# The market response to match performances and transfers of listed football clubs across Europe.

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**ABSTRACT**

This study examines the relationship between match results and players transfers with respect to the stock prices of eleven listed football clubs across Europe. According to the results of this study, there is evidence that share prices increase with 0.42% the first trading day after victories, while ties and losses are penalized with negative returns of 0.89% and 1.39% at day (0). Furthermore, market reactions are stronger after international draws and important losses. Moreover, there is strong evidence regarding wins and weak evidence regarding losses that unexpected match outcomes realize stronger market reactions.
In addition, both incoming as outgoing transfers generate positive market reactions of, for example, 0.63% and 1.54% over a three day event window. Lastly, weak evidence suggests that “high-end” transfers and outgoing transfers close to the transfer deadline will lead to stronger market reactions.

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## 1. INTRODUCTION

Over the past few decades, football has become an unbelievably large business involving billions in revenue. One of the best examples is the sale of the television broadcasting rights for the English Premier league at the beginning of 2015. While the economy is still struggling with the aftermath of the financial crisis, Sky and BT bought the rights for an impressive amount of approximately €7 billion. As a response, the share price of Manchester United rose with 5%. Furthermore, the Union of European Football Associates (UEFA) announced a significant increase in fees and bonuses for the Champions League and Europa league in the upcoming seasons. Consequently, transfer fees for football players rose dramatically over the last few years as well. Real Madrid broke records by buying Gareth Bale for €100 million from Tottenham Hotspur in the summer of 2013.

Previously, it was abundantly clear that money plays a crucial in football. In general, the most wealthy clubs have the best performing teams, which continued to lead to more capital regarding merchandising and sponsorship revenue.

This is particularly important since performance is pivotal and more funding could improve results among the enormous competition (i.e. clubs could attract top quality players, Renneboog and Vanbrabant, 2000). Therefore, British football clubs were going public on the stock exchange late 80's and early 90's (Mitchell and Stewart, 2007; Cooper and McHattie, 1997). Subsequently, other football teams in Europe became publicly listed as well.

Despite of the fact that the British football clubs were the first clubs traded on the stock exchanges, over the years, almost all of the British clubs abandoned the stock exchange or became privately owned. Currently, the only listed English football team is Manchester United, who was relisted at 2012 on the New York Stock Exchange. Apart from Manchester United, there are 22 listed football clubs divided over 11 different countries across Europe (STOXX Europe Football Index). These clubs are shown in appendix A.

Regarding listed football clubs, at first, it is interesting to examine whether and how these stocks reacted to sensitive information for football clubs, like football matches or players transfers. Second, since the major part of shareholders exists of football fans, with probably other incentives than solely maximize shareholder wealth (Renneboog and Vanbrabant,2000), investor behavior could deviate from the behavior of pure rational investors of, for instance, large listed corporations.

This study shows that football matches and transfers trigger stock prices of football clubs. For example, victories will lead to 0.42% higher returns following the first trading day after a match, while ties and losses are penalized with negative abnormal returns of 0.89% and 1.39%. In addition, this study examines several subsamples among football matches with respect to international matches, important matches and ex-ante match outcome expectations. The results show stronger negative reactions after international ties and important losses. Furthermore, there is evidence that unexpected match outcomes realize stronger market reactions with respect to victories and defeats.

Moreover, both the acquisitions and the sales of football players lead to positive market reactions of 0.63% and 1.54% over a three day event window in regard to these transfers. Furthermore, weak evidence presumes that “high-end” transfers and outgoing transfers close to the transfer deadline will lead to stronger market reactions.

Overall, these findings are partly consistent, partly inconsistent regarding relevant literature. Looking closely, the results contribute to previous research regarding some particularly interesting findings and presumptions based on an unique sample of matches and transfers of eleven football clubs across Europe over the past four seasons (listed in appendix B). Lastly, there is a strong assumption that investor behaviour among football stocks is influenced by investor sentiment.

The structure of this remaining study is mentioned in the following description. Section two exhibits an overview of relevant literature, followed by the hypotheses in section three. Section four explains both national and international competitions structures as well as institutional issues regarding players transfers. Furthermore, section five discusses the data set and methodology while section six presents the results. Finally, section seven focusses on the main limitations and lastly, section eight contains the main conclusions of this study.

## 2. LITERATURE REVIEW

This section contains relevant literature regarding market reactions to on pitch performances and players transfers of football clubs. At first, two different theories with respect to investor behavior on financial markets will be explained, followed by the shareholder structure of football clubs. The shareholder structure could exhibit important characteristics of investors and their expected incentives. Furthermore, the last two paragraphs exhibit previous research with respect to market reactions to football matches and players transfers.

