TILBURG UNIVERSITY

School of Economics and Management

MASTER THESIS

Football matches and stock returns: A comparison between Europe and Latin America in market reactions after football matches of national teams

"Some people think football is a matter of life and death. I don't like that attitude. I can assure them it is much more serious than that." – Bill Shankly –

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Abstract

This study investigates whether the match results of national football teams have an effect on domestic stock indices. Since football is an important part of many people's lives, match results can be seen as an important mood changer that may have an impact on stock markets. This fits in the field of behavioral finance literature which links mood to trading behavior. A newly introduced aspect is that I study the difference between Latin American countries and European countries. Because the public view is that football plays a more important part in the lives of Latin Americans than it does in the lives of Europeans, and since Latin Americans are considered to be more emotional than Europeans, I have the expectation that match results of Latin American national football teams on main tournaments will have a bigger effect on domestic stock indices than match results of European national football teams on main tournaments. To study these effects I perform an event study. In total, this study investigates match results of ten European and four Latin American countries on main tournaments between 1996 and 2018.

I found no statistically significant results that are in line with the main expectations. After won matches the average abnormal return was -0.0033%, and after lost matches, the average abnormal return was -0.0450%. Both are statistically insignificant. Also, the second expectation that match results of Latin American countries have more impact on the domestic stock indices than match results of European countries is not supported by the results.

The lack of evidence for the expectations may be caused by the fact that sports might not affect investors enough to have an impact on their trading behaviour. Another possible explanation is that a big proportion of the stocks of the firms that are on the studied stock indices are held by foreign investors who are not or less affected by match results.

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1. Introduction and motivation

1.1 Purpose of the study

The purpose of this study is to extend the literature about the effect of football match outcomes on the mood of investors. The (change in) mood of investors can be made visible with their behavior on the stock market. This effect will be tested by observing the impact of football matches of national teams on the national stock markets of those countries. The main difference with other studies in this field is that in this research European and Latin American countries will be compared. Since Latin Americans are considered to be more emotional and more involved in football, I want to investigate whether this is also visible in their behavior on the stock market. In total the football matches of 10 European countries and 4 Latin American countries are studied. I studied the matches of those countries played on the FIFA World Cup, UEFA European Championship, and the CONMEBOL Copa América between 1996 and 2018. In this research, I first made, of course, the distinction between European and Latin American countries. Furthermore, I studied if the importance of the tournament, with the FIFA World Cup considered as the most important, and/or the stage of the tournament, with knock out matches considered as the most important, has an effect on the behavior of investors. Lastly, I take the match expectations into account based on the ELO ratings, since it is expected that unexpected wins or losses have a bigger effect on the mood of investors. Regressions on these different subgroups will show if there are statistically significant effects on some of them that are in line with the hypotheses.

1.2 Outline

I start this paper with some main information about football, the FIFA World Cup, the UEFA European Championship, and the CONMEBOL Copa América. This information provides some inside about the history and the structure of these tournaments. I continue with a review on the prior literature about investor sentiment, sports sentiment, and emotionality levels. For the sports sentiment, I split up the literature in four sections. In the section about the emotionality levels, I zoom in on the difference between Latin Americans and Europeans. In chapters 3 and 4 the theoretical framework and hypotheses will be discussed. Chapters 5 and 6 provide an explanation of the chosen data and the used methodology. Finally, the results will be presented in chapter 7, followed by the conclusion in chapter 8.

All World Cup winners since 1974 (with the exception of Brazil in 2002) outperformed the global stock market in the first month after the win (Goldman Sachs, 2014).

1.3 Football

Football is the most watched, most practiced, and the most popular sport around the globe. According to a study by Nielsen Sports DNA (2018), 43% of the respondents, in their survey across 18 markets in the Americas, Europe, the Middle East and Asia, said to be at least "interested" in football. 43% equated 736 million people across the surveyed markets. This was the largest number of sports studied, followed by 36% of respondents that were at least "interested" in basketball. In their report, there is also a distinction made between men and women, low-income earners, medium-income earners, & high-income earners, and age groups. This distinction shows that people from all walks of life are "interested" in football. The international football organization FIFA (Fédération Internationale de Football Association) revealed that 3.572 billion people watched at least some of the latest World Cup (Russia, 2018)[1]. This is more than half of the global population aged four and over. The final between France and Croatia attracted a combined global audience of 1.12 billion viewers. These are just two proofs on how important football is for people, and that football is the one sport that could have the ability to change the mood of people.

Besides popularity, football is as well an important economic factor. The FIFA expects to get about $6 billion in revenue from the latest World Cup[2]. When a country does well in the World Cup, people worldwide can get a more positive perspective on this country. This more positive perspective can lead to more people investing in this country, which can subsequently lead to an economic boost. The change in the mood of people can lead to irrational behavior of investors. This irrational behavior can lead to abnormal returns in stock markets. The italic sentence at the top of this page is from research by Goldman Sachs. The conclusion of their report on the impact of winning the World Cup is that the stock market of the winning country outperforms the global market in the first month after the win (almost) every time. These gains fade in the months thereafter resulting in a, on average, 4% underperformance of the winning country over the complete year after the win. The economically interesting question is if this deviation from the global market is only true for the World Cup winner or are there abnormal returns after multiple matches on World Cups? If so, these football matches would have great implications for our investment behaviors. It would counter the efficient market hypothesis, which states that market prices should reflect all relevant and available information in the market. This hypothesis is based on the assumption that investors are rational and make rational decisions (Fama E. F., 1970). The outcome of a football match does not belong in this

[1] https://www.cnbc.com/2018/12/21/world-cup-2018-half-the-worlds-population-tuned-in-to-this-years-soccer-tournament.html
[2] https://www.cnbc.com/2018/06/14/the-business-of-the-world-cup--who-makes-money-and-how-much.html

efficient market hypothesis, and can, therefore, lead to non-rational investor decisions and to pricing deviation from the pure rationality.

In this study. I want to make the comparison between Europe and Latin America in market reactions after football matches of the national team on an important tournament (World Cup, European Championship and Copa América). I chose to compare these two groups because they include the best football countries. The sample in this study contains 18 of the last 24 World Cup semi-finalists (last 6 World Cups). With better football countries, I have more data (matches) per country which can improve the statistical significance. Furthermore, the high level of these countries reduces the effect of the expectation of the match outcome. Most of the countries in my sample are expected to make it (at least) to the knock out rounds of a tournament. Finally, in almost every country in Europe and Latin America (at least all the countries in my sample), football is the main sport. This increases the likelihood of an effect on the stock market after an international football match. In, for instance, the United States, China, Australia, and India football is not the country's main sport. The mood of the residents of these countries will be less affected by the outcome of an international football match of the countries' football team.

I expect a difference in market reactions because Latin Americans are more emotional than Europeans, which could lead to more irrational decisions. Furthermore, football is considered to play a more important role in the lives of Latin Americans than it does in the lives of Europeans. These two differences between Latin Americans and Europeans lead to my expectation that the market reactions differ between Latin American countries and European countries. The following ten European countries are incorporated in this research: Denmark, England, France, Germany, Holland, Italy, Portugal, Spain, Sweden, and Switzerland. Argentina, Brazil, Chile, and Mexico are selected as the Latin American countries. For each of these countries, I collected data of matches on the World Cup, European Championship, and Copa América for the period 1996 to 2018. The countries together played 290 World Cup matches, 198 European Championship matches, and 113 Copa América matches in this period that are incorporated in this study. This lead to a sample of 601 events. Section 5 will give more insight into the selection of the matches (events).

1.3.1 FIFA World Cup

The first World Cup was played in 1930 in Uruguay. Only thirteen countries participated in this tournament. The final was between host country Uruguay and Argentina and ended in a 4-2 win for Uruguay. After that, there was a World Cup every four years, with the exception of 1942, and 1946 when the tournament was cancelled due to the Second World War. The number of participating countries increased during the years to 32 in 1998. This remained so until now. The World Cup of 2026 will be the first with 48 participating

countries. Nowadays, each continent has its own qualification rounds, which makes it able for each country to qualify for the World Cup. In all those years, 82 countries participated at least once. Brazil did not miss any tournament and is record holder with 21 participations. Brazil is also the country that became World Champion most often, 5 times, followed by Italy and Germany with 4 wins each. At the latest World Cup (Russia, 2018) France won their second World Cup by beating Croatia with 4-2 in the final.

1.3.2 UEFA European Championship

The European Championship is played in Europe and only European[3] countries can qualify for this tournament. The tournament is played in one (or two) of the participating European countries. The first European Championship was played in 1960 in France. Only France, Czechoslovakia, Yugoslavia, and the Soviet Union participated. The Soviet Union won this tournament after a 2-1 win over France in the final. After this first European Championship, the tournament is organized each even year in which there is no World Cup. Till 1976 there were only four participating countries. This increased to eight in 1980, to sixteen in 1996, and to twenty-four in 2016. 37 countries participated in the European Championships at least once. Germany is record holder with 12 participations. It is also the country, together with Spain, that won the European Championships most often, both three times. At the latest European Championship (France, 2016) Portugal won their first European Championship by beating hosting country France with 1-0 in extra time.

1.3.3 CONMEBOL Copa América

The Copa América is the South American equivalent of the European Championship. The first Copa América was played in 1916 in Argentina. In contrast to the World Cup and European Championship, the intervals between two tournaments are irregular and not exact four years. For instance, there was a Copa América each year between 1919 and 1927 but was there no tournament between 1968 and 1974. Till 1967 there were only four participating countries. Since 1975 all 10 countries on the South American mainland (with the exception of Guyana, Suriname and French Guyana) participated on the Copa América. From 1993 the tournament was extended with two non-South American invited countries. Mexico has been invited to every edition from 1993. So far, 45 editions of the Copa América have been played. Uruguay is record holder with 42 participations. It is also the country with the most wins (15), followed by Argentina (14). The last Copa América was the first that was not held on the South-American mainland, but in the United States. Chile won this tournament after beating Argentina with penalties.

[3] Countries that are member of the UEFA (Union of European Football Associations). For instance Israel and Kazakhstan are members of the UEFA, but are not considered as European countries. Since they are a member of the UEFA, they are able to qualify for the European Championship.

2. Literature review

In this section, I will discuss the existing literature about investor sentiment and sports sentiment. I start by discussing the literature about no-sports factors that have an effect on investor mood and on the trading behavior of investors. Thereafter, I will look at the effect of sports, and football in specific, on the mood of investors. In this topic, I will make the distinction between four different groups. (1) The effects of match results of national football teams on stock indices. (2) The effects of match results of listed football clubs on their stock price. (3) The effects of match results on the stock price of intimately involved companies. (4) The effects of match results in other sports on stock prices of listed sports clubs or intimately involved companies or on stock indices. Next, I will discuss the literature about the relation between football and emotion, and the differences between Latin Americans and Europeans in emotional levels and mood changes.

2.1 Investor sentiment

Wachtel (1942) was one of the first to observe an effect on the stock market that was in contrast with rationality. He contradicted earlier studies by Richard N. Owens and Charles O. Hardy who stated that "*seasonal variations of security prices are impossible. If a seasonal variation in stock prices did exist, general knowledge of its existence would put an end to it*" (Owens & Hardy, 1925). Wachtel observed a higher performance of the stock market in January compared to any other month. He explained this with the general feeling of good fellowship and cheer existing throughout the Christmas holidays that tends to last in January. Numerous studies followed Wachtel, and the effects of the temperature, hours of sunlight, and sleeping patterns on investor decisions have been studied.

Saunders (1993), and Hirshleifer & Shumway (2003) studied the effect of the amount of sunshine on stock market returns. Saunders (1993) found that the weather in New York City is positively correlated with the stock market returns. In his research, he rejected the Null hypothesis that stock prices from indices in New York City are not systematically affected by local weather. This supports the view that security markets are systematically influenced by investor psychology and argues for including behavioral variables in models of asset-pricing. Where the research by Saunders is only based on New York City, Hirshleifer & Shumway (2003) studied the relationship between morning sunshine in the city of a country's leading stock index and daily market index returns across 26 countries from 1982 to 1997. They drew the same conclusion as Saunders, namely that sunshine is strongly, and significantly, correlated with stock returns. An investor with very low transactions costs would have improved on the Sharpe ratio of the market portfolio, though

somewhat modestly, by trading on the weather. However, because weather strategies involve frequent trading, fairly modest transaction costs eliminate this benefit. Nevertheless, the sunshine effect on stock returns is hard to reconcile with fully rational price setting.

Another variable that could influence investor behavior is the quality of sleep during a night. In a study by Kamstra, Kramer, & Levi (2000), they addressed the question if the daylight saving time change has consequences on financial markets. They found that the magnitude of the daylight saving effect is roughly 200 to 500 percent of the regular weekend effect in several international financial markets (both statistically and economically significant). Only in the United States alone, the daylight saving effect implies a one-day loss of $31 billion on the NYSE, AMEX, and NASDAQ exchanges. This draws the question if it is wise to do away with the time change.

Cao & Wei (2005) investigated whether stock market returns are related to temperature because several kinds of research in psychology has shown that temperature is another variable that affects mood, and mood changes, in turn, cause behavioral changes. They hypothesize that lower temperature leads to higher stock returns due to investors aggressive risk-taking, and higher temperature can lead to higher or lower stock returns since aggression and apathy have competing effects on risk-taking. Their analysis reveals an overall negative correlation between temperature and stock market returns. In other words, a higher (lower) temperature leads to lower (higher) stock market returns. The impact of apathy dominates that of aggression in the summer, leading to a statistically significant, negative correlation across the whole temperature range.

Fang Yu Hsu (2019) examined the relation between stock market returns and events such as Chinese New Year (CNY), Baseball competition, an earthquake, and a typhoon. These events were selected because they are of high concern and at the national level. A significant negative return is observed on the natural disasters (earthquake and typhoon) period. For the second observed event, CNY, a positive relationship with the stock market is found. By buying stocks just before the CNY holiday (there is a national holiday of about a week around CNY in Taiwan), and selling it thereafter, an investor could improve its Sharpe ratio of the market portfolio. Finally, there is no clear evidence that the results of baseball matches have an effect on stock market returns.

These are just some examples of studies that test the effect of mood on investor behavior. The studies showed that market prices do not always reflect all relevant and available information in the market and that investors can make non-rational decisions. Since many people are interested in sports, and football in particular, it raises the question of how much effect sports have on the mood of investors and on their trading behavior. In the next paragraph, some studies and their outcomes about this topic will be discussed.

2.2 Sport sentiment

Several studies have shown that there is a significant link between sports results and people's mood. Hirt, Zillman, Erikson, & Kennedy (1992) showed in their study on students supporting a college basketball team in the United States that not only fans' moods but also their self-esteem is affected by the outcome of a match. More importantly, fans' estimates on both the team's and their own future performance were significantly better in the win than in the loss condition. In addition, comparisons with conditions of personal success and failure indicated that team outcome and personal outcome had similar effects on fans' estimates. In another study, Dohmen, Falk, Huffman, & Sunde (2006) asked, during the 2006 World Cup, a representative sample of the German population about their personal economic situation, the current economic situation in Germany, and their expectations regarding changes in both situations a year later. After an unexpectedly good performance of the German football team, the respondents had more positive economic perceptions and expectations. The results hold for the whole economy as well as at the individual level.

In this study, I will investigate if the change in mood, as described in the two examples above, has an effect on the trading behavior of investors on domestic stock markets. Since I expect the change in mood to be higher in Latin American countries than in European countries, I am curious if this also gives a bigger effect on the stock indices of Latin American countries compared to European countries.

Multiple studies are performed about the relation between sports and stock(s) markets. For instance, some studies examined the effect of the outcome of sports matches (clubs & country) on stock markets. Also, the effect of player transfers on stock markets has been studied. In this part of the literature review, the focus will be on the effect of football match results, since that is what will be investigated in this study as well. The effect of a match result can be observed on three different levels. First, it can have an effect on a whole stock index. This will be mainly with matches of the national team. Furthermore, the stock price of a football club itself can be affected by a football match outcome. This can only be with clubs that are listed on a stock exchange (like AFC Ajax in the Netherlands, Juventus in Italy, and Arsenal in England). Finally, the stock prices of a company that is intimately involved with a football club can be affected by a match result. This will be mainly companies that are (shirt) sponsor of a football club. In the coming sections, some studies that are performed so far on each of these three different topics will be discussed.

