RADBOUD UNIVERSITEIT NIJMEGEN

The Soccer Stock Market Anomaly

Master Thesis: Financial Economics

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Abstract

The outcomes of important national soccer team matches have been linked to next trading day stock returns, most likely through the impact of the result on the moods and emotions of investors. Previous studies, studying different countries and time periods, reach different conclusions on whether or not this effect holds or not. This thesis investigates whether the proposed soccer result and stock market linkage might in fact be country and culture specific, and investigates what differences in cultural dimensions might explain the presence or absence of such a linkage. I find that rate of indulgence and individualism decrease the effect of a national soccer team loss on stock prices. The cultural dimensions of masculinity, long-term orientation, and individualism, decrease the effect of a national soccer team win on stock prices. Furthermore, the effect of a win on stock prices is bigger for so-called “soccer countries” and smaller for relatively wealthier countries. Hence, the anomaly is not uniform across countries and cultures but rather is influenced by the culture and relative wealth of a country, partially explaining the varying effects found in the existing literature.

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1. Introduction

Neoclassical economics is a set of solutions to economics focusing on the determination of goods, outputs, and income distributions in markets through supply and demand. Neoclassical economics assume that people`s (investors, consumers, etc.) behavior is completely rational. This view is criticized by behavioral economics, which incorporate psychological influences into economics. According to Loewenstein et al. (2001), people react to the prospect of risk at two levels: they evaluate the risk cognitively, and they react to it emotionally. Cognitive evaluations of risk are sensitive to the variables identified by decision theory, namely probabilities and outcome valences, which is in line with the neoclassical approach. Emotional reactions are sensitive to the vividness of associated imagery, proximity in time, and a variety of other variables that play a minimal role in cognitive evaluations.

There are various rules of thumb or heuristics that can lead to psychological biases and systematic errors involving how investors think (Baker & Nofsinger, 2002). One of these heuristics is mood and optimism. The mood of investors affects their decision making (Sjoberg, 2006; Kirchsteiger et al., 2006) and affects the way they analyze and make judgments (Nofsinger, 2002). Numerous studies have found that investors in good moods make optimistic judgments and choices and those investors in bad moods make pessimistic judgments and choices (Isen et al., 1978; Johnson & Tversky, 1983; Schwarz & Clore, 1983).

These emotional reactions are the topic of this master thesis. More specifically, whether international soccer results have an effect on the moods of investors, and whether this effect is observed on the stock market. The effect on the stock market is measured by abnormal returns. An abnormal or excess return is the difference between observed return and that appropriate given a particular return generating model (Peterson, 1989). In other words, this master thesis will investigate if there is a stock market anomaly due to international soccer results. Stock market anomalies refer to situations where a security or group of securities performs contrary to the notion of efficient markets, that security prices reflect all available information at any point in time.

Previous research in this topic, discussed in section 2.4 and 3.1, suggests the soccer market anomaly differs between countries. Hence, this thesis investigates whether some explanatory variables influence the potential soccer stock market anomaly, which could explain the difference between countries. These explanatory variables are pre-game expectations, culture, the popularity of soccer, and the wealth of the country.

The first explanatory variable, which could explain the difference in the soccer market anomaly between countries, is pre-game expectations. The emotions of investors are always relative. A win contrary to the expectations could feel like a bigger win, and a loss contrary to the expectations could feel like a bigger loss. Hence, the expectation is that the effect of international soccer results through the emotions of investors on the stock market is influenced by the pre-game expectations.

The second explanatory variable, which could explain the difference in the soccer market anomaly between countries, is culture. Anderson et al. (2011) define culture as a system of shared values, beliefs, and attitudes that influences individual perceptions, preferences, and behaviors. Because culture influence the behavior of people, the expectations is that, the effect of international soccer results through the emotions of investors on the stock market is influenced by culture.

The third explanatory variable, which could explain the difference in the soccer market anomaly between countries, is whether the country is classified as a soccer country. If a country is a soccer country, the people in a country are emotionally closer to the soccer results. People who love soccer are more affected through the results. Hence, the expectation is that the effect of international soccer results through the emotions of investors on the stock market is influenced by the classification of the country as a soccer country.

The fourth explanatory variable, which could explain the difference in the soccer market anomaly between countries, is the GDP of a country. The expectation is that soccer results are more important for a less wealthy country. Therefore, the effect of soccer results on the stock market could be lower for a country with a higher GDP level because the impact on the emotions of investors is lower. Hence, the expectation is that the GDP level of a country influences the effect of international soccer results through the emotions of investors on the stock market.

This thesis is organized as follows. Chapter 2 explains the theoretical framework, which contain the efficient market hypotheses, behavioral economics, culture, and the previous studies of the topic. Chapter 3 discusses the research question and formulates the hypotheses. Chapter 4 discusses the necessarily data and method to investigate the research question and test the hypotheses. Chapter 5 contains the results of the investigation. Chapter 6 gives the conclusions. In chapter 7 the results and concludes of the investigation will be discussed.

2. Theoretical framework

The theoretical framework explains the most important theories and provides the basis for this research. First of all the most important and broad theories from the neoclassical economics, which are the Efficient Market Hypotheses (EMH) and the Arbitrage Pricing Theory (APT), are discussed. These theories explain pricing in the stock market. The dominant view during the neoclassical economics is rational behavior. This view is criticized by behavioral economics and their subfield behavioral finance, which incorporates psychological influence in economics. Behavioral finance focuses on a more practical level, and explains why the theory of the neoclassical economics does not hold in practice. Section 2.3 argues that culture has an influence on the behavior of investors. The focus of this section is on the cultural dimensions of Geert Hofstede. Finally, before the research problem is formulated, the relevant research in the topic of the effect of international soccer results on the stock market is discussed. This provides an overview of the research in the topic.

2.1. Efficient Market Hypotheses

An important theory in financial economics is the efficient market hypotheses (EMH) proposed by Eugene Fama (1970). The most important assumptions of the EMH are that markets are rational and that markets make unbiased forecasts of the future. The general concept of the EMH is that financial markets are "informationally efficient", which means that asset prices in financial markets reflect all relevant information about an asset. If asset prices reflect all relevant information, it is impossible to "beat the market"- i.e. generate returns that are higher than the overall market on average without incurring more risk than the market. According to the EMH, stocks always trade at their fair value on stock exchanges. This implies that stock prices follow a *Brownian motion*, later referred to as a *stochastic process* or a *random walk* (Verheyden, de Moor, & Van den Bossche, 2014) because change is not predictable based on information. So in order to generate a higher return than the overall market you have to take more risk or just be lucky.

The Arbitrage Pricing Theory (APT), created by Stephen Ross (1976), can explain the intuition behind the EMH. The APT is the most fundamental principle of the capital markets and a well-known method of estimating the price of an asset. The assumptions of the APT are that some investors are rational and that an asset's return is dependent on various macroeconomic, market and security-specific factors. The pricing theory states that two identical assets cannot be traded at different prices and afford you the opportunity of an instantaneous risk free profit. If the market price of a stock was lower/higher than what available information would suggest it should be, investors could (and rational investors would) profit by buying/selling (short selling) the asset. This increase in demand/ supply, however, would push up/ down the price of the asset until it was no longer "underpriced"/ "overpriced". The profit motive of investors in these markets would lead to "correct" pricing of

assets. It is important to keep in mind that EMH doesn`t imply that no one ever profits from adjustments in asset prices. Profits go to those investors whose actions move the assets to their "correct" prices. However, no single investor is consistently able to profit from these price adjustments.

Technically speaking, the EMH comes in three forms: strong-form efficiency, semi-strong form efficiency and weak-form efficiency. Strong-form market efficiency resembles full efficiency. Strong-form market efficiency asserts that markets are efficient with respect to all information that is known by any market participant (Malkiel, 1989). So according to the strong-form efficiency, asset prices adjust almost instantaneously not only to new public information but also to new private information. Therefore, if the strong form persists, then no one can beat the market in any way, not even by insider trading (Brealey et al, 1999).

Semi-strong form market efficiency asserts that markets are efficient with respect to all and any publicly available information relevant to the markets as a whole or to any individual security. So according to the semi-strong form efficiency, stock prices react almost immediately to any new public information about an asset. In addition, the semi-strong form of the EMH claims that markets do not overreact or under react to new information. This implies that an investor cannot consistently beat the market with a model that incorporates all publicly available information. Semi-strong form market efficiency is investigated by looking at the adjustment of asset prices to a specific kind of information generating event (Fama, 1970). This is known as event studies (see also section 4).

The definition of weak-form efficiency asserted that markets were only efficient with respect to information contained in the past price (or return) history of the market (Jensen, 1978). So according to the weak-form efficiency, future stock prices cannot be predicted from historical information about prices and returns. This means that price changes in a given day must reflect only the new information on that day and this information is independent of past prices. Because news is by definition unpredictable, asset prices follow a random walk. This implies that security prices are unpredictable and an investor cannot consistently beat the market with a model that only uses historical prices and returns as inputs.

The large body of research into asset prices and all levels of market efficiency have produced a large amount of findings that are left unexplained by, or simply contradict, the efficient market hypothesis. Out of this, the field of behavioral finance has evolved.

2.2. Behavioral Finance

The empirical evidence for the EMH is somewhat mixed, though the strong-form hypothesis has pretty consistently been refuted. In particular, behavioral finance researchers aim to document ways in which financial markets are inefficient and situations in which asset prices are at least partially predictable. In addition, behavioral finance researchers challenge the EMH on theoretical grounds by documenting both cognitive biases that drive investors` behavior away from rationality and limits to arbitrage that prevent others from taking advantage of the cognitive biases (and, by doing so, keeping markets efficient).

Behavioral finance is the study of the influence of psychology on the behavior of financial practitioners and the subsequent effect on markets. By incorporating knowledge of the human mind into economic theory, behavioral economics has provided a significant upgrade to neoclassical economics (Levinson & Peng, 2007). The central issue in behavioral finance is explaining why market participants make irrational systematic errors contrary to assumption of rational market participants. Such errors affect prices and returns, creating market inefficiencies. Behavior finance is of interest because it helps explain why and how markets might be inefficient (Sewell, 2007). Behavioral finance is a field of finance that proposes psychology-based theories to explain stock market anomalies such as severe rises or falls in stock price.

Stock market anomalies refer to situations when a security or group of securities performs contrary to the notion of efficient markets, where security prices are said to reflect all available information at any point in time. There are many market anomalies; some occur once and disappear, while others are continuously observed. There are different kinds of anomalies. Anomalies that are linked to a particular time are called *calendar effects*, such as the *Monday effect* and the *January effect*. Other anomalies are linked to the announcement of information regarding stock splits, earnings, and mergers and acquisitions.

Besides these market anomalies, there are also some nonmarket signals that some people believe will accurately indicate the direction of the market. An example is the Super Bowl Indicator, which is an indicator based on the belief that a Super Bowl win for a team from the old American Football League foretells a decline in the stock market for the coming year, and a win for a team from the old National Football League means the stock market will be up for the year. The Super Bowl indicator was correct more than 80% of the time over a 40-year period ending in 2008. This group of anomalies, superstitious market indicators, exists because of behavior biases by economic agents.

There are various rules of thumb or heuristics that can lead to psychological biases and systematic errors involving how investors think (Baker & Nofsinger, 2002). One of these heuristics is mood and optimism. The mood of investors affects their decision making (Sjoberg, 2006; Kirchsteiger et al., 2006) and affects the way they analyze and make judgments (Nofsinger, 2002). Numerous studies have found that investors in good moods make optimistic judgments and choices and those investors in bad moods make pessimistic judgments and choices (Isen et al., 1978; Johnson & Tversky, 1983; Schwarz & Clore, 1983).

There is an important role played by emotions as informational inputs into decision making. Emotions may be more than just an important input into decision making under uncertainty; they may be necessary and, to a large degree, mediate the connection between cognitive evaluations of risk and risk-related behavior (Loewenstein, Weber, Hsee, & Welch, 2001). Although decision making under risk has been a central topic of decision theory, the decision-theoretic approach to decision making under risk has largely ignored the role played by emotions.

According to Loewenstein et al. (2001), people react to the prospect of risk at two levels: they evaluate the risk cognitively, and they react to it emotionally. Cognitive evaluations of risk are sensitive to the variables identified by decision theory, namely probabilities and outcome valences. Emotional reactions are sensitive to the vividness of associated imagery, proximity in time, and a variety of other variables that play a minimal role in cognitive evaluations. Focusing narrowly on the topic of decision making under risk, Loewenstein et al. (2001) attempt to integrate two strands of literature, one showing that emotions inform decision making and the other showing that emotional responses to risky decision situations – that is, anticipatory emotions – often diverge from cognitive evaluations. This is known as the risk-as-feelings perspective, which is clarified by the following figure.

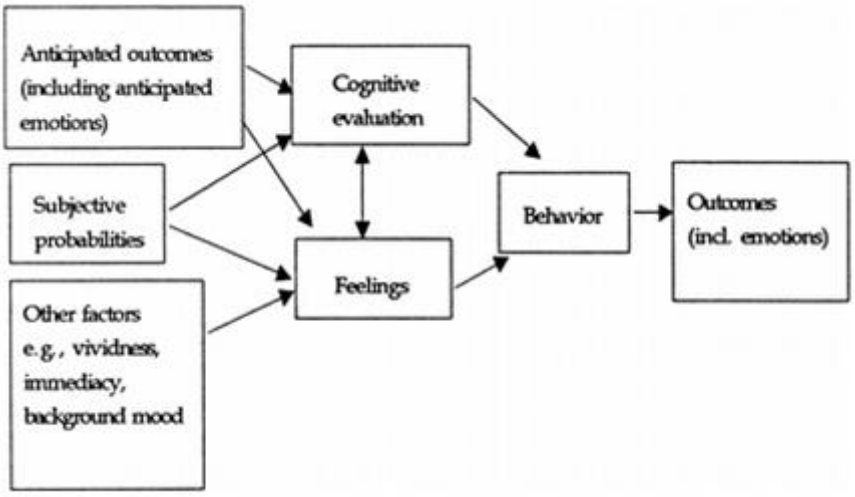


Figure 1: Risk-as-feelings perspective (Loewenstein et al., 2001)

An anticipatory emotional reaction, which is further called investor sentiment, sometimes diverges from cognitive evaluations and, when they do, the emotional reactions often exert a dominating influence on behavior. Investor sentiment, defined broadly, is a belief about future cash flows and investment risks that is not justified by the facts at hand. Charash et al. (2013) showed that the moods and emotions of investors have an effect on stock prices. They showed that activated pleasant mood predict increases in NASDAQ prices, while activated unpleasant mood predicted decreases in NASDAQ prices. Investors with positive mood achieve higher stock returns than investors with negative mood (Kourtidis et al., 2016). This is an important finding, because there are many phenomena that have an impact on stock market prices through the anticipatory emotional reactions of investors.

