature Review

In the present study it will be tested whether there is a relation between investor sentiment and stock market returns. Investor mood will be used as a proxy for investor sentiment. This is in line with earlier research, e.g. Yuan et al. (2005) found evidence of a relation between lunar phases and stock market returns at which stock returns were lower on days around full moon contrasted to days around new moon. Hirschleifer & Shumway (2003) examine the relation between sunshine and stock returns. Evidence states that sunshine has a positive effect on stock returns. The explanation for this relationship was found in the psychological literature, as sunshine affects the mood and thereby influences investor behavior, which impacts financial decision-making and in turn stock prices. In the present study soccer games played by national teams serve as a measure of investor mood. Section 4.1 outlines earlier empirical findings relating sports and investor sentiment.

Corredor et al. (2013) investigated whether sentiment is moderated by characteristics about the stock or country-specific factors or a combination of those two. The results of the study showed that sentiment has a significant influence on stock returns. Further, they stated that other factors such as cultural and institutional differences also might moderate the sentiment effects. E.g. they suggested that cultural differences might play a “key role” in explaining the level of investor sentiment on stock returns. Culture will therefore be included in the current study to test whether it has a moderating effect on investor sentiment. Section 4.2 states Hofstede’s cultural dimensions and earlier empirical evidence relating the cultural dimensions and investor sentiment.

4.1 Sports and Stock Returns

Part of the behavioral literature has investigated the impact of sport results on individual stocks or stock market indices. Some studies have further investigated why there is a link between sporting results and stock market pricing, but the explanations for the impact are highly different. First, part of the literature argues that sporting results have a real economic effect and thus reflect rational expectations. Second, a range of studies argues that the market reactions can be explained by behavioral factors induced by investor sentiment.
The teams investigated also differ, as some studies examine club teams rather than national representative teams, which influence the chosen stock returns for measurement. The effect of sporting results for club teams is measured using the stock return of that individual team in contrast to national teams where a representative country index is chosen. Section 4.1.1 discusses the market reactions and the explanation for these reactions at club level, while 4.1.2 discusses these two topics at national level. However, the literature in regard to the national level is rather limited. Section 4.1.3 outlines the expected reaction to winning and losing a soccer game based on behavioral factors.

4.1.1 Club Level Evidence
In a study of the effect of sporting results for individual teams, Brown & Hartzell (2001) studied the impact of Celtics’ basketball games on the same team’s equity prices and found that losses significantly affect the stock price, but no affect was found for winning. They further provided several explanations for why sporting results might affect cash flows and argued that winning can lead to an increase in game attendance, which will contribute to higher revenue. Also, an increase in ticket prices will be more accepted for winning teams than for losing teams, ceteris paribus. Moreover, the revenue from advertising and licensing is expected to be positive related to the performance of the team. Furthermore, winning is also expected to have an indirect economic impact through a higher value of club reputation leading to an improvement of their goodwill.

Palomino et al. (2009) examined the stock price reactions for individual soccer clubs in the UK to game outcomes and found a significantly abnormal return following both wins and losses. They also investigated the explanation for the market reactions and whether these reflected rational expectations or an overreaction. The arguments for a rational reaction were the direct economic impact in terms of higher sales of merchandise, tickets and advertising or the allocation of TV rights for the listed clubs when winning. In line with the rational expectations hypothesis they found that the positive (negative) average abnormal return in the first three days after a win (loss) was comparable to the average sales revenue. Hence, sport performance and operating performance is related. Palomino et al. (2009) also investigated the opportunity of an
irrational explanation induced by investor sentiment of the abnormal return in stock prices following a game. They found that the market reaction might be due to an overreaction to a win by investors induced by investor sentiment.

Sub-conclusion: This evidence indicates that both winning and losing impact the abnormal return for individual club stocks. Moreover, this can be explained rationally due to the economic outcomes, but also irrationally due to investor sentiment.

4.1.2 National Level Evidence

To the authors’ awareness only a small part of the literature uses national representative soccer teams to investigate the link between sporting results and stock market pricing. Ashton et al. (2003) conducted an event study by observing the movements in stock prices from the London stock exchange after international matches played by England’s national soccer team. They found a significant relation between performance of England’s national team and changes in stock prices, as winning was followed by higher market returns and losing was followed by lower market returns. However, the conclusion was made on a higher significance level for losing games. They stated two possible reasons for this link between soccer results and the stock market. First, a factor referred to as the “feelgood” factor meaning that sporting results stimulated better confidence about the future. Secondly, economic benefits could occur given that international tournament finals have an increasing commercial importance. However, Ashton et al. (2003) was not able to validate these two explanations.

Edmans et al. (2007) found a strong negative reaction to losses causing negative abnormal returns using international soccer results from the World Cup, the European Championship, Copa America and Asian Cup. The explanation for this effect was concluded to be investor sentiment due to several justifications. For instance, they stated that soccer results impact mood and have little direct economic impact. Furthermore, a larger effect was found for matches in World Cup and elimination games, where the participating countries might also be those who find soccer most important. Also, the impact was larger for small stock contrasted to large stocks. Thus, previously literature found investor sentiment to be higher for small stocks than reverse and small stocks are
to a greater extent held by local investors, which is expected to be those affected by the performance of their national team.

Sub-conclusion: The evidence on games played by national soccer teams indicate that both winning and losing can impact the stock returns, as Ashton et al. (2003) finds a reaction in both cases. However, Edmans et al. (2007) only find a significant effect after losing. Moreover it seems difficult to verify whether these results are due to the rational or irrational explanation, but Edmans et al. (2007) conclude that it is mainly due to investor sentiment.

4.1.3 Reaction after Winning or Losing a Soccer Game

Besides, evidence on the relation between sport and stock returns, other literature documents a particular difference in the behavior of individuals in relation to wins and losses. Considering the prospect theory by Kahneman & Tversky (1979), a change in wealth will be evaluated differently depending on the reference point. The reference point in regard to soccer results is the fans’ ex ante expectation of a specific game's outcome. Markman & Hirt (2002) showed that fans are affected by allegiance bias, which indicates that individuals who have psychologically invested in a desired outcome often make biased predictions, and therefore often favor their own teams. This means, that if the reference point is that one’s team will win and the team actually loses, the reaction measured in the movements of stock prices would be larger after losses than after wins. Kahneman & Tversky (1979) also found that losses were evaluated to be more frustrating than the joy from gaining the same amount of money, which could be applied in connection to the behavior of fans following wins and losses in soccer games.

An asymmetric reaction to soccer results following wins and losses is also expected due to the format of the tournaments especially in relation to elimination games (Appendix 1). A win will lead the team further in the tournament, but the final outcome of the tournament will still be unsure. A loss has a sure effect, as it immediately eliminates the team from the tournament (Edmans et al. 2007). Thus, an effect of losses is more likely to be seen compared to an effect of wins.
Self-attribution bias could however make people less influenced by losses, as this bias makes people take the credit for victories and blame others for their failure (Nguyen & Schüssler 2012, Pompian 2012). In relation to soccer games they might see a win as the outcome of their national team’s abilities, whereas a loss is due to a bad referee, pure luck of the opponents etc.

The psychology literature also finds it possible that the effects of one team’s win will be larger than for the experience of a loss. Hirt et al. (1992) discusses the phenomenon of Basking in Reflected Glory, which refers to: “the tendency of individuals to publicize their connection with a successful other” (Hirt et al. 1992, p. 1). Another phenomenon called Cutting Off Reflected Failure addresses that individuals also distance themselves from unsuccessful or negatively evaluated others (Hirt et al. 1992). These two phenomenons should result in fans increasing their connection to winning teams and distance themselves to losing teams.

Sub-conclusion: Due to these findings it is expected that both winning and losing can impact on stock returns.

4.2 Culture

In this section the impact of culture in regard to investor sentiment will be outlined. Section 4.2.1 presents the characteristics of Hofstede’s dimensions for measuring culture. Hofstede’s cultural dimensions have been applied in a number of other studies and moreover the dimensions are given for all of the countries in our sample. Lastly, it is based on one of the largest cultural studies (geert-hofstede.com). These considerations are the motivation for using Hofstede’s cultural dimensions as the main culture variables.

A review of the earlier findings of behavioral factors attached to the different cultural dimensions are discussed in sections 4.2.2-4.2.7. The discussion of the findings is based on studies relating investor sentiment and culture, but the literature is rather limited. It has therefore only been possible to link investor sentiment and a limited number of Hofstede’s cultural dimensions. The literature review, consequently, also includes findings on the relation between corporate decision-making and culture. However, as
this study focus on behavioral factors in regard to investors’ decision-making, these 
findings can only be used as indications for e.g. risk-taking behavior. Agency theories 
state that managers in general are more risk-averse than shareholders due to limited 
diversification possibilities and career concerns (Li et al. 2013).

4.2.1 National Culture
Breuer et al. (2012, p. 449) summarizes the concept of national culture as: “... a way of 
capturing and measuring information about the psychology of investors. Culture is 
defined as customary beliefs and values that social groups transmit fairly unchanged 
from one generation to another. Cultural beliefs and values reflect a person’s sense of 
what is good, right, fair, and just”.

Hofstede & Hofstede (2005) considers culture as a mental programming, which 
includes patterns of thinking, feeling and acting, which indicate that culture shapes 
attitudes and behavior. People, due to the social environment, which they engage in 
from their early childhood, learn these patterns. This makes culture a collective 
phenomenon, as people from the same social environment will have a shared culture. 
Consequently, it is possible to separate people into different groups based on their 
culture (Hofstede & Hofstede 2005).

Between 1967 and 1970 Geert Hofstede conducted a survey of the culture at IBM 
covering 70 countries. Hofstede’s cultural dimensions originally included four 
dimensions: Power distance [PDI], Individualism versus collectivism [IDV], 
Masculinity versus femininity [MAS] and Uncertainty avoidance [UAI] (Hofstede & 
Hofstede 2005). In 1991 the fifth dimension of Long-Term Orientation [LTO] was 
added based on Michael Harris Bonds research. However in 2010, Michael Minkov 
creates a new survey of an almost identical index called Pragmatic versus normative 
[PRA] (geert-hofstede.com). These measures were highly correlated. The results of 
Michael Minkovs survey are today available as a measure of LTO (Hofstede et. al. 
2010). In 2010 a sixth dimension was included called Indulgence versus restraint [IND], 
which is also created by Michael Minkov (Hofstede et al. 2010).
The cultural values for each dimension and country can be measured through a scale from 0 to 100. Even though culture is changing, Hofstede finds that the relative scores have been stable over time (geert-hofstede.com).

Sub-conclusion: Culture is used to distinguish people in one group from people of another group. It is therefore possible to separate the countries into groups depending on their cultural values. This study therefore applies Hofstede’s cultural values using all six dimensions. Appendix 2 includes an overview of the values of each dimension for the European countries included in the sample.

4.2.2 Individualism versus Collectivism
The dimension individualism versus collectivism indicates different preferences within a social framework. In collectivistic cultures the interests of the group is more important than the interest of the individual. In these societies people learn to separate groups into “we” and “they”. Depending on which group they belong to. Collectivism is therefore seen in societies, where “people from birth onward are integrated into strong, cohesive in-groups, which throughout people’s lifetimes continue to protect them in exchange for unquestioning loyalty” (Hofstede & Hofstede 2005, p. 76) The opposite goes for individualistic cultures, which can be defined as societies in which: “the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family” (Hofstede & Hofstede 2005, p. 76). These view themselves as “I”. In relation to Hofstede’s scale of culture, the lower the IDV score the more collectivistic.

4.2.2.1 Evidence in Relation to Individualism and Collectivism
Earlier studies have found a relation between IDV and behavioral factors attached to both individualism and collectivism. In relation to individualistic countries, a large part of the literature states a connection between individualism and overconfidence behavior. Breuer et al. (2012) studied the attitude of individuals toward risk and identify factors that influence the individuals in their willingness to take financial risks. They further studied whether behavioral factors, arising from cultural differences, can explain the risk-taking in regard to financial matters. They found support for a significantly positive
effect on financial risk attitudes among individuals in individualistic countries using Hofstede’s dimensions. The explanation for this is rooted in the link between individualism and overconfidence and overoptimism. Overconfidence arises when investors have too high beliefs in regard to their own abilities and their own knowledge (Baker & Nofsinger 2002). Overconfident investors have very strong beliefs about their own valuations of securities, which influence financial decision-making. As overconfident investors are more certain about their own opinions they believe they can predict the winning stocks, which in turn lead to excessive trading activity (Baker & Nofsinger 2002).

Evidence is also provided for a link between individualistic cultures and self-attribution biases. Self-attributions bias reveals that people interpret success and failure differently. This is a tendency for people to consider success as an outcome of their own ability. At the same time they consider failure as the result of exogenous and uncontrollable aspects like bad luck. A very successful investor might, due to this bias, become too overconfident and start taking on too much risk (Nguyen & Schüssler 2012, Pompian 2012). Markus & Kitayama (1991) suggest that people in individualistic countries have high self-esteem and try to enhance themselves, which is a tendency that lead to pervasive self-attribution biases. Chui et al. (2010) argue that individualism is likely to be linked with both of these behavioral factors referred to as attribution bias and overconfidence. To support the idea of a correlation between individualism and these behavioral biases, they showed a correlation between trading volume and volatility, and individualism. Earlier studies stated a higher trading activity leading to excess volatility among overconfident investors and investors with self-attribution biases.

Another part of the literature suggests a link between collectivism and some behavioral factors. Schmeling (2009) uses consumer confidence as a proxy for investor sentiment and found an impact on stock returns, which is further related to cross-cultural differences to find a moderation of the sentiment. The study suggests that individuals in collectivistic countries induce herd-like behavior and individuals with high uncertainty avoidance tend to overreact, whereby individuals with these two cultural dimensions have a tendency to have a herd-like overreaction. This induces a stronger sentiment-return relation. In the review of Yao et al. (2014), different theoretically and empirically
characteristics and implications of herding behaviors are stated. Herding behavior is referred to as a tendency to imitate others actions. This makes investors base their investment decisions on the collective actions of the market also when they do not agree with the collective predictions. Schmeling (2009) argues that collectivism boosts herd-like overreaction as people in collectivistic countries are integrated in strong groups and are likely to overweigh consensus opinion which leads to a herd-like overreaction among investors. Thus, financial markets in collectivistic countries contrasted to individualistic countries have a stronger investor sentiment-return relation due to a higher degree of correlation among investors. UAI and IDV are correlated with -0.64 (Appendix 3) in this study, which is in line with the paper of Schmeling (2009).

Li et al. (2013) investigated the influence of national culture in corporate risk-taking and argue for two influences of national culture. Firstly, there is a direct influence through the impact on managerial decision-making and secondly there is an indirect influence through firm- and country-level characteristics. They found that culture primarily affected directly through managerial decision-making and empirically stated a positive association between corporate risk-taking and individualistic countries. Hence, individualistic managers use decision rules, in which risky payoffs are overweighed due to their autonomy and underestimate the level of uncertainty due to their self-enhancing believes. Mihet (2012) conducted a study of the effects of culture on firm risk-taking. In particular, the paper used Hofstede’s first four dimensions for measuring culture. Mihet (2012) supports the higher risk-taking behavior in companies located in individualistic countries compared to collectivistic countries.

Sub-conclusion: The evidence above indicates that individualistic countries are related to overconfidence, self-attribution bias and higher risk-taking. Due to their overconfidence investors might be more affected by loses, as these are often unexpected. However, due to self-attribution bias they might be less affected by loses, as these are explained by uncontrollable factors. Moreover, there is a tendency for decision-makers in individualistic countries to take more risk. In section 3.4 it was stated that investors taking more risk are also often more prone to investor sentiment. Hence it could be expected that the individualistic countries would have a higher level of investor sentiment. However, limits to arbitrage are increased due to risk-averse
rational investors, who are not willing to trade due to noise trader risk mentioned in section 3.4.3. This would therefore indicate a higher level of investor sentiment in countries of collectivism. The literature also provides evidence of a connection between collectivism and herd-like behavior. Consequently, it would be expected that both individualistic and collectivistic countries could have a stronger investor sentiment-return relation.

4.2.3 Uncertainty Avoidance Index
Uncertainty depends on how an individual feels. Things that might seem uncertain to one person might not be uncertain to another (Hofstede & Hofstede 2005). Hofstede & Hofstede (2005, p. 167) defines uncertainty avoidance as: “the extent to which the members of a culture feel threatened by ambiguous or unknown situations”. Uncertainty avoidance and risk avoidance is not the same thing, as Hofstede & Hofstede (2005) define risk and uncertainty in the same way as Knight (1964). A higher UAI score indicates a higher level of uncertainty avoidance.

4.2.3.1 Evidence in relation to Uncertainty Avoidance
The study of Schmeling (2009), discussed in section 4.2.2, stated that individuals in countries with high levels of uncertainty avoidance tend to react more emotionally and therefore tend to have an overreacting behavior. But due to the correlation between UAI and IDV, the overreaction behavior must be seen in relation to herd-like behavior. Schmeling (2009) suggests a herd-like overreaction behavior in countries with high UAI and low IDV. There is a negative correlation between uncertainty avoidance and individualism. This indicates that countries of high uncertainty avoidance tend to be more collectivistic, whereas countries of low uncertainty avoidance are more individualistic.