2.2.1 Stock indices

I start with the effect of match results of national football teams on domestic stock indices. Ashton, Gerrard, & Hudson (2003) were the first to study this effect. They studied the effect of the performance of England's national football team between January 6, 1984, and July 3, 2002, on the British FTSE 100 Index, and found

a statistically significant relationship. Later on, their study has been doubted by Bernhard Zwergel & Christian Klein (2009). They have redone the binomial test of Ashton et al. to check whether the return of the trading day following a football match of England's national football team differs from the unconditional mean return of all other trading days. The two studies came to different conclusions, which is noteworthy since they used the same data. Nevertheless, there are some differences between the two studies that cause different results. First, Ashton et al. (2003) did not take the holiday effect into account. If there had been no trading on a day (a holiday) DataStream reports the same price as the day before, resulting in exactly zero return for that day. This has an impact on the unconditional mean return of all other trading days (no after-match days). Zwergel & Klein (2009) corrected this by removing all returns that fell on holidays. It could also occur that the day after a match is a holiday, giving zero return as actual return after the match, which is just due to the holiday.

A second difference between the two studies is how they handle draws in knock out matches. Ashton et al. (2003) reported 12 wins, 12 losses, and 11 draws in tournament final matches in the sample period, while Zwergel & Klein (2009) reported 13 wins, 14 losses, and 8 draws on the same matches. This difference is caused by penalty series after a draw in a knock out match. The result of a loss after penalties is the same as the result of a loss in regular time, the team is out of the tournament and will not win it.

A third difference is due to the time at which the match is played. Since most matches are played in the evening, the abnormal returns can be observed on the first trading day after the match. This seems reasonable but gives an error when a match is played in another time zone. The World Cup of 2002 for instance, was played in South Korea and Japan. On that tournament, England played against Argentina on Friday the 7th of June. The match started at 20:30 local time, which is 12:30 in England. The match ended around 22:30 local time (14:30 in England). Ashton et al. (2003) took the closing price on the first trading day after the match to calculate the abnormal return (Monday 10th of June), while investors could already react on the outcome on the match on Friday, June 7th since the FTSE 100 was still opened. Zwergel & Klein (2009) took the closing price on the match day (Friday, June 7th) to calculate the abnormal return.

These three differences lead to a different conclusion between the two studies. Whereas Ashton et al. (2003) found a statistically significant relationship between the stock market return on the FTSE 100 and the performance of England's national football team, Zwergel & Klein (2009) did not find a statistically significant relationship between this. This shows that there are several ways to study this topic and that these different ways can lead to different outcomes. It is important to identify and substantiate how the study is performed.

I support the method of Zwergel & Klein (2009). Therefore, I exclude the days that were a market holiday to avoid getting 0% returns due to market holidays. Also with the case of draws in knock out matches, I will follow Zwergel & Klein (2009). This means that knock out matches will always have a winner and a

loser. Finally, I need to deal with the time difference. Section 6.2 explains how this will be handled in this study. Briefly, I will follow Zwergel & Klein (2009) and not automatically take the next trading day after a match as the event date.

In response to Zwergel & Klein (2009), Ashton, Gerrard, & Hudson revisited Ashton et al. (2003) in their study of 2011. After this revision, they still assert that national football matches have an effect on the FTSE 100. (Ashton, Gerrard, & Hudson, 2011). The link between international football results and stock market returns appears robust to a number of statistical approaches, and in particular to parametric approaches which are ignored by Zwergel & Klein (2009).

A similar famous study is performed by Alex Edmans, Diego García, & Øyvind Norli (2007). They studied international football matches on the World Cup, European Championship, Copa América, and Asia Cup from January 1973 till December 2004. They also involved relevant qualification matches in their study to get to a total sample of 1,162 football matches played by 39 different countries. Besides football, they also studied the effect of cricket, rugby, ice hockey, and basketball matches on stock prices. The results of that part of their study will be discussed in section 2.2.4. Edmans et al. (2007) measured the effect of international football matches on stock prices by looking at the return on a broad stock market index on the first trading day following the match. This is the same method as Ashton et al. (2003) used in their study. Edmans et al. (2007) were familiar with the consequences that a part of the reaction in stock prices may have been incorporated in stock prices before the measurement day. They chose to still follow this method to ensure that they have the return for a full day when the match outcome is known. They documented a strong negative stock market reaction to losses by national football teams. The size of the loss effect is economically significant—in monthly terms, the excess returns associated with a football loss exceed 7%. No evidence was found of a corresponding reaction after wins in football matches. They assign this finding to the change in investor mood after the matches. In countries where football is especially important the effect is more pronounced. The effect also increases as the importance of the match increases. Therefore, the effect is bigger for matches in the World Cup, and for elimination matches. Another observation they made is that the effect is especially large in small stocks. This is due to the fact that small stocks are predominantly held by local investors, whose mood is more affected by the performance of the national football team.

Like Ashton et al. (2003), Elvira Anna Graziano, & Francesca Vicentini (2016) and Demirhan (2013) studied the effect of the performance of one single national football team on the domestic stock index. Graziano & Vicentini (2016) analyzed the effect of the Italian national football team results on the FIFA World Cup between 2002 and 2014 on the FTSE MIB. Demirhan investigated whether the sporting success

of the Turkish national football team between January 1988 and May 2011 affects Borsa Istanbul (BIST) stock index returns. Graziano & Vicentini (2016) found a positive and statistically significant (at the 1% confidence level) relationship with football match results of the Italian national football team in the FIFA World Cup. Demirhan (2013) observed no abnormal return on the Turkish stock market index after a win of the Turkish national football team, while he observed a very negative effect on the effect after a loss by the national team.

The study performed by Jeffrey R. Gerlach (2011) gave us a different perspective on the studies mentioned before. In his study, he showed that the patterns of returns documented in the papers by Edmans et al. (2007) and Ashton et al. (2003) also exist in matching countries whose national teams did not play on the dates included in the sample. This raises the question if these abnormal returns are because of the football match results or because of another (rational) reason. As an example, they mention the quarter-final between Brazil and England on Friday, June 21, 2002. Brazil won this match by 2-1. On the next trading day, Monday 24 June 2002, the Brazilian index rose 1.27% while England's fell 1.33%. The World Market index fell by 0.31%. Using the global index as a benchmark would provide support for the hypothesis that World Cup matches affect market returns by affecting investor sentiment because the winner (Brazil) had a higher return than the market index and the loser (England) had a lower return. However, on 24 June 2002, the return on the Argentine index (matching country Brazil) was 2.04% while the return on the French index (matching country England) was 3.45%. Neither Argentina nor France advanced to the elimination round of the 2002 World Cup, so their national team performances could not affect returns on that day.

Table 1 summarizes the results of the before mentioned and other studies that analyzed the effects of national football team results on domestic stock indices.

AUTHORS	YEAR	TITLE	COUNTRIES	PERIOD	CONCLUSION
(ASHTON, GERRARD, & HUDSON)	2003	Economic Impact of National Sporting Success: Evidence From the London Stock Exchange	England	1984 – 2002	Found a statistically significant relationship between the change in the price of shares traded on the FTSE 100 and the performance of the English national football. More important matches have a greater influence on share price movements, relative to less important matches.
(ZWERGEL & KLEIN)	2009	Reconsidering the Impact of National Soccer Results on the FTSE 100	England	1984 – 2002	Did not find a link between England's national football team's achievements and the FTSE 100. They stated that the efficiency of capital markets can never be proven significantly, only their failure can.
(ASHTON, GERRARD, & HUDSON)	2011	Do national soccer results really impact on the stock market?	England	1984 – 2009	In the revision of their previous study, they still found that national football matches have an effect on the UK stock market. The effect of sporting results on stock market returns is much stronger after losses than after wins.
(EDMANS, GARCÍA, & NORLI)	2007	Sport Sentiment and Stock Returns	39 countries	1973 – 2004	Found an economically and statistically significant negative effect on the losing country's stock market. This loss effect is stronger in small stocks and in more important matches, and is robust to methodological changes. They did not find a corresponding effect after wins.
(GRAZIANO & VICENTINI)	2016	Football cultural events and stock market returns: the case of the	Italy	2002 – 2014	Found a positive and statistically significant relationship between the FTSE MIB and football match results of the Italian

		FIFA World Cup				national football team in the FIFA World Cup.
(DEMIRHAN)	2013	Stock Market Reaction to National Sporting Success: Case of Borsa Istanbul	Turkey	1988 2011	–	Observed no abnormal return on the Turkish stock market index after a win of the Turkish national football team, while he observed a very negative effect on the effect after a loss by the national team.
(GERLACH)	2011	International sports and investor sentiment: do national team matches really affect stock market returns?	32 countries	1974 2002	–	Found that unusual returns also exist in those countries of which their national teams did not play. This shows that national team matches do not affect neutral markets like the matching countries, which implies that sports do not cause unusual returns in either domestic or foreign markets.
(KANG & PARK)	2014	Soccer sentiment and investment opportunities in the Korean stock market	South-Korea	1983 2012	–	Found a significant sentiment effect from national football match outcomes on the Korean stock market. However, the sentiment effect is extremely short-lived and the magnitude of ensuing expected returns based on the sentiment effect is about the same as the transaction costs, making it almost impossible to devise reliable arbitrage opportunities from it.
(VIEIRA)	2013	Market Reaction to Sports Sentiment: Evidence from the European Football Championship 2008	14 countries	2008		Their results provide some evidence that football losses are associated with a negative market reaction. This result suggests that losses have a particularly negative effect on investor mood. Contrary to the expected results, they also found evidence of a negative market reaction after football wins. The results are not statistically significant.

(VIEIRA)	2012	Investor sentiment and market reaction on 2010 FIFA World Cup	31 countries	2010	Globally, the study provides no evidence of a direct relationship between games results and the subsequent market reaction, not documenting a change in investor mood caused by soccer games outcome.
(TUFAN)	2004	Do World Cup Football Matches Affect Istanbul Stock Exchange?	Turkey	2002	He concluded that 2002 World Cup matches did not affect the ISE 100 Index returns, despite of football being the most popular sport in Turkey. This result can because of the ISE's investor structure. Almost half of Turkish shares being held by foreigners. As a result, since the matches held in different time zones, World Cup matches could have no any effect on ISE 100 Index returns.

Table 1: Overview of studies on sport sentiment (national football teams and stock indices)

As Ashton et al. (2011) already concluded, it is extremely difficult to be absolutely certain that the performed event study is correct in every detail and it is a rather sobering thought to reflect on how rarely academic studies are precisely replicated. One of the examples of the difficulties is described by Ashton et al. (2011). The zoomed in on the match between England and Tunisia on Monday the 15th of June 1998 (1998 World Cup). The study performed by Zwergel & Klein (2009) correctly deduce that the used return (0.244939%) on the next day, Tuesday, 16 June 1998, in Asthon et al. (2003) is incorrect since the FTSE 100 was still opened when the match result was known. Zwergel & Klein (2009) use the return (-0.937641%) on Monday, 15 June 1998, instead. However, Ashton, Gerrard, & Hudson did not find this return. They reported a return of -2.337% on Monday 15 June 1998. The data I use in this study confirms with the return found by Zwergel & Klein (2009), namely a return of -0.937641% on Tuesday the 16th of June 1998.

The different methods used and the difficulty of the studies as described by Ashton et al. (2011), results in the different conclusions. Some studies find a statistically significant effect on the stock market after wins and losses of the national football team (Ashton, Gerrard, & Hudson, 2003) (Ashton, Gerrard, & Hudson, 2011) (Graziano & Vicentini, 2016) (Kang & Park, 2014). Other only find a statistically significant effect on the stock market after losses of the national football team (Edmans, García, & Norli, 2007) (Demirhan,

2013) (Vieira, 2013). Lastly, some studies did not find statistically significant effects on the stock market after a football match of the national team at all (Zwergel & Klein, 2009) (Tufan, 2004) (Gerlach, 2011) (Vieira, 2012).

2.2.2 Listed football clubs

As mentioned in the introduction of section 2.2, some football clubs are listed on a stock exchange. Tottenham Hotspurs of England was the first football club that sold its stock to the public in 1983. Many football clubs from several European countries followed. Several studies are performed to measure the effect of a match result on the value of the stocks of these football clubs. A good recent example are the stocks of AFC Ajax N.V. in the Netherlands, and of Juventus in Italy after their Champions League quarterfinal match on April 16th 2018. Contrary to expectations, Ajax defeated Juventus with 2-1 and went on to the semi-finals for the first time in 22 years. The value of the shares of AFC Ajax N.V. increased from €17.15 to €18.75 (9.33% increase) on the day after the match (April 17th 2018), while the value of the shares of Juventus decreased with almost 24% on the Milano Stock Index that day (IEX, 2019). In this section, studies that focus on the effect on the share value of a football club after a match will be discussed.

Table 2 provides an overview of studies that analyzed the effects of match results of football clubs on the football clubs stock value.

AUTHORS	YEAR	TITLE	CLUBS	PERIOD	CONCLUSION
(BERUMENT & CEYLAN)	2012	Effects of soccer on stock market: The return-volatility relationship	13 clubs from Chile, Spain, Turkey, and the UK	1985 – 2007	Football teams' results in international cups affect stock market returns and the return-volatility relationship. Evidence from Spain and the UK suggests that losses are associated with lower returns and higher risk aversion but evidence from Chile and Turkey reveals that wins are associated with higher returns and lower risk aversion.
(SARAÇ & ZEREN)	2013	The Effect of Soccer Performance on Stock Return: Empirical Evidence From "The Big Three	Beşiktaş, Galatasaray, Fenerbaçhe	2005 – 2012	The football performance is positively and significantly related to stock return for all the three clubs. However, the relationship is found obviously higher and more

		Clubs" of Turkish Soccer League				significant in Beşiktaş than that of the other two clubs.
(BENKRAIEM, LE ROY, & LOUHICHI)	2010	Sporting Performances and the Volatility of Listed English Football Clubs	8 English clubs	2006 2007	–	The sporting performance of football teams has a significant impact on stock market valuation of listed clubs. The magnitude of the market reaction depends on the result of the match (i.e., defeat, draw, or victory) and on the match venue (home or away).
(RENNEBOOG & VANBRABANT)	2000	Share Price Reactions to Sporty Performances of Soccer Clubs listed on the London Stock Exchange and the AIM	17 English clubs	1995 1998	–	At the first day of trading after a match, positive abnormal returns almost 1% can be expected following a football victory. In contrast, defeats or draws are penalized, respectively, by negative abnormal returns of 1.4% and 0.6%. Much larger abnormal returns are generated subsequent to promotion and relegation matches.
(BENKRAIEM, LOUHICHI, & MARQUES)	2009	Market reaction to sporting results: The case of European listed football clubs	18 European clubs	2006 2007	–	The findings show that defeats and draws cause a significant drop in market prices. This impact is particularly important for defeats, especially those at home. Wins are not followed by a significant price reaction. This can be caused because supporter investors expects a win from their team and do not reward it the day after.
(SCHOLTENS)	2009	Scoring on the stock exchange? The effect of football matches on stock market returns: an event study	8 European clubs	2000 2004	–	The stock market responds positive (negative) to victories (defeats). Secondly, the stock market responds asymmetrically, the response to defeat is 'stronger' than that to victory. This may be related to the idea that the public is more sensitive to losses. Furthermore, the

						stock market reacts stronger to the results in European matches than to those in the national leagues.
(BERNILE & LYANDRES)	2011	Understanding Investor Sentiment: The case of Soccer	20 European clubs	2000	2006	The market reaction to football games' outcomes is asymmetric. Losses are associated with significantly negative post-game return, while wins are followed by near-zero returns. Overall, the mean return following games is significantly negative.
(ZUBER, YIU, LAMB, & GANDAR)	2005	Investor–fans? An examination of the performance of publicly traded English Premier League teams	10 English clubs	1997	2000	Their results show little or no significance in the relationship between returns and match-related information. The price behavior of football clubs is very insensitive to match outcomes in terms of both returns and trading volumes.

Table 2: Overview of studies on sport sentiment (football clubs and their stocks)

While there was no consensus found of the effects of football match results of national teams on the stock market index, investigators are quite like-minded about the effects of match results of football clubs on the stock values of those football clubs. This may be caused by the fact that besides mood changes, a match result can really add or reduce stock value. Dobson & Goddard (2001) showed that good match results may lead to financial rewards as success attracts media attention and the scope for sponsoring. Other financial rewards may come from (starting) premiums for European competitions (Champions League or Europa League). A good match result increases the likelihood of these financial rewards. The only study that came to a different conclusion was performed by Zuber et al. (2005). They concluded that an investor in a professional football club does not trade on information that may affect cash flows but, rather, appear to obtain value from mere ownership.

2.2.3 Intimately involved companies

The third category of stocks that can be affected by football match outcomes are those of involved companies. In most cases, this will be (shirt) sponsors of a football club. In this category, the least research is done.

Michael Hanke & Michael Kirchler (2013) studied the effect on the stocks of a jersey supplier (Adidas, Nike, Puma) after a match of a national football team that wears clothes of that brand. They used data from World Cups and European Championships between 1996 and 2008. They found abnormal returns at major football tournaments. Four main findings can be drawn from their study: first, matches where both teams share the same jersey supplier lead to positive excess returns. Second, defeats lead to negative excess returns. Third, both effects are larger for knock out matches than for group matches, reflecting the higher importance of the knockout stage in the tournaments. Finally, the defeat effect in total and in knock out matches is more significant when we account for the pre-match defeat probability (Hanke & Kirchler, 2013).