According to the EHM, human emotions should not affect stock market prices. A stock price is calculated through the discounted future dividends of a stock and the current mood of market participants should not in any way correlate with discounted future dividends of a stock.

The moods and sentiment of investors can be affected in many different ways. Studies showing that weather patterns in major financial centers influence stock index returns provide suggestive evidence that investor mood influence asset prices (Saunders, 1993; Hirshleifer and Shumway, 2003). For instance, sunshine is strongly significantly correlated with stock returns (Hirshleifer & Shumway, 2003), and relatively cloudier days' increase perceived overpricing in both individual stocks and the Dow Jones Industrial Index (Goetzmann, Kumar and Wang, 2014). Research in psychology has shown that temperature significantly affects mood. Cao & Wei (2005) find a statistically significant negative correlation between temperature and returns across the whole range of temperature. All of these anomalies have an effect on stock market return through the moods and sentiment of investors. The question is no longer whether investor sentiment affects stock prices, but how to measure investor sentiment and quantify its effects (Baker & Wurgler, 2007).

2.3. Cultural dimensions

Before the 1990s the dominant view in economics was based on rational behavior, which is consistent with the theory of efficient market hypotheses. The previous section showed that behavioral economics contradicts the efficient market hypotheses; behavioral economists argue that people are not fully rational. Levinson & Peng (2007) argue that behavioral economic research has tended to ignore the role of cultural differences in financial and economic decision-making.

Since the early 1990s, culture has entered economic analysis again, whereas it was totally absent from mainstream economics during most of the second half of the twentieth century (De Jong, 2013). Culture is a broad concept and has many definitions such as: The transmission from one

generation to the next, via teaching and imitation, of knowledge, values and other factors that influence behavior (Bohyd & Richerson, 1985), the subjective aspect of a society`s institutions: The beliefs, values knowledge and skills that have been internalized by people of a given society (Inglehart, 1997), a system of shared values, beliefs, and attitudes that influences individual perceptions, preferences, and behaviors (Anderson et al, 2011). These definitions have some common features; values are essential, they refer to a group, they refer to a trend or pattern, and the cultural elements are humanly devised aspects that are transmitted from generation to generation (De Jong, 2013). The most important feature for this research is that culture influence (investors) behavior, which implies that culture can mediate the effect of moods and emotions on the stock market.

Hofstede (2001), whose cultural dimensions are frequently used, treats culture as the collective programming of the mind that distinguishes the members of one group or category of people from another. Geert Hofstede is a Dutch social psychologist well known for his pioneering research on cross-cultural groups and organizations. Hofstede`s cultural dimensions' theory is a framework for cross-cultural communication, it describes the effects of a society`s culture on the values of its members, and how these values relate to behavior. Hofstede determines six dimensions of national culture, which will be explained in more detail when the hypotheses of this thesis are formulated. Masculinity (MAS) versus femininity refers to the distribution of roles between genders. The indulgence (IND) dimension is essentially a measure of happiness, whether or not simple joys are fulfilled. The uncertainty avoidance (UA) index deals with a society`s tolerance for uncertainty and ambiguity. The long-term orientation (LTO) versus the short-term orientation dimension associates the connection of the past with the current and future actions/challenges. The individualism (IDV) index explores the degree to which people in a society are integrated into groups. Power distance index (PDI) is the extent to which the less powerful members of organizations and institutions accept and expect that power is distributed unequally.

Despite the evidence that groups are different from each other, people tend to believe that deep inside everybody is the same. In fact, cultural differences are minimized because of unawareness of other countries` cultures. This leads to misunderstanding and misinterpretations between people from different countries. Putting together national scores (from 1 for the lowest to 120 for the highest), Hofstede`s six-dimensions model allows international comparison between cultures.

2.4. Soccer and the stock market

The fact that the moods and emotions of investors have an effect on stock prices contradicts the efficient market hypotheses. As mentioned, there are many factors that affect the moods of investors, and this master thesis will specify on international soccer results. Emotions are particularly strong after large gains and losses (Thaler & Johnson, 1990), and investors might experience a soccer result as a gain or a loss. This section specifies on international soccer results as a mood indicator. The general concept is to investigate whether the international soccer results has an influence trough the moods and emotions of investors on the stock market. This concept is clarified by the following figure:

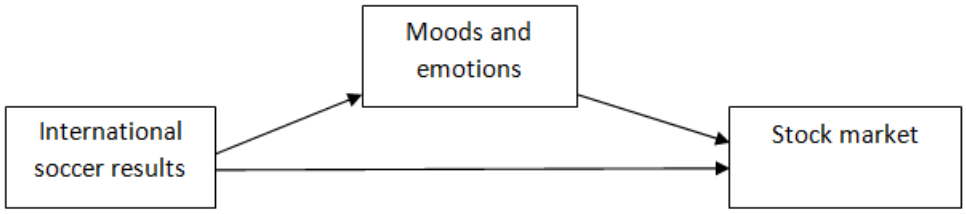


Figure 2: The concept of the research

International soccer results can affect the stock market in two ways. The soccer results can have a direct effect on the stock market. For example, Heineken sells potentially more beer when Holland wins an important soccer game. However, the indirect way is the interest of this research. The soccer results affect the stock market through the moods and emotions of investors. The effect on the stock market is measured through the "abnormal returns". Abnormal returns are defined as the difference between the actual stock price and the stock price according to EMH. According to the semi-strong form of efficiency, stock prices reflect all available public information. If there are abnormal returns due to international soccer results, which are public information, this will contradict the EMH on the semi-strong form efficiency. Furthermore, due to a significant soccer-sentiment effect there could be arbitrage opportunities, which mean that investors are able to earn a riskless payoff. In order to define the research problem and the hypotheses of this master thesis, this section explains the findings of the researches regarding this topic.

Edmans, Garcia and Norli (2007) investigate the effect of sport results on the stock market. They study the effect of soccer results of 39 countries on the respective stock market return on the next trading day. The reasons they use the respective stock markets of the countries is that investors are home biased, which means they invest largely in the stock market of their own country. Edmans, Garcia and Norli (2007) find a significant market decline after soccer losses and an insignificant

positive effect after soccer wins. Because other researchers follow their work, this research is one of the most important in this topic.

Other researchers studied the effect of the performance of a single national team on the stock market return on the next trading day (Ashton, Gerrard and Hudson, 2003; Botha and De Beer, 2013; Kang and Park, 2015). Although all these studies investigate the effect of international soccer results of a single national team on the stock markets, their findings differ slightly. Ashton, Gerrard and Hudson (2003) find a statistically significant positive relationship between the English national soccer team`s performance and changes in share prices on the London Stock Exchange and Kang and Park (2015) find a significant sentiment effect from national soccer match outcomes on the Korean stock market, while the results of Botha and De Beer (2013) indicate that sporting performance in South Africa does not significantly explain abnormal market returns, although they do find some evidence of a relationship between stock returns and sporting performance in the descriptive analysis. These different results suggest that the effect of soccer results on the stock market could be different for countries. The next section will further discuss this.

The previous studies showed the result of international soccer results affect next day stock returns through shifts in investors' mood. Ehrmann and Jansen (2015) also studied the effect of soccer results on the stock market. However, they studied minute-by-minute stock prices during sporting events instead of the market return on the next trading day. Because they study the intraday data, they test whether mood-related pricing effects already materialize as events unfold. They studied the soccer matches that led to the elimination of France and Italy from the 2010 World Cup and they use the data of a cross-listed firm, which allows for a straightforward identification of underpricing. During the matches, the firm`s stock is underpriced by up to 7 basis points in the country that eventually loses. The probability of underpricing increases as elimination becomes more likely.

Although they have slightly different results, Ashton, Gerrard and Hudson (2003), Edmans, Garcia and Norli (2007) and Kaplanski and Levy (2010) all document abnormal stock market returns on the trading day following international soccer games. There are however two caveats worth mentioning.

The first caveat is that the effect of the anomaly will diminish over time. It is possible that by recognizing and understanding this phenomenon, investors will find some financial devices to exploit it and, as a result, it may disappear (Kaplanski and Levy, 2010). De Senerpoint Domis (2013) verified the research of Edmans, Garcia and Norli (2007) and Kaplanski and Levy (2010), and showed the anomaly diminished over time.

The second caveat is that these researchers have been criticized by Gerlach (2011). His study shows that the patterns of returns documented in the papers by Edmans, Garcia and Norli (2007) and Ashton, Gerrard and Hudson (2003) also exist in matching countries whose national teams did not play on the dates included in the sample. Edmans, Garcia and Norli (2007) included global market movements as a control variable in their model. Gerlach (2011) argues that the world market index isn`t a good benchmark to measure stock market performance for several reasons. Previous research shows that regional factors can strongly influence stock market returns independent of a common global factor (Bekaert et al, 2003). Second, DataStream's World Market index is dominated by developed countries with the US, Canada, Japan and western Europe accounting for almost 80% of the index`s market value. Using the World Market index as a benchmark to measure stock market performance will not control for regional developments, particularly in areas not well represented by the index. Third, the winner and loser groups differ in their geographic composition. The fact that regional information matters and that this information could affect the winner and loser markets in systematically different ways suggest that the model of Edmans (2007) may not fully control for relevant information.

3. Research problem and hypotheses

This section summarizes and analyzes the previous research of the topic to determine the research problem. When the research problem and the coherent research question are determined, the hypotheses are formulated.

3.1. Research question

Most of the previous studies found a significant effect between international soccer matches and the stock market. However, there are some differences between the results. The table below summarizes the previous studies and show respectively: the investigated country (countries), the time-period of investigation, the moment of observing the stock market, and the results.

Table 1: A summary of the previous research

Auteur(s)	Year	Data	Time-period	Method	Results
Ashton, Gerrard and Hudson	2003	England	Jan 1984 - Jul 2002	Next trading day	Significant for losses Significant for wins
Edmans, Garcia and Norli	2007	39 Countries	Jan 1973 - Dec 2004	Next trading day	Significant for losses Insignificant for wins
Botha and De Beer	2013	South Africa	Jan 1990 - Dec 2010	Next trading day	Insignificant for losses Insignificant for wins
Kang and Park	2015	Korea	Jan 1983 - Aug 2012	Next trading day	Significant for losses Insignificant for wins
Ehrmann and Jansen	2015	Italy and France	May 3 - July 30, 2010	Intraday trading	Mixed effects

Ashton et al. (2003), Botha and De Beer (2013), and Kang and Park (2015) all studied the effect of the performance of a single national team on the next trading day stock market return. Their results, however, are different. Because they use a similar method and the time-period investigated is roughly the same, this suggests the different results are due to the fact they all studied a different country.

Moreover, Ashton et al. (2003), and Edmans et al. (2007) use a very similar methodological approach. The only difference is that Edmans et al. (2007) investigate 39 countries, while Ashton et al. (2003) only investigate England. The results of these studies are different. Again, this suggests that the results could differ between countries.

Maybe the differences are caused because the anomaly will diminish over time (Kaplanski and levy, 2010; De Senerpoint Domis, 2013). The results of Ashton et al. (2003), Botha and De Beer (2013), and Kang and Park (2015), are more significant when an older time-period is used, although the difference in time-period is very small. This indicates the different results are due to the anomaly diminished over time. However, Edmans et al. (2007) uses an older time-period than Ashton et al. (2003) do, but their results are less significant. Hence the different results of the previous studies are not (only) because the anomaly diminish over time (Kaplanski and levy, 2010; De Senerpoint Domis,

2013). Hence, the different results are potentially because of country differences. Previous studies suggest the effect of soccer results through the moods and emotions of investors on stock prices differs between countries. The purpose of this research is to prove the results differ between countries and to investigate what causes these differences. Therefore, the research question of this master thesis is:

"Is the effect of soccer results on stock prices different between countries and what factors can explain this differential impact?"

3.2. Hypotheses

Because the meaning of this thesis is to investigate the different results of the previous studies, the effect of international soccer results on stock prices is estimated by replicating the previous studies. Therefore, the first hypothesis is the following:

H_1: International soccer results affect the stock prices through the moods and sentiment of investors.

The result of this first hypothesis shows whether the anomaly exists. Because the previous studies have different results of the anomaly, the expectation is that the anomaly differs between countries. In order to investigate whether the anomaly differs between countries and to investigate potential causes for this difference, the anomaly should be estimated for each individual country. Therefore, the second hypothesis is the following:

H_2: The soccer anomaly differs between countries.

The first two hypotheses estimate the effect of soccer games on stock prices and whether this effect differs between countries. The next step is to investigate the causes of the differences. There are four potential causes (explanatory variables) investigated. The remainder of this section discusses these potential causes and formulates a corresponding hypothesis.

The first potential cause is pre-game expectations. Each country has different pre-game expectations. The moods of investors could be more affected due to the pre-game expectations. A win contrary to the expectations could feel like a bigger win, and a loss contrary to the expectations could feel like a bigger loss. Therefore, the expectation is that the anomaly is influenced by the pre-game expectations, which leads to the third hypothesis:

H_3: The pre-game expectations will negatively affect the effect of soccer results on stock prices.

The second potential cause is culture. Hofstede emphasizes that people's behaviors are different from each other due to their diverse cultural influences. Due to the cultural differences, investor`s behavior differ between cultures. Until now, the difference in culture between countries with respect to the effect of soccer results on stock prices has not been investigated. The previous research did not take cultural differences between countries into account. They treat each country, and thus each investor, as the same. This means that the effect of soccer results on stock prices could be different between countries, due to the fact that culture affects investor`s behavior. Culture could explain the different results of the previous research. Culture is operationalized through the cultural dimensions of Hofstede, which is discussed in the theoretical framework. The cultural dimensions are discussed separately because each cultural dimension leads to a hypothesis. As figure 3 indicates, culture can affect both the effect of international soccer results on the moods and emotions of investors (hypotheses 4, 5, and 6) and the effect of moods and emotions of investors on the stock market (hypotheses 7, 8, and 9). After testing all the hypotheses, it is possible to generalize the results and determine the influence of culture. The figure clarifies the research question.