The study of Li et al. (2013), discussed in section 4.2.2, also investigated the influence of culture on managerial decision-making in regard to corporate risk-taking in relation to Hofstede’s dimension of uncertainty avoidance. They found a negatively relation between high levels of uncertainty avoidance and corporate risk taking. Managers in high uncertainty avoidance countries feel anxious with uncertainty. Hence, they will
avoid innovative projects or require a higher risk premium. The study by Miheț (2012) found that companies located in countries with low uncertainty avoidance are higher risk-takers. These findings are in line with Li et al. (2013) although interpreted differently. But these indications on risk behavior cannot be directly applied in relation to the decision-making of investors, as there is a difference in risk behavior of investors and managers.

*Sub-conclusion:* High UAI has by Schmeling (2009) been linked to overreaction, which is related to sentiment. This could lead to an overreaction after soccer matches in countries of high UAI, which in turn could indicate a stronger investor sentiment-return relation. However evidence of corporate risk-taking also indicates that countries of low uncertainty avoidance are more willing to take risk. Fong (2013) found that the individuals, who are risk seekers, also are more prone to investor sentiment. In countries of more risk-averse individuals the limits to arbitrage might increase due to noise trader risk, which will increase the level of investor sentiment (Long et al. 1990). This indicates that uncertainty avoidance could moderate the effect of investor sentiment.

### 4.2.4 Power Distance Index

The power distance index is related to the level of inequality in society. More precisely it relates to whether less powerful people respects that power is unequally distributed in the society. In the countries with the largest power distance there is a tendency for less powerful people to be more dependent on the most powerful ones (Hofstede & Hofstede 2005). According to the measurement of PDI a higher score indicates a higher level of power distance in the country.

#### 4.2.4.1 Evidence in Relation to Power Distance

Miheț (2012) found corporate risk-taking to be higher among companies in countries with low tolerance for hierarchical relations measured using Hofstede’s power distance dimension. Thus, low levels of power distance favor higher risk-taking behavior. However, the different attitudes towards risk-taking among firms related to the power distance cannot directly be applied to the risk-taking behavior among investors, as mentioned earlier.
4.2.4.2 Correlation between Power Distance and Other Dimensions

More of Hofstede’s dimensions correlate. It would therefore be expected, that some of the results could arise due to this. The most severe correlations, based on the sample of the current study, will be discussed below (All correlations are included in appendix 3).

There is a negative correlation between the dimensions PDI and IDV of -0.60 (Appendix 3). The correlation indicates that individualistic (collectivistic) countries also seem to have a low (high) power distance. People from collectivistic countries have a tendency to herd-like behavior, as mentioned in section 4.2.2. This indicates that the individuals’ behavior is affected by other peoples’ opinion. In high power distance countries there is a tendency of less powerful people to be more dependent on the more powerful people. These two dimensions could thereby be linked, as the herd-like behavior in collectivistic countries might be connected to the less powerful people adopting the opinion of the more powerful people in high power distance countries.

A positive correlation between PDI and UAI of 0.71 also exists (Appendix 3). Countries of low power distance therefore have a tendency for low uncertainty avoidance. This is in line with the negative correlation between IDV and UAI mention in section 4.2.2.

Sub-conclusion: It is expected that countries of collectivism and high uncertainty avoidance have higher levels of investor sentiment. Based on the correlations it would therefore also be expected that countries of high power distance would have a stronger sentiment-return relation. However, this is not by any means explained by behavioral factors, as it only relies on the correlations. Evidence in regard to corporate decision-making indicates that countries of individualism, low uncertainty avoidance and low power distance could show more investor sentiment especially due to higher risk taking. In section 3.4.1 it was stated that investors taking higher risk would be more prone to investor sentiment. However, lower risk taking can increase the limits to arbitrage and, hence, increase the investor sentiment-return relation as stated earlier. This indicates that PDI could have a moderating effect. There is however no direct link between investor sentiment and PDI in the earlier literature.
4.2.5 Masculinity versus Femininity

Hofstede & Hofstede (2005, p. 120) defines masculine cultures as a society where “emotional gender roles are clearly distinct: men are supposed to be assertive, tough and focused on material success, whereas women are supposed to be more modest, tender and concerned with the quality of life”. The gender roles are therefore clearly separated in these societies. Feminine cultures are on the other hand defined as a society where: “emotional gender roles overlap: both men and women are supposed to be modest, tender and concerned with the quality of life” (Hofstede & Hofstede 2005, p. 120). In relation to the cultural dimension, a higher MAS score indicates a more masculine society.

4.2.5.1 Evidence in Relation to Masculinity versus Femininity

There is a tendency for catholic countries to be more masculine and protestant countries to be more feminine (Hofstede & Hofstede 2005). Appendix 4 illustrates that the connection between the level of MAS and religion also holds in the sample of this study. In relation to this, Kumar et al. (2011) investigated whether the variations in religion dispersed geographically showed a difference in tendency towards gambling norms, which further affected market outcomes. To measure gambling behavior, they used religious composition as a proxy for gambling propensity. They showed that a higher concentration of Catholics relative to Protestants gives a higher tendency of gambling behavior. Particularly, this made institutions have a larger holding of lottery-type stocks, non-executive employees receive larger stock options grants, the initial day IPO return is higher and the magnitude towards negative premiums for lottery-stocks are higher. Kumar et al. (2011) used these results to further indicate that the higher gambling tendency among Catholics will impact other economic decisions as for instance investors’ decision-making in regard to their portfolio choices and in corporate decisions and stock returns. Hence, relating these findings of religion-induced gambling norms to the correlation between Hofstede’s masculinity dimension and religion, masculine countries have a higher propensity of gambling than feminine countries. Further, as Kumar et al. (2011) indicates that the tendency of gambling might influence investors’ decision-making, the investors in masculine countries might be influenced in their decision-making by having a higher gambling behavior than feminine countries.
Sub-conclusion: Fong (2013) stated, that investors holding lottery stocks are often more risk seeking and more prone to investor sentiment. It would therefore be expected that Catholic countries, hence countries of high masculinity, would show a stronger investor sentiment-return relation. The opposite might also be true, as limits to arbitrage increase, when risk-averse rational investors do not trade due to noise trader risk (Long et al. 1990). However, there is no evidence of a direct link between investor sentiment and MAS.

4.2.6 Long-Term Orientation versus Short-Term Normative Orientation
Hofstede & Hofstede (2005) states the difference between long- and short-term orientations in the following quote: “long-term orientation (LTO) stands for the fostering of virtues oriented toward future rewards – in particular, perseverance and thrift. Its opposite pole, short-term orientation, stands for the fostering of virtues related to the past and the present – in particular, respect for tradition, preservation of “face”, and fulfilling social obligations” (Hofstede & Hofstede 2005, p. 210). Countries, which are more short-term oriented, therefore have a tendency to focus on fast results relative to other countries. Moreover, these invest in e.g. mutual funds, whereas long-term oriented countries invest in real estate. This also indicates that countries, which are short-term orientated, invest in more liquid assets. Furthermore, short-term orientated countries have strong feelings in regard to their own countries (Hofstede et. al. 2010).

4.2.6.1 Evidence in Relation to Long-Term Orientation versus Short-Term Normative Orientation
Matsumoto et al. (2007) reanalyzes a study using the data from a questionnaire about contestants’ reactions to seven emotions. The study included 2,921 participants across 37 countries and related the various responses to cultural variables. They stated that the dimension of short- or long-term orientation is related to more aspects of emotional responding than the dimension of individualism/collectivism. Long-term orientated countries are negatively related to trophotropic symptoms, ergotropic symptoms and felt temperature of fear. But long-term orientated countries are also positively related to other emotions as joy, sadness, shame and guilt.
Sub-conclusion: Countries of high LTO have a tendency to be more influenced by their emotions, which could make them more prone to investor sentiment and therefore the sentiment-return relation would be stronger in these countries.

4.2.7 Indulgence versus Restraint

Michael Minkov created this dimension in 2010 and defined it as follows: “Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms” (geert-hofstede.com/national-culture.html, Hofstede et al. 2005, p. 291). In relation to sport, people from indulgent countries are more active compared to people from restraint countries, which rarely participates in sports (Hofstede et al. 2010). The higher participation in sports in countries of indulgence could indicate a higher interest in sports. This could lead to a larger impact on mood after a soccer match.

4.2.7.1 Correlation between Indulgence and the other Dimensions

There is a positive correlation between IDV and IND of 0.55. The correlation indicates that collectivistic countries will also be more restraint. The correlation between UAI and IND are negative (-0.73). This indicates that countries of high UAI are more likely to be restraint. These correlations are in line with the correlation found between UAI and IDV (see section 4.2.2). PDI and IND are also correlated negatively by 0.75. It indicates that countries of high power distance are often related to restraint countries. This is also in line with the correlations between PDI and IDV and PDI and UAI (see section 4.2.4) (See correlations in appendix 3).

Sub-conclusion: The most significant evidence of the investor sentiment-return relation is found in relation to the IDV and UAI, when comparing IDV, UAI, PDI and IND. This will consequently lay the grounds for this conclusion. Countries of collectivism and high UAI have a tendency for a herd-like overreaction, which can lead to a stronger investor sentiment-return relation. If this holds, then restraint countries would also be more prone to investor sentiment due to correlations. The literature in regard to corporate decision-making indicates that individuals in individualistic, low power
distance and low uncertainty avoidance countries could also be prone to investor sentiment, as these take more risk. The opposite conclusion is stated in relation to limits to arbitrage, which increase when rational investors are risk-averse and affected by noise trader risk. This could indicate that countries of both restraint and indulgence could show a higher investor sentiment-return relation. However, these conclusions are only based on the above correlations. LTO and IND are the last added dimensions and the research in relation to these is therefore very limited.
Part II

Research Design
5 Detecting Investor Sentiment

In section 3.4 it was stated that several conditions need to be fulfilled before investor sentiment can be reflected in the stock returns. An event will have to impact investor sentiment. This will impact the financial decision-making and thereby stock returns. This causality is illustrated in Figure 5.1:

![Figure 5.1 Hypothesized Causality](image)

*Source: Authors’ own creation*

The causality between event and investor sentiment through financial decision-making and stocks returns have in the earlier sections been supported by evidence from previous studies. However, the causality between the elements is not direct, but rather indirect, which will create some noise in the interpretation of the results. This is a general problem within the study of behavioral finance including investor sentiment whereby no further actions are taken.

Section 5.1 clarifies the definition of an event in this research. Section 5.2 addresses how to measure investor sentiment and argue for the use of mood as a proxy for investor sentiment. Further, the section discusses why soccer results can be applied as a mood variable.

5.1 Events

In a broad perspective within the finance literature, an event study measures the effect of a specific event on the value of a firm (MacKinlay 1997). The concern is that a given event will have an impact on the firm’s value. The event encompasses new information that will influence the value of the firm or firms measured as the market price of the company’s publicly traded securities. The event studies are therefore a method for measuring the market efficiency, thus given rationality in the marketplace the effect of
the event will immediately be reflected in the security prices (Dutta 2014, MacKinlay 1997).

In this study the event study methodology is applied to determine the effect of a national soccer match (the event) on the country’s total market index. More specific, the events of focus are the soccer matches played by European national teams in a time period of 40 years from 01.01.1974 to 31.12.2014. For the European national teams the most important tournaments, and the tournaments for which all European national teams have the opportunity of participating in, are considered to be the FIFA World Cups and the UEFA European Championships. Therefore, soccer games played in relation to these two tournaments are the ones included, whereby friendly matches and other tournaments are excluded.

In relation to the impact of social mood stated in section 3.4.4, Shiller (1984) addresses that investors’ behavior leading to trade decisions is driven by social dynamics as investing is a social activity. Additionally, Shiller (1984) addresses a link between social dynamics and fluctuations: “…fluctuations in attitude often occur widely in the population and often appear without any apparent logical reason. It is plausible that attitudes or fashions regarding investments would also change spontaneously or in arbitrary social reaction to some widely noted events.” (Shiller 1984, p. 457). Due to the massive interest in soccer measured for instance in the amount of TV viewers in section 1, the authors argue that soccer games can be stated as widely noted events. This can be considered as social dynamics, which can create an investment fashion within a country and thus impact decision-making. Lucey & Dowling (2005) discussed the role of feelings in investor decision-making. They stated, that fluctuations in mood of large groups of people caused by social events impact decision-making of a large number of investors whereby stock prices are also affected.

Sub-conclusion: The expected causality is, that the outcome of a given game played by a national soccer team is observed by domestic investors and accordingly affect investor mood. The current state of mood impact financial decision-making and in turn impact stock returns. Specifically, the effect of a national team soccer match (the event) will be reflected on a European country’s total market index.
5.2 Measuring Investor Sentiment

The literature within behavioral finance and psychology argues for the fact that investors are subject to sentiment. However, researchers state a key issue within this area, which is to find a valid measurement of investor sentiment and to the authors’ awareness no clear valid variable seems available in the theory (Baker & Wurgler 2006). Several proxies have been used as investor sentiment indicators and Baker & Wurgler (2007) summarizes some of these, including for instance investor survey findings, trading volume, mutual fund flows, investor mood, the dividend premium, option implied volatility, insider trading, composite sentiment indexes etc. This study applies the same approach as Edmans et al. (2007) and uses investor mood as a proxy for sentiment. The relation between mood and investor sentiment will be discussed in section 5.2.1. Further, in section 5.2.2 it will be argued that soccer games can be used as a mood variable.

5.2.1 Mood as a Proxy for Investor Sentiment

In section 3.4 investor sentiment was related to the situation where market prices deviate from the intrinsic value. Moreover Corredor et al. (2013) linked investor sentiment and mood. Hirshleifer & Shumway (2003) addresses the inferences of mood on financial decision-making as people in a good mood will use this feeling to evaluate life prospects as positive. If these misattributions about prospects lead to investments, the fluctuations in stock prices will be due to the investor mood. Mood will therefore influence the way investors evaluate investment alternatives. Being in a good mood is often related to a more optimistic view, whereas a bad mood seems to make investors more critical. Further, investors in a bad mood tend to make more detailed analysis before deciding, whereas investors in a good mood make less detailed analysis, which in turn could lead to regret of the investment decision in the future (Baker & Nofsinger 2002). Furthermore, the investor’s mood also influences risk attitude. Investors in a good mood tend to underestimate risk and overestimate benefit, which increase their willingness of investing in risky stocks relative to investors in a bad mood (Shu 2010).

Mood has further been linked to other behavioral biases in the literature, including optimism and overconfidence. E.g. Baker & Nofsinger (2002) state that optimism is one
Detecting Investor Sentiment

of the precursors to overconfidence, where optimism is a state of mood. In the book *Thinking, fast and slow* by Kahneman (2011 s. 255), he links optimism and overconfidence by stating: “Most of us view the world as more benign than it really is, our own attributes as more favorable than they truly are, and the goals we adapt as more achievable than they are likely to be. We also tend to exaggerate our ability to forecast the future, which fosters optimistic overconfidence”. Example, newly married couples expect their marriage to succeed despite high divorce rates (Baker & Emery 1993). Kahneman (2011) states that optimism bias is the most significant of the cognitive biases, due to its consequences for decisions, as it influences risk-taking behavior.

Empirical evidence is provided on the correlation between the state of one’s mood and investor behavior, which in turn influences financial decisions. In a review on empirical evidence of Baker & Nofsinger (2002) and Hirshleifer & Shumway (2003), a correlation between sunshine and mood is stated. They state that people feel better under the exposure of sunshine, which will put them in a good mood. For example, sunshine was linked to give more tips and lack of sunshine was linked to depression and suicides among people. If investors are in a good mood it will lead to a more optimistic prospect about the future. The optimism among investors when the sun shines will lead to a specific buying behavior on sunny days. Hence, investors will incorrectly attribute the good mood to positive economic predictions instead of just good weather. Hirshleifer & Shumway (2003) investigated the weather in 26 cities around the world related to the stock return of the 26 cities’ stock exchanges. They found a positive correlation between sunshine and stock returns. Kamstra et al. (2001) studied the effect of sunshine on investor mood using seasons. They found that stock returns are lower during fall as the hours of daylights are decreasing. Thus, daylight influences investor’s mood, which also affect financial decisions. In the review of Kamstra et al. (2001), they also state the link between lack of daylight and depression and further a link between depression and lower risk-taking behavior.

*Sub-conclusion:* Mood and optimism are related to investor behavior. The theory and evidence states that individuals in a good mood often are optimistic, which makes their expectations for the future more positive. This can make them value securities too high.
This could be reflected in the stock market as an overreaction, which was pictured in Figure 2.1. On the opposite investors in a bad mood would be more pessimistic about the future, which could make them value securities too low. This makes mood a useable proxy for investor sentiment, as investor sentiment is present when prices deviate from the intrinsic value (see section 3.4).