Ramezani, H. Mardani, Emamgholipour, & S. Mardani (2012) studied the effect of the results of football matches on the stock prices of sponsoring companies. They used data of four Iranian football teams that have sponsoring companies that were listed on the Tehran Stock Exchange between 2009 and 2012. Their results indicate that with a probability of 86.6% there is a significant correlation between the results of matches and the stock price of sponsor companies. But the effect of match results on stock prices of all investigated companies is not the same. In other words, the results of football matches on stock prices of some companies will affect with greater intensity effect but on stock prices of others will affect with less intensity (Ramezani, Mardani, Emamgholipour, & Mardani, 2012).

A related question is if football sponsorship improves company performance. In a study performed by Naidenova, Parshakov, & Chmykhov (2016), no difference in performance is found between sponsoring and non-sponsoring companies. Nevertheless, they found that the effect of sponsorship can differ among football leagues. In addition, the successfulness of the team does not affect the effectiveness of the sponsorship contract.

2.2.4 Other sports

Finally, several studies have been done about the effects of other sports on stock prices of listed sports clubs, domestic stock indices or involved companies.

Boyle & Walter studied the effect of match outcomes of New Zealand's national rugby team on the New Zealand stock market (2001). They found no evidence of any relationship between sporting team success and stock market return behavior, regardless of the time period analyzed, the frequency of the data we use, or the classification of sporting success and failure.

Brown & Hartzell (2001) studied the impact of match outcomes of basketball club Boston Celtics on the shares of the club itself. The concluded that the results of the Boston Celtics' basketball matches significantly affect partnership share returns, trading volume, and volatility. Investors respond asymmetrically to wins and losses, and playoff matches have a larger impact on returns than regular-season match.

In their study on the relation between National Football League (NFL) match outcomes and the return patterns of Nasdaq firms headquartered geographically near the NFL teams, Chang, Chen, Chou, & Lin (2012) found that a team's loss leads to lower next-day returns for locally headquartered stocks and that this impact increases for a surprising loss or a critical match loss. The negative effects of match losses are stronger for stocks that are more vulnerable to shifts in sports sentiment. They suggest that the match outcomes of local sports teams influence investor sentiment, which significantly affects the returns of localized trading stocks.

Finally, the earlier mentioned study by Edmans, García, & Norli (2007) also investigated the effect of cricket, rugby, ice hockey, and basketball matches. Since this is the only study that investigated multiple sports it is the best one to compare football with other sports. Whereas they found a strong negative stock market reaction to losses by national football teams, the effect of losses in cricket, rugby, and basketball matches is smaller. They found no evidence of a corresponding reaction to wins in any of these sports. A possible reason for this weaker effect is that football is the main sport in (almost) each country in the sample, while the other sports are the second or third sport in these countries.

2.2.5 Comparison with this study

It is important to see the differences and comparisons between the mentioned studies in this section and this study. This applies in particular to the studies that investigated the effect of football matches of national teams on main tournaments (section 2.2.1). The studies in the other sections only have in common that they are related to football. First of all, in most studies, the effects of match outcomes of one single country were investigated. The effects of England's national team match outcomes were investigated in three studies (Ashton, Gerrard, & Hudson, 2003), (Ashton, Gerrard, & Hudson, 2011), (Zwergel & Klein, 2009). Furthermore, Graziano & Vicentini (2016) studied the effects in Italy, Demirhan (2013) and Tufan (2004) in Turkey, and Kang & Park (2014) in South-Korea. There were some studies that investigated several countries. Vieira studied 31 different countries (2012), and 14 different European countries (2013), Gerlach (2011) studied 32 different countries, and Edmans, García & Norli (2007) studied even 39 different countries. If I zoom in on these four studies, Vieira (2013) and (2012) studied only the match outcomes of

one single tournament. Because I will analyze match outcomes of several tournaments in this study, the studies of Gerlach (2011), and Edmans, García & Norli (2007) are most similar to this study. Since these studies use data until 2004 (Edmans, García & Norli), and 2002 (Gerlach), this study adds a significant extra period compared to these studies (see section 5). Another difference is that these studies did not group the countries to investigate differences between these groups (like I do with Europe vs Latin America). They just take this many countries to have a lot of matches to do their study. Finally and most importantly, they did not take into account the difference in sports sentiment and emotional levels between Latin Americans and Europeans and the difference in the involvement of the citizens with football.

2.3 Emotional levels

This study hypothesizes that Latin Americans are more emotional than Europeans, and therefore have more extreme mood changes. In this section, some studies that focus on the relation between football and emotion will be discussed, followed by a discussion on why I expect that Latin Americans are more emotional than Europeans.

There are two possible reasons why the stock market may react to the sporting performance of the national football team. First, there may be a 'feel-good' factor with national sporting success engendering greater confidence about the future. Second, given the increasing commercial importance of international tournament finals, an efficient stock market will revise expectations of the potential economic benefits to be derived from national team performance in the light of individual match results and the likelihood of the team progressing further in the tournament. It follows that the stock market reaction to qualifying and finals matches should be greater than for friendly matches. In the case of friendly matches, only a rather diluted feel-good factor is likely to operate and limited new information will be provided on the future prospects of the team in competitive tournament matches (Ashton, Gerrard, & Hudson, 2003).

The degree of team identification/fanaticism matters for the effect of football matches on stock market returns (Berument, Ceylan, & Ogut-Eker, 2009). A study by Salman (2005) reveals that Beşiktaş has the most fanatic supporters of the big three Turkish teams (Beşiktaş, Galatasaray, Fenerbaçhe). This is confirmed in a report from the Turkish Police Force (Beşiktaş is the most fanatic, 2009). Berument et al. (2009) only found a positive and statistically significant coefficient in their study for Beşiktaş. The coefficients found for Fenerbaçhe, and Galatasaray are not statistically significant. This supports their statement that a higher degree of fanaticism increases the response on the stock market. A higher degree of fanaticism can also be seen as being more involved with football and thus experience more extreme mood changes around football matches.

2.3.1 Latin Americans vs. Europeans

The differences in emotional levels and thus mood changes between Latin Americans and Europeans will be discussed in this section.

Tiago Maranhão referred to the former Brazilian socialist Gilberto Freyre to indicate the difference between Brazilians and Europeans in playing and experiencing football. Gilberto Freyre differentiated two opposite styles of playing football and, consequently, two different cultural styles: an 'Apollonian' style (formal, pent-up, rational) represented by the European; and the other 'Dionysian' (impulsive, individualist, emotional) portrayed in the mulatto's[4] 'character'. Freyre, just as the German philosopher Nietzsche did in relation to Greek culture, used the opposites (Apollonian and Dionysian) to define different ways of playing football. Freyre did not explicitly claim that Brazilians are undisciplined, disorderly. However, he makes such a claim when he describes the Europeans in an opposite manner. Europeans would have a rational game due to their 'organization', while the Brazilians would have a 'distinct' way of playing, representing the disorganization of the country and its Afro-Brazilian culture. In summary, the unspoken qualities related to 'rationality', 'calculus' and 'order' in Brazilian football reflect the same opinion with regards to the structure of the society. Football is seen as a nationalist feeling that should first be created and then transferred to the common sense. It is, in fact, an agglutinant event of emotions and part of the construct of the national spirit. Evaluations are more plausible during the big football events (like World Cups), be it for acts of heroism, or for disappointment and failures in the expected performance (Maranhão, 2007).

Jon Clifton studied the emotional level of people in more than 150 countries and areas by asking residents whether they experienced five positive and five negative emotions a lot the previous day. In both studies, the emotional level was higher for residents in Latin American countries than for residents in European countries (Clifton, 2015) (Clifton, 2012). Table 15 in appendix A presents an overview of the countries studied by Clifton. The column "%Yes" refers to the percentage of people saying yes to all positive and negative experience questions asked by Clifton. The average for European countries is 46.21% in 2012, and 47.24% in 2015. The average for Latin American countries is higher, with 52.32% in 2012, and 55.26% in 2015. If only the countries that are in the sample are taken into account (see section 5.2), the percentages are levelling, but still showing a difference. For Europe, the averages are 49.50% in 2012, and 51.90%, whereas the averages for Latin America are 51.75% in 2012, and 52.50% in 2015.

[4] Mulatto is a term generally used to refer to people born of one white parent and one black parent, or from two mulatto parents

In his book "*Fútbal! Why soccer matters in Latin America*" (2014), Joshua H. Nadel explains why competitors and fans alike are so fiercely dedicated to football throughout Latin America. The book illustrates that football has the powerful ability to forge national unity by appealing to people across traditional social boundaries in Latin America. In fact, it is revealed that what started as a simple game played a seriously important role in the development of Latin American countries in the twentieth century. This opinion is shared by Maranhão who mentions the unique sportive performance of the Brazilian national football team on the World Cup of 1938 lead to a kind of national identification linked to the Brazilian football team. Human beings in a community feel they are related to each other because they share a totem. And, from 1938 onwards, the Brazilian 'totem' has been the national football team (Maranhão, 2007). Finally, Nadel (2014) mentions that in Latin America people live for it (football) – and sometimes kill for it. It is a source of hope and a reason for suicide.

Moreover, Simoni Luhad Guedes tried to find out why football is so important in Argentina and Brazil in his paper: *On criollos and capoeiras: notes on soccer and national identity in Argentina and in Brazil* (2014). He quoted a journalist who said that "in Brazil there are two sports: football and whatever's winning". He mentioned that other sports are easily discarded in situations of successive losses, having no implications in evaluating 'the nation' and 'the Brazilian people', whereas this is precisely one of the personal characteristics of football. This indicates the differences between other sports and football and leads to football being the sport that affects the national identity the most.

The wave of heart attacks in Brazil after the 2-1 loss in the World Cup final of 1950 against Uruguay in their own Maracanã stadium shows the emotional involvement of Brazilians (Papastergiadis, 2002). This lost match, which holds the attendance record of around 200,000, is still very traumatic for Brazilians. Although there is no evidence of these heart attacks, the British paper The Independent mentions that, according to health officials, 98 people were treated with heart problems during the Round of 16 match against Chile on the 2014 World Cup. The match was won by Brazil after penalties (Withnall, 2014). This shows that Papastergiadis might be right as he mentions the wave of heart attacks.

However, it does not mean that this cannot be the case in European countries. Douglas Carroll, Shah Ebrahim, Kate Tilling, John Macleod, & George Davey Smith examined hospital admissions for a range of diagnoses on days surrounding England's 1998 World Cup football matches. Their results show that the risk of admission for acute myocardial infarction increased by 25% on 30 June 1998 (the day England lost to Argentina in a penalty shoot-out) and the following two days. No excess admissions occurred for other diagnoses (stroke, deliberate self-harm, and road traffic injuries) or on the days of the other England matches. Individual analyses of the day of, and the two days after, the match against Argentina showed 55 extra admissions for myocardial infarctions compared with the number expected. They concluded that the

increase in admissions suggests that myocardial infarction can be triggered by emotional upset, such as watching your football team lose an important match (Carroll, Ebrahim, Tilling, Macleod, & Smith, 2002).

Finally, the most shocking fact of emotional acting in Latin America is the dead of Colombian footballer Andres Escobar. He scored an own goal in the 1994 World Cup match against the United States. Colombia lost this match with 2-1 and was eliminated in the group stage. On the 2nd of July 1994, he was shot and died just 10 days after scoring the own goal. It is widely believed that the murder was a punishment for the own goal, mainly because it was reported that the killer shouted *"¡Gol!*" ("Goal!") after every shot, once for each time the South American football commentator said it during the broadcast.

The above-mentioned studies illustrate the difference in the way of experiencing football between Europe and Latin America. Added to that, the higher level of emotionality as described by Jon Clifton (2012) (2015) leads to the expectation that Latin Americans react more intense to football match results of "their" national team which may get visible on the stock indices.

3. Theoretical Framework

In section 1, the efficient market hypothesis has been briefly discussed. In summary, it states that market prices should reflect all relevant and available information in the market. This hypothesis is based on the assumption that investors are rational and make rational decisions (Fama E. F., 1970). Therefore, stock prices will only change when new information arrives. Since information, by definition, cannot be predicted ahead of time, price changes cannot be predicted ahead of time. An individual may have wrong expectations, but the market as a whole should be always right. This makes it impossible to beat the market and earn abnormal profits. In section 2, studies that show that investors make irrational decisions sometimes are discussed. In these cases, the efficient market hypothesis fails to hold and it is possible for investors to make abnormal profits. In this section, the three forms of the efficient market hypothesis and the criticism on this efficient market hypothesis will be discussed.

3.1 Three forms of market efficiency

In this section, I will discuss the three forms of market efficiency as stated by Fama, which serve as a useful purpose to pinpoint the level of information at which the hypothesis breaks down (1970).

The first form is the weak form. In this form, the information set is just historical prices. Most of the results here come from the random walk literature. It is not possible to extract information regarding future prices from past prices and returns. In the semi-strong form, the concern is whether prices efficiently adjust to other information that is obviously publicly traded like announcements of annual earnings, stock splits etc. Investors are not able to earn superior returns by making use of any publicly available information. Finally, the strong-form concerns whether given investors or groups have monopolistic access to any information relevant for price formation. This form states that share prices reflect all public and private information, which makes it impossible for investors to make superior returns.

3.2 Criticism of the Efficient Market Hypothesis

For a long time, the efficient market hypothesis was widely accepted. It was generally believed that securities markets were extremely efficient in reflecting information about individual stocks and about the stock market as a whole. The accepted view was that when information arises, the news spreads very quickly and is incorporated into the prices of securities without delay. The efficient market hypothesis is associated with the idea of a "random walk," which is a term loosely used in the finance literature to characterize a price series where all subsequent price changes represent random departures from previous

prices. The logic of the random walk idea is that if the flow of information is unimpeded and information is immediately reflected in stock prices, then tomorrow's price change will reflect only tomorrow's news and will be independent of the price changes today. As a result, prices fully reflect all known information, and even uninformed investors buying a diversified portfolio at the tableau of prices given by the market will obtain a rate of return as generous as that achieved by the experts (Malkiel, 2003). By the start of the twenty-first century, many financial economists and statisticians began to believe that stock prices are at least partially predictable. Many of these economists were making the claim that these predictable patterns enable investors to earn excess risk-adjusted rates of return. The different schools on challenging the efficient market hypothesis are:

1. Momentum investing, that claims that certain price patterns persist over time
2. Behavioral finance, which maintains that investors are guided by psychology more than by rationality and efficiency
3. Fundamental analysis, which holds that certain valuation ratios predict outperformance and underperformance in future periods.

Short-term Momentum is a part of the first school. Lo & Mackinlay (1999) found in their study that short-run serial correlations are not zero. The existence of “too many” successive moves in the same direction make them reject the hypothesis that stock prices behave as true random walks. There does seem to be some momentum in short-run stock prices. Long-Run Return Reversals is another part of the first school. Some studies have attributed this forecasting ability to the tendency of stock market prices to "overreact." De Bondt & Thaler (1985), for example, argue that investors are subject to waves of optimism and pessimism that cause prices to deviate systematically from their fundamental values and later to exhibit mean reversion. Their findings give some support to investment techniques that rest on a “contrarian” strategy, which is, buying the stocks, or groups of stocks, that have been out of favor for long periods of time and avoiding those stocks that have had large run-ups over the last several years. Finally, the Seasonal and Day-of-the-Week Patterns are part of Momentum investing. A number of researchers have found that January has been a very unusual month for stock market returns. Returns from an equally weighted stock index have tended to be unusually high during the first two weeks of the year. The return premium has been particularly evident for stocks with relatively small total capitalizations (Keim, 1983). Haugen & Lakonishok (1988) wrote a book about these high January returns. There also appear to be a number of day-of-the-week effects. For example, French (1980) documented significantly higher Monday returns. Lakonishok & Smidt (1988) found that some patterns in returns appear around the turn of the month, while Ariel (1990) found something similar around holidays.

Behavioral financials offered another explanation for patterns of short-run momentum, namely a tendency for investors to “underreact” to new information. If the full impact of an important news announcement is only grasped over a period of time, stock prices will exhibit the positive serial correlation found by investigators. This under reaction is studied by Fama (1998). He surveyed the considerable body of empirical work on "event studies" that seeks to determine if stock prices respond efficiently to information. As events, he included announcements such as earnings surprises, stock splits, dividend actions, mergers, new exchange listings and initial public offerings. Fama found that apparent underreaction to information is about as common as the before mentioned overreaction.