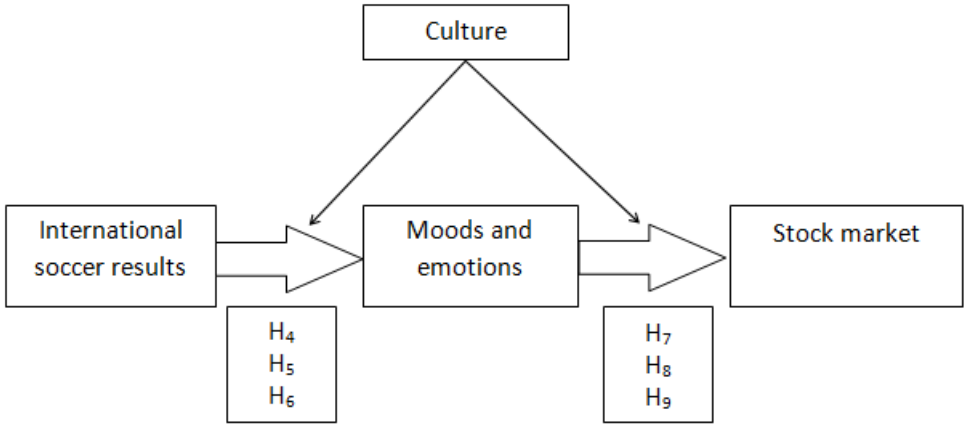


Figure 3: The influence of culture on the anomaly.

Masculinity (MAS) versus femininity refers to the distribution of roles between genders. Masculinity is a preference in society for achievement, heroism, assertiveness and material rewards for success. A masculine society is characterized by fighting out conflicts (competition). Femininity is a preference for cooperation, modesty, caring for the weak and quality of life. In a society with high masculinity, people are very assertive and competitive and have a willingness to seek competitive outcomes; managers make decisions on their own (De Jong and Semenov, 2004). Winning an international soccer match is an achievement and winning a soccer tournament will give a material reward for success. Therefore, the importance of an international soccer result can be greater for a masculine

society. Individual investors and portfolio managers in societies with high masculinity are likely to overreact and show overconfidence when they invest in shares, while they behave conservatively in societies with low masculinity (Lucey and Zhang, 2010). Therefore, the expectation is that masculinity will lead to a greater effect on the moods and sentiment of investors. This leads to the fourth hypothesis:

H_4: Masculinity will positively affect the effect of soccer results on stock prices.

The Indulgence (IND) dimension is essentially a measure of happiness; whether or not simple joys are fulfilled. Indulgent societies allow relatively free gratification of basic and natural human desires related to enjoying life and having fun. While restraint societies control gratification of needs and regulate it by means of strict social norms. Indulgent societies believe themselves to be in control of their own life and emotions; restrained societies believe other factors dictate their life and emotions. Because in indulgent societies people control their own emotions and the relatively free gratification, people will act faster and the role of emotions is greater. Therefore, the expectation is that in an indulgent society the international soccer results have a greater effect on the moods and sentiment of investors. This leads to the fifth hypothesis:

H_5: Indulgence will positively affect the effect of soccer results on stock prices.

The Uncertainty Avoidance (UA) index deals with a society`s tolerance for uncertainty and ambiguity. This dimension indicates to what extent people feel comfortable or uncomfortable with uncertainty and ambiguity and try to avoid such situations (Lucey and Zhang, 2010). Societies that score high in this index try to minimize the possibility of such situations by strict laws and rules. Aggarwal and Goodell (2009) find that societies with less uncertainty avoidance are more market-based and societies with higher uncertainty avoidance are more bank-based. In more bank-based societies, investments will be made indirectly through banks and other institutions, while in more market-based societies investments will trade more directly by investors on the stock market. This means that in more bank-based societies investments are made through professionals, while in more market-based societies investments are made by private investors. The expectation is that private investors are more affected by emotions compared to the professionals. This is however an effect on the investors that do invest on the market, instead of an effect on the moods and emotions of investors. In societies with high uncertainty avoidance, people prefer certainty, security and predictability and are reluctant to accept risks (Riddle, 1992; Offermann and Hellmann, 1997), while in societies with low uncertainty avoidance people are likely to be more risk loving. This risk loving behavior has an influence on the trading activity of investors, but also on the decision making process of investors. Uncertainty avoiding countries are also more emotional and motivated by inner nervous

energy (Anderson et al., 2011). Because investors in uncertainty avoiding countries are more emotional, the expectation is that high uncertainty avoidance positively affects the effect of soccer results on the stock prices. This leads to the sixth hypothesis:

H_6: Uncertainty Avoidance will positively affect the effect of soccer results on stock prices.

The Long-Term Orientation (LTO) versus the short-term orientation dimension associates the connection of the past with the current and future actions/challenges. A lower degree of this index (short-term) indicates that traditions are honored and kept, while steadfastness is valued. Societies with a high degree in this index (long-term) views adaptation and circumstantial, pragmatic problem solving as a necessity. Investors in societies with short-term orientation are expected to act more and think less. Because they trade faster, and not over think the long-term consequences, the expectation is that the effect of soccer performance on stock prices will be greater for a short-term orientated society. This leads to the seventh hypothesis:

H_7: Long-term orientation will negatively affect the effect of soccer results on stock prices.

The Individualism index (IDV) explores the degree to which people in a society are integrated into groups. Individualistic societies have loose ties that often only relate an individual to his/her immediate family. In collectivistic societies, people are integrated into strong, cohesive groups. People in collectivistic societies have a “we” feeling. Therefore, people in collectivistic societies are more connected with the national soccer performance. Hence, the expectation is that the moods and emotions of investors are more affected through the soccer results. Moreover, in a country with high individualism, the first priority of investors is to take care of their own interest. Hence, investors attempt to secure success rather than expected profits when making investment decisions (Hirshleifer and Thakor, 1992). This implies that investors in societies with high individualism may adopt more conservative investing strategies to secure success and maintain their reputation. By contrast, investors in societies with high collectivism are likely to behave more aggressively (Lucey and Zhang, 2010). Hence, the expectation is that in collectivistic societies the effect of soccer results on stock prices is greater compared to individualistic societies. This leads to the eighth hypothesis:

H_8: Individualism will negatively affect the effect of soccer results on stock prices.

The Power Distance Index (PDI) is the extent to which the less powerful members of organizations and institutions accept and expect that power is distributed unequally. A higher degree of the index indicates that hierarchy is clearly established and executed in society, without doubt or reason, while a lower degree of the Index signifies that people question authority and attempt to distribute power. In cultures with high power distance, people take inequality as granted, tolerate the concentration of power, and are more reluctant to give up independence (De Jong and Semenov, 2002). By contrast, factors such as trust, equality and cooperation are important hallmarks in cultures with small power distance. Hence, Lucey and Zhang (2010) argue that in countries with high power distance, investors are more willing to pursue "abnormal" returns to show their independence and autonomy, while investors are more satisfied with reasonable returns of investment in small power distance countries. Because investors in high power distance societies are more willing to pursue abnormal returns, the expectation is that the effect of soccer results on stock prices is greater. This leads to the ninth hypotheses:

H_9: Power distance will positively affect the effect of soccer results on stock prices.

The third potential cause is the popularity of soccer in the country. The popularity of soccer is measured through the classification whether the country is a soccer country or not. A country is defined as a soccer country if soccer is the most popular sport in the country. National Geographic ("Soccer United the World", 2006) measured this by the most watched sport and their figure below indicates whether the country is classified as a soccer country. The countries that are collared green are classified as a soccer country.

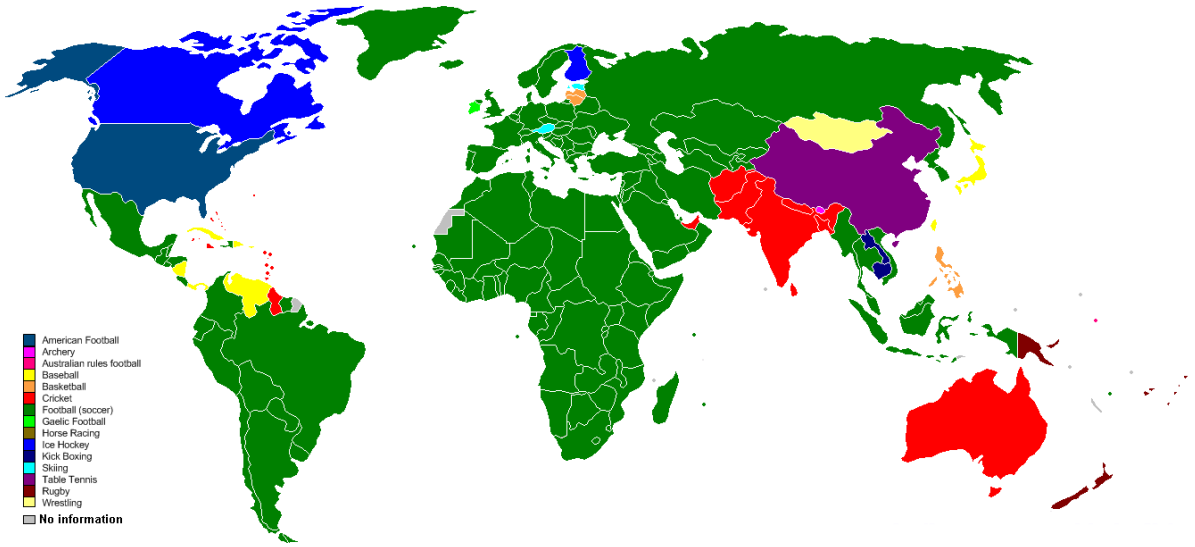


Figure 4: Soccer Countries (National Geographic, 2006) http://www.vox.com/2014/7/3/5868115/most-popular-sports-world-cup

If a country is a soccer country, the people in a country are emotionally closer to the soccer results. People who love soccer are more affected through the results. Therefore, the expectation is that investors of a soccer nation are more influenced through the soccer results. Hence, the effect of soccer results on the stock market could be greater for a soccer country because the impact on the emotions of investors is greater. This leads to the tenth hypotheses:

H_{10}: The popularity of soccer positively affects the effect of soccer results on stock prices.

The fourth and last potential cause discussed in this research is the wealth of the country. Many countries use soccer as a vehicle for the expression of nationalism, and for the promotion of individual nations' power and status internationally (Sugden and Tomlinson, 1998). These countries are in particular the developing countries (Hoffmann et al., 2002), which are less wealthy. For these countries, international soccer results may have an additional impact. Therefore, the expectation is that the soccer results are more important in a less wealthy country and hence the emotions of investors are more influenced. The wealth of a country is measured through the average GDP per capita levels of a country. Therefore, the expectation is that a lower GDP per capita level increases the effect of soccer results on stock prices. This leads to the last and eleventh hypotheses:

H_{11}: A high GDP will negatively affect the effect of soccer results on stock prices.

4. Data and methodology

In this chapter the data and the methodology are explained, which are used to test the hypotheses formulated in the previous chapter. The statistical method of this master thesis is an event study. All the hypotheses suggest that the explanatory variable influence the effect of soccer results (an event) on the stock prices (abnormal returns). The objective of an event study is to assess whether there are any abnormal or excess returns earned by security holders accompanying specific events where an abnormal or excess return is the difference between observed return and that appropriate given a particular return generating model (Peterson, 1989).

Before discussing the data and the methodology, it is important to mention a caveat in interpreting results from event studies. The problem is that while many pricing phenomena can be interpreted as deviations from fundamental value, it is only in a few cases that the presence of a mispricing can be established beyond any reasonable doubt (Barberis & Thaler, 2003). When computing abnormal returns, which is the difference between observed return and that appropriate given a particular return generating model, the model also has to estimate the appropriate return. Market efficiency is thus always tested jointly with a model for describing expected returns. Tests of efficiency are thus always contaminated by a bad-model problem, which is more formally referred to as the joint-hypothesis problem (Fama, 1970). Any test of mispricing is therefore inevitably a joint test of mispricing and a model of discount rates, making it difficult to provide definitive evidence of inefficiency (Barberis & Thaler, 2003). There is however consensus that when daily data is used, this problem is less serious, because average daily returns on stocks are close to zero.

4.1. Data

This section determines the necessary data. This master thesis investigates whether the explanatory variables mediates the effect of international soccer results on the stock market, where the soccer results are used as the mood induction variable. The data are collected from January 1988 through August 2014 for 44 countries[1]. The countries are comparable to the countries in the research of Edmans et al. (2007).

In order to test whether international soccer results have an effect on the stock market, the following data are required. First, the international soccer results are required. Because the expectation is that investors are only affected through the most important soccer games Edmans et al. (2007) use closeness in the ability of the two opponents as a proxy for importance, where ability is measured using Elo ratings. Elo rating assign points to a winning country, taking into account the difficulty of the opponent (according to Elo ratings). However, because countries can choose their

[1] See appendix A for a list of the investigated countries.

own opponents in a friendly match, the Elo ratings are biased. Therefore, the dataset of this master thesis only contains games from the World Cup and the main Continental Cups (European Championship, Copa America, Asian Cup, and the Africa Cup), because these are known as the most important international soccer games. Other games such as qualification games are excluded from the dataset because the expectation is that the effect on emotions is lower. Hence, the Elo ratings as a proxy for importance are unnecessary. The match data of the international soccer results are downloaded from flashscore.com and are double-checked through oddsportal.com. Because the dataset does not consist any wins or losses for the countries Canada and New Zealand, they are excluded from the dataset. The effect on the stock market is measured by the return on the stock market indexes on the next trading day (Ashton et al, 2003; Edmans et al., 2007; Botha and De Beer, 2013; Kang and Park, 2015), because investors should know the game result before trading. Dividends are assumed to be reinvested (Edmans et al., 2007). Therefore, the returns on the stock market indexes are computed through the stock prices. These stock prices are collected from DataStream. The dataset with the stock returns and the World Cup games is received from De SenerPoint Domis (2013).

In order to investigate why the size of the anomaly is different between countries, the data of the explanatory variables are necessary. The first explanatory variable is pre-game expectation. The pre-game expectations are measured by the expected probability to win, which are calculated from the odds of betting offices. Betting odds data have been collected of oddsportal.com. Unfortunately, the betting odds are not available for the whole time period of the dataset. The betting odds are available from 2004 onward for the European Championship, from 2006 onward for the World Cup, from 2007 onward for the Copa America, from 2008 onward for the Africa Cup and from 2011 onward for the Asian Cup. The betting odds are collected according to the following figure that represents the betting odds on the 23 of June of 2014.