5.2.2 Soccer as a Mood Variable

Edmans et al. (2007) states three requirements for a mood variable:

1. The variable must drive mood in a substantial and unambiguous way, so that its effect is powerful enough to show up in asset prices.
2. The variable must impact mood of a large proportion of the population, so that it is likely to affect enough investors.
3. The effect must be correlated across the majority of individuals within a country.

Below, this study argues that European soccer results satisfied these three requirements for a mood variable.

5.2.2.1 Requirement 1

A large amount of empirical evidence within psychology states that in general sport results have a significant impact on mood. Wann et al. (2001) wrote the book *Sport Fans: The Psychology and Social Impact of Spectators* and found a relation between the reaction of fans and the performance of their team. Specifically the fans reacted positively when their team performed well and the fans reacted negatively when their team performed poorly. Further, these reactions lead to an increase or decrease in self-esteem, and to positive and negative feelings about life in general. Hirt et al. (1992) studied college basketball and found that the mood of fans and self-esteem were affected by their team’s performance. Moreover, the fans estimated the future performance of their team and themselves to be significantly better if the team had won rather than lost. In 1988, Arkes et al. published a study of the relation between the game results of Ohio State University football team and the sales of lottery tickets in Central Ohio. They were able to report a higher lottery ticket sale on days following a victory.
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rather than a defeat. Bizman & Yinon (2002) investigated the distancing tactics among sport fans and the effects on self-esteem and emotional responses following a win or loss of one’s team. They found that fans were more likely to associate with their team after team success than after team failure. Furthermore, if self-esteem and emotions were measured after the fans have chosen to increase or decrease association with their team, contrasted to before, self-esteem and positive emotions were higher and negative emotions lower. Boyle & Walter (2003, p. 226) argued that: “When an investor’s team wins, self-confidence rises and so does the desire to undertake new investments, but a loss results in lower self-confidence and a curtailment of new investment activity”. Hence, embedded in the stated empirical evidence, sport results affect respondents’ mood in regard to optimism or pessimism about their own abilities and life in general. This is expected to impact investors’ views on the stock prices in the future and thus the investment decisions.

While a large part of the literature focus on the link between sport results and simple mood changes, the effects of sport results also extend far beyond mood variants. White (1989) studied US National Football League playoff games and found significantly more homicides in areas where the team had lost compared to areas of winning teams. In 1998, Trovato documented that if the Montreal Canadians were eliminated early in the playoffs from the Stanley Cup of Hockey, the number of suicides among Canadians increased significantly. In 2002, Carroll et al. examined hospital admissions for a range of diagnoses on days surrounding England’s football matches in the World Cup in 1998. The study was able to document a 25 percent increase in the number of heart attacks in the following two days after England lost to Argentina in a penalty shoot-out on 30th June 1998.

5.2.2.2 Requirement 2
The following section provides evidence of the large impact that soccer has on many people’s lives and that soccer is of national interest in most European countries. The interest of soccer exists across European countries, as soccer is the most popular sport in almost all of these (www.mostpopularsports.net) and the amount of soccer clubs in Europe has been increasing over the years (PJW et al. 2013). A high number of registered soccer clubs exist in a great part of Europe (Appendix 5). The high numbers
of clubs correspond in average to 3,703 European citizens per club, which must indicate a high level of interest in soccer throughout Europe. Also, the high level of interest is expected to be maintained over time, as soccer matches are played on a regular basis.

Further, more than one billion people around the world, including out-of-home viewing, watched the final, at the 2014 World Cup in Brazil, between Germany and Argentina, and the game attracted the biggest audience in German TV history. The tournament also set a new record for streaming data traffic, as fans watched it online. Moreover, the event had the biggest audience for a TV show in France for 7 years and for 2 years in UK, Italy, Spain and Portugal (The 2014 FIFA World Cup in Numbers and 2014 FIFA World Cup Brazil Television Audience Report). For the UEFA European Championship in 2012 the quarterfinal between England and Italy had 20.3 million TV viewers in England, which was more than the wedding of Prince William and the Queen’s Diamond Jubilee concert. The same game was viewed by 21.8 million on Italian TV and beats any non-sport transmission since 1994. Moreover the UEFA European Championship in 2012 was heavily followed on different social media platforms. The official Facebook page UEFA EURO 2012 had over 750,000 fans. On Twitter, 142,500 people were following @UEFAcom and at its highest there were seven tweets per second. Also the official page on Google+ was one of the fastest growing (UEFA 2012).

5.2.2.3 Requirement 3
The results in national soccer games affect the mood of an entire country in a similar way and the effect is expected to be isolated in the specific countries meaning that the result of a national game will in general not have a mood effect in more than the two countries involved. This is in contrast to soccer games on club level as the results for such games are expected to influence the mood across countries as soccer clubs are expected to have fans from other areas than where they are located. For example, Real Madrid has around 450 million fans compared to around 3 million citizens in Madrid (Corrigan 2015, www.whatmadrid.com).

In section 5.1 it was stated that widely noted events could lead to investment fashions. This could be interpreted as a correlation among the national investors decision-making after soccer games.
Sub-conclusion: The evidence in section 5.2.2 indicates that all three requirements are satisfied. Soccer games played by national teams will consequently be used as a measure of investor mood to investigate investor sentiment in European stock markets.
6 Hypotheses

Based on the problem statement stated in section 1.1 the hypotheses are formalized below. The hypotheses are gathered in two main categories including a category representing the investigation of investor sentiment and a category representing the moderation of investor sentiment through culture. In relation to the first category the null hypothesis implies that investor sentiment do not impact the stock market returns. This embeds that investors are rational and markets are efficient. The alternative hypothesis state that investors are subject to sentiment, which in turn affect stock returns. In relation to the second category the null hypothesis implies that culture does not moderate the investor sentiment-return relation; whereas the alternative hypothesis suggests that culture does have a moderating effect. The hypotheses are formalized as follows:

\[ H_0^a: \quad \text{Investor sentiment has no impact on stock market returns} \]
\[ H_1^a: \quad \text{Investor sentiment has an impact on stock market returns} \]
\[ H_0^b: \quad \text{Cultural dimensions do not moderate the effect of investor sentiment on stock market returns} \]
\[ H_1^b: \quad \text{Cultural dimensions moderate the effect of investor sentiment on stock market returns} \]

In section 5.2 it was stated that investor sentiment is measured using soccer games. Further in section 4.1 it was indicated that soccer games do impact the stock returns, as both Edmans et al. (2007) and Ashton et al. (2003) find evidence supporting this. Further section 4.1.3 indicated that both winning and losing could have an impact. This study, therefore, expect to find an impact of both winning and losing a soccer game.

Evidence from section 4.2 indicates that some cultures could be more prone to investor sentiment. Schmeling (2009) links investor sentiment and culture directly and finds that countries of high uncertainty avoidance and collectivism show a stronger investor sentiment-return relation. As these dimensions are correlated with PDI and IND it could further be expected that countries of high power distance and restraint could show higher levels of investor sentiment.
Hypotheses

Evidence in regard to corporate decision-making can serve as indicators of the influence of investor sentiment, as risk-taking behavior and investor sentiment can be linked. Firstly, risk-seekers are more prone to investor sentiment. Secondly, risk-aversion is linked to more limited arbitrage, which can lead to higher levels of investor sentiment, measured by higher abnormal stock returns. Based on this evidence it would be expected that the dimensions of IDV, UAI, PDI and MAS could moderate the level of investor sentiment.

As this study focuses on investor sentiment it would be expected that the results are in line with the earlier findings and therefore it is expected that countries of collectivism and high uncertainty avoidance will have a stronger investor sentiment-return relation.

Long-term orientation and indulgence have been less studied in the literature; however countries of long-term orientation are more affected by their emotions, which could lead to a higher investor sentiment.

Sub-conclusion: The null hypotheses imply that investor sentiment has no impact on stock return and that culture does not moderate the potential effect of investor sentiment. It is expected to find a reaction in stock returns to the outcome of a soccer game both in regard to a win and a loss. Based on the empirical evidence on investor sentiment and culture, it is expected that the cultural dimensions of IDV, UAI, PDI and IND will moderate the level of investor sentiment.
7 Methodology

The purpose of this section is to present the various methodological aspects and analyses applied in this study. Section 7.1 clarifies the use of Ordinary Least Squares regressions and the underlying assumptions of this methodology. Further, the econometric approach for linking investor sentiment, stock returns and culture is briefly presented and accounted for in section 7.2. The application of an econometric approach might be subject to different potential issues, whereby section 7.3 discusses some of these. The susceptible of investor sentiment might vary due to specific characteristics of the events and stock indices. These characteristics are discussed in section 7.4 for further application in subsequent analyses. Additionally, a number of robustness tests could be appropriate and these will be discussed in section 7.5.

7.1 Ordinary Least Squares Regression

Generally, researchers use Ordinary Least Squares [OLS] to establish a valid economic relationship between one dependent variable and a given set of independent variables. In the present study, OLS is applied in two steps. First OLS is used to calculate abnormal returns [AR], which are the stock returns used for measuring the effect of investor sentiment. This will be further outlined in section 7.2. In a review of the empirical literature in relation to investor sentiment and stock returns, the majority of the studies applied the linear regression model, OLS, for estimating the abnormal return (e.g. Palomoni et al. 2009, Renneboog & Vanbrabant 2000). A few other studies investigate the relationship of stock returns and investor sentiment through a non-linear relationship using for instance the GARCH regression model. For validation of results, Edmans et al. (2007) also applied the GARCH model, but found no improvements of the results, whereby only OLS was used in the additional regressions. Furthermore OLS provides a good indicator for the relationship between the variables even though the underlying assumptions are not satisfied.

The second step is to establish a link between the economic variable in the form of AR and a behavioral factor termed investor sentiment measured in soccer results across countries. In earlier studies this has also been achieved by using an OLS regression (Castellani et al. 2013, Edmans et al. 2007).
The setup of the OLS estimator is briefly stated in the following using Verbeek (2012). The linear relationship between the dependent variables and explanatory variables is given by:

\[ y_i = \beta_1 + \beta_2 x_{i2} + \cdots + \beta_K x_{iK} + \epsilon_i , \]  

where \( y_i \) is the dependent variable and the \( x_i = \{x_{i2}, \ldots, x_{iK}\} \) are the explanatory variables. The elements in \( \beta = \{\beta_1, \beta_2, \ldots, \beta_K\} \) are the unknown population parameters stated as the slope coefficients. \( \epsilon_i \) is the error term. The model is estimated by minimizing the sum of squared errors and the OLS estimator for \( \beta \) is then given by:

\[ b = (\sum_{i=1}^{N} x_i x_i')^{-1} \sum_{i=1}^{N} x_i y_i , \]  

where \( b \) is considered the approximation to the true unknown parameter \( \beta \).

*Sub-conclusion*: OLS will be applied for estimating the AR, as the majority of studies within the area apply this model and further Edmans et al. (2007) found no improvements using a non-linear model. OLS will also be used to investigate the relationship between the AR and investor sentiment, since the task of revealing a relationship between a dependent variable and some explanatory variables is best settled using OLS.

### 7.1.1 Gauss-Markov Assumptions

For the OLS estimator \( b \) to be a valid approximation to the unknown parameter \( \beta \), it depends upon the underlying assumptions of the OLS estimator. For the OLS estimator \( b \) to be the *Best Linear Unbiased Estimator* [BLUE], the four Gauss-Markov assumptions need to be satisfied. Under fulfillment of only assumptions (A1)-(A2), the OLS estimator is still unbiased. A discussion of the four assumptions is based on Verbeek (2012). The four Gauss-Markov conditions are stated below:

\[ E[\epsilon_i] = 0, \quad i = 1, \ldots, N \]  
\[ \{\epsilon_1, \ldots, \epsilon_N\} \text{ and } \{x_1, \ldots, x_N\} \text{ are independent} \]  

\[ \]
Methodology

\[ V\{\epsilon_i\} = \sigma^2, \quad i = 1, ..., N \quad (A3) \]
\[ \text{cov}\{\epsilon_i, \epsilon_j\} = 0, \quad i, j = 1, ..., N, \quad i \neq j \quad (A4) \]

These assumptions are tested for each of the different models estimated using OLS. In the following the main characteristics and tests of the different assumptions will be stated.

### 7.1.1.1 Assumption 1

(A1) states that the expected value of the error term equals zero. If this holds, the regression line would be correct on average (Verbeek 2012). In a review of the mean error term in the different regressions there is found no evidence, that the error terms are not zero as these are extremely close to zero.

### 7.1.1.2 Assumption 2

(A2) indicates that the error term and the explanatory variables are independent (Verbeek 2012). This is generally assumed to be satisfied and will not be discussed further.

### 7.1.1.3 Assumption 3

(A3) imposes that all error terms have the same variance stated as homoscedasticity. This means that if there is heteroscedasticity present, it will violate this assumption. To test for heteroscedasticity the Breusch-Pagan heteroscedasticity test [BP] has been applied. Under the null hypothesis, \( V\{\epsilon_i\} = \sigma^2 \), there is homoscedasticity. The test statistic is given as, \( BP = NR^2 \), which follows a chi-squared distribution with J degrees of freedom, where J is the number of exogenous variables in the auxiliary regression. N is the number of observations and \( R^2 \) is estimated from an auxiliary regression. The dependent variable in the auxiliary regression is the squared error terms, which are estimated from the initial OLS model (7.1). These error terms are regressed on a constant and a number of exogenous variables. These variables are similar to the ones in the initial OLS model excluding one (Verbeek 2012, Wooldridge 2009). See the tests of (A3) in appendix 6.
7.1.1.4 Assumption 4

(A4) states zero correlation between the different error terms, thereby any form of autocorrelation is excluded (Verbeek 2012). To test for autocorrelation the Breusch-Godfrey test [BG] has been applied. Under the null hypothesis \( \text{cov}\{\epsilon_i, \epsilon_j\} = 0 \) holds and there is no autocorrelation. The alternative hypothesis is that the model suffers from autocorrelation. The test statistic is, \( BG = (T - 1) \times R^2 \), where T is the number of observations in our sample, which follows a chi-squared distribution with one degree of freedom. \( R^2 \) is from an auxiliary regression, where the dependent variable is the residuals derived from the initial estimated OLS model (see model 7.1). The model includes the same explanatory variable as the initial model and further a lagged residual. If the \( R^2 \) in the auxiliary regression is close to zero it indicates that the lagged residual does not explain the current residual and they will therefore not be correlated (Verbeek 2012). The tests of (A4) are included in appendix 6.

Sub-conclusion: If (A1) and (A2) are satisfied the estimated coefficients will be unbiased. However, the inference will be wrong as the standard deviations will be estimated incorrectly. It will therefore not be possible to test the coefficients without correcting the standard deviations. If all four assumptions are fulfilled the model will be BLUE (Verbeek 2012). The Gauss-Markov assumptions are further evaluated for the models applied for the analyses in this study in section 7.3.1.

7.2 Specification of the Applied Econometric Approach

The purpose of this section is to clarify the econometric approach applied for the analyses in the current study. Particularly, this section introduces the approaches to detect whether soccer results have an effect on European stock market returns or not, and whether this is moderated by different cultural dimensions. These approaches are elaborated in section 7.2.1 and section 7.2.2, respectively.

7.2.1 Econometric Approach to Investor Sentiment

As mentioned in section 7.1, the econometric approach to investor sentiment is of two steps. Firstly, the AR needs to be calculated, which will be discussed in section 7.2.1.1.
Secondly, the link between the AR and investor sentiment is measured, which will be addressed in section 7.2.1.2.

### 7.2.1.1 Estimating Abnormal Returns

To measure the impact of a given event, in our case soccer matches, it is necessary to estimate abnormal returns. The abnormal return can be estimated as (MacKinlay 1997, p. 15):

\[
AR_{it} = R_{it} - E(R_{it} | X_{it}) ,
\]

where \( AR_{it} \) is the abnormal return for country \( i \) at day \( t \). \( R_{it} \) is the actual return and \( E(R_{it} | X_{it}) \) is the normal return. Moreover \( X_{it} \) contains the information, which is used to estimate the normal return in the best way. The information in \( X_{it} \) depends on which method is used for the estimation (MacKinlay 1997).