The Fundamental analysis school focuses on initial valuation parameters to predict future stock returns. It is claimed that valuation ratios, such as the price-earnings multiple or the dividend yield of the stock market as a whole, have considerable predictive power.
Fama & French (1988), and Campbell & Shiller (1988) tested the ability of dividend yields to forecast future returns. They found that about 40 percent of the variance of future returns for the stock market as a whole can be predicted by the initial dividend yield of the market index. Also, about 40 percent of the variance in future returns can be explained by the initial Price-Earnings ratio (Campbell & Shiller, 1988). Furthermore, also other valuation ration, such as short-term interest rates (Fama & Schwert, 1977), the term structure of interest rates spreads (Campbell, 1987), and risk spreads between high-yield corporate bonds and short rates (Keim & Stambaugh, 1986) are related to future stock returns.

All these nonrandom effects (even if they were dependable) are very small relative to the transactions costs involved in trying to exploit them. They do not appear to offer arbitrage opportunities that would enable investors to make excess risk-adjusted returns (Malkiel, 2003).

4. Hypotheses

The goal of this study is to extend the literature in several ways. Firstly, some of the countries that will be studied in this studied have not been studied before. Furthermore, a new period, with new matches, is studied which can lead to different conclusions. Moreover and most importantly, none of the before mentioned studies compared European countries with Latin American countries to investigate if there is a difference in how the domestic stock markets of these countries react to football match outcomes of the national team, which might be due to the sports sentiment in those countries. Below the alternative hypotheses that will be tested in this study are mentioned. The Null hypotheses state that there are no (statistically significant) differences between the mentioned groups (so no difference between wins and losses or no difference between World Cup wins and European Championship / Copa América wins).

H1: Match results of national football teams on main tournaments have a significant effect on the domestic stock indices. A victory will result in a positive abnormal return, while draws or defeats will lead to negative abnormal stock returns.

This first hypothesis does not take into account the possible differences in market reaction between European countries and Latin American countries. This is an important part of this study and is captured in the second hypothesis.

H2: Match results of Latin American national football teams on main tournaments have a bigger effect on domestic stock indices than match results of European national football teams on main tournaments.

For further investigation, subgroups are taken. Matches on the World Cups will be compared with matches on European Championships / Copa América's, and group stage matches will be compared with knock out matches. This offers two more hypotheses.

H3: Match results of national football teams on World Cups will have a bigger effect on domestic stock indices than match results of national football teams on European Championships / Copa América's.
H4: Knock out match results of national football teams on main tournaments will have a bigger effect on domestic stock indices than group stage match results of national football teams on main tournaments.

For these last two hypotheses, the complete group is first looked at, after which the split is made between European countries and Latin American countries.

5. Data

In this section, the used data for the study will be explained. From the matches the following data is needed: match results, and the match details (start time match, time zone match). Furthermore, from the domestic stock indices of the countries, historical data starting on the 2nd of January 1996 till the 28th of December 2018 will be used. Besides that, the trading hours of these stock indices need to be known.

5.1 Match results

In my study, I use European and Latin American countries that were present in at least three World Cups between 1998 and 2018 from a total of six World Cups played in this period. Besides that, the country must have participated in at least four of the six European Championships played between 1996 and 2016 (European countries) or in at least six of the eight Copa América's between 1997 and 2016 (Latin American countries). By selecting only the countries that attended at a certain number of tournaments the statistical power increases. The 12 European countries that fulfill the requirements are Croatia (5 WC, 5 EC), Denmark (4 WC, 4 EC), England (6 WC, 5 EC), France (6 WC, 6 EC), Germany (6 WC, 6 EC), Holland (4 WC, 5 EC), Italy (5 WC, 6 EC), Portugal (5 WC, 6 EC), Russia (3 WC, 5 EC), Spain (6 WC, 6 EC), Sweden (3 WC, 5 EC), and Switzerland (4 WC, 4 EC). The 8 Latin American countries that fulfill the requirements are Argentina (6 WC, 8 CA), Brazil (6 WC, 8 CA), Chile (3 WC, 8 CA), Colombia (3 WC, 8 CA), Ecuador (3 WC, 8 CA), Mexico (6 WC, 8 CA), Paraguay (3 WC, 8 CA), and Uruguay (4 WC, 8 CA). In total, these countries played 426 matches at the six World Cups, 261 matches at the six European Championships, and 286 matches on the eight Copa América's. This provides a total of 973 matches played at the three main tournaments.

5.2 Historical stock index data

One of the major stock indices of each of the countries is chosen. Table 16 in Appendix B shows which stock indices are selected. I chose to use the Closing Prices to calculate the returns (see section 6.1). Since DataStream only provides the Opening Prices, I decided to use Yahoo Finance as source. Here a problem occurs, namely that Closing Price data is not available for every country on Yahoo Finance. Therefore, some countries had to be eliminated from the sample. After this cut, 10 European and 4 Latin American countries were left.

The sample is now shortened to 327 World Cup matches, 219 European Championship matches, and 136 Copa América matches, which sums to a total of 682 matches.

5.3 Irrelevant matches

The number of matches will be further shortened since I only want to measure whether important matches have an effect on the domestic stock index. A match is considered unimportant if it is the third group stage match which can no longer change continuation or elimination of a country in the tournament. For instance, Holland and Chile won their first two group stages matches on the 2014 World Cup, which made them both end up with six points after two matches. The other two group members, Spain and Australia, could only get to a maximum of three points. Holland and Chile already made it into the Round of 16, no matter the outcome (win, draw or lose) of the last match between them (2-0 win for Holland). This match, and the third group stage match of Spain against Australia, as well as other comparable matches, are considered unimportant and will be excluded in the sample. Matches between the two losers of the semi-finals, for the third place, are also considered unimportant since both teams are in fact already out of the tournament. With this elimination, only the matches that have an effect on the final goal of a country, winning the tournament, are included. This last cut leaves a sample of 299 World Cup matches, 200 European Championship matches, and 120 Copa América matches, which sums to a total of 619 matches.

5.4 Draw but won and draw but lost

Knock out matches can end up in a draw after regular playing time. 30 minutes of extra playing time is then added to get to a winner. If there is still no winner after these 30 extra minutes (120 minutes in total), the teams must take penalties to get to a winner. When the teams have to take penalties to get to a winner, the match is ended in a draw. Nevertheless, one team will win and will stay in the tournament, while the other team will lose and is out of the tournament. The results with winning after regular time, extra time or after penalties are the same, you are still in the race to become champion. Therefore, a win (lose) after penalties will be treated equally as a win (lose) after regular time or extra time in this study.

5.5 No day returns

On some days there was no trading on a countries' index. For instance, in Brazil and Argentina, the stock indices are closed on the 9th of July each year. In both countries, they celebrate their independence on that day. As later explained in section 6.3, I will not report any return (also not 0%) on this and similar days. Therefore, the Copa América quarter-final match of Argentina against Peru (4-0 win for Argentina) on Sunday the 8th of July 2007 (Monday 9th of July should be next trading day) is excluded in the sample. This is also with 18 other matches. Therefore, the sample is further reduced to 601 matches of which 290 are World Cup matches, 198 European Championship matches, and 113 Copa América matches. I could choose to take the first trading day after these matches, but due to the fact that the change in mood can already be diminished, and to the fact that matches in a tournament are in rapid succession, I will not do so.

5.6 Benchmark

In an event study, it is essential to select an appropriate benchmark. In most event studies, the effects of an event on a single stock are measured. In this case, the index to which the shares belongs can be used as a benchmark. In this study, the effects of an event on a whole index will be measured. Therefore, a different path needs to be followed and another index needs to be used as a benchmark. There are different options to select a benchmark. First, a widely used continental or global stock index, such as the Euronext 100 or the S&P Global Inc. can be selected. A benefit of using such benchmarks is that one benchmark can be used for all the countries (in case a global benchmark is chosen, otherwise two continental benchmarks are needed). A disadvantage is that the countries being studied are also represented in this benchmark. As an example, I can take Germany which is a big economic country in Europe. As the German DAX decreases due to a loss of the German national football team, this effect could also occur in the Euronext 100 because a lot of Germans also invest in this index. This may reduce the abnormal returns. Another option is to select a similar country and use those countries' index as a benchmark. An advantage of this method is that the abnormal returns will not be reduced because the studied country is not represented in the benchmark. A disadvantage is that there are not many countries left with data in Yahoo Finance that can be used as a benchmark. Only Belgium and Austria have data in Yahoo Finance that fits the sample period. One of these countries' index could be used as a benchmark, but it is hard to tell if these indices correspond to the indices studied. Using countries' indices as a benchmark that are also studied themselves have the disadvantage that the results can be biased since these indices may have an abnormal return themselves. If, for instance, the Portuguese PSI20 is taken as a benchmark for the Spanish IBEX35, and the countries play on the same day (or even against each other) then both indices may be affected by the match result. If Spain would win a match against Portugal, and a return of +2% on the IBEX35 and a return of -2% on the PSI20 is observed, I could say the abnormal return for Spain is +4%. In fact, both countries' abnormal return can be 2% instead (or anything else when another index is used as a benchmark). A third option is to take all the other countries in the sample and take their average as a benchmark. In this case, an own global index, that only contains the countries that are studied, is created. If, for instance, the Dutch AEX is studied, the average return of the other 13 countries is used as a benchmark. In this case, the country itself does not affect the benchmark return. Furthermore, an abnormal return on one of the other 13 countries' indices due to a match result will be diminished because it only accounts for 1/13 in the benchmark return.

6. Methodology

An important methodological approach to market-based empirical research in finance and accounting is the event study. Also known by other names such as Residual Analysis and abnormal performance index tests, these studies involve the analysis of security price behavior around the time of an information announcement or event. The approach has been used to study a variety of events such as the announcements of annual accounting earnings, accounting principle changes, large block trades and corporate mergers (Bowman, 1983). In this study, the Event Study Methodology will be used to analyze whether there are abnormal returns in the domestic countries around football matches of national teams of those countries at main tournaments. In the Event Study Methodology, the assumption is made that all market participants act rational and that the effect of an event will immediately be reflected in stock prices. Bowman (1983) identified five steps in order to conduct an event study:

1. Identify the event of interest, in this study (the outcome of) a football match of a national team on a main tournament.
2. Model the security price reaction, this generally involves an expectations model conditional upon the event.
3. Estimate the excess returns, this step generally entails the calculation of residuals from some model of the process generating security returns
4. Organize and group the excess returns, the residuals may be treated individually, but time series cumulations are the standard procedure.
5. Analyze the results, when possible this will be done with statistical tests of significance designed for a stated (Null) hypothesis.

These five steps are mainly for Event Studies that focuses on individual company stocks. However, in this study, the focus will not be on individual company stocks but on complete stock indexes. For this kind of Event Studies, De Jong & De Goeij (2011) developed a three-step model based on the five-step model of Bowman. The three-steps identified by De Jong & De Goeij are:

1. Identify the event of interest and the timing of the event
2. Construct a benchmark model, to measure normal stock behavior. The benchmarks are mentioned in section 5.6
3. Calculate and analyze abnormal returns around the event date

In the coming sections, I will discuss how to conduct the event study to analyze the effects of football matches of national teams on domestic stock indices.

6.1 Conducting the Event Study

In section 5 is discussed which data will be used in this study. There are three different options to calculate the returns. The first option is displayed below: (CP is Closing Price, and OP is Opening Price)

$$R_t = \frac{\mathrm{CP_t} - \mathrm{OP_t}}{\mathrm{OP_t}}$$

Another option is to look at the differences between Opening (Closing) Prices between a day and the day before. By doing this with Opening Prices, the following formula is obtained:

$$R_t = \frac{\mathrm{OP_{t+1}} - \mathrm{OP_t}}{\mathrm{OP_t}}$$

Finally, the same can be done with Closing Prices which results in the following formula:

$$R_t = \frac{\mathrm{CP_t} - \mathrm{CP_{t-1}}}{\mathrm{CP_{t-1}}}$$

In a first thought, it is expected that the Closing Price of today is equal to the Opening Price of tomorrow and that the Closing Price of yesterday is equal to the Opening Price of today. With this assumption, all three formulas would result in the same return. Due to overnight-trading this is not the case. In the hours between the closing bell of today and the opening bell of the next trading day, a number of factors can affect the attractiveness of a particular stock. For example, good news such as a positive earnings announcement may be issued, increasing a stock's demand and raising the price from the previous day's close. On the other hand, bad news can negatively affect price with less demand for the shares. Due to overnight-trading, the first formula is wrong because it does not take the trades when markets are closed into account. Since Opening Prices may already be affected by the outcome of a match (if the match is played after the market closed), Closing Prices will be used in this study. The last formula will then be used for calculating the returns. In this formula, R_t is the return on the index today. CP_t is the Closing Price of today, and CP_{t-1} is the Closing Price of the previous trading day.

To calculate the abnormal return, the following formula is used:

$$AR_{it} = R_{it} - NR_{it}$$

How to calculate the Normal Return (NR_{it}) will be discussed in section 6.2.

The Abnormal Returns need to be tested for statistically significance. For that, the standard deviation of the Abnormal Returns need to be calculated with the following formula:

$$S_t = \sqrt{\frac{1}{N-1} * \sum_{i=1}^{N} (AR_{i,t} - AAR_t)^2}$$

By use of the t-statistic, the statically significance can now be tested:

$$TS_{1,t} = \sqrt{N} * \frac{AAR_t}{S_t}$$

Later on, I also want to compare subsamples (like won–loss) to see whether or not a subsample has statistically significant different Abnormal Returns than another. To test if this difference is statistically significant two-sided t-tests will be used. In this test unequal sample sizes and unequal variances are assumed. The t-statistic of this test is calculated with the following formula:

$$\mathrm{TS} = \frac{\overline{AR1} - \overline{AR2}}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

6.2 Models for the abnormal returns

There is a wide variety of models with which abnormal returns can be calculated. The main differences between the models are the chosen benchmark return model and its estimation interval. This leads to a different calculation of the Normal Return (NR_{it}). In this section, the models and their pros and cons will be discussed.

The first model is the Mean adjusted model. In this model, the own average return over a certain period (between T1 and T2) is used as NR_{it}.

$$NR_{it} = \frac{1}{\mathrm{T}} \sum_{s=T1}^{T2} R_{is}\,, \qquad T = T2 - T1 + 1$$

A reason not to use this model is the omission of market-wide stock price movements from the benchmark return. The results with this model might be biased if the whole market (markets around the whole world in this study) goes up or down in the event period. This can lead to significant abnormal returns, which may not be due to the event but rather to market-wide price movements.

With the Market adjusted model, the omission of market-wide stock price movements from the benchmark return can be corrected. The return on a market index, R_{mt}, can be chosen as the benchmark.

$$NR_{it} = R_{mt}$$

With this model, it is important to specify which market index to choose. I discussed how the market indices are selected. A contradiction on the Market adjusted model is that assumes that the "beta" of each country is equal to one, which is not always the case.

To overcome this problem, the Market model or the Capital Asset Pricing Model (CAPM) can be used. The Market model is a statistical model which relates the return of any given security to the return of the market portfolio (MacKinlay, 1997). In this model, abnormal returns are defined as residuals.

$$R_{it} = \alpha_i + R_{mt} + \varepsilon_{it}$$

ε_{it} represents the error term, which is assumed to be zero. NR_{it} is than calculated as the residuals or prediction errors of this model.

$$NR_{it} = \hat{\alpha}_i + \hat{\beta}_i * R_{mt}$$

In this formula, $\hat{\alpha}_i$ and $\hat{\beta}_i$ are Ordinary Least Squares (OLS) estimates of the regression coefficients. The index' recent performance track record is captured by $\hat{\alpha}_i$ and its sensitivity to the benchmark is captured by $\hat{\beta}_i$. An alternative for the Market model is a CAPM type model. In the CAPM the expected return of a given asset is determined by its covariance with the market portfolio (MacKinlay, 1997). In this model excess returns are modelled as:

$$R_{it} - R_{ft} = \beta_i * (R_{mt} - R_{ft}) + \varepsilon_{it}$$

NR_{it} can then be calculated as:

$$NR_{it} = R_{ft} + \hat{\beta}_i * (R_{mt} - R_{ft})$$

In this study, the Market model will be used to calculate the Normal Returns. Why this model is chosen above the Mean adjusted model and the Market adjusted model is mentioned above. Why not chose the CAPM is because, the CAPM imposes an additional restriction that the intercept equals the risk free rate. Because of this restriction, the variance of the error term is mostly larger in the CAPM than in the Market Model. This may result in a less powerful test. Furthermore, 79.1% of event studies used the Market Model against only 0.7% of the studies using the CAPM (Holler, 2014). Therefore, the Market Model the Market Model will be used in this study.