### *2.1 Efficient Market Hypothesis*

According to the efficient market hypothesis (Fama, 1970), if markets are efficient, prices always fully reflect available information. Therefore, the price of a stock should reflect the true fundamental value and will adapt only to sensitive information. In the extension of this theory, the efficient market hypothesis (EMH) expects that all investors act completely rationally. However, if some investors are not completely rational, this still should not have an impact on share prices, according to EMH, since their effect cancels out in the aggregate, like random mistakes. The efficient market hypothesis essentially assumes that rational arbitrageurs cancel out the effect on prices caused by non-rational investors that act in similar, correlated ways. Jensen (1978) described, in the most general way that markets are efficient pertaining to an information set if it is not possible to make economic gains by trading on the basis of the information set.

Furthermore, according to the efficient market hypothesis, there are three possible forms of market efficiency. In the semi-strong form security prices contain all obvious public available information (Fama, 1970). The other two forms are the weak form and strong form of market efficiency. In the weak form security prices include, at any point in time, all past information. Likewise, future prices cannot be derived from historical prices in case of weak market efficiency. In the strong form, prices fully incorporate all available information, as well public information as private. Therefore, it is not possible to earn excess returns for investors over others under strong form market efficiency conditions.

Throughout the years, several empirically proven research studies supported the efficient market hypothesis with consistent results. For example, Fama et al. (1969) showed quick price reactions after stock split announcements, coherent with the semi strong form of the

efficient market theory. Additionally, Fama (1991) concludes, 20 years after his famous paper published in 1970 on efficient capital markets, that the cleanest evidence on market efficiency of the semi strong form was achieved with the aid of event studies. Based on a large number of event studies in corporate finance, one could say that on average security prices adjust quickly to firm-specific information, the central issue of market efficiency (Fama, 1991).

To conclude, if markets are efficient, share price performances of listed industrial and commercial companies are immediately affected by their release of quarterly (operational) results, in contrast, the market value of football teams may mostly be influenced by the (weekly) sporty performances of the teams (Renneboog and Vanbrabant, 2000). Furthermore, in the ideal situation, while testing the efficient market hypothesis, news or information announcements occur very frequently (while markets are closed), are easy to quantify, and become publicly available to every investor at the same point in time (Stadtmann, 2006; Brown and Hartzell, 2001). Therefore, match results of football teams should be incorporated in the price, assuming that game results reflect firm-specific sensitive information about football clubs.
According to Bernile and Lyandres (2011), profitability, in terms of return assets, of European football clubs is increasing in sports performances. Therefore, one could suggest that match outcomes contain value-relevant information (Palomino et al., 2009). In addition, the (market) value of a football club should rise with increasing profits. Consequently, if sports performances increase profitability, sport performances should affect stock price returns, as expected by broad existing literature. Moreover, price reactions to sporty performances represents a semi-strong form of market efficiency (Bell et al., 2012). Consequently, if transfers of players contain sensitive information for football clubs, share prices of football clubs should reflect sales and acquisitions of football players.

*2.2 Behavioral Finance*

In the 1970s, the efficient markets theory in academic finance was highly supported in academia, however, the field of 'behavioral finance' would eventually challenge much of the efficient market theory (Shiller, 2003). Behavioral finance is a relatively young field, which helps financial researchers with a broader social science perspective and understanding in

the world of finance. This field includes, for the most part, psychology and sociology (Shiller, 2003) as well. Behavioral finance challenges the efficient markets hypothesis mainly in two ways: with respect to observed market anomalies and behavioral biases in individual decision making. The first challenge occurs from anomalies in the market, which the efficient markets hypothesis and its evidence fails to explain, while the second one is based on irrational (investment) decisions of individual investors.

In the 1980s, behavioral finance became a growing field within finance. One could say that a famous early article by Shiller (1981) about excess volatility commenced the beginning of many other studies challenging the efficient market hypothesis. In Shiller's research, a model was conducted that formally stated the efficient market hypothesis. The model consists of the price at any possible time as best possible forecast for the present value of dividends given the information available. Related to the fundamental principal of optimal forecasting in conjunction with the model, the forecast cannot be more volatile than the forecasted variable (Shiller, 1981). Remarkably, the stock prices are more volatile than the discounted future dividends in the time period 1871-2002, which implies that there is excess volatility in the stock market (Shiller, 1981). The evidence regarding this anomaly seems to suggest that price changes occur for no fundamental reason at all (Shiller, 2003), which could be interpreted as the opposite of the efficient markets theory. Later, subsequent research by Campbell and Shiller (1988) and West (1988), found similar results with respect to excess volatility as Shiller (1981) did. The discovery of the volatility anomaly led many to doubt about market efficiency and could be seen as a start of more research for the purpose of the behaving of security prices.