In a review of the literature, several different regression models have been used for estimating normal stock returns. Some of these include various control variables (e.g. Bernille & Lyandres 2011, Demir & Danis 2011), whereas others use very simple regressions without any further control variables (e.g. Castellani et al. 2013). Part of this study is to validate the empirical findings by Edmans et al. (2007) on European countries using the same investor sentiment proxy and therefore the same econometric approach is applied. Moreover the model of Edmans et al. (2007) includes a number of control variables, which are important. To estimate the normal return for each country index in the sample, the following model is used, where each independent variable is multiplied by a country dummy variable:

\[
R_{it} = \gamma_0 + \gamma_1 R_{it-1} + \gamma_2 R_{mt-1} + \gamma_3 R_{it} + \gamma_4 R_{mt+1} + \gamma_5 D_t + \gamma_6 Q_t + \epsilon_{it} ,
\]

The variable \( R_{it} \) is the continuously compounded daily log stock return on the total market index for country \( i \) on day \( t \). The stock returns are measured on the first trading day following a soccer game. This ensures that all matches are represented by at least the return of one whole day’s trading. This is in line with the method of Edmans et al. (2007). The variable \( R_{mt} \) is the continuously compounded daily log stock return on the
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total market index for Europe \( m \) on day \( t \). \( D_t = \{D_{1t}, D_{2t}, D_{3t}, D_{4t}\} \) are dummy variables for the weekdays including Monday till Thursday. By including these dummies the model controls for the effect of trading on specific days using Friday as the baseline. Earlier literature has e.g. found returns on Mondays to deviate significantly from returns on the four other trading days (French 1980). \( Q_t = \{Q_{1t}, Q_{2t}, Q_{3t}, Q_{4t}, Q_{5t}\} \) are dummy variables taking the value one if one of the previous 1-5 days are non-weekend holidays. The importance of these dummies is discussed in section 7.3.2. To account for first-order serial autocorrelation, the lagged return index \( R_{it-1} \) is included. As the European stock markets might be integrated to some degree, the returns on stock indices across countries are likely to be correlated. To control for this potential correlation, the stock return for the total European market index \( R_{mt} \) is included. The regression also includes the lagged index return for total European market index \( R_{mt-1} \) as some country indices may be lagging the Europe index. Further, some country indices may lead the European market index, whereby \( R_{mt+1} \) is included. No further lags or leads are included as it is assumed that the stock returns follow a rather random walk. The R-squared for this calculation is 0.495416, which indicates that the model is able to explain a large part of the actual return.

In regression (7.4) \( R_{it} \) is the actual return on the first trading day following a soccer game and moreover \( \gamma_0i + \gamma_1iR_{it-1} + \gamma_2iR_{mt-1} + \gamma_3iR_{mt} + \gamma_4iR_{mt+1} + \gamma_5iD_t + \gamma_6iQ_t \) is a measure of the normal return. The estimated error term consequently becomes the abnormal return on the first day following a soccer game, as indicated below:

\[
\hat{\varepsilon}_{it} = \frac{R_{it}}{Actual \ Return} - (\gamma_0i + \gamma_1iR_{it-1} + \gamma_2iR_{mt-1} + \gamma_3iR_{mt} + \gamma_4iR_{mt+1} + \gamma_5iD_t + \gamma_6iQ_t) \tag{7.5}
\]

### 7.2.1.2 Abnormal Returns and Investor Sentiment

To estimate the effect of a soccer match on a stock return, the following regression model is applied:

\[
\hat{\varepsilon}_{it} = \beta_WW_{it} + \beta_LL_{it} + u_{it} \tag{7.6}
\]
where the $\hat{\epsilon}_{it}$ denote the residuals from regression (7.4) corresponding to the abnormal return. $W_{it}$ is a dummy, which equals one if country $i$ wins a game on a day that makes $t$ the first trading day after the match. Otherwise the dummy equals zero. The dummy variable for losses, $L_{it}$, is applied analogously to the dummy variable for wins. If e.g. $\beta_{W}$ is significant this would indicate that winning a soccer game leads to an AR, which is different from zero. The above regression model is applied by Edmans et al. (2007), but also in other studies in relation to soccer (Castellani et al. 2013).

Sub-conclusion: Regression model 7.4 will be applied to estimate the normal return. The residuals from this model equal the abnormal returns, which are applied when estimating the effect of investor sentiment. Regression 7.6 is used to model the relation between investor sentiment and abnormal stock returns.

7.2.2 Econometric Approach to Culture

The relation between investor sentiment and stock returns may be moderated by culture as addressed in section 4.2. To investigate the moderating effect of culture, the Moderation Model is applied (Fairchild & MacKinnon 2009). The Moderation Model tests if the prediction of the dependent variable ($Y$) from an independent variable ($X$) differs across levels of a third variable referred to as the moderator ($Z$). This Moderation Model is illustrated in a path diagram below:

Figure 7.1 Path Diagram of the Moderation Model

![Path Diagram of the Moderation Model](image)

Source: Fairchild & MacKinnon (2009), p. 90
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The effects of moderations are modelled through a multiple regression analysis stated as (Aiken & West 1993, p. 2):

\[
\hat{Y} = \beta_0 + \beta_1 X + \beta_2 Z + \beta_3 XZ , \tag{7.7}
\]

where \(\beta_1\) is the coefficient of the independent variable investor sentiment (\(X\)) related to the stock return (\(Y\)), when \(Z = 0\). \(\beta_2\) is the coefficient of the moderator variable culture (\(Z\)) related to the stock return (\(Y\)), when \(X = 0\). The moderator variable is measured using Hofstede’s six culture dimensions. In the equation, \(\beta_0\) is the intercept. The coefficient \(\beta_3\) of the interaction term gives an estimate of the moderation effect. A significant moderation of the relation between investor sentiment (\(X\)) and stock returns (\(Y\)) is present, if \(\beta_3\) is statistically different from zero. The underlying assumptions of the Moderation Model correspond to the OLS assumptions.

\(X\) is still a dummy variable, where 1 indicates a win and 0 indicates a loss (or the opposite). It is preferred to keep the dummy coding in this model, since the \(Z\) variable is a continuous variable, and it will therefore be easier to interpret regression (7.7) (Aiken & West 1993). \(Z\) is measured using Hofstede’s cultural dimensions, which all take a value between 0 and 100. When interpreting the results of the Moderation Model it is important that the value 0, for both the predictor variable (\(X\)) and the moderator variable (\(Z\)), makes sense. If Hofstede scores are used directly the value of 0 does not correspond to there being no moderation effect. A value of 0 instead indicates the minimum value, which makes the interpretation difficult. To solve this problem the \(Z\) values have been centered using the following method: \(X_i' = X_i - \bar{X_i}\), where \(X_i\) is the original value of the cultural dimension and \(\bar{X_i}\) is the mean value of the cultural dimension across all countries weighted by their number of games in the sample. This makes \(Z\) measure the deviation from the mean and thus \(Z\) equals 0 at a mean level of a given cultural dimension in this sample (Fairchild & MacKinnon 2009). It is expected that the cultural dimension will have no impact at the mean level and the interpretation thereby become more intuitive. If \(Z\) becomes larger than 0 it would indicate that the country is placed in the top spectrum of the specific cultural dimension. Oppositely, a \(Z\) value below 0 would indicate that the country is placed in the bottom spectrum of the
cultural dimension. Centering does not change the impact of the interaction term (Dearing & Hamilton 2006).

Sub-conclusion: The moderating effect of Hofstede’s culture dimensions on the relation between investor sentiment and stock returns is investigated using the regression of the Moderation Model, where the values of Hofstede’s cultural dimensions have been centered to make the interpretation of the results more useful.

7.3 Possible Issues with the Methodology

This section elaborates the various potential issues in regard to the methodology. Section 7.3.1 briefly addresses the potential violation of the Gauss-Markov assumptions. Section 7.3.2 states some of the potential issues in regard to the econometric approach used to investigate the link between investor sentiment and stock returns.

7.3.1 Potential Violation of the Gauss-Markov Assumptions

The following section provides an evaluation of the underlying Gauss-Markov assumptions of the model applied in this study. The evaluation is based on the practice of Verbeek (2012). An overview of the assumption tests is included in appendix 6.

7.3.1.1 A3

The Breusch-Pagan test for heteroscedasticity indicates that the models in regard to soccer results do not suffer from heteroscedasticity (Appendix 6). However, most of the models testing the moderation effect of culture do not have constant variances.

7.3.1.2 A4

The problem of autocorrelation arises if succeeding error terms are correlated, which mostly occurs with time-series data. As the current study investigates financial time-series data, in the form of daily stock returns across time and countries, autocorrelation may be a problem. Using the Breusch-Godfrey test for autocorrelation, all models showed a problem with autocorrelation (Appendix 6). Autocorrelation does not make
the OLS estimator biased, but indicates that the model is misspecified and the standard errors are estimated wrong.

**Sub-conclusion:** Heteroscedasticity-and-autocorrelation-consistent [HAC] standard errors have been applied to adjust for the problems of heteroscedasticity and autocorrelation (Verbeek 2010).

### 7.3.2 Other Issues

Besides violation of the underlying OLS assumptions in relation to the validity of the OLS estimator, other potential issues might be related to the econometric models. Previous studies, on the link between investor sentiment and sport, state various issues in regard to their models (e.g. Ashton et al. 2011). Some of these issues are highly relevant for the model applied in this study and are elaborated in the following sections.

#### 7.3.2.1 Macro-Economic Control Variables

To obtain the unbiased effect of sentiment on the stock markets in isolation, it is critical to control for other factors. The standard finance theory often includes macro-economic variables to control for patterns in the economy. However, such proxies for the state of the economy is not workable as data on the stock return indices are based on daily observations, where macro-economic variables only can be obtained less frequently. Example, the gross domestic product for some European countries can only be obtained on a quarterly basis in the databases provided by OECD.

#### 7.3.2.2 Difference in Time Zones

The soccer games within the sample are from the UEFA European Championship and FIFA World Cup tournaments, where the latter is often played in a time zone different from the three time zones in Europe. Hence, the result of a game could become known during trading hours across European markets and the reaction will not be incorporated on the following trading day as the model states. This is a potential issue as it might already have been incorporated in the stock returns and it becomes more difficult to observe investor sentiment. To solve the issue, the time of the games are manually compared with the time zone of the specific European country and their financial
market’s trading hours. There is not found a collision, whereby this problem is eliminated.

7.3.2.3 **Holidays**

In Datastream, the extracted data from a holiday is not identified as a non-trading day, but the stock returns take the value zero or the value of the previous trading day. To detect investor sentiment, the specific stock indices must be traded. The problem is adjusted for by using holiday dummies in the model (regression 7.4) in the current study.

7.3.2.4 **Extreme Observations**

The existence of extreme observations in the stock return data can lead to misleading test statistics. However, these extreme observations could contain relevant information, which should be incorporated or be outliers. One possible solution could be to trim the observations, but this will be based on subjective adjustments, and is thus not applied for the main analyses.

The four most extreme observations in this sample are observed for the following countries on the given days Turkey (04.09.99) with an AR of 7.8 %, Greece (06.09.97, 7.5 % AR), Romania (26.03.05, -7.4 % AR) and Greece (22.06.12, -5.5 % AR). The days for these extreme observations were further investigated with regard to specific national events around these days. These are listed in appendix 7. E.g. the extreme negative abnormal return for Greece was observed the following trading day after they had lost 4-2 against Germany on the 22\textsuperscript{nd} June 2012. Before the match the media states the game as a “symbolic” match due to the political situation between the two nations, where Germany grants loans for the more debt-burdened Greece. The extreme negative AR could be due to investor sentiment and therefore contain highly relevant information for the current study.

7.3.2.5 **Out-of-Sample Data**

To confirm the findings in studies, it is in general highly essential to apply out-of-sample data. Such a process will detect data snooping and validate the results. As
Edmans et al. (2007) have already applied an international data set using the same proxy for investor sentiment and econometric approach, an out-of-sample data set will not be applied in the current study.

Sub-conclusion: Other potential issues in the models include a lack of control for macro-economic variables and a validation of results using out-of-sample data, which is not applied in this study due to various reasons mentioned above. The issue in regard to differences in time-zones and the incorrect value of stock returns in Datastream on holidays are accounted for. The removal of extreme results is considered to be rather subjective and at such it is not applied in the main tests.

7.4 Subsequent Analyses
This study mainly focuses on the link between investor sentiment and stock returns as well as the potential moderation of the results deriving from cultural differences. However, various research states that the susceptible of investor sentiment might vary due to specific characteristics of the events and stock indices. These various characteristics are elaborated in the following sections 7.4.1 - 7.4.4, and further used for subsequent analyses.

7.4.1 Game Classification
The structure of the tournaments has changed throughout the time period applied in the current study. Due to this the number of teams participating at the tournaments also varies. Moreover, the number of group and elimination matches played at each tournament differs across time (Appendix 1). However, it seems common for all of the tournaments in the time period, that there is a qualification tournament prior to the actual tournament. These matches could therefore be categorized as qualification matches. Moreover, most of the tournaments include both group games and elimination games, as the following example will illustrate. For the FIFA World Cup 2014, 53 European nations participated in the qualification matches, but only 13 qualified for the tournament in Brazil where a total of 32 nations from all over the world participated. These were divided into eight groups of four each. The games played at this stage of the tournament are classified as group games. The two best teams from each group moved
on to the elimination stage, which therefore included the top 16 countries. The games played at this stage are classified as elimination games (fifa.com). At the elimination stage, the losing team will immediately be out of the tournament and the winning team moves on. This structure is almost identical to the structure of the UEFA European Championship 2012. Prior to this 51 European nations participated in the qualification games. 16 of these nations entered the group stage of the tournament. There were four groups of four nations. The two best teams from each group advanced to the elimination stage (uefa.com).

The categorization of soccer matches in different subgroups including qualification, group and elimination games are important for subsequent analyses to investigate whether investors are more prone to sentiment following specific games. The importance of the games increases over qualification, group and elimination games, whereby it would be natural that the level of sentiment increased concurrently with the game type in a tournament. Thus, people might be more emotionally involved when a big soccer title is at stake. Furthermore, the outcome of an elimination game has a clear impact - either the team is out of the tournament or moves on to next game, which will affect the mood positively or negatively respectively as stated in section 5.2. E.g., Edmans et al. (2007) found a greater loss effect for elimination games.

Furthermore, the susceptible of investor sentiment might vary due to the type of tournament. As stated above, people might be more emotionally involved when a big soccer title is at stake, where a World Cup title is considered to be more important than a European Championship title due to a higher level of competition. E.g., Edmans et al. (2007) found a greater loss effect for World Cup games than continental cup games.

To create these tests three models have been estimated:

\[ e = \beta_1 w_{wc} + \beta_2 l_{wc} + \beta_3 w_{ec} + \beta_4 l_{ec} + u \]  
(7.8a)

\[ e = \beta_1 c_{wq} + \beta_2 c_{lq} + \beta_3 w_g + \beta_4 l_g + \beta_5 w_e + \beta_6 l_e + u \]  
(7.8b)

\[ e = \beta_1 c_{wqc} + \beta_2 c_{lwcq} + \beta_3 c_{wec} + \beta_4 c_{lcec} + \beta_5 w_{wce} + \beta_6 l_{wce} + \beta_7 w_{eg} \]  
+ \beta_8 l_{ecg} + \beta_9 w_{wce} + \beta_{10} l_{wce} + \beta_{11} w_{ece} + \beta_{12} l_{ece} + u \]  
(7.8c)
where $e$ is the estimated residuals from regression (7.4).

Model (7.8a) classifies the games based on tournament, and therefore diversifies between World Cup games and European Championship games, where e.g. $w_{wc}$ is a dummy variable, which takes the value of 1 if the team is winning a World Cup game. Model (7.8b) makes a classification based on game type. There is a separation between three types of games; close qualification games ($cw_{q}$, $cl_{q}$), group games ($w_{g}$, $l_{g}$) and elimination games ($w_{e}$, $l_{e}$). Lastly, model (7.8c) classifies the games both in regard to tournament type and game type.

**Sub-conclusion:** These tests of game classification are used to determine whether specific matches drive the overall investor sentiment.

### 7.4.2 Top Soccer Nations

Although soccer is the most important sport in most European countries, soccer may not be equally important in all European countries. Hence, this study hypothesize that investors from countries where soccer is of relative higher importance are more prone to investor sentiment reflected in the market reactions. To investigate the difference in investor sentiment across European countries the data set is divided into two samples. The first sample consist of the top 5 soccer countries for which soccer is most important relative to the other countries in the sample. Importance is measured based on the participation level stated as the number of tournament participations throughout the sample period. The top 5 soccer countries are England, France, Germany, Italy and the Netherlands. The second sample consists of the remaining 21 countries.

This is modelled by the following regression:

$$e = \beta_1 w * top5 + \beta_2 l * top5 + \beta_3 w * (1 - top5) + \beta_4 l * (1 - top5) + u$$  \hspace{1cm} (7.9)

The model tests whether the top 5 countries games have an effect on stock returns and whether non-top 5 countries games have an effect on stock returns.
Sub-conclusion: These tests indicate whether the overall investor sentiment is due to a pronounced interest of soccer in a limited number of countries.

7.4.3 Sample-Split

The influence of investor mood resulting from soccer games are hypothesized to only affect the countries in isolation, which in turn will impact the national stock market. Hence, a win by the national soccer team of Croatia will not drive the mood of German investors. To establish the link between investor mood and a specific country, the stocks in the specific country must also be owned by investors from that specific country.