6.3 Timing

Since most football matches are played when stock exchanges are already closed, the return of the next trading day (calculated as stated in section 6.1) will be used to measure the effect of these matches. In most cases, this will be the next calendar day, but because stock exchanges are closed on Saturday and Sunday, the return of the first Monday after a football match on Saturday or Sunday is taken to measure the effect of these matches. When matches are not played in the evening, when stock markets are already closed, a problem with observing abnormal returns can occur. The effect of the football match on the stock market can already occur on the day when the match is played. On the next day, there might be no abnormal return, while investors did indeed respond on the match result, but already on the day of the match. This can be especially the case with the 2002 World Cup, which was held in South-Korea and Japan. The time zone for

these countries is GMT+9, while the time zone for the European countries is GMT+1 or GMT+2. This results in a difference of eight or seven hours. The differences are even bigger for the Latin American countries. These countries have a time zone of GMT-3, GMT-4, or GMT-5. The World Cup match between Brazil and England on Monday the 21st of June, 2002 is taken as an example. This match started at 15:30 GMT+9. The match ended around 17:30 GMT+9. In Brazil, the match ended around 5:30. The Brazilian BOVESPA still had to open at the time the match ended. In England, the match ended around 9:30. England's FTSE100 was opened at that moment. If the trading day after the match was played, Monday the 24th of June, 2002, was taken as event date, I might not observe any abnormal returns while these could already occur on the day of the match. To overcome this kind of problems, I take as a base that if the match has ended while the stock market is opened for at least one more hour, I take the match day as event day. If the stock market is opened for less than one hour, or already closed when the match has ended, the next trading day is taken as the event date. Due to injury time, the matches are not ended exactly 105 minutes (90 minutes play time plus 15 minutes break) after they started. In this case, I take as a base point that a match is ended 2 hours after it started. If 30 minutes of extra time is added (because a knock out matches ended in a draw after regular time), I take as a base point that a match is ended 2.5 hours after it started. When penalties have to decide who wins the match, I assume that the match is ended 2 hours and 45 minutes after it started. These are the assumptions to establish the event date. The countries have different trading hours, which makes it not possible to use one time to determine if a stock market is opened or closed at the time a match has ended. For each country separately I have to look at the trading hours of the chosen stock indices. Table 17 in Appendix B shows the trading hours of the stock indices in this study.

Another issue are the market holidays. On these days the stock exchanges are closed as well. Luckily, most of these days are not in the months June, and July (when the tournaments are played), but still they have to be taken into account with calculating the average return. The Brazilian BOVESPA, for instance, has seventeen market holidays. On each 9th of July, it is Independence Day in Brazil and the stock exchange is closed. As mentioned in section 5.5 this day will be excluded instead of reporting a 0% return. The same approach is used on non-trading days that are also non-match days. Excluding these days instead of reporting a 0% return is important for the average return and variance in the estimation window.

6.4 Analyzing the events

As mentioned in section 6.2 the Market model will be used to analyze the events. Now the estimation window and the event window of an event (match) has to be chosen. The estimation window is a period of trading days before the event date that is used to estimate the expected return. This period should start early enough to ensure that it captures enough observations (T1) and should end early enough to ensure that it is

not affected by the event (T2). Renneboog & VanBrabant (2000) used an estimation window of 6 months prior to the event, Zuber, Yiu, Lamb, & Gandar (2005) used the return of the trading days that are in the off-season. Since they studied the performance of publicly traded English Premier League teams, this was between the 1st of June and the 31st of July. Benkraiem, Louhichi, & Marques (2009) used an estimation window of 120 days prior to the event. As shown, there are several options for the estimation window. I choose to start the estimation window 100 trading days before the event date (mostly the day after the match, but sometimes the day of the match, see section 6.3). I could take a longer estimation window, but because the first matches in the sample are on Saturday the 8th of June 1996 (event date is Monday the 10th of June 1996), which is just 115 trading days after the first data (2nd of January 1996), I choose 100 days to ensure that the same calculation can be done for all matches (events). Furthermore, an event window is needed. This is the period of trading days over which the abnormal returns are calculated. This can be multiple days, but since I want to measure the effect of a certain mood change, which does not last long, and matches follow each other quickly in a tournament, the event window is just one day. In figure 1 the estimation window and event window are graphically displayed.

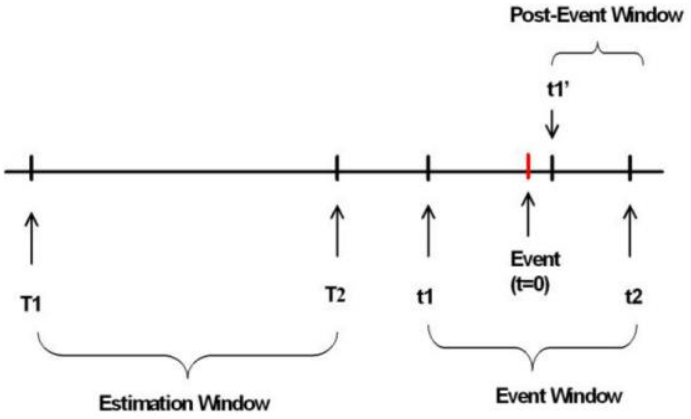

Figure 1: Estimation and Event window

In the Market model, a beta is needed to calculate abnormal returns. The beta is calculated with the following formula:

$$\widehat{\beta_i} = \frac{Cov\,(r_i - r_f\,;\, r_m - r_f)}{Var\,(r_m - r_f)}$$

Excess returns are used for calculating the beta. As a risk-free rate, the 10 Year US Treasury Bill-rate[5] is taken. For each event, a new beta is calculated by taking the covariance of the countries' index excess return and the excess benchmark (our own created global index) return and the variance of the excess benchmark

[5] https://finance.yahoo.com/quote/%5ETNX?p=%5ETNX

return in the estimation window. Also $\hat{\alpha}_i$ (alpha) is calculated for each single event over the estimation window of that event. Alpha is calculated with the following formula:

$$\hat{\alpha}_i = (R_i - R_{ft}) - \hat{\beta}_i * (R_{mt} - R_{ft})$$

In this formula, $R_{it}, R_{mt}, and\ R_{ft}$ are the averages of the estimation window. Then I put the numbers in the formula as stated in section 6.2 to calculate the Normal Returns (NR_{it}), and the Abnormal Returns (AR_{it}) with the formula in section 6.1. In section 6.4.1 the 2010 World Cup quarter-final match between Brazil and Holland is used as clarification.

6.4.1 Example Brazil – Holland, July 2nd 2010

On Friday the 2nd of July 2010, Brazil and Holland faced each other in the World Cup quarter-final. The match was played at 4:00 PM in Port Elisabeth, South Africa. Holland won the match with 2-1 in regular time. According to the guidelines of section 6.3, the match was ended at 6:00 PM local time. South Africa and Holland are in the same time zone. In Holland, the match was therefore also finished at 6:00 PM. The Dutch AEX closes at 5:30 PM (Appendix B). The event date for Holland is, therefore, Monday the 5th of July 2010. In Brazil (São Paulo & Rio de Janeiro) the match was ended at 1:00 PM. The Brazilian BOVESPA is opened till 5:00 PM. Therefore, Friday the 2nd of July 2010 is taken as the event date for Brazil.

For Brazil, the estimation window is from February 11, 2010, until July 1, 2010. The average daily excess return on the BOVESPA was 0.1473% in that period with a variance of 0.0256%. My own created benchmark (the 13 other countries), had an average daily excess return of 0.2011% in that period with a variance of 0.0196%. The covariance between the excess benchmark returns and the excess returns on the BOVESPA was 0.0163% between February 11, 2010, and July 1, 2010. Then $\widehat{\beta_\iota}$ is the covariance, of 0.0163%, divided by the variance of the excess market returns, 0.0196%. This results in $\widehat{\beta_\iota} = 0.8326$. Then also alpha ($\hat{\alpha}_i$) need to be calculated. The just calculated beta (0.8326), the average daily excess return on the BOVESPA in the estimation window (0.1473%), and the average daily excess return of the benchmark (0.2011 %) are used. Then the following formula is applied to calculate alpha:

$$\hat{\alpha}_i = 0.1473\% - 0.8326 * 0.2011\% = -0.0201\%$$

The Normal Return (NR_{it}) can now be calculated with the formula of the Market Model (section 6.2).

$NR_{it} = \hat{\alpha}_i + \hat{\beta}_i * R_{mt}$ $\qquad$ $NR_{it} = -0.0201\% + 0.8326 * 0.4996\% = 0.3959\%$

With R_{mt} as the average return of the other 13 countries on the 2nd of July 2010 (benchmark return on July 2, 2010). Then I look up the actual return on the BOVESPA on the event date (2nd of July 2010), which is 0.3168%. The abnormal return (AR_{it}) is then 0.3168% minus 0.3959%, which is -0.0791%.

For Holland, the estimation window is from February 12, 2010, until July 4, 2010. The average daily excess return on the AEX was 0.2445% in that period with a variance of 0.0270%. My own created benchmark (the other 13 countries), had an average daily excess return of 0.1890% in that period with a variance of 0.0190%. The covariance between the benchmark returns and the returns on the AEX was 0.0214% between February 12, 2010, and July 4, 2010. Then $\widehat{\beta_i}$ is the covariance, of 0.0214%, divided by the variance of the excess market returns, 0.0190%. This results in $\widehat{\beta_i} = 1.1238$. Then also alpha ($\hat{\alpha}_i$) need to be calculated. The just calculated beta (1.1238), the average daily excess return on the AEX in the estimation window (0.2445%), and the average daily excess return of the benchmark (0.1890%) are used. Then the following formula is applied to calculate alpha:

$$\hat{\alpha}_i = 0.2445\% - 1.1238 * 0.1890\% = 0.0321\%$$

I can now calculate the Normal Return (NR_{it}) with the formula of the Market Model (section 6.2).

$NR_{it} = \hat{\alpha}_i + \hat{\beta}_i * R_{mt}$ $\qquad$ $NR_{it} = 0.0321\% + 1.1238 * -0.3164\% = -0.3235\%$

With R_{mt} as the average return on the 5th of July 2010 for the other 13 countries (benchmark return on July 2, 2010). Then I look up the actual return on the AEX on the event date (5th of July 2010), which is -0.6262%. The abnormal return (AR_{it}) is then -0.6262% minus -0.3235%, which is -0.3027%.

I apply the same method for all the matches. In section 7.2 all the results will be discussed.

7. Results

In this section, the results from the descriptive statistics and the regression analysis of the study will be presented. First, for the descriptive statistics, the returns for the whole period and the returns on match days are discussed. Later on, the calculated abnormal returns in the regression analysis are displayed and the hypotheses from section 4 will be discussed.

7.1 Descriptive statistics

The whole sample period is from the 2nd of January 1996 till the 28th of December 2018. In this period each of the countries in de sample documented at least 4,231 returns (Chile), and a maximum of 5,876 returns (Switzerland). The four Latin American countries together documented 21,130 returns, and the ten European countries documented 55,857 returns. Table 3 shows the descriptive statistics of the countries.

COUNTRY	MEDIAN	AVERAGE	ST DEV	NO MATCH AVG
ARGENTINA	0.1203%	0.0946%	2.1723%	0.1026%
BRAZIL	0.0956%	0.0671%	1.9683%	0.0686%
CHILE	0.0498%	0.0392%	0.9708%	0.0398%
DENMARK	0.0880%	0.0485%	1.2725%	0.0476%
ENGLAND	0.0459%	0.0170%	1.1532%	0.0166%
FRANCE	0.0438%	0.0253%	1.4119%	0.0268%
GERMANY	0.0890%	0.0370%	1.4729%	0.0367%
HOLLAND	0.0599%	0.0229%	1.3983%	0.0234%
ITALY	0.0558%	0.0103%	1.5595%	0.0104%
MEXICO	0.0632%	0.0557%	1.3960%	0.0577%
PORTUGAL	0.0127%	-0.0108%	1.1746%	-0.0107%
SPAIN	0.0769%	0.0250%	1.4613%	0.0248%
SWEDEN	0.0616%	0.0357%	1.4798%	0.0366%
SWITZERLAND	0.0575%	0.0228%	1.1811%	0.0248%

Table 3: Descriptive statistics

The table shows that all of the countries have a positive average daily return, with the exception of Portugal. An important observation is that the Latin American countries have higher average returns than the European countries. For Argentina and Brazil, the two countries with the highest average daily return, it also accounts that they have the highest standard deviation of the countries in the sample. Furthermore, the median is positive for each country, which means that all the countries have more days with a positive return than days with a negative return. The last column of the table shows the average daily return on days

that are not considered as an event date. These returns are almost equal to the average daily returns for the whole sample period, which is logical since just a small fraction (around 1%) of the returns are on an event date.

The next step is to take a look at the average daily returns and standard deviations on event dates. Table 4 shows the average daily returns after World Cup matches and European Championship / Copa América matches.

COUNTRY	WORLD CUP		EUROPEAN CHAMPIONSHIP		COPA AMÉRICA	
	Average	St dev	Average	St dev	Average	St dev
ARGENTINA	-0.8701%	4.2442%			-0.5937%	2.2638%
BRAZIL	0.0298%	2.2855%			-0.1413%	1.3221%
CHILE	-0.0924%	0.6706%			-0.0405%	0.6665%
DENMARK	0.2965%	1.3779%	0.1665%	0.6752%		
ENGLAND	0.1225%	1.0933%	0.0139%	0.9334%		
FRANCE	-0.0011%	0.9595%	-0.2916%	1.2252%		
GERMANY	0.1335%	1.2721%	-0.0180%	1.5440%		
HOLLAND	-0.1248%	1.2646%	0.0145%	0.6346%		
ITALY	-0.3223%	1.2415%	0.3116%	2.3049%		
MEXICO	-0.6482%	1.5987%			0.2180%	0.8829%
PORTUGAL	-0.0593%	0.8009%	0.0008%	1.3135%		
SPAIN	0.0695%	1.4323%	0.0459%	1.5105%		
SWEDEN	-0.5590%	1.2019%	0.2500%	1.3728%		
SWITZERLAND	-0.3489%	0.6926%	-0.5236%	0.9282%		

Table 4: Average daily returns after main tournament matches

A big difference in the average daily returns on event dates compared to the average daily returns for the whole sample can be observed. Most countries have a negative average daily return on World Cup event dates. Also on Copa América event dates, there are more negative average daily returns than expected. On European Championship event dates the negative and positive average daily returns are more evenly spread, with also some that are really close to zero. The high standard deviations of Argentina and Brazil at World Cup event dates are noteworthy. This also makes that the average standard deviations of Latin American countries (2.1998%) at World Cup event dates is higher than the average standard deviation of all daily returns (1.6264%).

The average daily returns after wins, losses and draws are now separated in group stage matches and knock out matches. As explained in section 5.4, a draw in a knock out match is not possible. The average daily returns in the column draws are thus for group stage draws. Table 5 shows the average daily returns for

World Cup matches, and table 6 shows the average daily returns for European Championship and Copa América matches.

COUNTRY	WORLD CUP						
	Wins			Losses			Draws
	Total	Group stage	Knock out	Total	Group stage	Knock out	
ARGENTINA	-0,4603%	-1,5546%	1,9471%	-0,3121%	0,0167%	-0,4766%	-5,8223%
BRAZIL	-0,1109%	0,4274%	-0,6493%	1,0664%		1,0664%	0,1642%
CHILE	0,1269%	0,1269%		-0,5309%		-0,5309%	
DENMARK	-0,2028%	-0,3481%	0,3784%	0,5913%	0,3070%	1,0176%	0,8078%
ENGLAND	-0,1926%	-0,6872%	0,7966%	0,6436%	0,3163%	0,8399%	-0,0068%
FRANCE	-0,1491%	-0,4233%	0,0254%	0,0003%	0,2089%	-0,4169%	0,5303%
GERMANY	0,3189%	-0,1685%	0,7657%	-0,3289%	-0,1758%	-0,4437%	-0,2090%
HOLLAND	-0,0825%	0,3414%	-0,5064%	-0,0960%		-0,0960%	-0,4789%
ITALY	-0,4736%	-0,9684%	0,1201%	0,1193%	-0,2829%	0,9237%	-0,5192%
MEXICO	-1,1004%	-1,1004%		0,0544%	0,2614%	-0,0491%	-1,0992%
PORTUGAL	-0,1523%	-0,2208%	0,0190%	-0,0547%	-0,1609%	0,0514%	0,0653%
SPAIN	0,6646%	0,5075%	0,9158%	-0,8532%	-0,2791%	-1,6188%	-0,3563%
SWEDEN	-0,9418%	-1,1474%	-0,5306%	0,6278%	-0,9616%	1,4225%	-0,8750%
SWITZERLAND	-0,3759%	-0,3759%		-0,3690%	-0,7580%	-0,1097%	-0,2832%

Table 5: Average daily returns after wins / losses in World Cup group matches / knock out matches

Some cells are empty because that country had no match played in that category

First, the expectations are stated. From the first hypothesis, the expectation is that after a win the average daily return is higher than after a draw or a loss. The fifth hypothesis states that this effect will be higher with knock out matches than with group stage matches. Finally, the second hypothesis states that the expectation is that the mentioned effects will be higher for Latin American countries than for European countries.