Besides the volatility anomaly, studies throughout the years indicate several other market anomalies or behavioral biases which are in conflict with the efficient market hypothesis. For example, Cronqvist and Thaler (2004) discovered in their case study of the privatization of the social security system in Sweden that some behavioral biases existed. According to Cronqvist and Thaler (2004), the Swedish investors formed their portfolios based on past returns (extrapolation bias), chose familiar companies close to home (familiarity bias) and found overconfidence by actively managing rather than passively by choosing the default fund.

Furthermore, overconfidence could lead to excessive trading that lowers investors' returns (Odean, 1999). If investors recognize this problem, one should expect that investors should overcome these biases. Remarkably, Gervais and Odean (2001) found that investors tend to reward them self for good trades in contrast to bad trades, where investors blamed it on bad luck (self-serving attribution bias).
Additional to these biases, literature showed several more examples which should not occur following the efficient market hypothesis, instead rational arbitrageurs should cancel out the price effect caused by non-rational investors. One of these behavioral biases that is interesting for this study regarding football stocks is investor sentiment.

In general, investor sentiment is an expectation about future cash flows and risk of investing that is not justified given the facts available (Baker and Wurgler, 2007) or, in other words, a general behavior of investors in the market relative to securities not always based on fundamentals. According to research in the field of behavioral finance, financial investors are subject to sentiment (Delong et al., 1990) and betting against sentimental investors is costly and risky (Shleifer and Vishny, 1997). These two assumptions are contrary to the fundamental model of market efficiency as described in the aforementioned section. This is first due to irrational investors and second, arbitrageurs are not as aggressive in forcing mispriced securities to their fundamental prices, as the standard model should suggest (Baker and Wurgler, 2007). The dot.com bubble in the late 1990s is an example of a period where due to extraordinary investor sentiment, prices of difficult-to-value technology stocks were pushed to inscrutable levels (Baker and Wurgler, 2007). Although the efficient market hypothesis suggests that this mispricing should be cancelled out by rational arbitrageurs, the stocks were relatively unattractive to arbitrageurs due to some characteristics (inter alia young stocks, extreme growth stocks), limits to arbitrage (inter alia costs and risks of trading and short selling) and less available information on the fundamental value of the underlying relatively small start-up companies (Baker and Wurgler, 2006 and 2007).
Several studies provide examples of the effect of investor sentiment on prices, similar to the dot.com crisis that was previously mentioned in this study. As a result, security prices do not always reflect their true fundamental value (Baker and Wurgler, 2007). According to DeLong et al. (1990), the mispricing, with respect to investor sentiment, originates from a combination of two factors: rational traders face limits to arbitrage and irrational ones who

change their sentiment. Particularly young, small, unprofitable or extreme growth stocks are risky and costly with regard to exploiting arbitrage opportunities, which might lead to a greater effect on such stock fluctuations (Baker and Wurgler, 2007). A number of arguments derived from previous research indicated the greater sentiment effect on stocks with these types of characteristics. First, those particular stocks tended to be more costly with respect to buy and sell short (D'avolio, 2002). Second, such stocks are riskier due to the high degree of idiosyncratic variation in the returns of those stocks (Wurgler and Zhuravskaya, 2002). Furthermore, Shleifer and Vishny (1997) concluded that such high volatility stocks ensure that investors, who provide funds to arbitrageurs, may think twice about the funding, which ultimately could lead to withdrawals from rational arbitrageurs when mispricing is large or even at the peak. Last, if such stocks pay no dividend, their fundamentals remain (far) in the future, which leads to speculation (Pontiff, 1996). Thus, such stocks that are difficult to value are also difficult with regard to exploiting arbitrage opportunities (Baker and Wurgler, 2007).

In conclusion, sentiment is probably one of the behavioral biases in the literature with reference to behavioral finance that could affect investors of football, or other sports related, stocks the most. Besides, some of the characteristics of difficult to arbitrage stocks relate to characteristics of football, or other sports, stocks. These stocks are more often relatively small and often unprofitable whereby arbitrage becomes difficult and the effect of investor sentiment on the price might be present. Because measuring investor sentiment is not a straightforward principle, investor sentiment could be described on the basis of several proxies (Baker and Wurgler, 2007). Possible proxies for investor sentiment are, among others, investor mood (Kamstra et al., 2003; Edmans et al., 2007) and consumer confidence for small stock returns (Lemmon and Portniaguina, 2006).