French & Poterba (1991) documented the tendency of investors to under-diversify and hold domestic shares, which is a behavior of investors referred to as home bias (Ackert & Deaves 2010). The shares on the world’s five largest stock markets have mainly domestic ownership, where the percentage of domestic ownership is distributed by 92.2 percent in United States, 95.7 percent in Japan, 92 percent in United Kingdom, 79 percent in Germany and 89.4 percent in France. This means that the individuals affected by the results of soccer matches also are likely to be the marginal investors in the domestic stock market. As the numbers are from 1991 the distribution of ownership might have changed. Since 1991, the markets have become more liberalized, transaction costs are decreased due to online trading platforms, fewer restrictions exist in the market at least within the EU etc. This might indicate that a greater part of a country’s shares, ceteris paribus, is owned by foreign investors. This makes it more difficult to detect the impact of investor mood on the stock market in specific countries. Hence, the effect of investor sentiment might also be easier to detect in historical data than recent data. Ideally, the current study should control for these globalization factors through the ownership structure of the indices included, but it is considered as to comprehensive in proportion to the purpose of this research.

Sub-conclusion: This study investigates investor sentiment on historical data and recent data by splitting the data set in two periods including one sample for the years 1974-1994 and another sample for the years 1995-2014. This will indicate if investor sentiment is mainly driven by a specific time period. The tests are created using the same approach as outlined in section 7.2.1.
7.4.4 Stock Types
Investor sentiment might be more observable in stocks with specific characteristics. Schmeling (2009) hypothesized: “The effect of sentiment on returns is stronger for stocks that are hard to value and/or hard to arbitrage, e.g. growth stocks, value stocks, and small stocks.” (Schmeling 2009, p. 396). Baker & Wurgler (2006) investigated the effect of investor sentiment across stock indices and found that: “When sentiment is estimated to be high, stock that are attractive to optimists and speculators and at the same time unattractive to arbitrageurs – younger stocks, small stocks, unprofitable stocks, non-dividend-paying stocks, high volatility stocks, extreme growth stocks, and distressed stocks – tend to earn relatively low subsequent returns.” (Baker & Wurgler 2006, p. 1677). Motivated by the link between specific stock characteristics and the susceptible of investor sentiment effects, the current study, besides the total market indices, also includes size cap indices and growth vs. value stock indices.

7.4.4.1 Size Cap Indices
Previous studies address that in general small stocks are more likely to be affected by investor sentiment due to the particular ownership structure (Baker & Wurgler 2006, Edmans et al. 2007). As this study hypothesized that the mood of domestic investors affects stock return, stocks with especially high local ownerships are expected to be more prone to sentiment. Small stocks are more likely to be owned by domestic investors and in turn more sensitive to soccer results. The local ownership of smaller stocks can be due to several reasons. First, foreigners have lower analyst – and media coverage in small stocks, which give them an informational disadvantage compared to domestic owners. Second, foreign investors underweight smaller stocks (Edmans et al. 2007). Third, domestic owners are subject to home bias by which they tend to hold domestic shares instead of diversifying into foreign shares as they are more optimistic about home markets and they feel higher familiarity (Ackert & Deaves 2010). This home bias is expected to be even more pronounced in small stocks.

To create these tests three regressions are calculated:

\[ es = w + l + u \]  
\[ el = w + l + u \]
The first regression tests the influence of soccer matches when applying small stock indices (7.10a). \( es \) is calculated using regression (7.4), but applies indices of small stocks. Regression (7.10b) measures the impact of soccer matches when applying large stock indices and the last regression tests the difference between large and small stock indices (7.10c).

### 7.4.4.2 Growth vs. Value Stock Indices

Growth stocks can be characterized as stocks in a firm that are expected to experience growth rates above-average compared to the market. Value stocks are stocks of firms, which tend to trade at a lower price compared to its fundamental value and characterized by having for instance a low P/E-ratio (www.investopedia.com). A review of the literature on the sentiment effect on value and growth stocks by Schmeling (2009) states inconsistent findings within the area. One find a stronger effect of sentiment for growth stocks than value stocks, another find the sentiment effect to be similar across value and growth stocks and one only found value stocks to be prone to sentiment. The inconsistent may be due to different sentiment proxies and difference in the stock indices applied.

To create these tests three regressions are calculated:

\[
es_v = w + l + u \quad \text{(7.11a)}
\]

\[
es_g = w + l + u \quad \text{(7.11b)}
\]

\[
es_v - \es_g = w + l + u \quad \text{(7.11c)}
\]

These regressions are similar to the ones used for testing small and large stocks mentioned in section 7.4.4.1. However the portfolios differ. Regression (7.11a) uses value stock indices and regression (7.11b) uses growth stock indices. Lastly, regression (7.11c) tests the difference between value and growth stock indices.

*Sub-conclusion:* Given the above characteristics small stocks are expected to be more susceptible to investor sentiment due to the ownership by local investors. Based on the
evidence in relation to growth and value stocks it cannot directly be stated which will be more susceptible to investor sentiment. To investigate whether there is a difference in investor sentiment across size cap indices; this study applies a large cap index and a small cap index for subsequent analysis. Moreover, indices of growth and value stocks are applied to investigate whether investor sentiment differs across these.

### 7.5 Robustness Tests

To test the robustness of the main results three robustness tests will be performed. Firstly, to test whether the results of culture as a moderator is robust another measure of culture has been applied. Secondly, to test the overall robustness of the results the most extreme returns have been removed from the sample. Lastly, the GARCH model will be applied to test whether the results are robust depending on the method used to estimate the abnormal stock returns.

#### 7.5.1 GLOBE’s Cultural Dimensions

For robustness check of the results for Hofstede’s cultural dimensions, this study applies the cultural dimensions from the Global Leadership and Organizational Behavior Effectiveness [GLOBE] research program. The study is based on the results of a survey of over 17,000 middle managers to detect cross-cultural relations. The respondents had to state their values and practices in the survey, which lead to two entities for each dimension containing a practice level and a value level. Both entities are used for validation in this study. GLOBE researchers identified nine culture dimensions stated as Assertiveness, Institutional Collectivism, In-group Collectivism, Future Orientation, Gender Egalitarianism, Humane Orientation, Performance Orientation, Power Distance and Uncertainty Avoidance. The GLOBE dimensions of Power Distance and Uncertainty Avoidance adapts to Hofstede’s dimensions of power distance and uncertainty avoidance respectively, whereby these are used as validation for those of Hofstede’s. The Future Orientation dimension in the GLOBE study adapts to Hofstede’s dimension of long-term orientation. The GLOBE study splits Hofstede’s dimension on individualism vs. collectivism in two parts stated as Institutional Collectivism and In-Group Collectivism. As this study investigates individual behavior, the In-Group collectivism is used. The GLOBE study splits Hofstede’s masculinity dimension in four
parts: Assertiveness, Performance Orientation, Gender Egalitarianism and Humane Orientation, whereby the mean value is applied. However, the GLOBE study did not measure Hofstede’s last dimension, indulgence, which is therefore not validated (House et al. 2004, Shi & Wang 2011).

Sub-conclusion: In the main tests of culture as a moderator of investor sentiment Hofstede’s cultural dimensions have been applied. To validate these results the cultural dimensions of GLOBE is also applied. The test of culture using GLOBE’s dimensions is completed by using the same approach as for Hofstede’s dimensions.

7.5.2 Removal of Extreme Observations

To investigate the sensitivity of the results to extreme observations, the sample is trimmed by 1%. Hereby, the observations with the most extreme positive or negative stock returns are removed (Appendix 7 shows the removed observations).

7.5.3 GARCH Model

In section 7.1 it was outlined that the normal return would be estimated using the OLS regression model. Further, the residuals from regression 7.4 equaled the abnormal stock returns. Some researchers state that financial time series data often do not fulfill the assumption of constant-volatility (A3) (Edmans et al. 2007). Financial time series of daily or monthly returns often show volatility clustering, which is the tendency to observe large (small) abnormal returns follow large (small) abnormal returns (Verbeek 2012). Verbeek (2012) states that a way to solve this problem is to let the variance of the abnormal return ($\hat{\epsilon}_{it}$ from regression 7.4) depend on the earlier abnormal returns. The volatility of $\hat{\epsilon}_{it}$ can therefore be modelled using GARCH(1,1):

$$\sigma_{it}^2 = \lambda_0 + \lambda_1 \epsilon_{it-1}^2 + \lambda_2 \sigma_{it-1}^2,$$

(7.12)

where $\sigma_{it}^2$ is the variance of the actual stock return in country $i$ on day $t$. The estimated variance will afterwards be applied to generate normalized stock returns:

$$R_{it}^0 = \alpha_i + b_i \left(1/\sigma_{it}^2\right)R_{it}$$

(7.13)
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This ensures that variance of the abnormal returns will be reduced (Bollerslev 1986, Edmans et al. 2007). The abnormal returns derived from the regression applying the GARCH model will be named abnormal normalized returns.

*Sub-conclusion:* Robustness tests will be performed using the GARCH model to investigate whether the results are robust across different regression models.
8 Data

The data for the empirical study has been assembled using various data sources presented in section 8.1 and 8.2. Further selection criteria were imposed to create an appropriated sample. The criterions are elaborated in section 8.3.

8.1 Portfolios

In this study the use of the event study methodology is “up scaled”, as this study measures the effect of a country-specific event on the country index contrary to other studies, which measure the effect of a firm-specific event on the firm’s value. Hence, the effect of investor sentiment is detected in the stock returns using a market index for each country in the sample.

To capture the different market dynamics of interest, the behavioral literature uses different kinds of market indices as S&P 500, NYSE, Dow Jones, TOTMK etc. (Lucey & Dowling 2005, Fisher & Statman 2000, Edmans et al. 2007). Edmans et al. (2007) mainly used TOTMK, which is also applied in the current study. Specifically, the Total Market Index of Datastream Global Equity Index coded TOTMK in Datastream, is used for each country in the sample. To obtain the data for each national market index, the code TOTMK is followed by a country mnemonic. For instance, the national market index for France is coded TOTMKFR. Also, this total market index is used for Europe (Appendix 8). The TOTMK indices are weighted on the basis of market capitalization. This ensures that the total returns are similar to the changes in total market value (valueweightedindex.com). The obtained datatype from the national TOTMK indices for calculating the abnormal returns is the total return index [RI], which includes the reinvestment of dividends (Datastream report 2012).

In subsequent analysis it will be investigated whether there is a difference in investor sentiment across indices with specific characteristics. The small stock indices are provided by HSBC through Datastream termed HSBC Small and obtained for 15 countries out of the 26 soccer countries in the total sample. The large stock indices are provided for the same 15 countries and also extracted from Datastream. The large stock indices are different across countries including Austria ATX Prime (Austria), BEL 20
(Belgium), Copenhagen KFX (Denmark), FTSE 100 (England), France CAC 40 (France), DAX 30 (Germany), FTSE/Athex Large Cap (Greece), MSCI Hungary (Hungary), Milan Comit 30 (Italy), AEX Index (Netherlands), Oslo Se (Norway), Portugal PSI-20 (Portugal), ISEQ (Ireland), IBEX 35 (Spain), OMX Stockholm 30 (Sweden) and MSCI (Switzerland).

The growth- and value indices are provided for 22 countries out of 26 soccer countries in the sample. The growth stock indices used in the current study is S&P BMI Growth Index extracted from Datastream for each country. Datastream is also used for extraction of data for the value indices using S&P BMI Value Index for each country.

Sub-conclusion: To investigate the market reaction to investor sentiment, this study uses the total market return index (TOTMK) for each country in the sample. Moreover, different indices are used in subsequent analyses to investigate whether investor sentiment differs across these.

8.2 Other Dataset Sources

The dataset has been comprised from several sources to obtain data in relation to soccer and culture. The results of national soccer games for all 56 European countries were manually collected using the website www.eu-football.info. This included games in relation to the FIFA World Cup tournaments and the UEFA European Championship tournaments for the period 01.01.1974 - 31.12.2014, which sum to a manual collection of more than 4,500 game results. The results of the games and the game dates have further been validated through the use of the websites www.fifa.com and www.uefa.com. To compute the importance of a qualification game, the Elo Ratings of all games in the sample were collected manually using the website www.eloratings.net. Elo Ratings are among other things used for rating soccer matches. Additional information on Elo Ratings can be found in appendix 9.

The financial data related to the stock market indices are extracted from Datastream. By applying the econometric approach by Edmans et al. (2007), only actual trading days are used whereby non-weekend holidays are accounted for by manually collecting relevant public holidays from the website www.timeanddate.com/calendar/.
Data in regard to Hofstede’s cultural dimensions have been downloaded from the webpage www.geert-hofstede.com (Appendix 2). For robustness analyses of cultural data, the cultural dimensions of the GLOBE study have been collected using the book Culture, Leadership, and Organizations: The Globe Study of 62 Societies by House et al. (2004).

Sub-conclusion: A number of different data sources have been used to create the sample, which has been used in the empirical study.

8.3 Data Validity
The current study investigates investor sentiment in European countries, which initially include 56 soccer nations (www.eu-football.info). For the different data related to the countries to be valid for use in the analyses, some adjustments are made. The elimination of data is based on two conditions.

- Event Characteristics
- Data Sufficiency

These are elaborated below.

8.3.1 Event Characteristics
Initially the sample included more than 4,500 matches consisting of wins, losses and draws. As it wasn’t possible to consistently determine the sentiment effect of a draw, all draws were eliminated. In some situations a draw might be enough to move on to the next stage and at other times it might be the result that ends the tournament.

Edmans et al. (2007) state, that not all qualification matches are equally important. To create a proxy for the importance of each individual qualification match Edmans et al. (2007) use the Elo Ratings. These ratings indicate how close the ability of the two teams, playing against each other, is. In this rating system each team is appointed new points after each match depending on the importance of the game and the closeness of their rankings. A qualification match is in accordance with the Elo Ratings defined as
close if the ratings of the teams are within 125 points after the home team have been added an extra 100 points due to the home team advantage. A qualification game is therefore close if the following equation is satisfied (eloratings.net):

$$|Elo_{Home} + 100 - Elo_{Away}| < 125$$  \hspace{1cm} (8.1)

Sub-conclusion: All games resulting in a draw have been removed from the sample. Moreover, all qualification games, which couldn’t be classified as close, were removed from the sample.

8.3.2 Data Sufficiency

Data sufficiency eliminates countries from the sample if data is unavailable in the data sources applied. Using Datastream, it was only possible to find stock indices for 34 nations. (The nations removed from the sample are listed in appendix 10).

Three of the excluded nations include Scotland, Wales and Northern Ireland. The United Kingdom has a common stock index and since England is the largest country in the United Kingdom it has been chosen to use this index in relation to the games played by the national team of England. However the authors are aware, that other countries might influence the index as well.

Two of the 34 countries, for which indices were found, have afterwards been removed, as there were large gaps in the time series of their equity indices. These included Estonia and Lithuania. Furthermore, some of the countries’ stock indices vary in sample sizes due to the time period available for the specific stock index. E.g. the stock indices of England and France began in 1974, whereas other countries stock indices, especially from Eastern European countries, start later, e.g. Slovenia in 2000. Appendix 8 shows an overview of the used equity indices.

Lastly, all countries, which are represented by less than 15 games, are removed to make it more representative for the nations actually included. Thereby Kazakhstan (1 game), Iceland (6 games), Ukraine (7 games), Luxembourg (4 games), Latvia (12 games) and Cyprus (14 games) have been removed.
Sub-conclusion: After correcting for different event characteristics and data sufficiency the sample includes 1318 games played by 26 countries. 744 of these games are wins and 574 games are losses (see an overview of the nations in appendix 8).
Part III

Results
9 Analysis of Investor Sentiment

In the following section, an analysis of the data is conducted to investigate whether investor sentiment impact stock returns resulting in an abnormal return or not. To give an overview of the investor sentiment variables in the dataset, the descriptive statistics are stated in section 9.1. The analysis of the link between investor sentiment and abnormal return is conducted in section 9.2. The subsequent analyses of results in relation to detecting investor sentiment are conducted in section 9.3.

9.1 Descriptive Statistics

Table 9.1 presents the descriptive statistics including information on the mean daily log stock market return in percent for the first trading day following a soccer game and non-game days, and the standard deviations [SD]. The table also provides information on number of non-game days and number of games in the sample period from 01.01.1974-01.01.2014.

<table>
<thead>
<tr>
<th></th>
<th>No games</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>No Games</td>
<td>199,969</td>
<td>0.0004</td>
<td>0.0158</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Wins</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>All Games</td>
<td>744</td>
<td>0.0534</td>
<td>1.2601</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Losses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>All Games</td>
<td>574</td>
<td>-0.1089</td>
<td>1.4716</td>
</tr>
</tbody>
</table>

Note: N for No Games corresponds to the number of non-game days in the sample period. N for All Games correspond to number of games played in the sample period. Hence, games can be played on the same day.