23 Jun 2014			1	X	2
21:00	Cameroon - **Brazil**	**1:4**	22.52	9.39	1.14
21:00	Croatia - **Mexico**	**1:3**	2.73	3.47	2.66
17:00	Australia - **Spain**	**0:3**	7.95	5.30	1.40
17:00	**Netherlands** - Chile	**2:0**	2.71	3.53	2.63

Figure 5: Betting Odds (oddsportal.com)

1 stands for a win of the home-team, X stands for a draw and 2 stands for a win of the away-team. The numbers in the figure show how many times your investment is repaid. Therefore, an investment of €1 on a win of the Netherlands against Chile pays out €2,71 if the Netherlands win.

Because it is necessarily to have one variable for the pre-game expectation, the expected probability to win is calculated according to the following equations:

$$\pi Home - Win_i = \frac{1_i^{-1}}{1_i^{-1} + X_i^{-1} + 2_i^{-1}} \;\; ; \; \pi Away - Win_i = \frac{2_i^{-1}}{1_i^{-1} + X_i^{-1} + 2_i^{-1}}$$

These equations provide an expected probability to win the game for both of the countries. The expected probability is a number between zero and one.

The second explanatory variable is culture, which is operationalized by using the cultural dimensions of Hofstede. The data of the cultural dimensions are collected from the website of Hofstede (geert-hofstede.com). The countries receive a national score from 1 (lowest) to 120 (highest) for each cultural dimension. Hence Hofstede`s six-dimensions model allows international comparison between cultures.

The third explanatory variable is a dummy variable whether the country is a soccer nation or not. If the country is a soccer nation, the country receives the value 1 and if the country is not a soccer nation the country receives the value 0. A country is classified as a soccer country if soccer is the most watched sport. The data is collected from the website vox.com and comes from a 2006 National Geographic called “Soccer United the World”.

The fourth explanatory variable is GDP. This explanatory variable indicates, whether the country is wealthy. An average GDP per capita level is calculated for each country. The average GDP`s per capita level are calculated from the annual GDP` s per capita level from 1990 onwards. The annual GDP`s per capita level are collected from the World Bank.

4.2.Methodology

The data contains observations of multiple phenomena obtained over multiple time periods, which is called a panel data. A “panel” of data, also known as “longitudinal” data, has observations on individual micro-units who are followed over time (Hill et al, 2012, p. 8). Panel data refers to multi-dimensional data frequently involving measurement over time. Because the number of time period observation for each micro-unit (country) is not the same, the data is called an unbalanced panel. The appropriate model to deal with the data and to test the hypotheses is multilevel modeling.

This master thesis follows largely the method used by Edmans, Garcia and Norli (2007) to investigate the effect of international soccer results on the stock market. This method is extended to investigate the influence of the explanatory variables on this effect. Edmans et al. (2007) use a relatively uncomplicated model to estimate daily stock market return residuals, which is the following:

$$R_{it} = \gamma_{0i} + \gamma_{1i}R_{it-1} + \gamma_{2i}R_{mt-1} + \gamma_{3i}R_{mt} + \gamma_{4i}R_{mt+1} + \sum_{t=1}^{4}\gamma_{5i}D_{i,t} + \sum_{t=1}^{5}\gamma_{6i}Q_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where;

R_{it} = the continuously compounded daily local currency return on a broadly based stock market index for country i on day t (local market return).

R_{mt} = the continuously compounded daily U.S. dollar return on DataStream's world market index on day *t* (world market portfolio return).

Local market return is regressed with the lagged local market return (R_{it-1}), the world market return (R_{mt}), as well as the lagged (R_{mt-1}) and leaded (R_{mt+1}) world market return and some control variables. Local market return is lagged and regressed with itself to account for first-order serial correlation, which makes it an autoregressive model. This is useful because market performance could depend on past market performance, but it could also depend on variables determining past market performance. Models with the dependent variable lagged one period can be used to represent models where the impact of an independent variable is spread out over time while negating multicollinearity issues and improving degrees of freedom (Studenmund, 2011). The world market portfolio return is included because the return on local indices will be correlated across countries because international stock markets are integrated. The lags and leads account for laggards and leaders on the global scale (Edmans, García, & Norli, 2007).

The control variables are D_t and Q_t. D_t represents dummy variables for the working days of the week and Q_t represents the first five days after a non-weekend holiday, identified as being a bank holiday. The bank holidays are excluded from the dataset because there is no trading during a bank holiday. The data for the bank holidays are collected from DataStream. These control variables account for several anomalies that might be present.

The market return data are normalized because this eliminates the heterogeneity in volatility across countries. This heteroscedasticity influences the precision of standard errors and confidence intervals when an OLS is used. This causes misrepresentations of significance (Engle, 2001). Therefore, the market return data are normalized with a GARCH model. This adjusts for the time-series variation and volatility of stock returns varies over time. The market return data are normalized as follows. First, by running regression (1) for each country separately, a set of predicted conditional variances were obtained. These are then used to create a new normalized series with a mean of 0 and a standard deviation of 1. This is approximated by dividing the R by the square root of the predicted variance. This new series are then standardized for each country separately by subtracting the mean and divide by the standard deviation. This new normalized returns leads to the following model:

$$\hat{R}_{it} = \gamma_{0i} + \gamma_{1i}\hat{R}_{it-1} + \gamma_{2i}\hat{R}_{mt-1} + \gamma_{3i}\hat{R}_{mt} + \gamma_{4i}\hat{R}_{mt+1} + \sum_{t=1}^{4}\gamma_{5i}D_{i,t} + \sum_{t=1}^{5}\gamma_{6i}Q_{i,t} + \varepsilon_{i,t} \quad (2)$$

Secondly, by running regression (2) the residuals are estimated. These residuals are by definition the difference between observed and predicted return, which mean they reflect abnormal returns.

Now the residuals are estimated, the hypotheses can be tested. To test whether international soccer games have an effect on the stock market, the residuals are regressed against the variables of interest (one dummy for a win and one dummy for a loss) with an OLS regression.

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + u_{i,t} \quad (3)$$

This regression estimates the effect of wins and losses on the abnormal return. The coefficients for these give the magnitude of the effect. This method will be used to estimate the effect of international soccer results on abnormal returns on the stock market.

In order to test whether the effect of the anomaly is different between countries, regression (2) is run with a different multilevel model. Multilevel models (also known as hierarchical linear models) are statistical models of parameters that vary at more than one level. Because the observations are nested within countries, the appropriate multilevel model is the random slopes model. The random slopes model allows for different slopes between countries, which is necessarily to investigate the differences between the countries. Hence, the following regression is estimated:

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \beta_{W,i} W_{i,t} + \beta_{L,i} L_{i,t} + e_{i,t} \quad (4)$$

This regression estimates whether the results differ between countries. If the results differ between countries, the explanatory variables are added to the model to investigate whether they influence the anomaly. The explanatory variables are used to predict the variation in the β_W and β_L.

First the explanatory variables are standardized by subtracting the mean and divide by the standard deviation. The new explanatory variables created have a mean of 0 and a standard deviation of 1 (~N (0,1)). Now, the explanatory variables are added into the model as interaction variables. One interaction variable shows the combined effect of the explanatory variable and a win, while the other interaction variable shows the combined effect of the explanatory variable and a loss. The coefficients of the main effects (Win and Loss) represent their value for the situation in which the other variable has value zero. The explanatory variables are added to regression (3) separately.

The first explanatory variable is pre-game expectation. To investigate whether pre-game expectations mediates the effect of international soccer results on the stock price, the odds ratios are added into the model. The following regression (5) is estimated with an OLS regression:

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_1 OddsRatio_{i,t}\beta_W W_{i,t} + \gamma_1 OddsRatio_{i,t}\beta_L L_{i,t} + u_{i,t} \quad (5)$$

The second explanatory variable is culture. To investigate whether culture mediates the effect of international soccer results on stock price, the cultural dimensions of Hofstede are added into the model. First, the cultural dimensions of Hofstede are included separately into the model. This leads to the following six multilevel regressions, which estimate the influence of respectively; masculinity, indulgence, uncertainty avoidance, long-term orientation, individualism, and power distance.

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_2 MAS_i\beta_W W_{i,t} + \gamma_2 MAS_i\beta_L L_{i,t} + u_{i,t} \quad (6a)$$

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_3 IND_i\beta_W W_{i,t} + \gamma_3 IND_i\beta_L L_{i,t} + u_{i,t} \quad (6b)$$

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_4 UA_i\beta_W W_{i,t} + \gamma_4 UA_i\beta_L L_{i,t} + u_{i,t} \quad (6c)$$

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_5 LTO_i\beta_W W_{i,t} + \gamma_5 LTO_i\beta_L L_{i,t} + u_{i,t} \quad (6d)$$

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_6 IDV_i\beta_W W_{i,t} + \gamma_6 IDV_i\beta_L L_{i,t} + u_{i,t} \quad (6e)$$

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_7 PDI_i\beta_W W_{i,t} + \gamma_7 PDI_i\beta_L L_{i,t} + u_{i,t} \quad (6f)$$

Secondly, the cultural dimensions of Hofstede are included together into the model, which estimate the influence of all the cultural dimensions together.

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_2 MAS_i\beta_W W_{i,t} + \gamma_2 MAS_i\beta_L L_{i,t} + \alpha_3 IND_i\beta_W W_{i,t} + \gamma_3 IND_i\beta_L L_{i,t} + \alpha_4 UA_i\beta_W W_{i,t} + \gamma_4 UA_i\beta_L L_{i,t} + \alpha_5 LTO_i\beta_W W_{i,t} + \gamma_5 LTO_i\beta_L L_{i,t} + \alpha_6 IDV_i\beta_W W_{i,t} + \gamma_6 IDV_i\beta_L L_{i,t} + \alpha_7 PDI_i\beta_W W_{i,t} + \gamma_7 PDI_i\beta_L L_{i,t} + u_{i,t} \quad (6g)$$

The third explanatory variable is the popularity of soccer. The popularity of soccer is measured through the classification whether the country is a soccer country or not. A country is classified as a soccer nation (SN) if soccer is the most popular sport in the country. To investigate whether this mediates the effect of international soccer results on the stock price, the following regression is estimated:

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_8 SN_i\beta_W W_{i,t} + \gamma_8 SN_i\beta_L L_{i,t} + u_{i,t} \quad (7)$$

The fourth explanatory variable is the relative wealth of the country, which is measured through the average GDP per capita levels. To investigate whether GDP mediates the effect of international soccer results on the stock price, the following regression is estimated:

$$\epsilon_{i,t} = \beta_0 + \beta_W W_{i,t} + \beta_L L_{i,t} + \alpha_9 GDP_i \beta_W W_{i,t} + \gamma_9 GDP_i \beta_L L_{i,t} + u_{i,t} \quad (8)$$

The regressions of interest (5, 6, 7 and 8) are regressed with an OLS. These regressions are estimated and analyzed in chapter 5.

5. Results

In the previous chapter, the data and methodology are discussed, which are used to test the hypotheses formulated in chapter 3. In this chapter, the results of the test shall be discussed. The chapter is split up in three parts. The first part summarizes and describes the observations in the dataset in order to receive basic insight in the dataset. The second part replicates the work of Edmans et al. (2007), determine whether the effect of soccer games on stock prices diminish over time, and estimate whether there are individual country effects. The third part estimates the mediating factors through interaction effects.

5.1. Summary Statistics

This section summarizes and describes the observations in the dataset in order to receive basic insight of the dataset. The table below shows the variables of interest:

Table 2: Summary Statistics of the variables of interest.

Variable	N	Mean	Std. Dev.	Min	Max
Residuals	224536	-1,00E-11	0,837218	-13,4296	23,05046
Return	224536	0,051488	1,394407	-19,5331	34,7106
Market return	224536	0,031517	0,917866	-6,4367	8,523635
MAS	222999	50,87844	20,63864	5	100
IND	222999	54,18437	19,27945	18	97
UA	222999	67,83567	22,36558	23	100
LTO	222999	49,24814	22,48232	4	100
IDV	222999	55,79883	23,44644	13	91
PDI	222999	52,74804	20,58262	11	100
Odds ratio	528	0,410323	0,18963	0,030933	0,89982
Soccer country	224536	0,790492	0,406958	0	1
GDP	224536	23872,2	16142,1	786	60958

The table above shows for each variable of interest, the number of observations (N), the mean, the standard deviation and the minimum and the maximum of the variables. The most obvious feature of the table is the number of observations. The variable odds ratio has much fewer observations than the other variables of interest because, as explained in section 4.1, the odds ratios were not available for the entire time-period of the dataset. The six cultural dimensions have fewer observations because there are no values for the country Bosnia.

Furthermore, the values of the cultural dimensions vary between 4 and 100, the value of GDP varies between 786 and 60958 and the value of soccer country varies between 0 and 1 (dummy variable). Because these explanatory variables are measured at different scales, which will not contribute equally to the analysis, the variables should be standardized before they are added into the model. These variables are standardized by subtracting the mean and divide by the standard deviation. The

new variables created have a mean of zero and a standard deviation of one (~N (0, 1)). The standardized explanatory variables are used in the regressions and these variables show the influence on the anomaly when they deviate from the mean.

In order to estimate the residuals, the variables return and market return are standardized. These variables are also standardized by subtracting the mean and divide by the standard deviation. Again, the new variables created have a mean of zero and a standard deviation of one (~N (0, 1)).

The meaning of this master thesis is to investigate the effect of international soccer results on the stock market, where the effect on the stock market is measured by abnormal returns. The residuals are by definition the difference between observed and predicted return, which mean they reflect abnormal returns. These residuals are estimated with regression (2), which is explained in chapter 4:

$$\hat{R}_{it} = \gamma_{0i} + \gamma_{1i}\hat{R}_{it-1} + \gamma_{2i}\hat{R}_{mt-1} + \gamma_{3i}\hat{R}_{mt} + \gamma_{4i}\hat{R}_{mt+1} + \sum_{t=1}^{4}\gamma_{5i}D_{i,t} + \sum_{t=1}^{5}\gamma_{6i}Q_{i,t} + \varepsilon_{i,t} \quad (2)$$

The residuals, which represent abnormal returns, are the main variable of interest. According to the EMH, stock markets are efficient, which means that the residuals ($\varepsilon_{i,t}$) should be unpredictable. An anomaly is a deviation from a common rule, which means the residuals ($\varepsilon_{i,t}$) are predictable. If the return ($\hat{R}_{it}$) in regression (2) is not fully explained by the independent variables in the regression, the residuals are nonzero. Regression (2) has been run for each country separately to estimate the residuals.