As observable in table 5, the expectations mentioned above have not come true. Only for Chile, Germany, and Spain the average daily return at the event date after a win is larger than the average daily return at the event date after a loss. Although a regression analysis is needed to control for market-wide stock price movements and to be able to draw a conclusion about the first hypothesis, it is a remarkable observation. With focusing on the group stage and knock out wins, the average daily returns that are more in line with the expectation of the fifth hypothesis. For 9 of the 11 countries (Chile, Mexico, and Switzerland are excluded because they did not win any World Cup knock out match in the sample), the average daily returns are higher after knock out wins than after group stage wins. With the group stage and knock out losses, the

countries are divided. Of the 11 countries (Brazil, Chile, and Holland are excluded because they did not lose any World Cup group stage match in the sample), 5 countries have a lower average daily return after knock out losses than after group stage losses, and 6 countries have the opposite. For the second hypothesis, the differences in the above-mentioned categories between Latin American and European countries are looked at. As mentioned, the first outcomes contradict with the first hypothesis. For both groups (European and Latin American countries), this is the case. Therefore, the conclusion that Latin American countries have higher (lower) average daily returns after wins (losses) than European countries cannot be drawn. It is hard to compare group stage wins (losses) with knock out stage wins (losses) of Latin American countries because only Argentina and Brazil did win at least one group stage match and one knock out match, and only Argentina and Mexico did lose at least one group stage match and one knock out match. The only Latin American country, Argentina, for which the comparison can be made, shows average daily returns that are in line with the expectations. Of the European countries, almost all, Holland excluded, have higher average daily returns after knock out match wins than after group stage match wins. After losses, the observed average daily returns contradict with the expectation. Six out of nine European countries have lower average daily returns after group stage match losses than after knock out match losses.

I can perform the same analysis for the European Championship and Copa América. The average daily returns for European Championship and Copa América matches are displayed in table 6.

COUNTRY	**EUROPEAN CHAMPIONSHIP / COPA AMÉRICA**						
	Wins			**Losses**			**Draws**
	Total	**Group stage**	**Knock out**	**Total**	**Group stage**	**Knock out**	
ARGENTINA	-0.2385%	-0.0576%	-0.5398%	-1.6549%	0.2969%	-2.2126%	0.3733%
BRAZIL	-0.0566%	0.3376%	-0.5226%	-0.2520%	0.8786%	-1.7595%	-0.5603%
CHILE	-0.0163%	0.1978%	-0.2304%	0.0564%	0.3690%	-0.4126%	-0.1924%
DENMARK	0.6743%	0.6743%		-0.2835%	-0.3898%	0.1418%	0.4087%
ENGLAND	0.0948%	0.1452%	-0.3089%	-0.1122%	-0.5444%	0.2120%	0.0654%
FRANCE	-0.4121%	-0.5335%	-0.2734%	-0.2011%	-0.5636%	0.0707%	0.0022%
GERMANY	-0.6223%	0.0571%	-1.3017%	1.1467%	0.3781%	2.1714%	0.3611%
HOLLAND	-0.0638%	-0.4023%	0.7825%	0.0054%	-0.2145%	0.2803%	0.3294%
ITALY	0.7862%	0.3178 %	1.5356%	-0.5022%	-1.1916%	-0.3298%	-0.1083%
MEXICO	0.0426%	0.1924%	-0.2268%	0.4962%	0.2297%	0.7627%	0.0415%
PORTUGAL	0.1282%	0.1622%	0.0941%	-1.1285%	-0.4527%	-1.4664%	1.5801%
SPAIN	-0.1776%	0.0033%	-0.4790%	0.7076%	0.4696%	0.8663%	0.1128%
SWEDEN	-0.5019%	-0.5019%		0.5486%	0.5987%	0.2480%	0.0544%
SWITZERLAND	-1.7715%	-1.7715%		-0.4572%	-0.2049%	-1.9710%	-0.2627%

Table 6: Average daily returns after wins / losses in European Championship / Copa América group matches / knock out matches

The average daily returns after European Championship / Copa América wins are larger than after losses in Argentina, Brazil, Italy, Denmark, England, Italy, and Portugal. For the other seven countries, the average daily returns are higher after losses. This means that it is hard to observe a strict difference in returns between winning and losing. By splitting the matches in group stage matches and knock out matches, only in 3 (France, Holland, and Italy) of the 11 countries the average daily returns are higher after wins in knock out matches at the European Championship / Copa América than after wins in group stage matches at those tournaments. In Argentina, Brazil, Chile, Portugal, Sweden, and Switzerland the average daily returns after losses in knock out matches at the European Championship / Copa América are lower than after losses in group stage matches at these tournaments.

Overall, it is hard to observe effects that are in line with the hypotheses mentioned in section 4. As earlier mentioned, a regression analysis is needed to control for market-wide stock price movements. Which is as stock markets around the whole world or in a whole continent increase (decrease), which may result in an increase (decrease) despite the loss (win).

7.2 Regression analysis

For the 601 matches in the sample, the abnormal returns are calculated by the Market model (see section 6). First, the results of the groups will be presented (so European countries together and Latin American countries together), to test the hypotheses. Later on, the hypotheses are tested for the individual countries. Table 18 in Appendix C presents the average abnormal returns in each of the possible categories of this study.

7.2.1 First hypothesis

The first hypothesis just tests if there is any difference in average abnormal return between won, drawn, and lost matches, with the expectation that wins will result in a positive average abnormal return, and draws and losses will lead in a negative average abnormal return. In this hypothesis, there will be no distinction between European and Latin American countries or between different tournaments or stages. [6]

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	330	-0.0033%	1.4364%	0.0420
DRAW	95	-0.0696%	1.2355%	-0.5490
LOST	176	-0.0450%	1.1134%	-0.5359

Table 7: Average Abnormal Returns (AAR_t) split by match result.

[6] For all tables that presents average abnormal returns; *** after the AAR_t means that the AAR_t is statistically significant at a 99% level, ** at a 95% level, and * at a 90% level

Table 7 shows the average abnormal returns after the won, lost, and drawn matches in the sample. After each match outcome, the average abnormal return is negative. The annualized average abnormal returns, to get some economic interpretation, are respectively -1.2058%, -22.4368%, and -15.1432% after respectively won, drawn, and lost matches. The expectation was that the average abnormal return would be positive after won matches. The results after won matches do therefore not support the expectation. After lost and drawn matches, the expectation was that the average abnormal returns would be negative. This expectation is supported by the results. However, the results are very small, and not statistically significant. To compare the average abnormal returns after won and lost matches, the t-statistic is calculated with two-sided t-tests assuming unequal sample sizes and unequal variances. The difference between $\overline{AR}1$ (Won) and $\overline{AR}2$ (Loss) is 0.0417%. The t-statistic of this difference is 0.3612. Although the difference is positive, the Null hypothesis that the average abnormal returns after won, drawn, or lost differ from each other cannot be rejected.

7.2.2 Second hypothesis

Now the European and Latin American countries are separated. The results are split into wins, losses and draws. Yet, no distinction between the different tournaments and between the different stages is made.

RESULT	GROUP	N	AAR_T	S_T	$TS_{1,T}$
WON	European	213	0.0397%	1.0160%	0.5694
DRAW	European	70	0.0979%	0.8532%	0.9604
LOST	European	123	-0.0076%	0.7530%	-0.1122
WON	Latin American	117	-0.0844%	2.0056%	-0.4550
DRAW	Latin American	25	-0.5387%	1.8906%	-1.4246*
LOST	Latin American	53	-0.1336%	1.6934%	-0.5744

Table 8: Average Abnormal Returns (AAR_t) split by European vs Latin American countries and by match result.

The average abnormal returns are extremer for Latin American countries than for European countries. But not all are as expected. The average abnormal return after wins is negative (-0.0844%) in Latin American countries, while this should be positive and higher than the average abnormal return after wins of European countries according to the second hypothesis. The average abnormal returns after losses are in line with the second (alternative) hypothesis. With this, the Null hypothesis that the effects of match results of Latin American national football teams on main tournaments do not differ from the effects of match results of European national football teams on main tournaments could be partly rejected. However, the results found after losses are not statistically significant, which makes it unable to (partly) reject the Null hypothesis and to conclude that match results of Latin American national football teams on main tournaments have a bigger

effect on domestic stock indices than match results of European national football teams on main tournaments.

To compare the won (lost) matches of Latin American countries with the won (lost) matches of European countries, the two-sided t-test is used again. The difference between $\overline{AR}1$ (Won Latin American) and $\overline{AR}2$ (Won European) is -0.1240%. This was expected to be positive. The t-statistic is -0.6263. For lost matches, the same can be done. The difference between $\overline{AR}1$ (Lost Latin American) and $\overline{AR}2$ (Lost European) is -0.1260% (negative like expected). The t-statistic is -0.5200. For both tests, the Null hypothesis cannot be rejected, and therefore it cannot be concluded that the effects of match results are bigger in Latin American countries than in European countries.

7.2.3 Third hypothesis

The next step is to make a distinction between the tournaments to test the third hypothesis. This (alternative) hypothesis states that match results of national football teams on World Cups will have a bigger effect on domestic stock indices than match results of national football teams on European Championships / Copa América's. To ensure that clear results are used to test this hypothesis, only average abnormal returns of European (Latin American) countries after World Cup matches are taken if they are compared with average abnormal returns after European Championship (Copa América) matches.

RESULT	GROUP	TOURNAMENT	N	AAR_T	S_T	TS_T
WON	European	World Cup	115	-0.0380%	0.6765%	-0.6029
DRAW	European	World Cup	36	0.1539%	0.8698%	1.0619
LOST	European	World Cup	57	0.0525%	0.8172%	0.4851
WON	European	European Championship	98	0.1309%	1.3049%	0.9927
DRAW	European	European Championship	34	0.0386%	0.8442%	0.2670
LOST	European	European Championship	66	-0.0594%	0.6953%	-0.6943
WON	Latin American	World Cup	53	-0.0464%	2.6304%	-0.1286
DRAW	Latin American	World Cup	9	-1.6660%**	2.7115%	-1.8432
LOST	Latin American	World Cup	20	-0.0683%	1.3784%	-0.2217
WON	Latin American	Copa América	64	-0.1145%	1.3403%	-0.6832
DRAW	Latin American	Copa América	16	0.0955%	0.7785%	0.4905
LOST	Latin American	Copa América	33	-0.1724%	1.8756%	-0.5280

Table 9: Average Abnormal Returns (AAR_t) split by tournament, by European vs Latin American countries, and by match result.

Most results are the opposite of what was expected. The average abnormal return of European countries after won World Cup matches is lower (even negative) than the average abnormal return after won European Championship matches. For the Latin American countries, both average abnormal returns after won World Cup matches and after won Copa América matches are negative, although the average abnormal return after

won World Cup matches is less negative. Looking at the lost matches, the results are totally not in line with the expectation of the third hypothesis. The average abnormal return after lost World Cup matches by European (Latin American) countries is higher than the average abnormal return after lost European Championship (Copa América) matches, while this should be lower (more negative) according to the expectation. However, none of the mentioned results is statistically significant, so no conclusion can be drawn on the third hypothesis. Therefore, it cannot be said that the results of World Cup matches have a bigger effect on domestic stock indices than results of European Championship / Copa América matches.

7.2.4 Fourth hypothesis

For the fourth hypothesis, the group stage matches and knock out matches will be separated. This fourth hypothesis states that knock out match results will have a bigger effect on domestic stock indices than group stage match results. To test this hypothesis, there will first be no distinction made between European and Latin American countries. Later on, these distinctions will be made.

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	200	0.0033%	1.5101%	0.0309
WON	Knock out	130	-0.0136%	1.3199%	-0.1172
LOST	Group stage	84	0.0361%	0.9766%	0.3388
LOST	Knock out	92	-0.1188%	1.2257%	-0.9300

Table 10: Average Abnormal Returns (AAR_t) split by match result, and by stage.

In table 10 is visible that the difference between the average abnormal return after lost group stage matches and the average abnormal return after lost knock out matches is in line with the expectation. The difference between won group stage matches and won knock out matches contradicts the expectation. To compare the won (lost) group stage matches with the won (lost) knock out matches, the two-sided t-test is used again. The difference between $\overline{AR}1$ (won knock out) and $\overline{AR}2$ (won group stage) is -0.0169%. This was expected to be positive. The t-statistic is -0.1071. For lost matches, the same can be done. The difference between $\overline{AR}1$ (lost knock out) and $\overline{AR}2$ (lost group stage) is -0.1549% (negative like expected). The t-statistic is -0.9312. Since none of the results, not of the single average abnormal returns neither of the two-sided t-tests, is statistically significant, the Null hypothesis that the effects on domestic stock indices of results of knock out matches differ from the effects on domestic stock indices of results of group stage matches cannot be rejected.

Now the distinction between European and Latin American countries is made in table 11.

RESULT	STAGE	GROUP	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	European	127	0.0330%	0.8581%	0.4338
WON	Knock out	European	86	0.0495%	1.2178%	0.3767
LOST	Group stage	European	64	0.0104%	0.7793%	0.1063
LOST	Knock out	European	59	-0.0271%	0.7296%	-0.2857
WON	Group stage	Latin American	73	-0.0499%	2.2556%	-0.1890
WON	Knock out	Latin American	44	-0.1426%	1.5155%	-0.6243
LOST	Group stage	Latin American	20	0.1214%	1.4798%	0.3670
LOST	Knock out	Latin American	33	-0.2851%	1.8139%	-0.9028

Table 11: Average Abnormal Returns (AAR_t) split by stage, by group, and by match result.

Table 11 shows that the average abnormal return after won knock out matches by European countries is slightly higher than the average abnormal return after won group stage matches by European countries. For Latin American countries the average abnormal return is higher (less negative) after won group stage matches than after won knock out matches. This contradicts with the expectation of the fourth hypothesis. After losses, for both European and Latin American countries the average abnormal return is lower after knock out losses than after group stage losses. The difference is the biggest for Latin American countries, which makes it interesting to test this difference with the two-sided t-test. The difference between $\overline{AR}1$ (lost knock out Latin American) and $\overline{AR}2$ (lost group stage European) is -0.4065%. The t-statistic is -0.8888. Because of this low t-statistic (caused by few observations and high standard deviation), it cannot be said that the average abnormal returns after lost knock out matches by Latin American countries are significantly different from the average abnormal returns after lost group stage matches by Latin American countries. In summary, with the results in table 11, the Null hypothesis cannot be rejected for both European and Latin American countries.

7.2.5 Individual countries

Now the countries will be studied individually to test if the mentioned effects do exist for some of the countries in the sample. This section provides a summarized overview of the findings of the individual countries. The tables with the results of the first, third, and fourth hypothesis can be found in Appendix D. First only the match results are compared, no matter the tournament or stage. Later on, the distinction between the tournaments and stages will be made.

Argentina, Denmark, Holland, Italy, Spain, and Switzerland have a higher average abnormal return after won matches than after lost matches. The differences are the biggest for Argentina (0.5747%), Denmark (0.5935%), and Italy (0.5888%). The t-statistic in the two-sided t-test for these three countries are

respectively, 0.6208, 1.4243, and 0.9854. The p-values of the two-tailed tests for these countries are 0.5388, 0.1842, and 0.3219 respectively. Since these are all greater than 0.10 (90% significance level), the Null hypothesis that the average abnormal returns after won, drawn, or lost differ from each other cannot be rejected for these countries. Since the differences in results are smaller or opposite from the expectation in the other countries, it cannot be concluded that the match results of one countries' national football team on main tournaments have a significant effect on that countries domestic stock index.

Now the won (lost) World Cup matches will be compared with won (lost) European Championship / Copa América matches. As stated in the third hypothesis, the expectation is that won (lost) World Cup matches will lead to higher (lower) average abnormal returns than won (lost) European Championship / Copa América matches. For Brazil, Chile, England, Germany, Holland, and Spain the expectation comes true for the won matches. For the lost matches, the expectation comes true for Brazil, Germany, Holland, Mexico, and Spain. Nevertheless, none of the results is statistically significant since none of the p-values is lower than 0.10.

Finally, the group stage and knock out matches will be separated. As stated in the fourth hypothesis, the expectation is that won (lost) knock out matches have a higher (lower) average abnormal return than won (lost) group stage matches. For Argentina and Portugal, this expectation comes true for both the won and the lost matches. For Italy, the expectation comes only true for the won matches, and for Brazil, Germany, Holland, Mexico, Spain, and Sweden the expectation comes only true for the lost matches. Most results are again not statistically significant, which causing that the Null hypothesis cannot be rejected. Also, one statistically significant result was found. The p-value of the two-sided t-test for lost matches of Portugal is 0.0627. Therefore for Portugal, it can be said that the average abnormal return after lost knock out matches is lower than the average abnormal return after lost group stage matches.