The trading days in each country, which are not associated with an important soccer game, amount to 199,969 in the sample period when summing for all countries. For these days the mean daily log stock market return is 0.0004 percent with a standard deviation of 0.0158. The mean daily log stock market return on a trading day following a soccer match with a win outcome is 0.0534 percent. For trading days following a soccer match with a loss outcome, the average return is -0.1089 percent. The average return on the trading day after a soccer win or soccer loss is higher (positive or negative) than the average return on non-game days. This indicates that soccer results have an impact on stock returns. The causality between a soccer win giving a positive return and
a soccer loss giving a negative return make intuitive sense. The impact of a soccer match ending with a loss seems to have a larger negative effect on stock returns compared to the positive effect of a winning game. This indicates that the level of sentiment is higher after losses compared to wins. Furthermore, the standard deviations of the average returns are 1.2601 after a soccer win and 1.4716 after a soccer loss. Thus, the standard deviations of the returns are higher after a soccer match compared to non-game returns, which indicate a higher volatility.

However, as outlined in appendix 8, the causality between a soccer result and average return is different for some countries compared to the causality stated above. For some countries a soccer win (loss) have a negative (positive) impact on stock returns. Example, a soccer win (loss) by Norway is followed by an average return of -0.4141 percent (0.3066) on the next trading day. Further, in some countries the average stock returns are positive or negative both after a soccer win and a soccer loss. For example, the average return is positive for Denmark both after wins and losses, and negative for England after both outcomes.

*Sub-conclusion:* The descriptive statistic indicates that soccer games impact the stock return in the European countries, as the returns after soccer games are larger than the mean stock return on days, with no games. Moreover, there is a higher volatility of stock returns after soccer games, which could indicate a higher risk level in relation to the returns.

### 9.2 Results of Investor Sentiment

In this section, the main findings of the paper are stated and analyzed using the theory, methodology and evidence outlined in part I and II. Specifically, the relationship between investor sentiment and stock returns are analyzed. Table 9.2 states the abnormal daily stock returns on the following trading day after a European soccer match for wins and losses for all sample games from 01.01.1974-01.01.2014.
Table 9.2 Abnormal Daily Stock Return after European Soccer Matches

<table>
<thead>
<tr>
<th></th>
<th>Wins</th>
<th></th>
<th>Losses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>( \beta_1 )</td>
<td>t-Values</td>
<td>N</td>
</tr>
<tr>
<td>All Games</td>
<td>744</td>
<td>0.054809</td>
<td>*1.686567</td>
<td>574</td>
</tr>
</tbody>
</table>

Note: *statistical significance at a 10% level, **statistical significance at a 5% level, ***statistical significance at a 1% level.

Both soccer wins and losses have an effect on stock market returns at a 10% statistical significance level, which is the most important finding. A soccer win of a national team will have a positive impact on daily stock returns revealed in a positive abnormal return. For soccer wins the magnitude of the coefficient \( \beta_1 \) is 0.054809 percent for the 744 games. This means, that a soccer win is on average followed by a positive abnormal stock return of 0.054809 percent on the first trading day after the match. Focusing on loss games, the magnitude of the loss coefficient, \( \beta_2 \), is -0.071042 percent for the 574 loss games, which means that a loss by a national team is on average followed by a negative abnormal return of -0.071042 percent on the first trading day following a game. The effect of a game outcome on stock returns is larger for losses than wins with a difference of 0.016233 percentage point using the absolute values.

The indications of the descriptive statistics in section 9.1 of the common sense causality between soccer outcome and stock returns for all European countries is hereby confirmed as a soccer win (loss) is followed by a positive (negative) abnormal return on the first trading day after a match.

To observe the effect of national soccer games on the stock market, the game outcome must impact financial decision-making. Section 3 addressed that people are subject to behavioral factors when making decisions and so are investors in financial decision-making. Lewin’s equation in section 3.3 stated that behavior among others is influenced by the aspects inside a person as cognitive and emotional factors. As argued in section 5.2.1, financial decision-making is influenced by investor’s mood, which is part of one’s mental state. Section 5.2.2 addressed various evidence on the link between mood and soccer results and clarified the valid use of soccer results as a mood variable. The above considerations indicate that the mood of investors might explain the findings of positive (negative) market reactions after soccer wins (losses). A soccer win might induce a good mood manifested in a positive stock return and a soccer loss might induce
a bad mood manifested in a negative stock return. Further, section 5.2.1 addresses the relation of mood to the behavioral bias of optimism. Investors in a good mood are often optimistic, which makes their expectations for the future more positive. This could lead to less rational expectations for future cash flows and, hence, make stock price deviate from the intrinsic value, which is a sign of sentiment, as stated in section 3.4. This might explain the positive abnormal return after a win by the national soccer team. This causality might also explain the effect of loss due to a bad mood and pessimistic view of the future. The findings could therefore be classified as a fundamental anomaly (see section 3.1).

These findings do not find support for the null hypothesis, $H_0^a$, stated in section 6 in which investor sentiment has no impact on stock market returns. The findings show an abnormal return after both wins and losses, which deviate from zero. This could be due to investor sentiment and thereby challenge the market efficiency theory mentioned in section 2.2. The findings of abnormal returns might be due to an overreaction as illustrated in Figure 2.1 in section 2.2.1.

The findings of a market reaction following both soccer wins and losses by national soccer teams are in line with the findings by Ashton et al. (2003) using England’s national soccer team and London stock exchange for investigation, which is outlined in section 4.1.2. The effect of losses is also in line with the findings of Edmans et al. (2007) using different countries from all over the world as addressed in section 4.1.2. Relating the findings of Table 9.2 to the studies using a club team, Palomino et al. (2009) found a reaction to both wins and losses using UK soccer club teams stated in section 4.1.1, which is in line with the findings of this study. The effect of loss was also found by Brown & Harzell (2001) addressed in section 4.1.1. However, the study investigated the effect of the outcome of basketball teams.

The findings are also supported by the more behavioral factors related to soccer addressed in section 4.1.3. The impact on stock returns from losses might be due to the reference point that one’s team will win using the prospect theory by Kahneman & Tversky (1979) together with fans subject of allegiance bias. As people have psychologically invested in a specific outcome they will also make biased predictions.
This will often make them believe in a victory for their own team. If the team loses it will therefore have a higher impact, as this was unexpected.

Sub-conclusion: The main results show that both wins and losses have an impact on abnormal stock returns. This indicates that investor sentiment has an impact on stock returns and therefore hypothesis $H_0$ is not supported. The findings consequently question the efficient market theory, as this could indicate an overreaction after soccer games and therefore inefficient markets. The findings are in line with earlier research.

9.3 Subsequent Analyses of Investor Sentiment

The susceptible of investor sentiment in the stock market might vary due to specific characteristics of the events and stock indices. The various characteristics and the reasons for the potential difference in susceptible of investor sentiment were elaborated in section 7.4. The following sections 9.3.1 – 9.3.4 provide the various subsequent analyses.

9.3.1 Analysis of Game Classification

Table 9.3 presents the abnormal daily stock returns on the first trading day following a European soccer match for wins and losses. The soccer matches are classified as qualification games, group games or elimination games. Further, the games are classified by tournaments including World Cup [WC] games and European Championship [EC] games. The table includes all sample games from 01.01.1974-01.01.2014.
Table 9.3 Abnormal Daily Stock Returns after European Soccer Matches Classified in Game and Tournament Type

<table>
<thead>
<tr>
<th></th>
<th>Wins</th>
<th></th>
<th>Losses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>β₁</td>
<td>t-Values</td>
<td>N</td>
</tr>
<tr>
<td>All WC Games</td>
<td>410</td>
<td>0.047907</td>
<td>1.103072</td>
<td>297</td>
</tr>
<tr>
<td>All EC Games</td>
<td>334</td>
<td>0.063282</td>
<td>1.404225</td>
<td>277</td>
</tr>
<tr>
<td>All Qualification</td>
<td>352</td>
<td>0.070265</td>
<td>1.232749</td>
<td>291</td>
</tr>
<tr>
<td>WC Qualification</td>
<td>178</td>
<td>0.117064</td>
<td>1.399803</td>
<td>155</td>
</tr>
<tr>
<td>EC Qualification</td>
<td>174</td>
<td>0.022390</td>
<td>0.317192</td>
<td>136</td>
</tr>
<tr>
<td>All Group</td>
<td>265</td>
<td>0.068124</td>
<td>1.366971</td>
<td>180</td>
</tr>
<tr>
<td>WC Group</td>
<td>152</td>
<td>0.019414</td>
<td>0.291357</td>
<td>80</td>
</tr>
<tr>
<td>EC Group</td>
<td>113</td>
<td>0.133645</td>
<td><strong>2.022643</strong></td>
<td>100</td>
</tr>
<tr>
<td>All Elimination</td>
<td>127</td>
<td>-0.015809</td>
<td>-0.232110</td>
<td>103</td>
</tr>
<tr>
<td>WC Elimination</td>
<td>80</td>
<td>-0.051829</td>
<td>-0.635914</td>
<td>62</td>
</tr>
<tr>
<td>EC Elimination</td>
<td>47</td>
<td>0.045501</td>
<td>0.404884</td>
<td>41</td>
</tr>
</tbody>
</table>

Note: *statistical significance at a 10% level, **statistical significance at a 5% level, ***statistical significance at a 1% level. WC = World Cup, EC=European Championship.

Recall, that the findings in section 9.2 showed a positive (negative) abnormal returns after soccer wins (losses). Such causality is not provided for the findings in Table 9.3 as soccer wins and losses are followed by both positive and negative abnormal returns. Further, the findings of abnormal returns for wins and losses are not consistent across different sub-classification games and games in different tournaments. As stated in section 7.4.1, the effect of soccer outcomes was expected to be higher for elimination games and World Cup games. Only soccer wins in group games played in the European Championship tournament and soccer losses in elimination games are followed by a statistical significant abnormal return on the following trading day. The significant result in relation to European Championships group games does not make intuitive sense, as both World Cup and elimination games are considered to be more important and should therefore show a higher abnormal return. The finding of a larger negative loss effect for elimination games compared to all loss games are in line with the importance of this game type compared to others and the results of Edmans et al. (2007).

Sub-conclusion: In general, the findings are rather weak and the main results in section 9.2 are therefore not driven by the characteristics of game type or tournament type. Further, investor sentiment is not consistently higher in specific game types or tournament types.
9.3.2 Analysis of Top Soccer Nations

The importance of soccer might vary across European countries and in turn investor sentiment as clarified in section 7.4.2. Table 9.4 states the daily abnormal returns after soccer wins and losses for top 5 soccer countries and other countries.

<table>
<thead>
<tr>
<th></th>
<th>Wins</th>
<th></th>
<th>Losses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>$\beta_1$</td>
<td>t-Values</td>
<td>N</td>
</tr>
<tr>
<td>Top 5 Nations</td>
<td>296</td>
<td>0.039349</td>
<td>0.951224</td>
<td>147</td>
</tr>
<tr>
<td>Other Nations</td>
<td>448</td>
<td>0.065024</td>
<td>1.398833</td>
<td>427</td>
</tr>
</tbody>
</table>

Note: *statistical significance at a 10% level, **statistical significance at a 5% level, ***statistical significance at a 1% level.

The daily abnormal returns after soccer wins and soccer losses are positive and negative, respectively, which is in line with the main findings of this study. In a comparison of the corresponding coefficients between top five soccer nations and non-top soccer nations, the magnitude of the coefficients are larger for non-top soccer nations. However, none of the findings are statistical significant and the effect of soccer outcome on the stock market is not more disposed in either of the two samples. The results for top ten soccer nations and non-top soccer nations are provided in appendix 11, but these are also statistical insignificant.

Sub-conclusion: The theorized anticipation of a larger effect for top-soccer nations is not supported.

9.3.3 Analysis of Sample-Split

This section investigates the susceptible of investor sentiment in more historical data compared to recent data by splitting the sample in two time periods. The first sample period consist of data from 1974-1994 and the other from 1995-2014. Table 9.5 states the impact on the stock market resulting from wins and losses for the two sample periods.
Investor sentiment is in general not more likely to be observed in either of the two time periods and both samples show statistical insignificant abnormal returns. In section 7.4.3, this study hypothesized that it would be more difficult to detect investor sentiment in recent data compared to historical data due to a shift in ownership structure, but these expectations are not supported. Yet, the magnitudes of the coefficients are, after both wins and losses, larger for the recent data in the period 1995-2014 than the more historical data in the period 1974-2014. However, the results are statistical insignificant and valid conclusions cannot be drawn.

The results of a simple split between the years 1974-2000 and 2001-2014 are presented in appendix 12. This ensures more equal-sized samples. Further, only the most recent years are separated from the remaining years. These results are also statistical insignificant.

Sub-conclusion: Evidence does not support the anticipation that investor sentiment would be more likely in historical data compared to recent data.

9.3.4 Analysis of Stock Types

Investor sentiment might be more observable in some stock indices as elaborated in section 7.4.4. The following sections provide evidence on the abnormal return after wins and losses using different stock indices.

9.3.4.1 Analysis of Size Cap Indices

Table 9.6 provides the findings of abnormal return after wins and losses using two different size cap indices for detection of investor sentiment. The two size cap indices...
applied include small stocks and large stocks. Further, the differences between these size cap indices are tested and the results are also provided.

Table 9.6 Abnormal Daily Stock Returns after European Soccer Matches using Small- and Large Stock Indices

<table>
<thead>
<tr>
<th></th>
<th>Wins</th>
<th></th>
<th></th>
<th>Losses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>$\beta_1$</td>
<td>t-Values</td>
<td>N</td>
<td>$\beta_2$</td>
<td>t-values</td>
</tr>
<tr>
<td>Small Stocks</td>
<td>210</td>
<td>0.000292</td>
<td>0.635327</td>
<td>136</td>
<td>-0.000452</td>
<td>-0.769709</td>
</tr>
<tr>
<td>Large Stocks</td>
<td>210</td>
<td>0.000067</td>
<td>0.167278</td>
<td>136</td>
<td>-0.000104</td>
<td>-0.172207</td>
</tr>
<tr>
<td>Difference</td>
<td>0.000225</td>
<td>0.717149</td>
<td></td>
<td>-0.000348</td>
<td>-0.853705</td>
<td></td>
</tr>
</tbody>
</table>

Note: *statistical significance at a 10% level, **statistical significance at a 5% level, ***statistical significance at a 1% level.

The expectations of a larger effect on small stocks elaborated in section 7.4.4.1 are indicated in the larger magnitude of the coefficients for small stocks after both wins and losses. However, the findings are statistical insignificant and either of the size cap indices is more susceptible for observing investor sentiment. Also, the magnitudes of the coefficients are markedly smaller than the main findings in section 9.2.

9.3.4.2 Analysis of Growth and Value Stock Indices

In Table 9.7, the daily abnormal returns after wins and losses are presented for value and growth stock indices. The difference in abnormal return between these two stock indices is also presented.

Table 9.7 Abnormal Daily Stock Returns after European Soccer Matches using Value- and Growth Stock Indices

<table>
<thead>
<tr>
<th></th>
<th>Wins</th>
<th></th>
<th></th>
<th>Losses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>$\beta_1$</td>
<td>t-Values</td>
<td>N</td>
<td>$\beta_2$</td>
<td>t-values</td>
</tr>
<tr>
<td>Value Stocks</td>
<td>467</td>
<td>0.000183</td>
<td>0.571097</td>
<td>332</td>
<td>-0.000257</td>
<td>-0.563451</td>
</tr>
<tr>
<td>Growth Stocks</td>
<td>467</td>
<td>0.000080</td>
<td>0.254705</td>
<td>332</td>
<td>-0.000112</td>
<td>-0.268288</td>
</tr>
<tr>
<td>Difference</td>
<td>0.000103</td>
<td>0.423728</td>
<td></td>
<td>-0.000145</td>
<td>-0.501759</td>
<td></td>
</tr>
</tbody>
</table>

Note: *statistical significance at a 10% level, **statistical significance at a 5% level, ***statistical significance at a 1% level.

The magnitudes of the coefficients for value stocks are larger than the corresponding coefficients for growth stocks. The magnitudes are also noticeably smaller than those of the main findings in section 9.2. The findings from earlier studies, using these stock indices, are rather diverse as addressed in section 7.4.4.2. Investor sentiment is likely to
be observed in both types of stocks. However, the previous findings are not supported in this study as the daily abnormal return is statistical insignificant for both value stocks and growth stocks. Further, there is no difference in the abnormal return using these two stock indices.

Sub-conclusion: There is a minor tendency for small stocks to show higher returns than large stocks, which is in line with earlier studies, however the findings are statistical insignificant. Moreover, value stocks have a higher return than growth, which is in line with some earlier studies. These findings are also statistical insignificant.

The main findings in section 9.2 are not driven by specific characteristics of the events or stocks as addressed in the analyses of section 9.3.1 – 9.3.4. Therefore, the further analyses in this study continue using the main findings of section 9.2.
10 Analysis of the Moderating Effect of Culture

Previous studies have indicated that the investor sentiment-return relation might be moderated by cultural differences. Further, some behavioral patterns are also attached to specific cultures, which are likely to influence financial decisions. Section 9.2 indicated the existence of investor sentiment, as abnormal returns followed both wins and losses. This section analyses whether these findings are moderated by national culture.