### *2.3 EMH versus Behavioral Finance*

Presently, supporters of the efficient market hypothesis still disagree with those of behavioral finance. The center of the debate between the two theories is what Fama (1970) calls the Joint Hypothesis Problem. Fama counters the arguments of behavioral finance that market anomalies undermines the efficient market hypothesis. He argues that if security prices differ from their true fundamental value, there is a need for a model that determine that price. Subsequently, the model that defines the mispricing is therefore immediately a

model of pricing securities. However, there is never complete certainty that a model is right and thus no certainty there is mispricing. So what looks like a mispricing may not be a mispricing at all which means a better model is necessary (Fama, 1970). Also, even before the blossoming of behavioral finance in the 1980s, Jensen (1978) concluded that the efficiency theory will not be abandoned by preventing market anomalies discovered by behavioral finance, but that over the years there will be a much more fundamental understanding of the market.

### *2.4 Shareholder structure of listed football clubs*

With respect to previous described theories on stock price behavior, information and characteristics of investors are important to include while analyzing stock prices of football clubs, since their incentives and behavior affects the prices.

Renneboog and Vanbrabant (2000) described the shareholding structure of football stocks as a few stable controlling shareholders, some institutional investors and many individual investors. The individual investors are often soccer fans who hold shares of their favorite club as a way of supporting them and only consider the potential profit as a bonus (Renneboog and Vanbrabant, 2000). Although Renneboog and Vanbrabant (2000) expect an effect of sporty performances on stock prices, the characteristics of the shareholders (stable, lack of short term investors , supporters) may attenuate the effect. The possible weakening of the effect might mostly due to the shareholding supporters, who are not willing to sell their stocks because of their loyalty to the team, especially after poor team performance (Renneboog and Vanbrabant, 2000). Therefore, it seems that most of the investors in football clubs or other sport clubs, the group of supporters, have different incentives than contrarian investors whose interest is fully focused on gaining the highest return.

Furthermore, Edmans et al. (2007) concluded that the effect of stock prices after international sports games is driven by emotional factors like changes in mood of investors after sport results.

Football matches are a great tool to investigate a possible “mood-effect” as extensive psychological evidence showed that sports have a significant effect on mood (Edmans et al., 2007). As referred to in the section above, investor mood is a possible proxy for investor sentiment whereby it is likely, based on Edmans et al. (2007), that sentiment plays a role regarding stock prices of football clubs. In addition, Bell et al. (2012) uses, among others, the

study of Edmans et al. (2007) to suggest that the results of football matches can affect share prices influenced by emotions, like mood and confidence, and sentimental adhesion of investors. For instance, after a win, supporters may become more optimistic, more confident of their abilities and less risk averse (Bell et al., 2012). Which could lead to supporters that are more willing to buy risky shares and sell less risky ones (Kaplanski and Levy, 2010). Due to the (high) uncertainty of match results, it is likely that shares of football clubs are risky under the condition that prices of football clubs respond to on-pitch performances.
According to Edmans et al. (2007), a mood variable should meet three requirements in order to rationalize studying the link between the variable and stock returns. First, a given variable must influence mood in a substantive and unambiguous way that its effect is strong enough to appear in security prices. Second, the variable must influence the mood of a large part of the shareholders and therefore affect enough investors. Last, the mood-effect has to be correlated across the majority of individuals within a country. Football games should satisfy all three of the requirements if a mood effect on football stocks will take place. Edmans et al. (2007) believe this is the case for international football games. Additionally, numerous (psychological) research suggests that sports have a significant effect on mood (see e.g. Hirt et al.,1992).
So far, taking previous discussed literature into account, it is likely that stock price returns are influenced by investor sentiment regarding the shareholder structure of football clubs and incentives of their investors.

*2.5 The on-pitch performance effect*

Several papers have already examined stock price returns effects on football matches. For example, Renneboog and Vanbrabant (2000) investigated share price reactions of 17 British soccer clubs listed on the London Stock Exchange (LSE) or the Alternative Investment Market (AIM) from the start of season 1995-1996 until the end of the season 1997-1998. At first, they tested the effect for different match outcomes (victories, ties and losses). According to Renneboog and Vanbrabant (2000) there is a positive abnormal return of 0.92% the next trading day following a win, while negative abnormal returns of 0.61% and 1.43% normally occur after draws and losses. Furthermore, the effect after being defeated tends to be greater compared to stock price returns with respect to wins.