7.2.6 Elo Ratings

The World Football Elo Ratings[7] is a ranking system for men's national football teams. It is created by the Hungarian physicist and chess master Arpad Emrick Elo. Primarily, it was used for rating chess players, but it is transformed to be suitable for football. It is not the same as the official FIFA World Rankings, which is also a ranking system for men's national football teams. The Elo Rating system takes football-specific variables into account, such as the importance of a match, the margin of victory, and home-field

[7] Published by the website eloratings.net

advantage. Since being developed, the Elo Rankings have been found to have the highest predictive capability for football matches (Lasek, 2013).

The Elo Ratings can be used to give a predicted outcome of a football match. Each football team has a score prior to a tournament. The score of one team is divided by the score of the opponent. If the outcome is >1.025, the team is expected to win the match. If the outcome is <0.975, the team is expected to lose the match. If the outcome is between 1.025 and 0.975 are draw is expected. These values are chosen to get a representative distribution of wins, draws, and losses (63.38% expected wins, 15.56% expected draws, and 20.07% expected losses).

As an example, the group stage match on the 2002 World Cup between France and Denmark is taken. Prior to this tournament, France had an Elo rating of 1962, and Denmark had an Elo rating of 1902. For France, 1962 is divided by 1902, which gives an outcome of 1.0315. Therefore, the expectation was that France would win this match. For Denmark, a loss was expected (which can be checked by dividing 1902 by 1962, which gives an outcome of 0.9694). Nevertheless, Denmark won this match with 2-0. Therefore the result of this match is classified as unpredicted and is given a +2 for Denmark and a -2 for France. If a draw is expected and a team wins (loses) the match, the result of the match is classified as +1 (-1). This is done for all the matches to see if the predicted outcome of a match has an effect on the average abnormal returns.

In this study, it is important to control for match expectations since this study wants to test if the (change in) mood of people (investors) caused by match results affects their trading behavior resulting in abnormal returns. An unexpected match result may have more effect on the mood of people than an expected match result, which may result in higher abnormal returns. Furthermore, since this study hypothesizes that Latin Americans act more on emotions and mood than Europeans, it is interesting to test if unexpected match results may result in higher abnormal returns for Latin American countries than for European countries.

RESULT	EXPECTED	CLASSIFIED	N	AAR_T	S_T	$TS_{1,T}$
WON			330	-0.0033%	1.4364%	-0.0420
WON	Won	0	240	0.0124%	1.3923%	0.1380
WON	Draw	+1	49	-0.2711%*	1.2360%	-1.5352
WON	Lost	+2	38	0.2355%	1.8727%	0.7753
DRAW			95	-0.0696%	1.2355%	-0.5490
DRAW	Won	-1	63	-0.0925%	1.2971%	-0.5660
DRAW	Draw	0	10	0.4348%*	1.0499%	1.3096
DRAW	Lost	+1	22	-0.2332%	1.1145%	-0.9816
LOST			176	-0.0450%	1.1134%	-0.5359
LOST	Won	-2	76	0.2030%**	0.9875%	1.7920
LOST	Draw	-1	40	-0.2659%**	0.8682%	-1.9367
LOST	Lost	0	60	-0.2171%	1.3439%	-1.2513

Table 12: Average Abnormal Returns (AAR_t) split by match results and match predictions

In the table can be observed that when a loss was expected, but the team won (like Denmark in the example), the average abnormal return is higher than when a win or draw was expected. It can be said that the surprising positive performance of the national football team has a positive effect on the mood of investors which results in a positive average abnormal return. Nevertheless, both results (and that of the two-sided t-test) are statistically insignificant, therefore no conclusion can be drawn from the results after won matches. The average abnormal return after lost matches that are expected to be won (like France in the example) is positive, which contradicts the expectation. A negative average abnormal return after these matches was expected, but the average abnormal return is +0.2030%. The difference between the average abnormal returns after lost matches that are expected to be won and after lost matches that are expected to be lost is -0.4201%. This result is statistically significant since the p-value of this difference is 0.0482. The conclusion is the opposite of what was expected.

For the second hypothesis, in which is tested if match results of Latin American national football teams on main tournaments have a bigger effect on domestic stock indices than match results of European national football teams on main tournaments, the sample is separated in two groups. Table 13 is for European countries and table 14 for Latin American countries.

RESULT	EXPECTED	CLASSIFIED	N	AAR_T	S_T	$TS_{1,T}$
WON			213	0.0397%	1.0160%	0.5698
WON	Won	0	153	0.0400%	0.7975%	0.6211
WON	Draw	+1	31	-0.1676%	0.7996%	-1.1668
WON	Lost	+2	29	0.2671%	1.9205%	0.7489
DRAW			70	0.0979%	0.8532%	0.9604
DRAW	Won	-1	46	0.0995%	0.7960%	0.8478
DRAW	Draw	0	8	0.3652%	1.0727%	0.9628
DRAW	Lost	+1	16	-0.0402%	0.9233%	-0.1739
LOST			123	-0.0076%	0.7530%	-0.1122
LOST	Won	-2	51	0.1588%*	0.7800%	1.4637
LOST	Draw	-1	30	-0.1485%	0.7618%	-1.0681
LOST	Lost	0	41	-0.1141%	0.6856%	-1.0552

Table 13: Average Abnormal Returns (AAR_t) of European countries split by match results and match predictions

RESULT	EXPECTED	CLASSIFIED	N	AAR_T	S_T	$TS_{1,T}$
WON			117	-0.0844%	2.0056%	-0.4550
WON	Won	0	89	-0.0371%	2.0741%	-0.1687
WON	Draw	+1	18	-0.4598%	1.7972%	-1.0854
WON	Lost	+2	10	0.1472%	1.8279%	0.2547
DRAW			25	-0.5387%*	1.8906%	-1.4246
DRAW	Won	-1	17	-0.6120%	2.0843%	-1.2107
DRAW	Draw	0	2	0.7134%	1.2932%	0.7802
DRAW	Lost	+1	6	-0.7481%	1.4905%	-1.2295
LOST			53	-0.1336%	1.6934%	-0.5744
LOST	Won	-2	24	0.2970%	1.3422%	1.0839
LOST	Draw	-1	10	-0.6570%**	1.1196%	-1.8555
LOST	Lost	0	18	-0.4460%	2.2129%	-0.8552

Table 14: Average Abnormal Returns (AAR_t) split by match results and match predictions

The before mentioned observations about match results and match expectations are true for both European and Latin American countries. Only the difference of 0.2728% between the results of European countries after lost matches that are expected to be won vs. lost matches that are expected to be lost is statistically significant (p-value of 0.0797). Despite the bigger difference (0.7430%) in average abnormal returns after lost matches of Latin American countries that are expected to be won vs lost matches of Latin American countries that are expected to be lost, the p-value of the two-sided t-test is 0.2185, which makes the difference statistically insignificant. This is due to higher the standard deviation and fewer observations.

8. Conclusion

This thesis investigated whether match results of national football teams have an effect on domestic stock indices. A sample of 601 World Cup, European Championship or Copa América matches between 1996 and 2018 was studied. These 601 matches were played by ten European and four Latin American countries. As an additional field of research, the difference in market reactions after football matches between European and Latin American countries was studied. The expectation was that Latin Americans would react more extreme than Europeans. This expectation was supported by the public view that football plays a more important part in the lives of Latin Americans than it does in the lives of Europeans. Furthermore, Latin Americans are considered to be more emotional than Europeans. The possible existence of an effect of match results of national football teams is studied by means of an event study. The Market Model was chosen to calculate the Normal Returns in the event study.

As substantiation of this research, several studies on mood variables that affect the behavior of traders on the stock markets are discussed. Multiple papers are written about sports being one of those mood variables. First, the effects of match results of national football teams on domestic stock indices are discussed. Of these studies, Ashton, Gerrard & Hudson (2003), Ashton, Gerrard & Hudson (2011), Graziano & Vicentini (2016), and Kang & Park (2014) found a statistically significant effect on the stock market after wins and losses of the national football team. Edmans, García & Norli (2007), Demirhan (2013), and Vieira (2013) only found a statistically significant effect on the stock market after losses of the national football team. Lastly, Zwergel & Klein (2009), Tufan (2004), Gerlach (2011), and Vieira (2012) did not find statistically significant effects on the stock market after a football match of the national team at all. Also, the effects of match outcomes of listed football clubs on the share value of these football clubs are an interesting topic in the literature about finance and football. On this topic, almost all studies reported significant effects of match results on the share value of these football clubs, with a win resulting in an increase in share value, and draws and losses in a decrease in share value. This may be caused by the fact that besides mood changes, a match result can really add or reduce stock value.

Subsequently, the emotional levels and the difference between Latin Americans and Europeans in experiencing football was discussed. Gilberto Freyre differentiated two opposite styles of playing football and, consequently, two different cultural styles: an ‘Apollonian’ style (formal, pent-up, rational) represented by the European; and the other ‘Dionysian’ (impulsive, individualist, emotional) portrayed in the mulatto’s ‘character’. According to Freyre Europeans would have a rational game due to their ‘organization’, while the Brazilians would have a ‘distinct’ way of playing, representing the disorganization of the country and its Afro-Brazilian culture (Maranhão, 2007). Two studies by Jon Clifton (2015) (2012)

supports this view as he found that the emotional level for residents in Latin American countries was higher than for residents in European countries.

Most of the results found with the event study do not support the two main research question of this study. The average abnormal returns after won (-0.0033% daily, -1.2058% annualized), drawn (-0.0696% daily, -22.4368% annualized), and lost (-0.0450% daily, -15.1432% annualized) matches are negative. None of the results is statistically significant. Also, the difference, tested with the two-sided t-test assuming unequal variances, in average abnormal returns between won and lost matches (+0.0417%) is statistically insignificant. From these results, we cannot conclude that match results of national football teams have an effect on domestic stock indices. By separating the matches of European and Latin American countries, the difference in market reactions after football matches between European and Latin American countries was studied. Surprisingly, the average abnormal return after won matches by European countries (0.0397%) was higher than the average abnormal return after won matches by Latin American countries (-0.0844%). After lost matches, the expectation was that the average abnormal return for Latin American countries was lower than the average abnormal return for European countries. This expectation is supported by the results (-0.1336% for Latin American countries and -0.0076% for European countries). But also these results and their differences are statistically insignificant. Therefore, also the 2nd hypothesis that Latin Americans react more extreme than Europeans cannot be accepted. Furthermore, this study investigated if the market reactions differ between tournaments (World Cup vs. European Championship / Copa América) or tournament stages (group stage matches vs. knock out matches). Barely any statistically significant results were found that would suggest that match importance has an effect on domestic stock indices.

Moreover, the countries were studied individually to test if the mentioned effects do exist for some of the countries in the sample. For some countries, the found results are in line with the expectations. However, most of these results are statistically insignificant, which makes it not possible to draw conclusions from these results. The statistically significant result of the two-sided t-test between lost group stage matches and lost knock out matches of Portugal can be accidental since many more results support the opposite or are statically insignificant.

Finally, match predictions based on Elo Ratings were incorporated. The most interesting result of this is with the difference between won matches that are expected to be won (+0.0124%) and won matches that are expected to be lost (+0.2355%). There seems to be a significant difference in these average abnormal returns. However, the difference between these results is statistically insignificant according to the two-sided t-test.

The main conclusion of the results in this study is that the match results of national football teams do not affect domestic stock indices. These outcomes correspond with findings of Zwergel & Klein (2009), Tufan (2004), Gerlach (2011), and Vieira (2012). A reason for these results may be that sports might not affect

investors enough to have an impact on their trading behavior. Another possible explanation is that a big proportion of the stocks of the firms that are on the studied stock indices are held by foreign investors who are not or less affected by match results. In Holland, for instance, is only 59.72% of the domestic equity held by domestic investors (Faruqee, Li, & Yan, 2004). Furthermore, as Ashton et al. (2011) already concluded, it is extremely difficult to be absolutely certain that the performed event study is correct in every detail and it is a rather sobering thought to reflect on how rarely academic studies are precisely replicated. A different estimation window, different benchmark, or different timing of event dates may give results that support the existence of sports sentiment and the effect of match results on domestic stock indices. For further research, it may be interesting to study the effects with intraday data. Matches that ended when stock markets were still open can be incorporated in this study.

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Appendices

Appendix A

COUNTRY	REGION	PLACE (2012)	%YES	PLACE (2015)	%YES	IN SAMPLE
BOLIVIA	Latin America	10	54%	1	59%	No
EL SALVADOR	Latin America	2	57%	2	59%	No
ECUADOR	Latin America	11	54%	3	58%	No
NICARAGUA	Latin America	14	54%	5	58%	No
GUATEMALA	Latin America	9	54%	6	58%	No
COLOMBIA	Latin America	5	55%	9	57%	No
COSTA RICA	Latin America	7	54%	10	57%	No
HONDURAS	Latin America	18	52%	11	57%	No
DOMINICAN REPUBLIC	Latin America	12	54%	12	56%	No
PORTUGAL	Europe	37	50%	15	56%	Yes
PARAGUAY	Latin America	31	51%	17	55%	No
CHILE	Latin America	6	54%	18	55%	Yes
PANAMA	Latin America	29	51%	20	55%	No
VENEZUELA	Latin America	26	52%	22	55%	No
CYPRUS	Europe	19	52%	23	55%	No
URUGUAY	Latin America	34	51%	24	54%	No
GREECE	Europe	57	49%	26	54%	No
SPAIN	Europe	16	53%	27	54%	Yes
PERU	Latin America	13	54%	28	54%	No
ITALY	Europe	74	47%	33	53%	Yes
ARGENTINA	Latin America	24	52%	37	52%	Yes
BELGIUM	Europe	23	52%	40	52%	No
MALTA	Europe	22	52%	41	52%	No
BRAZIL	Latin America	30	51%	45	52%	Yes
SWITZERLAND	Europe	54	49%	46	51%	Yes
MEXICO	Latin America	42	50%	47	51%	Yes
ALBANIA	Europe	87	46%	50	51%	No
DENMARK	Europe	49	50%	52	51%	Yes
FRANCE	Europe	21	52%	53	51%	Yes

SWEDEN	Europe	59	49%	57	51%	Yes
UNITED KINGDOM	Europe	58	49%	60	51%	Yes
IRELAND	Europe	33	51%	61	51%	No
NETHERLANDS	Europe	55	49%	62	51%	Yes
FINLAND	Europe	44	50%	63	51%	No
GERMANY	Europe	73	47%	70	50%	Yes
LUXEMBOURG	Europe	39	50%	72	49%	No
SLOVENIA	Europe	66	48%	76	48%	No
ROMANIA	Europe	93	46%	79	48%	No
HAITI	Latin America	138	40%	81	48%	No
AUSTRIA	Europe	79	47%	83	48%	No
MACEDONIA	Europe	117	44%	91	47%	No
SLOVAKIA	Europe	91	46%	92	47%	No
POLAND	Europe	83	46%	95	47%	No
MONTENEGRO	Europe	97	46%	100	46%	No
TURKEY	Europe	103	45%	102	46%	No
ARMENIA	Europe	114	44%	106	46%	No
CROATIA	Europe	122	43%	112	45%	No
LATVIA	Europe	129	42%	116	44%	No
ISRAEL	Europe	46	50%	119	44%	No
HUNGARY	Europe	85	46%	121	44%	No
CZECH REPUBLIC	Europe	112	44%	126	43%	No
SERBIA	Europe	111	44%	129	42%	No
ESTONIA	Europe	120	43%	130	42%	No
BULGARIA	Europe	135	41%	134	42%	No
BOSNIA & HERZEGOVINA	Europe	108	44%	137	41%	No
MOLDOVA	Europe	128	42%	138	41%	No
KOSOVO	Europe	125	42%	139	40%	No
LITHUANIA	Europe	149	37%	140	40%	No
RUSSIA	Europe	148	38%	141	40%	No
UKRAINE	Europe	146	38%	142	40%	No
BELARUS	Europe	145	38%	143	39%	No

Table 15: State of emotions for European and Latin American countries

Appendix B

COUNTRY	STOCK INDEX	YAHOO FINANCE	
		Start	End
ARGENTINA	MERVAL 25	10/08/1996	12/28/2018
BRAZIL	BOVESPA	01/02/1996	12/28/2018
CHILE	IGPA	01/02/2002	12/28/2018
COLOMBIA	IGBC	N.A.	N.A.
CROATIA	CROBEX	N.A.	N.A.
DENMARK	OMXC20	01/02/1996	12/28/2015
ECUADOR	BVG	N.A.	N.A.
ENGLAND	FTSE100	01/02/1996	12/28/2018
FRANCE	CAC40	01/02/1996	12/28/2018
GERMANY	DAX30	01/02/1996	12/28/2018
HOLLAND	AEX	01/02/1996	12/28/2018
ITALY	FTSE MIB	12/31/1997	12/28/2018
MEXICO	BOLSA	01/02/1996	12/28/2018
PARAGUAY	BVPASA	N.A.	N.A.
PORTUGAL	PSI20	01/04/1999	12/28/2018
RUSSIA	MOEX (MICEX)	N.A.	N.A.
SPAIN	IBEX35	01/02/1996	12/28/2018
SWEDEN	OMXS30	01/02/1996	12/28/2018
SWITZERLAND	SMI	01/03/1996	12/28/2018
URUGUAY	BVM	N.A.	N.A.