Table 10.1 presents the moderating effect $\beta_3$ on abnormal returns after soccer wins from Hofstede’s six culture dimensions. The moderating effect of culture after soccer losses can be seen in appendix 13.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Coefficient</th>
<th>$\beta_0$</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>$\beta_3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDV</td>
<td>62.396813</td>
<td>-0.069786</td>
<td>0.125465</td>
<td>0.004197</td>
<td>-0.007962</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td>*-1.817737</td>
<td>**2.289936</td>
<td>1.542935</td>
<td>**-2.091682</td>
<td></td>
</tr>
<tr>
<td>UAI</td>
<td>68.564491</td>
<td>-0.074219</td>
<td>0.127185</td>
<td>-0.002502</td>
<td>0.004383</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td>*-1.865482</td>
<td>**2.273917</td>
<td>-1.622183</td>
<td>*1.883258</td>
<td></td>
</tr>
<tr>
<td>PDI</td>
<td>47.236722</td>
<td>-0.073802</td>
<td>0.126672</td>
<td>-0.003430</td>
<td>0.006555</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td>*-1.856675</td>
<td>**2.274784</td>
<td>-1.428930</td>
<td>*1.900854</td>
<td></td>
</tr>
<tr>
<td>MAS</td>
<td>46.427162</td>
<td>-0.071258</td>
<td>0.125988</td>
<td>-0.000928</td>
<td>0.001368</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td>*-1.816796</td>
<td>**2.243166</td>
<td>-0.652600</td>
<td>0.639940</td>
<td></td>
</tr>
<tr>
<td>LTO</td>
<td>56.731411</td>
<td>-0.067519</td>
<td>0.401169</td>
<td>0.002400</td>
<td>-0.004866</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td>*-1.737283</td>
<td>**2.282369</td>
<td>1.227930</td>
<td>*-1.744522</td>
<td></td>
</tr>
<tr>
<td>IND</td>
<td>50.376153</td>
<td>-0.080045</td>
<td>0.135469</td>
<td>0.003794</td>
<td>-0.006611</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td>*-1.923457</td>
<td>**2.365584</td>
<td>1.341828</td>
<td>*-1.685699</td>
<td></td>
</tr>
</tbody>
</table>

Note: Regression: $e = \beta_0 + \beta_1 \times W + \beta_2 \times Z + \beta_3 \times W \times Z$, where $Z$ is the cultural dimension.*statistical significance at a 10% level, **statistical significance at a 5% level, ***statistical significance at a 1% level.

The findings in Table 10.1 evidently state that the impact of investor sentiment on the stock return is modified by national culture measured by the interaction term, $\beta_3$. Evidence indicates that the cultural dimensions of IDV, UAI, PDI, LTO and IND moderate the relation between investor sentiment and abnormal returns. Specifically, individualistic, low uncertainty avoidance, low power distance, long-term oriented and indulgence countries have a lower level of investor sentiment measured as a reduction of the abnormal return. Whereas collectivistic, high uncertainty avoidance, high power distance, short-term orientated and restraint countries have a stronger investor
sentiment-return relation. Recall from section 9.2 that the abnormal return after a soccer win was 0.054809 percent. That effect is even higher in cultures with the above characteristics. For example, the effect after soccer wins in collectivistic countries is positively moderated with an abnormal return of 0.007962 percent when IDV drops by one. Remember from section 7.2.2 that a Z-value below 0 places the country in the lower spectrum of the dimension and in the higher spectrum if Z is above 0. The most collectivistic countries in the sample have an IDV score of 27, which would equal a Z value of -35.396813\(^1\). If these countries win a game it should therefore on average generate an AR of 0.188948 percent\(^2\). This is more than three times higher than the mean abnormal return of winning a game stated in section 9.2. The most individualistic country has an IDV score of 89. This would on average generate an abnormal return after a win of -0.044482 percent (Appendix 14). The return thereby becomes negative after a win in the most individualistic countries, which could indicate that investors in these countries are not influenced by the soccer games.

The finding of investor sentiment reflected in the abnormal return is more pronounced in collectivistic countries compared to individualistic countries measured by the IDV dimension. The link between investor sentiment and collectivistic countries are in line with the findings by Schmeling (2009) stated in section 4.2.2. Schmeling (2009) found that the higher level of investor sentiment in collectivistic countries was due to the behavioral factor of herd-like behavior. Therefore, the finding of investor sentiment in collectivistic countries in this study might be due to herding behavior among investors as this correlates the financial-decision making at a higher degree and in turn affect stock returns as addressed in section 4.2.2. Moreover investors in collectivistic countries are more risk-averse, which could increase the limits to arbitrage due to noise trader risk.

Countries with high uncertainty avoidance have a statistical significant higher level of investor sentiment measured in the higher abnormal return. The abnormal return after a win will increase by 0.004383 percent when UAI increase by 1. Moreover, the total

\[ e = \beta_0 + \beta_1 \times W + \beta_2 \times Z + \beta_3 \times W \times Z \rightarrow -0.069786 + (0.125465 \times 1) + (0.004197 \times -35.396813) + (-0.007962 \times 1 \times -35.396813) = 0.188948 \]

\[^{1} X_i = X_i - \bar{X}_i \rightarrow 27 - 62.396813 = -35.396813 \]

\[^{2} e = \beta_0 + \beta_1 \times W + \beta_2 \times Z + \beta_3 \times W \times Z \rightarrow -0.069786 + (0.125465 \times 1) + (0.004197 \times -35.396813) = 0.188948 \]
abnormal return after a win in the country with the highest uncertainty avoidance level (100) within the sample is 0.112096 percent (Appendix 14). These findings are in line with those by Schmeling (2009) as stated in section 4.2.2 and 4.2.3. The higher investor sentiment in these countries are by Schmeling (2009) explained by people’s behavior in these countries. Individuals in high uncertainty avoidance countries tend to react more emotionally and therefore tend to have an overreacting behavior. This might explain the findings of the current study. Investors react emotionally after soccer games, as soccer is able to drive sentiment, which leads to an overreaction causing the abnormal return to increase. Schmeling (2009) also stated a high correlation between collectivistic countries and high uncertainty avoidance countries, where countries with these two dimensions have a tendency of herd-like overreaction behavior. This behavior induces investor sentiment. This study also found a correlation between these two dimensions of 0.64 as stated in section 4.2.2. The finding of investor sentiment in both dimensions in the current study might therefore be explained by a herd-like overreaction among investors as addressed in section 4.2.2 and section 4.2.3. The countries of high uncertainty avoidance are also linked to more risk-averse individuals, which can increase the limits to arbitrage stated in section 3.4.3 and thereby explain the higher level of investor sentiment.

This study also found investor sentiment to be statistical significantly higher in countries with high power distance, as the moderator indicates an increase in the abnormal return of 0.006555 percent when PDI increase by one. The highest PDI score in the sample correspond to 93, which will lead to an abnormal return after a win of 0.195880 percent (Appendix 14). As addressed in section 4.2.4, a direct link between investor sentiment and countries with high power distance has not been found in previous studies. This study finds a correlation of -0.60 between IDV and PDI and a correlation of 0.71 between UAI and PDI. As addressed above collectivistic countries and high uncertainty avoidance countries have a tendency of herd-like overreaction behavior. This might explain the finding of a stronger investor sentiment-return relation in high power distance countries. Furthermore, in section 4.2.4 it was stated that collectivistic countries are subject to herding behavior, which might be connected to the less powerful people adapting the opinion of the more powerful people in high power distance countries. This evidence of investor sentiment in high power distance might
therefore be due to people’s tendency of herding behavior. The individuals in countries of high power distance are also more risk-averse, which can also increase the level of investor sentiment due to limits of arbitrage (section 3.4.3). However, these indications are only based on correlations between the cultural dimensions and nothing evidently can be concluded.

The dimension of LTO also moderates the level of investor sentiment at a statistically significant level. The evidence shows that the abnormal return after winning a game is reduced by -0.004866 percent when LTO increases by one. This indicates that countries of short-term orientation have a stronger investor sentiment-return relation. The country with the lowest level of LTO (24) would have an abnormal return of 0.414366 percent after a win (Appendix 14). The moderating effect of LTO cannot be validated in previous studies, as the literature on this dimension is highly limited. Further, the moderation cannot be explained by a correlation with the other dimensions (Appendix 3). As elaborated in section 4.2.6, Hofstede et al. (2010) address that short-term orientated countries have strong feelings in regard to their own countries, whereby they might get more involved with their national soccer team. Further, Matsumoto et al. (2007) state that the dimension, short- or long-term orientation, is related to more emotional responding than individualism/collectivism. Also, short-term orientated countries invest in more liquid assets as opposite to long-term orientated countries which invest more in real estate. The strong feelings for their own countries and more emotional responding might indicate a more sentimental responding to soccer outcomes, which might influence the financial decision-making and hereby impact the stock market. However, the emotional responding is also seen for long-term orientated countries and the causality are rather weak, whereby no valid explanations for the finding of a higher level of investor sentiment in short-term orientated countries can be drawn.

The investor sentiment was also investigated for Hofstede’s latest dimension indulgence vs. restraint, where this study finds investor sentiment to be moderated by this dimension. The moderator effect indicates that the abnormal return after a win drops with 0.006611 when IND increases by one. Hence, the level of investor sentiment is higher for countries of restraint. The most restraint countries in this sample (16) would
have an abnormal return of 0.152262 percent after a win (Appendix 14). This finding cannot be validated in previous literature as it is highly limited. One possible explanation of the finding might be the high correlation between IND and UAI and PDI, and the relative weaker correlation with IDV (Appendix 3). As elaborated above, collectivistic countries and countries with high uncertainty avoidance are subject to the behavior of herd-like overreaction, which might explain the effect found for countries of restraint due to the correlations. However, such explanation is rather weak as it is solely based on correlations.

*Sub-conclusion:* This study finds that the cultural dimensions of IDV, UAI, PDI, LTO and IND moderate the relation between investor sentiment and abnormal stock returns. The null hypothesis, $H_0^b$, can therefore be rejected. This study finds the level of investor sentiment to be higher in collectivistic countries, high uncertainty avoidance countries, high power distance countries, short-term orientated countries and restraint countries. The finding of a stronger investor sentiment-return relation in collectivistic countries and high uncertainty avoidance countries might be due to behavioral factors related to these dimensions in previous studies, which influence financial decision-making and hereby stock returns. Due to correlations among the dimensions, these behavioral factors might also explain the findings related to the dimensions of PDI and IND. In general, the research within the link between investor sentiment and culture are rather limited especially for the latest added dimensions of LTO and IND, which make the explanation of investor sentiment for some dimensions rather weak.
11 Robustness Analyses

To investigate the sensitivity of the findings in this study, robustness analyses will be conducted based on the factors elaborated in section 7.5. Firstly, to investigate the robustness of the results found for Hofstede’s culture dimensions, the GLOBE dimensions are applied for robustness analysis in section 11.1. Secondly, to investigate the sensitivity of the main findings analyzed in section 9.2, the most extreme observations are removed and the findings are evaluated in section 11.2. Lastly, in section 11.3 the GARCH model has been applied for estimating the normal return of regression 7.4, wherefrom the abnormal returns are derived.

11.1 Robustness Analysis Applying GLOBE

The moderating effect of culture was investigated in section 10 with the use of Hofstede’s six cultural dimensions. These results indicated that five of the dimensions moderated the level of investor sentiment. To investigate the robustness of these results, the corresponding dimensions of GLOBE’s cultural study are applied except for a validation of Hofstede’s dimension of indulgence, as elaborated in section 7.5.1. The moderating effect of GLOBE’s cultural dimensions on daily abnormal stock returns after soccer wins are presented in Table 11.1 using value entities for measurement.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Coefficient</th>
<th>(\beta_0)</th>
<th>(\beta_1)</th>
<th>(\beta_2)</th>
<th>(\beta_3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDV</td>
<td>5.654089</td>
<td>-0.083163</td>
<td>0.144761</td>
<td>0.070831</td>
<td>-0.138792</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td><strong>-2.126688</strong></td>
<td>***2.635826</td>
<td>0.635248</td>
<td>-0.808002</td>
<td></td>
</tr>
<tr>
<td>UAI</td>
<td>4.101475</td>
<td>-0.082154</td>
<td>0.144225</td>
<td>-0.093751</td>
<td>0.158283</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td><strong>-2.143264</strong></td>
<td>***2.658274</td>
<td>-1.291190</td>
<td>1.592220</td>
<td></td>
</tr>
<tr>
<td>PDI</td>
<td>2.634226</td>
<td>-0.083230</td>
<td>0.145026</td>
<td>-0.013382</td>
<td>0.061850</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td><strong>-2.109710</strong></td>
<td>***2.628367</td>
<td>-0.090871</td>
<td>0.287856</td>
<td></td>
</tr>
<tr>
<td>MAS</td>
<td>5.087279</td>
<td>-0.079908</td>
<td>0.144046</td>
<td>0.198499</td>
<td>-0.407480</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td><strong>-2.114925</strong></td>
<td>***2.636317</td>
<td>0.958528</td>
<td>-1.199903</td>
<td></td>
</tr>
<tr>
<td>LTO</td>
<td>5.275337</td>
<td>-0.087888</td>
<td>0.148001</td>
<td>-0.123550</td>
<td>0.173400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>t-Values</td>
<td><strong>-2.142017</strong></td>
<td>***2.642452</td>
<td>-0.964876</td>
<td>0.972443</td>
<td></td>
</tr>
</tbody>
</table>

Note: Regression: \(e = \beta_0 + \beta_1 \cdot W + \beta_2 \cdot Z + \beta_3 \cdot W \cdot Z\), where Z is the cultural dimension. *statistical significance at a 10% level, **statistical significance at a 5% level, ***statistical significance at a 1% level. The sample are reduced to 1098 games, as there are no values for Belgium, Bulgaria, Croatia, Czech Republic, Norway and Romania.
The moderating effect of culture in relation to investor sentiment is statistical insignificant for all of GLOBE’s cultural dimensions. Hence, the abnormal return after soccer wins is not moderated by any cultural dimension at a statistical significant level. As presented in appendix 15, this is also valid for soccer losses. Appendix 15 also contains the moderating effect using GLOBE’s practice entities for both wins and losses. These results are also statistical insignificant except from the IDV dimension, where collectivism moderate the investor sentiment-return relation positively.

The sample has changed due to missing GLOBE data for six of the countries, which makes it difficult directly to compare these results with the ones in section 10. Appendix 16 therefore shows the moderating effect of culture using Hofstede’s cultural dimension on the reduced sample. These results are more in line with the ones of this section, as most of the cultural dimensions have no statistically significant moderating effect.

Sub-conclusion: Generally, the use of GLOBE’s cultural dimensions was not able to validate the findings in section 10. However, not all of Hofstede’s dimensions correspond directly to those of GLOBE’s and the sample size are substantially reduced due to missing data on GLOBE for 6 out of 26 countries. The GLOBE study is therefore not completely valid for robustness checks. If Hofstede’s cultural dimensions are applied to the same countries as GLOBE’s the results become more aligned. This indicates that the results are more robust when the two cultural measures are applied to the same sample.

11.2 Robustness Analysis Applying a Trimmed Sample

To investigate whether the main findings in section 9.2 are sensitive to extreme observations, the sample is trimmed by 1 %. Table 11.2 presents the daily abnormal return after wins and losses using the trimmed sample (Appendix 7 includes an overview of the removed outliers).
### Table 11.2 Abnormal Daily Stock Return after European Soccer Matches using a Trimmed Sample

<table>
<thead>
<tr>
<th></th>
<th>Wins</th>
<th></th>
<th></th>
<th>Losses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>β₁</td>
<td>t-Values</td>
<td>N</td>
<td>β₂</td>
</tr>
<tr>
<td>All Games</td>
<td>738</td>
<td>0.000207</td>
<td>0.736443</td>
<td>568</td>
<td>-0.000269</td>
</tr>
</tbody>
</table>

*Note: *statistical significance at a 10% level, **statistical significance at a 5% level, ***statistical significance at a 1% level. The sample is trimmed by 1% corresponding to removal of 12 outliers.

The causality between return and soccer wins or losses is still complete as the daily returns are positive (negative) after soccer wins (losses). However, the effect has become smaller as the magnitudes of the coefficients are relative smaller compared to the corresponding findings in section 9.2. Recall, that the abnormal return was 0.054809 percent after wins and -0.071042 percent after losses, where the corresponding effects, after removal of extreme results, are 0.000207 percent and -0.000269 percent. By only removing 1% of the most positive and negative abnormal returns in the sample, the return after soccer wins and losses are statistical insignificant. The main findings in section 9.2 are therefore highly sensitive to the dataset applied and the conclusions drawn in section 9.2 are rather weak. The moderating effect of culture has also been tested using the trimmed sample (Appendix 17). These results also become statistical insignificant.

As discussed in section 7.5.2 there are especially four soccer games, which are followed by extreme first day returns. Appendix 18 tests the influence of these four games by removing them from the sample. The evidence indicates that by removing these four games the results become insignificant, which support the conclusion that the results are extremely sensitive.