5.2.Estimating the effect of soccer results on stock prices.

The previous section showed how the residuals (abnormal returns) are estimated. This section consists of two parts, which respectively describe the test of the first two hypotheses.

5.2.1. Replicating Edmans et al. (2007)

To test the first hypotheses: *"International soccer results affect the stock prices through the moods and sentiment of investors."* the work of Edmans et al. (2007). As mentioned in chapter 4, there are two adjustments made. Edmans et al. (2007) use closeness in the ability of the two opponents as a proxy for importance, where ability is measured using Elo ratings. Because the Elo ratings are biased, they are excluded from the model. A proxy for importance is unnecessarily because the dataset only includes the most important international soccer games (World Cup and the main Continental Cups). Hence, the exhibition games are excluded from the dataset. In order to test the first hypothesis, the residuals (abnormal returns) are regressed against the dummy variables for wins and losses. In this regression, the standard errors of the observations are clustered.

Table 3: The effect of soccer results on the stock market

	Win				Loss			
	β-Win	Std. Dev.	t-values	N	β-Loss	Std. Dev.	t-values	N
All games	0,0316851	0,0339629	0,93	588	-0,1460297***	0,041869	-3,49	457
Group games	0,0465636	0,0404024	1,15	383	-0,152664***	0,0490298	-3,11	288
Elimination games	0,0037533	0,052127	0,07	205	-0,1348146**	0,0615232	-2,19	169

An OLS regression is used to estimate the effect of the dummy variables for wins and losses on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The table above shows a significant market decline for losses and an insignificant increase for wins. Hence, the first hypothesis is confirmed. These results are in line with the results of Edmans et al. (2007) and Kang and Park (2015). Botha & De Beer (2013) concluded that the effect of wins and losses are both insignificant, while Ashton et al. (2003) concluded that the effect of wins and losses are both significant.

If a distinction is drawn between group games and elimination games, there is still a significant effect for losses and an insignificant effect for wins. The effect is smaller and less significant for the elimination games, while the expectation is that the effect would be greater because the games are more important. However, the less significant effect of the elimination games is probably caused because they have fewer observations. In order to test whether the effect differs between group games and elimination games, the type of the game is included as interaction variable.

Table 4: The influence of the type of the game on the anomaly

	Baseline (1)				Type of the game (2)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0316851	0,0339629	0,93	588	0,02961	0,057451	0,52	588
Loss	-0,1460297***	0,041869	-3,49	457	-0,1476467**	0,0657051	-2,25	457
Win x Type	.	.	.	.	0,0012852	0,0290231	0,04	588
Loss x Type	.	.	.	.	0,0009626	0,0289969	0,03	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of the type of the game on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The table shows the interaction variables have a small coefficient and a small t-value, which means the effect does not differ between the types of the games.

5.2.2. Estimating individual country effects

This section shows whether the anomaly differ between countries. Hence the second hypotheses "*H_2: The soccer anomaly differs between countries.*" is tested and the size of the anomaly is estimated for each country separately.

In order to test the second hypotheses, regression (3) is run with a different multilevel model. Multilevel models (also known as hierarchical linear models) are statistical models of parameters that vary at more than one level. Because the observations are nested within countries, the appropriate multilevel model is the random slopes model. The random slopes model allows for different slopes between countries. Hence, regression (4) is run with a random slopes model:

Table 5: The anomaly differs between countries

					Country Differences
	Coef.	Std. Dev.	z-value	N	Std. Dev.
Win	0,0316851	0,0345829	0,92	588	0,0000663
Loss	-0,1469937***	0,040599	-3,62	457	0,0610686

The random slopes model is used to estimate whether the anomaly differs between countries.

*p<0.1 **p<0.05 ***p<0.01

The table above shows the results of the random slopes model and consist of two parts. The first (left) part is the main part of the regression and shows almost the same average effect for wins and losses compared to table 3, which shows the results of the estimation of regression (3).

The second (right) part of the table shows the standard deviation of the random slopes estimates per country. The differences between countries in terms of the impact of a win on next day stock returns are relatively small as the standard deviation of the estimated individual slopes is only 0.0000663. The differences between countries in terms of the impact of a loss on next day stock returns are somewhat bigger as the standard deviation of the estimated individual slope is 0.0610686.

A better way to show the difference between countries is to graph the effects of the anomaly for each country separately in a histogram. The first histogram shows the effect of a win on stock prices for each country separately. The second histogram shows the effect of a loss on stock prices for each country separately.

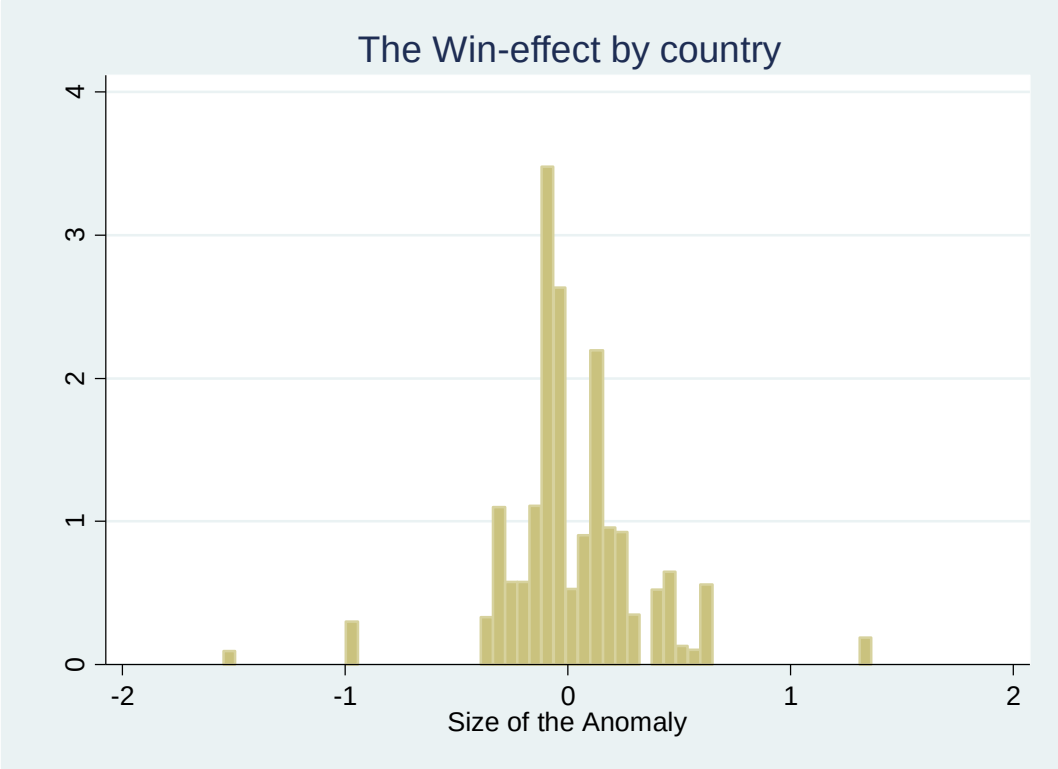


Figure 6: The effect of a win on stock prices per country

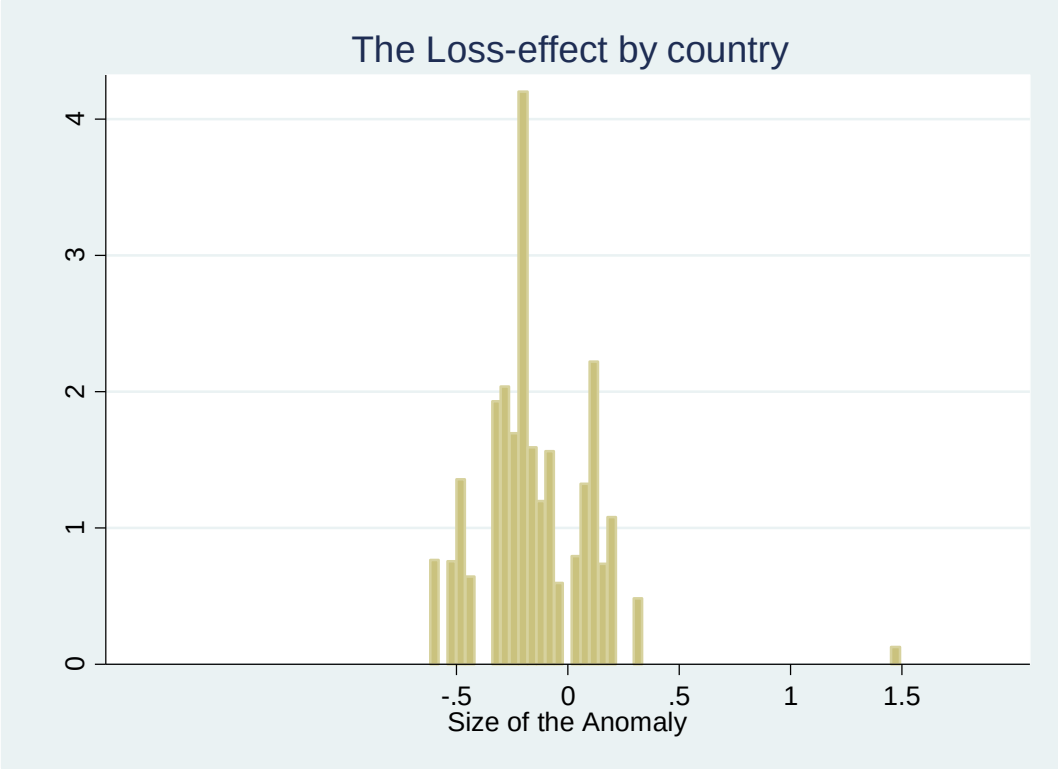


Figure 7: The effect of a loss on stock prices per country

The two histograms show the anomaly differ between countries. Table 5 indicates the effect of a loss on stock prices differs more between countries than the effect of a win. The two histograms indicate the effect of a win differs more between countries than the effect of loss, although the difference is small. In order to test the second hypothesis, two t-tests are used to prove whether the effect of a loss and whether the effect of a win differs between countries. A t-test show whether the effects of win/loss on stock prices for countries differ from the mean at a significant-level of 5%. The results of the t-test show the effect of a loss on stock prices does not significantly differs between countries, while the effect of a win does significantly differs between countries. Because the effect of a win on stock prices significantly ($p < 0.05$) differs between countries, the second hypothesis is confirmed.

Table 6 gives an overview and show for each country the effect of a win and the effect of a loss. The countries are sorted by the effect of a win because this effect significantly differs between countries. The same table sorted by the effect of a loss is shown in the appendix. Furthermore, the table shows for each country the values of the cultural dimensions, the average pre-game expectation to win, whether the country is classified as a soccer country, and their average GDP-level. These values give a first impression of the influence of the explanatory variables on the anomaly.

Table 6: Overview per country

Country	β-Win	β-Loss	MAS	IND	UA	IDV	LTO	PDI	Oddsratio	Soccercountry	GDP
Urkaine	1,3652040	-.2993558	27	18	95	25	55	92	.3084629	1	1911
Austria	.6371925	-.0857892	79	63	70	55	60	11	.1990105	0	36466
Nigeria	.5477014	-.5059823	60	84	55	30	13	80	.4004129	1	1093
Bosnia	.4883158	.1926052	.	.	.	.	.	.	.3449837	1	2814
Norway	.4426464	-.1466765	8	55	50	69	35	31	.	1	60958
Ghana	.4339316	.1835396	40	72	65	15	4	80	.4721891	1	786
Greece	.3977279	-.2796048	57	50	100	35	45	60	.2205985	1	18880
Russia	.305926	.3012165	36	20	95	39	81	93	.3435696	1	6388
Morocco	.2529674	-.0611181	53	25	68	46	14	70	.427839	1	2059
Denmark	.2521968	-.3074452	16	70	23	74	35	18	.2671709	1	44650
Brazil	.1801775	.0955426	49	59	76	38	44	69	.6187506	1	6355
Mexico	.1706995	.0751924	69	97	82	30	24	81	.283379	1	7253
Croatia	.1556859	-.2768994	40	33	80	33	58	73	.3451327	1	9739
South Korea	.1420141	-.4665539	100	28	51	52	77	100	.3871531	1	10555
Spain	0,1366011	-.194693	19	48	88	27	49	71	.7453696	1	17707
Argentina	.1296684	-.5347801	56	62	86	46	20	49	.6188849	1	8157
Colombia	.11074	-.4274189	64	83	80	13	13	67	.4062413	1	3981
Chile	.0622302	.1599902	28	68	86	23	31	63	.3702637	1	8240
Romania	.0482949	-.6186973	42	20	90	30	52	90	.2531744	1	4817
South Africa	-.0010769	.0990022	63	63	49	65	34	49	.3702314	1	16804
Portugal	-.0080911	-.2350337	31	33	99	27	28	63	.4125086	1	16626
Turkey	-.0152369	-.1190023	45	49	85	37	46	66	.2086163	1	6318
Poland	-.0204422	-.1999015	64	29	93	60	38	68	.372428	1	7878
Italy	-.0418156	-.2704978	70	30	75	76	61	50	.4585521	1	28416
Belgium	-.0486041	.0380746	54	57	94	75	82	65	.4754818	1	34364
Germany	-.063426	-.1972169	66	40	65	67	83	35	.5083147	1	34426
France	-.0735115	-.2548377	43	48	86	71	63	68	.482976	1	32417
Czech Republic	-.0782644	-.1821288	57	29	74	58	70	57	.3649494	1	12149
Sweden	-.0868931	-.0876172	5	78	29	71	53	31	.3266508	1	40975
Scotland	-.0870271	.1225459	66	69	35	89	51	35	.	1	33250
Netherlands	-.0976956	-.1637705	14	68	53	80	67	38	.4444527	1	38092
Serbia	-.113	-.5892782	43	28	92	25	52	86	.3448723	1	4030
Australia	-.1330125	-.3130175	61	71	51	90	21	36	.2084068	0	35340
Switzerland	-.1710708	-.1808516	70	66	58	68	74	34	.3088031	1	57036
United States	-.2015068	.1781589	62	68	46	91	26	40	.6559626	0	40746
England	-.2576541	-.2164993	66	69	35	89	51	35	.4879076	1	33250
Saudi Arabia	-.2889009	-.229239	60	52	80	25	36	95	.3256508	1	13435
China	-.3107124	-.4793134	66	24	30	20	87	80	.3361407	0	2646
Japan	-.3122908	.1084762	95	42	92	46	88	54	.3806927	0	36709
Slovenia	-.3586327	-.3028066	42	44	86	51	48	57	.2731097	1	22764
Ireland	-.9778001	-.1038401	68	65	35	70	24	28	.1357669	0	38427
Slovakia	-1,5450030	1,4913760	39	29	85	18	100	60	.2783957	1	4868

First of all, table 6 indicates a potential outlier in the dataset. Slovakia has a positive sign for losses and a negative sign for wins, which is contrary to the other countries and the expectations. Therefore, regression (3) is run again, but now without the country Slovakia.