Table 16: Available data of stock indices

COUNTRY	STOCK INDEX	TRADING HOURS	
		Open	Closed
ARGENTINA	MERVAL 25	11:00	17:00
BRAZIL	BOVESPA	10:00	17:00
CHILE	IGPA	09:30	16:00
DENMARK	OMXC20	09:00	17:00
ENGLAND	FTSE100	08:00	16:30
FRANCE	CAC40	09:00	17:30
GERMANY	DAX30	08:00	20:00
HOLLAND	AEX	09:00	17:40
ITALY	FTSE MIB	09:00	17:30
MEXICO	BOLSA	08:30	15:00
PORTUGAL	PSI20	08:00	17:30
SPAIN	IBEX35	09:00	17:30
SWEDEN	OMXS30	09:00	17:30
SWITZERLAND	SMI	09:00	17:30

Table 17: Trading hours of stock indices

Appendix C

RESULT	GROUP	TOURNAMENT	STAGE	N	AAR_T	S_T
WON				330	-0.0033%	1.4364%
WON	European			213	0.0397%	1.0160%
WON	European	World Cup		115	-0.0380%	0.6765%
WON	European	World Cup	Group stage	66	-0.0331%	0.7376%
WON	European	World Cup	Knock out	49	-0.0446%	0.5916%
WON	European	European Championship		98	0.1309%	1.3049%
WON	European	European Championship	Group stage	61	0.1046%	0.9731%
WON	European	European Championship	Knock out	37	0.1741%	1.7340%
WON	Latin American			117	-0.0844%	2.0056%
WON	Latin American	World Cup		53	-0.0464%	2.6304%
WON	Latin American	World Cup	Group stage	36	-0.1710%	2.8651%
WON	Latin American	World Cup	Knock out	17	0.2182%	2.1053%
WON	Latin American	Copa América		64	-0.1145%	1.3403%
WON	Latin American	Copa América	Group stage	37	0.0614%	1.5301%
WON	Latin American	Copa América	Knock out	27	-0.3647%**	0.9862%
DRAW				95	-0.0696%	1.2355%
DRAW	European			70	0.0979%	0.8532%
DRAW	European	World Cup	Group stage	36	0.1539%	0.8698%
DRAW	European	European Championship	Group stage	34	0.0386%	0.8442%
DRAW	Latin American			25	-0.5387%*	1.8906%
DRAW	Latin American	World Cup	Group stage	9	-1.6660%**	2.7115%
DRAW	Latin American	European Championship	Group stage	16	0.0955%	0.7785%
LOST				176	-0.0450%	1.1134%
LOST	European			123	-0.0076%	0.7530%
LOST	European	World Cup		57	0.0525%	0.8172%
LOST	European	World Cup	Group stage	27	0.1520%	0.8612%
LOST	European	World Cup	Knock out	30	-0.0401%	0.7775%
LOST	European	European Championship		66	-0.0594%	0.6953%
LOST	European	European Championship	Group stage	37	-0.0959%	0.7055%
LOST	European	European Championship	Knock out	29	-0.0141%	0.6920%
LOST	Latin American			53	-0.1336%	1.6934%
LOST	Latin American	World Cup		20	-0.0683%	1.3784%
LOST	Latin American	World Cup	Group stage	5	0.1310%	2.4704%
LOST	Latin American	World Cup	Knock out	15	-0.1395%	0.8557%
LOST	Latin American	Copa América		33	-0.1724%	1.8756%
LOST	Latin American	Copa América	Group stage	15	0.1181%	1.0743%
LOST	Latin American	Copa América	Knock out	18	-0.3983%	2.3257%

Table 18: Average Abnormal Returns (AAR_t) split by stage, by tournament, by European vs Latin American countries, and by match result.

Appendix D

7.2.6.1 Argentina

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	32	-0.2954%	3.4511%	-0.4842
DRAW	6	-1.5298%	3.0058%	-1.2467
LOST	15	-0.8700%	2.6967%	-1.2496

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	16	-0.3439%	4.6507%	-0.2958
WON	Copa América	16	-0.2469%	1.7263%	-0.5721
DRAW	World Cup	2	-4.6969%**	3.8778%	-1.7130
DRAW	Copa América	4	0.0538%	0.1195%	0.9010
LOST	World Cup	6	-0.6712%	2.2073%	-0.7449
LOST	Copa América	9	-1.0026%	3.1035%	-0.9692

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	21	-0.7244%	3.9753%	-0.8351
WON	Knock out	11	0.5238%	2.0470%	0.8486
LOST	Group stage	4	-0.1769%	2.7102%	-0.1305
LOST	Knock out	11	-1.1221%*	2.7777%	-1.3398

7.2.6.2 Brazil

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	48	-0.0290%	1.6454%	-0.1223
DRAW	5	0.1020%	0.8142%	0.2802
LOST	10	0.4406%*	0.9413%	1.4801

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	24	-0.0258%	1.9295%	-0.0656
WON	Copa América	24	-0.0323%	1.3451%	-0.1175
DRAW	World Cup	2	0.6282%	0.9378%	0.9473
DRAW	Copa América	3	-0.2488%	0.6516%	-0.6612
LOST	World Cup	3	0.3392%	0.4677%	1.2560
LOST	Copa América	7	0.4840%	1.1175%	1.1460

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	25	0.1957%	1.9300%	0.5070
WON	Knock out	23	-0.2733%	1.2651%	-1.0362
LOST	Group stage	4	0.5894%	1.3311%	0.8856
LOST	Knock out	6	0.3413%	0.7086%	1.1799

7.2.6.3 Chile

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	14	-0.0954%	1.1105%	-0.3215
DRAW	4	0.2612%	0.9871%	0.5293
LOST	6	0.5166%**	0.5755%	2.1985

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	4	0.1939%	0.7605%	0.5100
WON	Copa América	10	-0.2112%	1.2395%	-0.5387
DRAW	World Cup	0			
DRAW	Copa América	4	0.2612%	0.9871%	0.5293
LOST	World Cup	2	0.8575%	1.0878%	1.1149
LOST	Copa América	4	0.3461%***	0.2034%	3.4024

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	9	0.2738%	0.7326%	1.1212
WON	Knock out	5	-0.7601%	1.4406%	-1.1798
LOST	Group stage	2	0.4464%***	0.0953%	6.6267
LOST	Knock out	4	0.5517%*	0.7376%	1.4957

7.2.6.4 Denmark

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	8	0.2417%	0.9776%	0.6992
DRAW	5	0.3254%	1.4386%	0.5057
LOST	11	-0.3518%*	0.7719%	-1.5117

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	5	-0.1895%	0.8478%	-0.4999
WON	European Championship	3	0.9603%**	0.8171%	2.0356
DRAW	World Cup	2	1.2698%	2.1484%	0.8359
DRAW	European Championship	3	-0.3043%	0.5872%	-0.8976
LOST	World Cup	5	-0.2383%	0.8694%	-0.6130
LOST	European Championship	6	-0.4653%*	0.7433%	-1.5334

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	7	0.3092%	1.0355%	0.7901
WON	Knock out	1	-0.2314%		
LOST	Group stage	8	-0.4094%*	0.8348%	-1.3870
LOST	Knock out	3	-0.2175%	0.7427%	-0.5072

7.2.6.5 England

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	21	-0.1189%	0.4826%	-1.1293
DRAW	6	0.1354%	0.2974%	1.1154
LOST	15	0.3286%**	0.5657%	2.2497

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	12	-0.1009%	0.5841%	-0.5986
WON	European Championship	9	-0.1429%	0.3347%	-1.2810
DRAW	World Cup	3	-0.0771%	0.2447%	-0.5460
DRAW	European Championship	3	0.3480%***	0.1604%	3.7573
LOST	World Cup	8	0.5223%***	0.6143%	2.4049
LOST	European Championship	7	0.1073%	0.4465%	0.6355

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	16	-0.0867%	0.4957%	-0.6998
WON	Knock out	5	-0.2220%	0.4748%	-1.0452
LOST	Group stage	6	0.2507%	0.5985%	1.0259
LOST	Knock out	9	0.3806%**	0.5733%	1.9916

7.2.6.6 France

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	33	-0.1012%	0.5942%	-0.9782
DRAW	9	0.2326%	0.5665%	1.2318
LOST	13	0.0125%	0.6719%	0.0669

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	18	-0.1198%	0.4626%	-1.0986
WON	European Championship	15	-0.0788%	0.7390%	-0.4132
DRAW	World Cup	5	0.4304%*	0.7013%	1.3724
DRAW	European Championship	4	-0.0147%	0.2308%	-0.1273
LOST	World Cup	6	0.0301%	0.9447%	0.0781
LOST	European Championship	7	-0.0027%	0.3982%	-0.0178

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	15	0.0059%	0.5478%	0.0418
WON	Knock out	18	-0.1904%	0.6316%	-1.2790
LOST	Group stage	7	-0.0329%	0.8185%	-0.1063
LOST	Knock out	6	0.0654%	0.5227%	0.3063

7.2.6.7 Germany

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	39	0.0155%	0.5225%	0.1855
DRAW	7	-0.1577%	0.5101%	-0.6952
LOST	14	0.1422%	0.9775%	0.6037

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	23	0.0633%	0.5749%	0.5283
WON	European Championship	16	-0.0532%	0.4453%	-0.4779
DRAW	World Cup	3	-0.0343%	0.8151%	-0.0729
DRAW	European Championship	4	-0.2088%**	0.2450%	-1.7046
LOST	World Cup	7	-0.1561%	0.7995%	-0.5165
LOST	European Championship	7	0.4715%	1.0960%	1.1381

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	19	0.0228%	0.4876%	0.2039
WON	Knock out	20	0.0086%	0.5663%	0.0679
LOST	Group stage	7	0.2821%	1.2010%	0.6214
LOST	Knock out	7	0.0333%	0.7691%	0.1146

7.2.6.8 Holland

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	21	0.1772%*	0.5887%	1.3792
DRAW	4	0.1971%	0.4901%	0.8042
LOST	13	-0.1502%	0.5380%	-1.0067

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	14	0.2400%*	0.5695%	1.5766
WON	European Championship	7	0.0516%	0.6519%	0.2096
DRAW	World Cup	2	0.5739%**	0.3623%	2.2401
DRAW	European Championship	2	-0.1797%**	0.1463%	-1.7373
LOST	World Cup	4	-0.2302%	0.7265%	-0.6337
LOST	European Championship	9	-0.1147%	0.4813%	-0.7148

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	12	0.2339%*	0.5899%	1.3737
WON	Knock out	9	0.1016%	0.6138%	0.4963
LOST	Group stage	5	-0.1017%	0.5740%	-0.3964
LOST	Knock out	8	-0.1805%	0.5525%	-0.9241

7.2.6.9 Italy

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	24	0.3132%	2.3266%	0.6595
DRAW	10	-0.1715%	1.6380%	-0.3311
LOST	11	-0.2755%	1.1357%	-0.8047

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	11	-0.3276%**	0.6020%	-1.8049
WON	European Championship	13	0.8554%	3.0624%	1.0072
DRAW	World Cup	5	-0.2988%	1.3368%	-0.4999
DRAW	European Championship	5	-0.0441%	2.0516%	-0.0481
LOST	World Cup	6	0.1134%	1.2074%	0.2300
LOST	European Championship	5	-0.7422%*	0.9505%	-1.7462

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	14	-0.0840%	1.6647%	-0.1888
WON	Knock out	10	0.8693%	3.0400%	0.9042
LOST	Group stage	5	-0.4397%	1.0718%	-0.9173
LOST	Knock out	6	-0.1388%	1.2694%	-0.2678

7.2.6.10 Mexico

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	23	-0.2056%	1.1433%	-0.8625
DRAW	10	-0.5843%	1.6501%	-1.1197
LOST	21	-0.1563%	1.0366%	0.6909

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	9	-0.3442%	1.4353%	-0.7194
WON	Copa América	14	-0.1165%	0.9605%	-0.4540
DRAW	World Cup	5	-1.3713%**	1.8417%	-1.6649
DRAW	Copa América	5	0.2027%	1.0892%	0.4161
LOST	World Cup	9	-0.2241%	0.9612%	-0.6994
LOST	Copa América	12	-0.1054%	1.1293%	-0.3234

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	18	-0.1683%	1.19223%	-0.5988
WON	Knock out	5	-0.3400%	1.0578%	-0.7188
LOST	Group stage	9	-0.0262%	1.1410%	-0.0688
LOST	Knock out	12	-0.2539%	0.9913%	-0.8872

7.2.6.11 Portugal

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	23	0.0275%	0.6743%	0.1959
DRAW	8	0.1008%	0.9491%	0.3003
LOST	12	0.0297%	0.6322%	0.1628

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	7	-0.2638%	0.6724%	-1.0380
WON	European Championship	16	0.1550%	0.6551%	0.9465
DRAW	World Cup	5	0.1100%	1.0825%	0.2273
DRAW	European Championship	3	0.0854%	0.8991%	0.1644
LOST	World Cup	6	0.2927%	0.5752%	1.2465
LOST	European Championship	6	-0.2333%	0.6183%	-0.9244

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	13	-0.0032%	0.6725%	-0.0171
WON	Knock out	10	0.0675%	0.7109%	0.3003
LOST	Group stage	5	0.4374%**	0.5685%	1.7202
LOST	Knock out	7	-0.2615%*	0.5289%	-1.3078

7.2.6.12 Spain

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	29	0.1482%	1.0211%	0.7818
DRAW	7	0.1421%	0.4450%	0.8450
LOST	12	0.0577%	0.8491%	0.2354

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	13	0.3029%	0.9014%	1.2115
WON	European Championship	16	0.0226%	1.1219%	0.0805
DRAW	World Cup	3	0.2784%**	0.2088%	2.3092
DRAW	European Championship	4	0.0399%	0.5783%	0.1380
LOST	World Cup	7	-0.0363%	1.0710%	-0.0897
LOST	European Championship	5	0.1893%	0.4743%	0.8926

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	18	0.2291%	1.0394%	0.9352
WON	Knock out	11	0.0159%	1.0254%	0.0513
LOST	Group stage	6	0.4117%***	0.3443%	2.9294
LOST	Knock out	5	-0.2963%	1.0801%	-0.6720

7.2.6.13 Sweden

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	8	-0.6164%**	0.8510%	-2.0487
DRAW	7	0.3119%	0.6482%	1.2731
LOST	10	0.0917%	0.6801%	0.4265

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	6	-0.7140%**	0.9631%	-1.8160
WON	European Championship	2	-0.3234%	0.4497%	-1.0169
DRAW	World Cup	4	0.1660%	0.6692%	0.4960
DRAW	European Championship	3	0.5065%	0.6996%	1.2540
LOST	World Cup	3	0.2781%	0.5749%	0.8378
LOST	European Championship	7	0.0118%	0.7475%	0.0419

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	6	-0.5542%*	0.8579%	-1.5824
WON	Knock out	2	-0.8028%	1.1385%	-0.9973
LOST	Group stage	7	0.1316%	0.7959%	0.4376
LOST	Knock out	3	-0.0014%	0.4027%	-0.0061

7.2.6.14 Switzerland

RESULT	N	AAR_T	S_T	$TS_{1,T}$
WON	7	0.0726%	0.6605%	0.2909
DRAW	7	0.0291%	0.3058%	0.2515
LOST	12	-0.1322%	0.5076%	-0.9024

RESULT	TOURNAMENT	N	AAR_T	S_T	$TS_{1,T}$
WON	World Cup	6	0.1538%	0.6843%	0.5504
WON	European Championship	1	-0.4142%		
DRAW	World Cup	4	-0.1296%	0.2276%	-1.1388
DRAW	European Championship	3	0.2406%*	0.2922%	1.4262
LOST	World Cup	5	-0.2265%	0.4782%	-1.0591
LOST	European Championship	7	-0.0649%	0.5543%	-0.3097

RESULT	STAGE	N	AAR_T	S_T	$TS_{1,T}$
WON	Group stage	7	0.0726%	0.6605%	0.2909
WON	Knock out	0			
LOST	Group stage	8	-0.3252%**	0.4374%	-2.1032
LOST	Knock out	4	0.2537%	0.4478%	1.1334