**Sub-conclusion:** Focusing on the sensitivity of the main results in this study, the effect of investor sentiment is highly sensitive to the dataset applied. By trimming the dataset by 1%, the main findings become statistical insignificant. However, the results already become insignificant if the four most extreme values are removed. This of course questions the usefulness of the results, which among other things will be discussed in section 12.2.
11.3 Robustness Analysis Applying the GARCH Model

As mentioned in section 7.5.3 there might be problems with the assumption of constant variance when applying OLS on regression 7.4. This might be solved using the GARCH model, which have been applied in this section. Table 11.3 shows the relation between soccer matches and abnormal normalized stock returns.

Table 11.3 Abnormal Normalized Stock Returns after European Soccer Matches

<table>
<thead>
<tr>
<th></th>
<th>Wins</th>
<th></th>
<th>Losses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>$\beta_1$</td>
<td>t-Values</td>
<td>N</td>
</tr>
<tr>
<td>All Games</td>
<td>744</td>
<td>0.041907</td>
<td>1.324428</td>
<td>574</td>
</tr>
</tbody>
</table>

Note: *statistical significance at a 10% level, **statistical significance at a 5% level, ***statistical significance at a 1% level.

Applying the GARCH model slightly alters the results, as the effect of winning a soccer match becomes insignificant. Moreover the effect of losing a soccer match becomes significant at a 5% level compared to a 10% level in section 9.2. This indicates that only the results in relation to losing a soccer game are robust when applying another method for estimating the normal return. This is in line with Edmans et al. (2007), who also find that only soccer losses have a statistical significant effect.

Viewing the magnitude of the abnormal stock returns these have changed by 0.012902 percentage points for winning games and 0.023152 percentage points for lost games. The abnormal normalized stock returns have also been applied in regard to the subsequent analysis, the moderating effect of culture and the robustness test applying a trimmed sample. All of these show results similar to the ones stated in earlier sections (Appendix 19).

Sub-conclusion: This section indicates that the results of this study also are influenced by the model applied for estimating normal stock returns. However, the main findings, that losses are followed by a negative return and wins by a positive return still holds, even though only losses have a significant effect when applying the GARCH model. This indicates that only loss results are robust when applying another model of estimating the normal return.
Part IV

Discussion and Conclusion
12 Discussion

In part III the results of the current study were presented and analyzed. In this section the results will be further discussed to enlarge the understanding and perspective of these. In section 12.1 the implication of the results will be outlined to discuss the practical use of the main findings. Section 12.2 includes a reflection upon the results in regard to what drive these and section 12.3 discusses the applied methodology. Section 12.4 is a discussion of the generalizability of the results and lastly proposals for future research are included in section 12.5.

12.1 Implication of the Results

In section 1.2 it was stated that the practical purpose of this study was to make investors aware of their investor errors and thereby reduce the impact of behavioral biases when making financial decisions. The main findings indicate that European investors are prone to investor sentiment measured using soccer matches played by national teams. The mood of the investor therefore impacts the decisions he/she makes on the first trading day following an important soccer match. If investors become aware of their subjection to sentiment, they might be able to correct their trading decisions on these days and avoid financial pitfalls. The moderating effect of culture indicates that especially people in collectivistic countries with high uncertainty avoidance should be even more aware of these findings, as these show higher levels of investor sentiment. This section will discuss how to overcome these biases.

Pompian (2012) categorized biases as either cognitive or emotional and stated that emotional biases were more difficult to correct. Even though, he believes that if investors recognize their mood they might be able to adjust their decisions in response to this. Baker & Nofsinger (2002) created a number of guidelines to help overcome behavioral biases. These will be presented in the following:

- **Understand and avoid biases**: Investors should be able to recognize the mistakes they make and thereafter try to avoid these. This study can make investors aware that they are affected by their sentiment when making investment decisions. If the
investors become aware of this they might be able to recognize when sentiment affects them and adjust.

- **Identify investment objects and constraints**: Investors can create realistic investment objectives by e.g. making risks and return requirements. Further, the investors could make rules in regard to time horizon etc. This might help them reduce the risk they take.

- **Develop quantitative investment criteria**: This can help investors become less influenced by their mood, as they evaluate each investment possibility in accordance with the quantitative investment criteria before investing.

- **Diversify investments**: Investors can diversify investments across assets (stocks, bonds etc.) and/or countries. This will often create a more stable return and reduce the risk. This could e.g. ensure that investors not only invest in their own countries.

- **Review and reallocate assets**: Investors should review their portfolios to see if these are in line with their investment criteria mentioned earlier. If the portfolios are not, then the investors should reallocate their assets. This ensures that if the investors have made investments not in line with the investment criteria they become aware of this and are able to correct the mistake.

Using the above recommendations, investors might be able to correct their trading decisions and avoid financial pitfalls. But avoiding financial pitfalls is definitely not the same as making a profitable trading strategy.

*Sub-conclusion*: The current study is a way of making investors aware of their sentiment, which is necessary to overcome the behavioral biases linked to investor sentiment. This can further help them avoid behavioral biases in the future. To ensure that the investment decisions are not influenced by investor sentiment it would further be advised to develop quantitative investment criteria, diversify the investments and lastly to review the investments periodically. However, this will not lead to a profitable trading strategy.
12.2 Result Reflections

This study documents positive (negative) abnormal returns after the events of soccer wins (losses). However, the results might be vague due to several factors. Firstly, as addressed in section 5.2.2, the effect on mood after national soccer games is expected to be isolated in the specific countries meaning that the result of a national game will in general not have a mood effect in more than the two countries involved. But due to the structure of the tournaments, the result of a soccer game might impact the mood of a third country not involved in the game. E.g., at the UEFA European Championship 2004 group C included Sweden, Denmark, Italy and Bulgaria. Bulgaria had lost to all three teams, so they had no chance of moving on. Italy’s matches against Sweden and Denmark had ended in draws. In the last group match Sweden played against Denmark and if this game ended 2-2 both nations would move on to the next stage. Any other result would make Italy go to the quarterfinals. The game ended 2-2 and Italy was out of the tournament even though they had won their game against Bulgaria on the same day (Nielsen 04.06.2009).

Secondly, investors might have been affected by other major events unrelated to soccer games in the same period. This could influence financial-decision making and impact stock prices. One example is a clash of events in Greece in the period Friday 5th of September through Monday 8th of September 1997. Monday becomes the first trading day after the weekend and relevant information for the stocks returns recognized during the weekend will all be reflected in the market that day. On Monday, the Greek stock market earned an abnormal return of 7.5 percent, but it is rather difficult to give an exact explanation due to a clash of events. Hence, on Friday Greece was appointed to host the Olympic Games of 2004 at a voting by the IOC and on Saturday Greece won a soccer match against Slovenia whereby they still had the possibility of qualifying to the World Cup (Appendix 7). Thereby, it might not solely be the soccer match driving the stock returns and the results become spurious.

Thirdly, the market reactions might, to some degree, also reflect a rational processing of relevant information related to stock returns. In section 4.1.2 it was stated that participation in important soccer games could have a commercial effect for the countries involved. E.g. when Germany won the World Cup in 2014 it increased awareness of
Discussion

Germany in many other countries. This could therefore e.g. lead to more tourism. Hence, it will benefit the country economically.

Sub-conclusion: In a reflection upon the results, the causality between soccer results and stock returns are in some situations disturbed by other factors. Firstly, a soccer game might drive the mood of investors in another country besides the two countries involved in the game. Secondly, other major events may occur in the same period as soccer games, which makes it harder to state a valid relation between soccer results and abnormal returns. Thirdly, the observed market reactions might, to some degree, be due to rational expectations.

12.3 Methodology Reflections

In this study a regression of different variables, including dummies, were applied for estimating the normal return and hence the abnormal return. In general, the regressions used for estimating abnormal stock returns differ in the amount of included variables. E.g. Castellani et al. (2013) does not include any dummy variables, where the model applied in this study includes dummy variables for both weekdays and non-weekend holidays. By removing these dummy variables from the model, the results become statistical insignificant (Appendix 20). Thus, the dummy variables included in the model are highly relevant for estimating abnormal returns.

This study applies a large dataset, which increase the possibility of finding statistical significant results. If enough information is included, the models will always find something (Verbeek 2012).

Sub-conclusion: The inclusion of characteristics on the trading days with the use of dummies, are highly relevant in the model applied in this study as the results otherwise are insignificant. Moreover, the use of a large dataset could be one of the reasons why the results become statistically significant.
12.4 Generalizability

The findings of this study are based on a sample of soccer games played by European national teams in the time period 01.01.1974-31.12.2014. Edmans et al. (2007) inspired the use of soccer games played by national teams as a measure of investor mood. However, the findings in the present study deviate from the study of Edmans et al. (2007), as they find statistically significant results after losing a soccer game also after trimming the sample, which indicates more robust results. This could be due to differences in the samples. The current sample period is extended by 10 years compared to Edmans et al. (2007). The sample split in appendix 12 indicated that the last 14 years do not deviate from the first 36 years. It therefore seems that the increased sample period does not influence the results. The results therefore primarily deviate due to the countries included in the samples. Edmans et al. (2007) have a much more diversified sample of countries, as these are both developed and less developed and represents all continents. The current sample only includes European countries, which makes the results mainly generalizable to these. The results might further be generalized to other developed countries, as these differ from less developed countries in relation to investor sentiment (Chen et al. 2013). Moreover, most European countries in the sample can be categorized as developed.

The moderating effect of culture is generalizable to all European countries. Especially countries of collectivistic and high uncertainty avoidance show higher levels of investor sentiment. In the current sample these countries include Spain, Portugal, Greece, Turkey and the Eastern European countries. Schmeling (2009) found similar results when focusing on developed countries. As all of the countries in the current study are also developed it seems plausible to generalize the findings to other developed countries.

In section 5.2.2 it was outlined why soccer results could serve as a measure of mood. Moreover, in section 5.1 it was stated that events, which were widely noted, could be able to create an investment fashion. The findings might therefore be generalized to other major events fulfilling the requirements of a mood variable. These events would deviate across countries due to specific interests. In some countries these might therefore be other sport events, royal events, religious events etc.
**Discussion**

*Sub-conclusion:* In general, the European countries in the sample of this study are all considered to be developed countries and the findings might be generalizable to other developed countries. Further, investor sentiment might also be induced by other major events and the results might therefore be generalizable to these.

### 12.5 Future Research

The study indicates that the findings of Edmans et al. (2007) do not hold for a sample only consisting of European countries, as these findings are very sensitive. To further validate the results of Edmans et al. (2007) the same methodology could be applied on a sample consisting only of non-European countries. Moreover, it would be interesting to create two samples consisting of developed and less developed countries, respectively, to investigate whether these deviate in their response to investor sentiment, as stated by Chen et al. (2013). This could also be applied to the moderating effect of culture.

Furthermore, future research might benefit from considering the aspect of institutional development as a moderating effect of investor sentiment. Chui et al. (2010) and Schmeling (2009) suggest that markets with higher institutional quality better facilitate the flow of information, which reduce transaction costs and in turn make markets more efficient and therefore indicate lower levels of investor sentiment. However, it is expected that the quality of institutions are relative more alike across European countries than institutions worldwide due to the EU and a difference may not be found across European countries.

The findings of investor sentiment are highly sensitive to the sentiment proxy applied, as stated in section 1. To evidently state investor sentiment in European countries, application of other sentiment proxies would be beneficial for future research. Recall, the different proxies listed in section 5.2. Also, to validate the use of a mood variable as a proxy for investor sentiment, other mood variables besides soccer results could be applied in the European markets. Remember from section 1, that other studies have used sunshine and lunar phases as drivers of investor mood.

*Sub-conclusion:* The results of Edmans et al. (2007) were not consistent across European countries as evidently stated in this study. To further validate the results of
Edmans et al. (2007), one could investigate only non-European countries. Future research might also benefit from considering other moderator variables besides culture including the institutional development and the general level of development. Further, several studies state sensitivity in the results due to the sentiment proxy applied, whereby application of other sentiment proxies or mood variables could be beneficial for future research.
13 Conclusion

This study investigated whether investors are influenced by their sentiment when investing in stocks and whether the effect of investor sentiment is moderated by national culture.

Inspired by Edmans et al. (2007), this study applied investors mood as a proxy for investor sentiment using the outcome of soccer games as a mood driver. The sample included 1,318 soccer games played by 26 European countries in the period 01.01.1974-31.12.2014. To investigate the moderating effect of culture, Hofstede’s six cultural dimensions were applied. OLS regression models were used for investigating the relation between investor sentiment and abnormal stock returns and further the moderating effect of culture.

The main findings show that a soccer win (loss) is followed by a statistical significant positive (negative) abnormal return on the first trading day after a match. A soccer win might induce a good mood manifested in a positive stock return and a soccer loss might induce a bad mood manifested in a negative stock return. Investors in a good mood are often more optimistic, which induce more positive expectations for the future. This could indicate an influence of investor sentiment on financial decision-making revealed in higher stock returns. The findings indicate an overreaction in the stock returns after soccer games, which question the efficient market theory. In general, these findings are not driven by specific tournaments as WC and EC or game-type as qualification, group and elimination games. Furthermore, the results are not more pronounced in top-soccer nations or non-top-soccer nations, recent data or historical data, small or large stocks and growth or value stocks.

This study evidently states that the investor sentiment-return relation is moderated by cultural differences. Specifically, the cultural dimensions of IDV, UAI, PDI, LTO and IND moderate the relation between investor sentiment and abnormal stock returns. The level of investor sentiment is higher in collectivistic countries, high uncertainty avoidance countries, high power distance countries, short-term orientated countries and restraint countries. The finding of higher investor sentiment in collectivistic countries and high uncertainty avoidance might be induced by a herd-like overreaction among
investors in their financial decision-making and hereby an observable reaction in the stock returns. The positive moderating effect in countries of high power distance and countries of restraint might be explained by correlations among the dimensions. The explanation of a larger market reaction in short-term orientated countries cannot be validated within earlier literature. Overall, the research on the investor sentiment-return relation and culture is highly limited, whereby the explanation of investor sentiment in relation to specific dimensions becomes rather weak.

However, the results are highly sensitive to the dataset and by removal of the most extreme observations, the findings are statistically insignificant and no valid conclusions can be drawn from the study. The results thereby deviate from the findings of Edmans et al. (2007), which indicate a lower level of investor sentiment in European countries compared to Edmans et al. (2007) sample, which include countries from all continents. Evidence does not indicate that the extended sample period influence the results.

Even though the results are not robust they still indicate that investors, to some degree, could be influenced by mood in financial decision-making. The practical use of these findings is to make investors aware of the impact of sentiment. This could make investors able to correct their trading decisions, whereby they might avoid financial pitfalls. Investors in countries, which have the highest level of investor sentiment, measured by the cultural characteristics, might benefit even more from becoming aware of their sentiment.
14 List of References

14.1 Books


Hofstede, Geert; Hofstede, Jan Gert; Minkov, Michael (2010), *Kulturer & organisationer: Overlevelse I en grænseoverskridende verden*, 3rd edition, Handelshøjskolens Forlag, København


14.2 Book Chapters


14.3 Articles


List of References


Li, K, Griffin, D, Yue, H & Zhao, L 2013, ‘How Does Culture Influence Corporate Risk-Taking?’, *Journal of Corporate Finance*, vol. 23, pp. 1-22


White, GF 1989, ‘Media and Violence: The Case of Professional Football Championship Games’, *Aggressive Behavior*, vol. 15, no. 6, pp. 423-433


**14.4 Articles from Webpages**


<http://www.econlib.org/library/EncI/NeoclassicalEconomics.html>

**14.5 News Articles**


Nielsen, A 04.06.2009, ‘2-2 i sidste minut skabte italiensk raseri’, *Politiken.dk*< http://pol.dk/724523>


Ritzaus Bureau (06.09.1997): *Uanset kampen mod Kroatien: Danmark i skæbnekamp til sidst*, Ritzau, Artikel-id: Z2085127


Ritzaus Bureau (26.03.2005): *Cocu bragte Holland på sejrskurs mod Rumænien*, Ritzau, Artikel-id: e03645dd

Ritzaus Bureau (22.06.2012A): *Sejrende tyskere sætter ny verdensrekord*, Ritzau, Artikel-id: e34b2605

Ritzaus Bureau (22.06.2012B): *Symbolsk EM-opgør rykker stort EU-møde*, Ritzau, Artikel-id: e34acae2

Sporten.dk (22.06.2012): *Tryner tyskerne også grækerne i fodbold?*, sporten.dk, Artikel-id: e34aeb10

Svensson, Terkel (05.09.1999): *EU på vej til forsoning med Tyrkiet*, Ritzau, Artikel-id: Z4752903

### 14.6 Webpages

Catholic Hierarchy, *Statistics by Country*,  

ELO ratings: <http://eloratings.net>


FIFA: <fifa.com>

Investopedia: <www.investopedia.com>

Most Popular Sports: <www.mostpopularsports.net>


Time and date: <http://www.timeanddate.com/calendar/>

UEFA: <uefa.com>

UEFA 2012, *Stunning figures for UEFA EURO 2012*  


14.7 Other


Datastream Database