Table 7: The anomaly without outlier(s)

	Win				Loss			
	β-Win	Std. Dev.	t-values	N	β-Loss	Std. Dev.	t-values	N
All games	0,0343565	0,0339397	1,01	587	-0,1531906***	0,0415323	-3,69	455
Group games	0,050708	0,0403313	1,26	382	-0,1618583***	0,0486078	-3,33	287
Elimination games	0,0037444	0,0521428	0,07	205	-0,1384836**	0,0617629	-2,24	168

An OLS regression is used to estimate the effect of the dummy variables for wins and losses on the residuals, where the outlier is dropped from the dataset.

*p<0.1 **p<0.05 ***p<0.01

The table gives the results of this regression and shows that the exclusion of Slovakia from the dataset did not change the model. The effect of a win is still positive and insignificant, while the effect of a loss is still negative and significant.

Secondly, table 6 show more soccer countries at the top of the table and less soccer countries at the bottom of the table. This suggests that the effect of a win on stock prices is bigger for soccer countries. The GDP-levels are on average higher at the bottom of the table. This suggests GDP negatively influence the effect of a win. Furthermore, the countries at the bottom of the table have higher values of individualism and long-term orientation. The average value of individualism and long-term orientation is lower for countries with a positive effect of a win than the countries with a negative effect of a win. This suggests individualism and long-term orientation negatively influence the effect of a win on stock prices.

Furthermore, table 6 sorted by the effect of a loss (Appendix B) show the values of the explanatory variables differ less observable than table 6 sorted by the effect of a win. Logically, because the effect of a loss does not significantly differ between countries. The value of indulgence is on average lower for the countries with a negative effect of a loss than the countries with a positive effect of a loss, although the difference is small. This suggest indulgence positively influence the effect of a loss on stock prices.

The first impressions of the explanatory variables are in line with the expectations. In the next section, the explanatory variables are added into the model and the hypotheses will be tested.

5.3. Estimating mediating factors through interaction effects

International soccer results have a negative and significant effect for losses and a positive and insignificant effect for wins on the stock market. More important for this research is that the size of the anomaly differs between countries, which potentially explain the differences between the previous studies. In the previous section the first impressions of the different results between the countries are given. In this section, the causes for these differences are investigated. Section 3.2 determined four potential causes (pre-game expectations, culture, whether the country is a soccer nation, and relative wealth) for the differences between countries. This section investigates whether these four explanatory variables influence the anomaly.

The explanatory variables are added into the model as interaction variables. One interaction variable shows the combined effect of the explanatory variable and a win, while the other interaction variable shows the combined effect of the explanatory variable and a loss. The coefficients of the main effects (Win and Loss) represent their value for the situation in which the other variables has value zero. Because the explanatory variables are standardized, a value of zero means that explanatory variables have the average value. An OLS regression is used to estimate the four regressions (5, 6, 7 and 8). These regressions are used to test the hypotheses 3 until 11.

The first explanatory variable is the pre-game expectations of a game. The table below shows the results when the pre-game expectations are added into the model. These results are used to test H_3: "*The pre-game expectations will negatively affect the effect of soccer results on stock prices.".* A negative influence on the anomaly means that the pre-game expectations decrease the effect of a win and of a loss.

Table 8: The influence of the pre-game expectations on the anomaly

	Baseline (1)				Odds ratio (2)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0208057	0,0749695	0,28	224	0,0310612	0,13853	0,22	224
Loss	-0,0607695	0,0702904	-0,86	195	-0,0763659	0,1246191	-0,61	195
Win x Oddsratio	.	.	.	.	-0,0209187	0,2062097	-0,1	224
Loss x Oddsratio	.	.	.	.	0,0504204	0,2958083	0,17	195

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of the odds ratio on the residuals.

*p<0.1 **p<0.05 ***p<0.01

As in section 4.1 is explained, the odds ratios were not available for the entire time-period of the dataset, but are only available for the more recent World/Continental Cups. Therefore, the model is based on a more recent time-period compared to the other models and there are fewer observations. Column 1 of the table shows the results of regression (3) for the same observations. Remarkable is that the results are insignificant, while the results of regression (3) are significant for the entire dataset (see table 3). The reason is that the anomaly is diminished over time (Kaplanski

and Levy, 2010; De Senerpoint Domis, 2013) and this model used a more recent time-period. Column 2 of the table shows the results of regression (5), which is used to test the influence of the pre-game expectations. Not surprising, the results are insignificant. The addition of the pre-game expectations did not change the main effects of the model. The effect of a win is positive and the effect of a loss is negative. The interaction variables in the model have the expected sign. The pre-game expectation decreases the effect of a win and a loss. This implicates that the effect of a win or a loss on stock prices decreases if this win or loss is expected. However, the results are insignificant because the anomaly diminishes over time (Kaplanski and Levy, 2010; De Senerpoint Domis, 2013). Hence, the third hypothesis should be rejected.

The second explanatory variable is culture and is operationalized through the cultural dimensions of Hofstede. Because Hofstede did not asign values for the cultural dimenisons to the country Bosnia, Bosnia is excluded in these models. The six cultural dimensions are discussed separately. The tables 9a until 9f shows the results of the influence of the cultural dimensions. The first column of each table show the results of regression (3), withouth the country Bosnia. The second column shows the results when the cultural dimension is added into the model. The third column shows the results of the cultural dimension when the six cultural dimensions are added into the model. Because each cultural dimensions is discussed separately, column three ony shows the relevant part of this regression. The entire table of the results of the addition of the six cultural dimensions is shown in appendix C. The purpose of the addtition of all the cultural dimensions is to indicate which dimensions has a strong influence on the anomaly. If the influence of a dimension did not change due to the addition of the other dimensions, the influence of the dimension is strong.

The first cultural dimension is masculinity. The table below shows the results when masculinity is added into the model and these results are used to test H_4: "*A masculine society will positively affect, while a feminine society will negatively affect, the effect of soccer results on stock prices.*". A positive influence on the anomaly means that masculinity increases the effect of a win and a loss.

Table 9a: The influence of Masculinity on the anomaly

	Baseline (1)				Masculinity (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0309036	0,0340189	0,91	587	0,0342172	0,0335853	1,02	587	0,196418	0,0239836	0,82	588
Loss	-0,1475154***	0,0420556	-3,51	455	-1,474119***	0,0420276	-3,51	455	-0,1502151***	0,0347094	-4,33	457
Win x MAS	.	.	.	.	-0,0690447	0,044863	-1,54	587	-0,0688029**	0,0302185	-2,28	588
Loss x MAS	.	.	.	.	0,0330794	0,0389005	0,85	455	0,0121581	0,0384087	0,32	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of masculinity on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The addition of masculinity did not change the main effects of the model. The interaction variables in column 2 show the influence of masculinity. The interaction variable between masculinity and a loss

has a positive sign, which means that the effect of a loss on stock prices become smaller when the country is more masculine. The interaction variable between masculinity and a win has a negative sign, which means that the effect of a win on stock prices become smaller when the country is more masculine. This suggests the size of the anomaly is smaller in a more masculine society, which is in contrast to the expectations. However, these results are insignificant. Column 3 shows the influence of masculinity when all the cultural dimensions are added into the model. The sign of the interaction variables in column 3 are the same as in column 2, which are both contrary to the expectations. However, the influence of masculinity on the effect of a win is significant ($p < 0.05$). Therefore, the fourth hypothesis is rejected. The expectation was that in a society with high masculinity, people are very assertive and competitive and have a willingness to seek competitive outcomes; managers make decisions on their own (De Jong and Semenov, 2004). Winning an international soccer match is an achievement and winning a soccer tournament will give a material reward for success. Although the importance of a soccer game is greater, it does not mean the effect on the stock market is greater. Levant et al (1992) summarized masculinity into seven principles and one of these principles is the restriction of emotions. Hence, investors are less influenced through the international soccer games. In a less masculine (more feminine) society, the emotions of investors are less restricted. This could be an explanation of the negative influence of masculinity on the anomaly.

The second cultural dimension is indulgence. The table below shows the results when indulgence is added into the model and these results are used to test H_5: "*Indulgence will positively affect the effect of soccer results on stock prices.*". A positive influence on the anomaly means that indulgence increases the effect of a win and a loss.

Table 9b: The influence of Indulgence on the anomaly

	Baseline (1)				Indulgence (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0309036	0,0340189	0,91	587	0,0315209	0,0329743	0,96	587	0,196418	0,0239836	0,82	588
Loss	-0,1475154***	0,0420556	-3,51	455	-0,1494939***	0,0391116	-3,82	455	-0,1502151***	0,0347094	-4,33	457
Win x IND	.	.	.	.	0,0230772	0,0320998	0,72	587	-0,015759	0,0350015	-0,45	588
Loss x IND	.	.	.	.	0,051746	0,0368272	1,41	455	0,0707461**	0,0295098	2,4	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of indulgence on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The addition of indulgence did not change the main effects of the model. The interaction variables in column 2 show the influence of indulgence. The interaction variable between indulgence and a win has a positive sign, which is in line with the expectations. This means that the effect of a win on stock prices become bigger when the country is more indulgent. Contrary to the expectations are the interaction variable between indulgence and a loss, which also has a positive sign. This means that the effect of a loss on stock prices become smaller when the country is more indulgent. However, both of these interaction variables are insignificant. Column 3 shows the influence of indulgence

when all the cultural dimensions are added into the model. The interaction variable between indulgence and a win has a negative sign, which is contrary to column 2 and to the expectations. The interaction variable between indulgence and a loss has the same sign as in column 2 and is significant ($p<0.05$), which is contrary to the expectation. Therefore, the fifth hypothesis is rejected.

The third cultural dimension is uncertainty avoidance. The table below shows the results when uncertainty avoidance is added into the model and these results are used to test H_6: "*Uncertainty avoidance will positively affect the effect of soccer results on stock prices.*". A positive influence on the anomaly means that uncertainty avoidance increases the effect of a win and a loss.

Table 9c: The influence of Uncertainty Avoidance on the anomaly

	Baseline (1)				Uncertainty Avoidance (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0309036	0,0340189	0,91	587	0,0175608	0,0319865	0,55	587	0,196418	0,0239836	0,82	588
Loss	-0,1475154***	0,0420556	-3,51	455	-0,1460023***	0,041618	-3,51	455	-0,1502151***	0,0347094	-4,33	457
Win x UA	.	.	.	.	0,0635632	0,0423986	1,5	587	0,0249407	0,046678	0,53	588
Loss x UA	.	.	.	.	-0,0190688	0,0399236	-0,48	455	0,0094396	0,052185	0,18	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of uncertainty avoidance on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The addition of uncertainty avoidance did not change the main effects of the model. The interaction variables in column 2 show the influence of uncertainty avoidance. The interaction variable between uncertainty avoidance and a win has a positive sign, which means that the effect of a win on stock prices become bigger when the country is more uncertainty avoidance. The interaction variable between uncertainty avoidance and a loss has a negative sign, which means that the effect of a loss on stock prices become bigger when the country is more uncertainty avoidance. These interaction variables are in line with the expectations, but they are insignificant. The addition of all the cultural dimensions into the model, see column 3, changed the sign of the interaction variable between uncertainty avoidance and a loss, and is still insignificant. Therefore, the sixth hypothesis is rejected.

The fourth cultural dimension is long-term orientation. The table below shows the results when long-term orientation is added into the model and these results are used to test H_7: *"Long-term orientation will negatively affect the effect of soccer results on stock prices."*. A negative influence on the anomaly means that long-term orientation decreases the effect of a win and a loss.

Table 9d: The influence of Long-term orientation on the anomaly

	Baseline (1)				Long-term orietation (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0309036	0,0340189	0,91	587	0,0378025	0,0272716	1,39	587	0,196418	0,0239836	0,82	588
Loss	-0,1475154***	0,0420556	-3,51	455	-0,1485188***	0,0404184	-3,67	455	-0,1502151***	0,0347094	-4,33	457
Win x LTO	.	.	.	.	-0,0806168***	0,0278096	-2,9	587	-0,0636966**	0,0286144	-2,23	588
Loss x LTO	.	.	.	.	-0,0247075	0,044408	-0,56	455	0,0119444	0,0351349	0,34	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of long-term orientation on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The addition of long-term orientation did not change the main effects of the model. The interaction variables in column 2 show the influence of long-term orientation. The interaction variable between long-term orientation and a win has a negative sign and is significant ($p < 0.01$), which is in line with the expectations. This means that the effect of a win on stock prices become smaller when the country has a more long-term orientation. Contrary to the expectations is the interaction variable between long-term orientation and a loss, which has a negative sign and is insignificant. The addition of all the cultural dimensions into the model, see column 3, changed the sign of the interaction variable between long-term orientation and a loss, which is in line with the expectations. However, this interaction variable is still insignificant. The interaction variable between long-term orientation and a win is still negative and significant ($p < 0.05$). Therefore, the seventh hypothesis is confirmed.

What is the interpretation of these significant results on stock prices? All the cultural dimensions are standardized, so they have a mean of zero and a standard deviation of one. The influence of long-term orientation on the effect of a win is -0.0806168, and the influence is -0.0636966 when all the cultural dimensions are added into the model. So these effects on stock prices are caused by an increase of one in the value of long-term orientation. The average returns on the AEX have a standard deviation of 1.160561. Therefore, an increase of one in the value of long-term orientation influence the effect of a win on the average returns on the AEX by -0.0936 standard deviations, and by -0.0739 standard deviations when all the cultural dimensions are added into the model.

The fifth cultural dimension is individualism. The table below shows the results when individualism is added into the model and these results are used to test H_8: *"Individualism will negatively affect the effect of soccer results on stock prices."*. A negative influence on the anomaly means that individualism decreases the effect of a win and a loss.

Table 9e: The influence of Individualism on the anomaly

	Baseline (1)				Individualism (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0309036	0,0340189	0,91	587	0,0114531	0,0260266	0,44	587	0,196418	0,0239836	0,82	588
Loss	-0,1475154***	0,0420556	-3,51	455	-0,1389957***	0,039296	-3,54	455	-0,1502151***	0,0347094	-4,33	457
Win x IDV	.	.	.	.	-0,0991956***	0,0239014	-4,15	587	-0,0554254	0,0333106	-1,66	588
Loss x IDV	.	.	.	.	0,0467492	0,0419813	1,11	455	0,115224*	0,0559876	2,06	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of individualism on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The addition of individualism did not change the main effects of the model. The interaction variables in column 2 show the influence of individualism. The interaction variable between individualism and a win has a negative sign and is significant ($p < 0.01$), which is in line with the expectations. This means that the effect of a win on stock prices become smaller when the country is more individualistic. The interaction variable between individualism and a loss has a positive sign, which is

also in line with the expectation although result is insignificant. The addition of all the cultural dimensions into the model, see column 3, did not change the sign of the interaction variables of individualism. However, the significance of the interaction variables did change. The influence of individualism on wins is no longer significant, while the influence of individualism on losses is significant ($p < 0.01$). Column 3 shows the influence is less significant than column 2 suggest. However the significant results show that individualism negatively influence the anomaly. Therefore, the eighth hypothesis is confirmed.

What is the interpretation of these significant results on stock prices? All the cultural dimensions are standardized, so they have a mean of zero and a standard deviation of one. The influence of individualism on the effect of a win is -0.0991956, while the influence of individualism on the effect of a loss 0.115224 when all the cultural dimensions are added into the model. So these effects on stock prices are caused by an increase of one in the value of individualism. The average returns on the AEX have a standard deviation of 1.160561. Therefore, an increase of one in the value of individualism influence the effect of a win on the average returns on the AEX by -0.1151 standard deviations, and influence the effect of a loss on the average returns on the AEX by 0.1337 standard deviations when all the cultural dimensions are added into the model.

The sixth cultural dimension is power distance. The table below shows the results when power distance is added into the model and these results are used to test H_9: *"Power distance will positively affect the effect of soccer results on stock prices."*. A positive influence on the anomaly means that power distance increases the effect of a win and a loss.

Table 9f: The influence of Power Distance on the anomaly

	Baseline (1)				Power Distance (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0309036	0,0340189	0,91	587	0,0145461	0,0283544	0,51	587	0,196418	0,0239836	0,82	588
Loss	-0,1475154***	0,0420556	-3,51	455	-0,1496174***	0,0408147	-3,67	455	-0,1502151***	0,0347094	-4,33	457
Win x PDI	.	.	.	.	0,098808**	0,0421393	2,34	587	0,0210812	0,058407	0,36	588
Loss x PDI	.	.	.	.	0,0124218	0,0417329	0,3	455	0,1227278	0,0687055	1,79	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of masculinity on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The addition of power distance did not change the main effects of the model. The interaction variables in column 2 show the influence of power distance. The interaction variable between power distance and a win has a positive sign and is significant ($p < 0.05$), which is in line with the expectations. This means that the effect of a win on stock prices become bigger when the country has more power distance. Contrary to the expectation is the interaction variable between power distance and a loss, which has a positive sign and is insignificant. The addition of all the cultural dimensions into the model, see column 3, did not change the sign of the interaction variables of

individualism. However, the significance of the interaction variables did change. The interaction variable between power distance and a win is no longer significant. This means that the significant influence of power distance on the effect of a win, as column 2 suggests, is due to one of the other cultural dimensions. Therefore, the ninth hypothesis is rejected.

The third explanatory variable is whether the country is classified as a soccer country or not. The table below shows the results when the dummy variable soccer country is added as interaction variables into the model and these results are used to test H_{10}: *"The popularity of soccer positively affect the effect of soccer results on stock prices."*. A positive influence on the anomaly means that the effect of a win and a loss is bigger for soccer countries.

Table 10: The influence of Soccer Country on the anomaly

	Baseline (1)				Soccer Country (2)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0316851	0,0339629	0,93	588	-0,0076299	0,0262804	-0,29	588
Loss	-0,1460297***	0,041869	-3,49	457	-0,1385837***	0,042278	-3,28	457
Win x Soccer Country	.	.	.	.	0,1338615***	0,0202268	6,62	588
Loss x Soccer Country	.	.	.	.	-0,0446312	0,0526268	-0,85	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of soccer country on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The addition of the dummy variable soccer country into the model changed the coefficient of the main effects of the model. The effect of a loss become smaller, but the difference is minimal and the effect is still significant. The effect of a win changed in sign, although the negative effect is minimal. The interaction variables are in line with the expectation that a country classified as a soccer country will positively influence the anomaly. The interaction variable between soccer country and a loss has a negative sign, although this effect is insignificant. The interaction variable between a soccer country and a win has a positive sign and is significant ($p < 0.01$), which explains the change in the main effect of a win. This means that there is a positive and significant effect after a win on stock prices for soccer countries, while there is no effect after a win for the other countries. Therefore, the tenth hypothesis is confirmed.

This means that a win in an international soccer match only has a positive effect on stock prices in soccer countries. For soccer countries, the effect of a win on stock prices is 0.1262316 (-0.0076299 + 0.1338615). The average returns on the AEX have a standard deviation of 1.160561. Therefore, the effect of a win on the average returns on the AEX is 0.1465 standard deviations for soccer countries.

Because the effect of a win on stock prices is only significant for the soccer countries, the regressions in the previous analysis, which investigated the influence of culture on the anomaly, is estimated again with a sub sample that contains only the soccer countries. The results of the influence of the

cultural dimensions do not differ so much when only the soccer countries are used. Therefore, the tables with the results are shown in the appendices D and E. These results confirm that long-term orientation and individualism have a significant and negative influence on the effect of a win on stock prices.

The fourth and last explanatory variable is the wealth of the country, which is measured through the average GDP-level. The table below shows the results when average GDP-levels are added as interaction variables into the model and these results are used to test H_{11}: *"A high GDP will negatively affect the effect of soccer results on stock prices."*. A negative influence on the anomaly means that a high GDP decreases the effect of a win and a loss.

Table 12: The influence of GDP on the anomaly

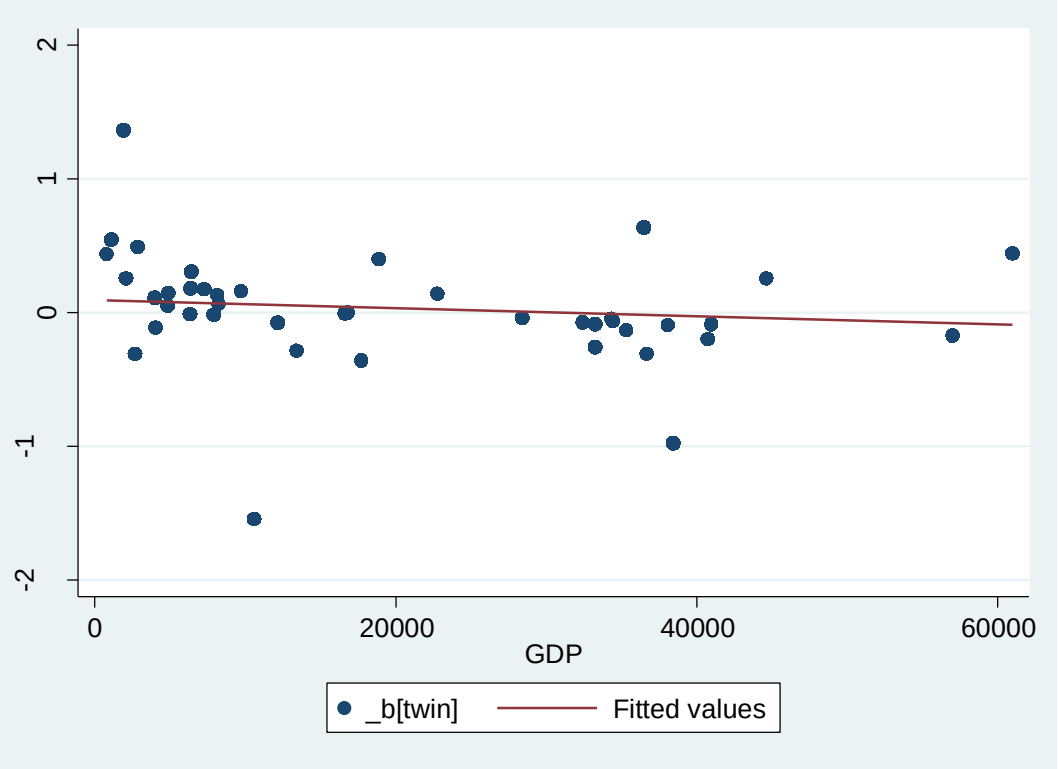
	Baseline (1)				GDP (2)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0316851	0,0339629	0,93	588	0,0065493	0,0238727	0,27	588
Loss	-0,1460297***	0,041869	-3,49	457	-0,1401253***	0,0389764	-3,6	457
Win x GDP	.		.	.	-0,1267197***	0,0295999	-4,28	588
Loss x GDP	.		.	.	0,0336179	0,0411655	0,82	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of GDP on the residuals.

*p<0.1 **p<0.05 ***p<0.01

The addition of the average GDP-levels into the model decreased the coefficients of the main effects, altough the size of the change is negliglable. The interaction variables are in line with the expectations. The interaction variable between GDP and a win has a negative sign and is significant ($p < 0.01$), while the interaction variable between GDP and a loss has a positive sign and is insignificant. This means that the anomaly decreases when the country is wealthier and the effect of a win. GDP influence the effect of a win on stock prices by -0.1267197 and the average returns on the AEX has a standard deviation of 1.160561. Therefore, an increase of one in GDP influences the effect of a win on the average returns on the AEX by 0.1471 standard deviations. However, the effect of a win becomes even negative for wealthy countries, which is unlikely. In order to investigate whether the negative influence of GDP is due to the wealthy countries or due to the less wealthy countries, the figure below shows the correlation between the effect of a win and GDP.

Figure 8: The correlation between the effect of a win and GDP.



The red line in the figure represents the regressionline between the effect of a win and GDP and the blue dottes represent the average effect of a win for each country. The blue dottes shows the effect of a win does not become negative due to a higher GDP. However the blue dottes do indicate that the effect of a win is bigger for countries with a lower GDP-level. This means that the negative regression line between the effect of a win and GDP is due to the less wealthy countries. Hence the effect of a win is not negative because the country is wealthy. Nonetheless the conclusion is that GDP negatively influence the effect of a win on stock prices. Therefore the eleventh hypothesis is confirmed.

6. Conclusion

International soccer results have an effect on stock prices. Previous studies indicate that the anomaly differs between countries, which the results of this study confirm. In most countries, a loss in an international soccer game leads to a decrease in stock prices. Therefore, this research and most previous studies find a significant effect after a loss. Previous studies mostly differ in their results of the effect after a win and this study find the effect of a win differs between countries and an insignificant effect after a win. The hypotheses are tested and the results are used to answer the research questions:

"Is the effect of soccer results on stock prices different between countries and what are the causes?"

The effect of international soccer games on stock prices differs between countries. This research investigates four potential causes for the difference between countries. The first potential cause is the pre-game expectations. However, the influence of pre-game expectations is biased because the anomaly diminishes over time and these expectations are only available for the more recent World/ Continental Cups. The other causes do have a significant influence on the anomaly and explains the differences between countries. The explanatory variables can influence the anomaly through the effect of a win on stock prices or through the effect of a loss on stock prices.

Two cultural dimensions; indulgence and individualism influence the effect of a loss on stock prices. The index of both dimensions negatively influence the effect of a loss on stock prices, which means the effect of a loss become smaller when the value(s) of the cultural dimension(s) is/are higher. Therefore, the effect of a loss on stock prices is smaller for countries with a higher value of indulgence or the effect of a loss on stock prices is bigger for countries with a lower value of indulgence because these countries more strictly regulate pleasure. Moreover, the effect of a loss on stock prices is smaller for countries with a higher value of individualism or the effect of a loss on stock prices is bigger for more collectivistic countries.

The effect of a win on stock prices is influenced by culture, soccer country and the relative wealth of the country. There are three cultural dimensions, masculinity, long-term orientation, and individualism, which have a negative influence on the effect of a loss. A negative influence means the effect of a win on stock prices become smaller when the value(s) of the cultural dimension(s) is/are higher. Therefore, the effect of a win on stock prices is smaller for countries with a higher value of masculinity, long-term orientation, and individualism or the effect of a win on stock prices is bigger for countries with more femininity, short-term orientation, and collectivism. Furthermore, the explanatory variable soccer country significantly influences the effect of a win. The effect of a win on

stock prices is greater for soccer countries. At last the relative wealth of a country influence the effect of a win. However, this influence is contrary to the influences of culture and soccer country. The relative wealth of a country negatively influences the effect of a win on stock prices. The effect of a win on stock prices is smaller for wealthier countries.

7. Discussion

The results show the effect of international soccer results on stock prices is very small. The reason the effect is significant is that the dataset consists of a large time-period and therefore a large number of observations. Therefore, the results do not contradict the all forms of the EMH. The semi-strong-form (and the strong form) EMH asserts stock prices adjust almost instantaneously to new public information. The effect of international soccer results on next trading day stock prices contradicts the semi-strong form (and the strong form) EMH. However, the results of this study do not contradict the weak-form EMH because the weak-form EMH only assert that markets are efficient with respect to information contained in the past price history of the market. , although the EMH state that stock market are fully efficient and could not be influenced by investors sentiment.

Furthermore, the results can only explain a part of the differences between the previous studies because most of the previous studies differ in their effect of a loss on stock prices. The results show that only the effect of a win differs between countries. Only Ashton et al. (2003) find a significant effect after a win on stock prices and this can potentially be explained by the explanatory variable soccer country because Ashton et al. (2003) investigate the country England, which is a soccer country.

However, there are some potential weaknesses with respect to the data and the methodology.

First, this master thesis investigates the influence of international soccer results on stock prices through the moods and emotions. This thesis made a distinction in the type of the game and showed the effect does not differ between the type of the game (group games or elimination games). However, this thesis does not distinguish the more emotional games. For example, the games between the Netherlands and Germany or between Brazil and Argentina are more emotional than some other games.

Secondly, this master thesis claims the effect of international soccer results on stock prices come through the moods and emotions of investors. However, there could be other declaration mechanism. For example, due to an important win of the Netherlands Heineken could sell more beer. Soccer results have an effect on stock prices; however, it is unclear whether this effect is through the moods and emotions of investors.

Furthermore, the methodology does not account for regional factors. The effect of an international soccer result is measured through the residuals of their home stock market. The world market index is used as a benchmark to estimate the residuals. Gerlach (2011) argues that the world market index isn`t a good benchmark to measure stock market performance, because the world market index is dominated by developed countries. The residuals could be influenced by regional factors. Therefore, the results could be biased.

8. References

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9. Appendices

Appendix: A

	Country	Start	Wins	Draws	Losses
1	Argentina	aug-93	33	6	16
2	Australia	jan-88	7	4	9
3	Austria	jan-88	1	3	5
4	Belgium	jan-88	10	5	8
5	Bosnia	mei-08	1	0	2
6	Brazil	jan-95	53	4	12
7	Canada	jan-88	0	0	0
8	Chile	jul-89	15	9	24
9	China	mei-94	9	5	11
10	Colombia	mrt-92	26	5	16
11	Croatia	okt-05	5	3	5
12	Czech Republic	jan-95	12	1	11
13	Denmark	okt-91	11	6	13
14	England	jan-88	19	12	19
15	France	jun-88	25	11	14
16	Germany	jun-88	49	10	14
17	Ghana	jan-11	6	3	4
18	Greece	jan-90	7	3	13
19	Ireland	nov-00	1	2	4
20	Italy	jan-88	34	13	15
21	Japan	dec-90	28	8	12
22	Mexico	mei-89	26	14	24
23	Morocco	apr-94	11	9	13
24	*Netherlands*	jan-88	36	9	18
25	New Zealand	jan-90	0	3	0
26	Nigeria	sep-09	9	4	6
27	Norway	jan-88	2	5	3
28	Poland	jan-95	1	3	8
29	Portugal	jan-92	23	4	14
30	Romania	mei-97	3	4	4
31	Russia	feb-98	6	3	8
32	Saudi Arabia	mei-06	4	2	6
33	Scotland	jan-88	3	2	7
34	Serbia	okt-05	1	0	5
35	Slovakia	nov-09	1	1	2
36	Slovenia	jan-99	1	3	5
37	South Africa	jan-90	17	14	13
38	South Korea	jan-88	22	12	22
39	Spain	feb-90	34	8	12
40	Sweden	jan-88	11	10	14
41	Switzerland	jan-90	7	5	12
42	Turkey	jan-88	8	2	8
43	Ukraine	feb-05	4	0	4
44	United States	jan-88	7	7	24

Appendix B: Overview per country

Country	β-Loss	β-Win	MAS	IND	UA	IDV	LTO	PDI	Odds ratio	Soccercountry	GDP
Romania	-.6186973	.0482949	42	20	90	30	52	90	.2531744	1	4817
Serbia	-.5892782	-.113	43	28	92	25	52	86	.3448723	1	4030
Argentina	-.5347801	.1296684	56	62	86	46	20	49	.6188849	1	8157
Nigeria	-.5059823	.5477014	60	84	55	30	13	80	.4004129	1	1093
China	-.4793134	-.3107124	66	24	30	20	87	80	.3361407	0	2646
South Korea	-.4665539	.1420141	100	28	51	52	77	100	.3871531	1	10555
Colombia	-.4274189	.11074	64	83	80	13	13	67	.4062413	1	3981
Australia	-.3130175	-.1330125	61	71	51	90	21	36	.2084068	0	35340
Denmark	-.3074452	.2521968	16	70	23	74	35	18	.2671709	1	44650
Slovenia	-.3028066	-.3586327	42	44	86	51	48	57	.2731097	1	22764
Urkaine	-.2993558	1,3652040	27	18	95	25	55	92	.3084629	1	1911
Greece	-.2796048	.3977279	57	50	100	35	45	60	.2205985	1	18880
Croatia	-.2768994	.1556859	40	33	80	33	58	73	.3451327	1	9739
Italy	-.2704978	-.0418156	70	30	75	76	61	50	.4585521	1	28416
France	-.2548377	-.0735115	43	48	86	71	63	68	.482976	1	32417
Portugal	-.2350337	-.0080911	31	33	99	27	28	63	.4125086	1	16626
Saudi Arabia	-.229239	-.2889009	60	52	80	25	36	95	.3256508	1	13435
England	-.2164993	-.2576541	66	69	35	89	51	35	.4879076	1	33250
Poland	-.1999015	-.0204422	64	29	93	60	38	68	.372428	1	7878
Germany	-.1972169	-.063426	66	40	65	67	83	35	.5083147	1	34426
Spain	-.194693	0,1366011	19	48	88	27	49	71	.7453696	1	17707
Czech Republic	-.1821288	-.0782644	57	29	74	58	70	57	.3649494	1	12149
Switzerland	-.1808516	-.1710708	70	66	58	68	74	34	.3088031	1	57036
Netherlands	-.1637705	-.0976956	14	68	53	80	67	38	.4444527	1	38092
Norway	-.1466765	.4426464	8	55	50	69	35	31	.	1	60958
Turkey	-.1190023	-.0152369	45	49	85	37	46	66	.2086163	1	6318
Ireland	-.1038401	-.9778001	68	65	35	70	24	28	.1357669	0	38427
Sweden	-.0876172	-.0868931	5	78	29	71	53	31	.3266508	1	40975
Austria	-.0857892	.6371925	79	63	70	55	60	11	.1990105	0	36466
Morocco	-.0611181	.2529674	53	25	68	46	14	70	.427839	1	2059
Belgium	.0380746	-.0486041	54	57	94	75	82	65	.4754818	1	34364
Mexico	.0751924	.1706995	69	97	82	30	24	81	.283379	1	7253
Brazil	.0955426	.1801775	49	59	76	38	44	69	.6187506	1	6355
South Africa	.0990022	-.0010769	63	63	49	65	34	49	.3702314	1	16804
Japan	.1084762	-.3122908	95	42	92	46	88	54	.3806927	0	36709
Scotland	.1225459	-.0870271	66	69	35	89	51	35	.	1	33250
Chile	.1599902	.0622302	28	68	86	23	31	63	.3702637	1	8240
United States	.1781589	-.2015068	62	68	46	91	26	40	.6559626	0	40746
Ghana	.1835396	.4339316	40	72	65	15	4	80	.4721891	1	786
Bosnia	.1926052	.4883158	.	.	.	.	.	.	.3449837	1	2814
Russia	.3012165	.305926	36	20	95	39	81	93	.3435696	1	6388
Slovakia	1,4913760	-1,5450030	39	29	85	18	100	60	.2783957	1	4868

Appendix C: The influence of the six cultural dimensions on the anomaly

	Baseline (1)				Culture (2)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,0309036	0,0340189	0,91	587	0,196418	0,0239836	0,82	588
Loss	-0,1475154***	0,0420556	-3,51	455	-0,1502151***	0,0347094	-4,33	457
Win x MAS	.	.	.	.	-0,0688029**	0,0302185	-2,28	588
Loss x MAS	.	.	.	.	0,0121581	0,0384087	0,32	457
Win x IND	.	.	.	.	-0,015759	0,0350015	-0,45	588
Loss x IND	.	.	.	.	0,0707461**	0,0295098	2,4	457
Win x UA	.	.	.	.	0,0249407	0,046678	0,53	588
Loss x UA	.	.	.	.	0,0094396	0,052185	0,18	457
Win x LTO	.	.	.	.	-0,0636966**	0,0286144	-2,23	588
Loss x LTO	.	.	.	.	0,0119444	0,0351349	0,34	457
Win x IDV	.	.	.	.	-0,0554254	0,0333106	-1,66	588
Loss x IDV	.	.	.	.	0,115224*	0,0559876	2,06	457
Win x PDI	.	.	.	.	0,0210812	0,058407	0,36	588
Loss x PDI	.	.	.	.	0,1227278	0,0687055	1,79	457

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of the six cultural dimensions on the residuals.

*p<0.1 **p<0.05 ***p<0.01

Appendix D1: The influence of Masculinity on the anomaly

	Baseline (1)				Masculinity (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,060535*	0,0317435	1,91	535	0,057898*	0,03157	1,83	535	0,0394989*	0,0210141	1,88	535
Loss	-0,1633162***	0,0428231	-3,81	392	-0,1607815***	0,0438424	-3,67	392	-0,1758002***	0,031259	-5,62	392
Win x MAS	.	.	.	.	-0,0296194	0,044928	-0,66	535	-0,0366467	0,0292305	-1,25	535
Loss x MAS	.	.	.	.	0,0158671	0,0443233	0,36	392	-0,0178015	0,0414943	-0,43	392

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of masculinity on the residuals, for soccer countries only.

*p<0.1 **p<0.05 ***p<0.01

Appendix D2: The influence of Indulgence on the anomaly

	Baseline (1)				Indulgence (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,060535*	0,0317435	1,91	535	0,604666*	0,0313646	1,93	535	0,0394989*	0,0210141	1,88	535
Loss	-0,1633162***	0,0428231	-3,81	392	-0,1646275***	0,0403068	-4,08	392	-0,1758002***	0,031259	-5,62	392
Win x IND	.		.	.	0,0093468	0,0319451	0,29	535	-0,0316869	0,0321208	-0,99	535
Loss x IND	.		.	.	0,0404778	0,0390825	1,04	392	0,0534729*	0,0315193	1,7	392

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of indulgence on the residuals, for soccer countries only.

*p<0.1 **p<0.05 ***p<0.01

Appendix D3: The influence of Uncertainty Avoidance on the anomaly

	Baseline (1)				Uncertainty Avoidance (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,060535*	0,0317435	1,91	535	0,0446087	0,0316231	1,41	535	0,0394989*	0,0210141	1,88	535
Loss	-0,1633162***	0,0428231	-3,81	392	-0,1576619***	0,0406622	-3,88	392	-0,1758002***	0,031259	-5,62	392
Win x UA	.		.	.	0,0699109	0,0418893	1,67	535	-0,310647	0,0566647	-0,55	535
Loss x UA	.		.	.	-0,0285986	0,0369718	-0,77	392	-0,0690389	0,0794264	-0,87	392

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of uncertainty avoidance on the residuals, for soccer countries only.

*p<0.1 **p<0.05 ***p<0.01

Appendix D4: The influence of Long-term orientation on the anomaly

	Baseline (1)				Long-term orietation (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,060535*	0,0317435	1,91	535	0,0610017**	0,0271336	2,25	535	0,0394989*	0,0210141	1,88	535
Loss	-0,1633162***	0,0428231	-3,81	392	-0,1640896***	0,0416625	-3,94	392	-0,1758002***	0,031259	-5,62	392
Win x LTO	.		.	.	-0,0689374***	0,0256819	-2,68	535	-0,0434498*	0,024441	-1,78	535
Loss x LTO	.		.	.	-0,0155581	0,0494489	-0,31	392	0,0182127	0,035842	0,51	392

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of long-term orientation on the residuals, for soccer countries only.

*p<0.1 **p<0.05 ***p<0.01

Appendix D5: The influence of Individualism on the anomaly

	Baseline (1)				Individualism (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,060535*	0,0317435	1,91	535	0,0371612*	0,0199422	1,86	535	0,0394989*	0,0210141	1,88	535
Loss	-0,1633162***	0,0428231	-3,81	392	-0,1573717***	0,0364388	-4,32	392	-0,1758002***	0,031259	-5,62	392
Win x IDV	.		.	.	-0,1125095***	0,025594	-4,4	535	-0,0843755***	0,0224461	-3,76	535
Loss x IDV	.		.	.	0,0206418	0,042725	0,48	392	0,0918537	0,0574652	1,6	392

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of individualism on the residuals, for soccer countries only.

*p<0.1 **p<0.05 ***p<0.01

Appendix D6: The influence of Power Distance on the anomaly

	Baseline (1)				Power Distance (2)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,060535*	0,0317435	1,91	535	0,0411509*	0,0240882	1,71	535	0,0394989*	0,0210141	1,88	535
Loss	-0,1633162***	0,0428231	-3,81	392	-0,1756875***	0,0383344	-4,58	392	-0,1758002***	0,031259	-5,62	392
Win x PDI	.		.	.	0,1069262**	0,0422768	2,53	535	0,0432882	0,0634184	0,68	535
Loss x PDI	.		.	.	0,0488971	0,0408887	1,2	392	0,1933362**	0,0819027	2,36	392

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of power distance on the residuals, for soccer countries only.

*p<0.1 **p<0.05 ***p<0.01

Appendix E: The influence of the six cultural dimensions on the anomaly

	Baseline (1)				Culture (3)			
	β	Std. Dev.	t-values	N	β	Std. Dev.	t-values	N
Win	0,060535*	0,0317435	1,91	535	0,0394989*	0,0210141	1,88	535
Loss	-0,1633162***	0,0428231	-3,81	392	-0,1758002***	0,031259	-5,62	392
Win x MAS	.	.	.	.	-0,0366467	0,0292305	-1,25	535
Loss x MAS	.	.	.	.	-0,0178015	0,0414943	-0,43	392
Win x IND	.		.	.	-0,0316869	0,0321208	-0,99	535
Loss x IND	.		.	.	0,0534729*	0,0315193	1,7	392
Win x UA	.		.	.	-0,310647	0,0566647	-0,55	535
Loss x UA	.		.	.	-0,0690389	0,0794264	-0,87	392
Win x LTO	.		.	.	-0,0434498*	0,024441	-1,78	535
Loss x LTO	.		.	.	0,0182127	0,035842	0,51	392
Win x IDV	.		.	.	-0,0843755***	0,0224461	-3,76	535
Loss x IDV	.		.	.	0,0918537	0,0574652	1,6	392
Win x PDI	.		.	.	0,0432882	0,0634184	0,68	535
Loss x PDI	.		.	.	0,1933362**	0,0819027	2,36	392

An OLS regression is used to estimate the effect of the dummy variables for wins and losses and the interaction variables of the six cultural dimensionson the residuals, for soccer countries only.

*p<0.1 **p<0.05 ***p<0.01