In addition, Scholtens and Peenstra (2009) analysed stock price returns effects from matches for eight different football clubs divided over five different countries across Europe. In line with Renneboog and Vanbrabant (2000), there are positive market reactions after victories and negative following draws and defeats, where investors react stronger to losses compared to wins. A possible explanation for the stronger reaction after losses is that individuals feel losses more deeply than gains, stated by the prospect theory of Kahneman and Tversky (1979). Moreover, Palomino et al. (2009) found similar results and concluded, in addition, that investors react faster to victories than to defeats. However, in contrast to findings of Renneboog and Vanbrabant and Scholtens and Peenstra, there is no difference in market reactions between match outcomes.

Besides literature regarding stock price behavior around football matches, research throughout the years examined market reactions after games of other types of sports. According to Stadtmann (2006), the study of Brown and Hartzell (2001) provides the most extensive study of the effect of match results on share prices. Brown and Hartzell (2001) focused on share price reactions after the NBA Boston Celtics basketball games. Just as for football teams, the revenue of the Celtics mainly depends on performances of the basketball team (e.g. ticket sale). Therefore, the basketball matches contain valuable information regarding the operations of the Celtics.
Additionally, the large amount of games give the investors of the Celtics, in contrast to investors of traditional corporations, relatively frequent opportunities to respond to sensitive information (Brown and Hartzell, 2001). Furthermore, they concluded that losses significantly influence stock returns while wins do not trigger market reactions. Invariably, investors respond asymmetric to losses with respect to wins. This is conflicting, since there is no clear reason to expect an asymmetric market reaction between good (win) or bad (loss) news (Brown and Hartzell, 2001). In addition, Edmans et al. (2007) analysed, besides football, market responses around international cricket, rugby and basketball games and also found significant negative market responses after losses.

Surprisingly, regarding all possible match outcomes, in contrast to all literature discussed so far, Zuber et al. (2005) concluded that stock returns are insensitive to football matches. This is particularly striking since there is an overlap in data (e.g. similar football clubs and

seasons) with the study of Renneboog and Vanbrabant (2000). According to Zuber et al. (2005), the lack of investor' reactions to matches in the football market shows a different type of investor that exist in the sports market. This type of investors are fans who do not trade on valuable information with respect to future cash flows of the club but, rather, only seem to obtain utility from ownership. Supporting evidence shows the difference in trading volume between traditional corporations and soccer teams. In comparison with traditional markets, there are four times more trading days without price changes in the soccer market, which indicates an absence of response to new information like game outcomes (Zuber et al., 2005).

### *2.5.2 International and important matches*

Since football clubs receive higher earnings in international competitions (e.g. match premiums), literature expects stronger market reactions after international matches compared to matches in national competitions. Consequently, Renneboog and Vanbrabant (2000), Scholtens and Peenstra (2009) showed stronger stock returns after European matches. However, Stadtmann (2006) did not find any supporting evidence regarding higher share price fluctuations around European matches of Borussia Dortmund, relative to matches in the German league.

Furthermore, literature distinguishes football matches regarding their relative importance. First, since there are much higher earnings in the highest national league (e.g. in terms of TV broadcasting and sponsorships), promotion and relegation games are determined as important (Renneboog and Vanbrabant, 2000; Palomino et al., 2009). In addition, matches between clubs competing for the same league positions could determine the difference between qualification for international competitions upcoming season, and consequently higher earnings, or no international matches the next season at all. Therefore, matches between close rivals, competing for the same positions in the league, are more important relative to other 'normal' league matches (Bell et al., 2012). Renneboog and Vanbrabant (2000), Palomino et al. (2009), Bell et al. (2012) all concluded that stock prices tend to respond stronger to important matches relative to less important matches.

In addition, compared to regular season NBA games, Brown and Hartzell (2001) found larger stock price fluctuations around playoff games at the end of the season. Playoff games are

important games with relatively high earnings, played in order to determine the national basketball champion team of the season. Therefore, the conclusion of Brown and Hartzell concerning important games is in line with previous discussed research.

### *2.5.3 Match outcome expectations*

Prior to football matches, investors' beliefs about match results are biased, based on their expectations. There are multiple ways to develop match outcome expectations, for example, expectations could be derived from recent results, position in the league table or betting odds. According to Palomino et al. (2009), betting odds are reliable predictors of match outcomes, based on the strong relationship between match outcomes and betting odds. If markets are efficient, investors should price the expected economic impact of performances in advance (Edmans et al., 2007; Palomino et al., 2009). However, in contrast to the fundamentals of the efficient market hypothesis, there is zero evidence of abnormal returns following released odds by bookmakers on trading days. Therefore, responses of the market to match outcomes should be weaker than the higher the probability of those results (Palomino et al., 2009). Consequently, there should be a difference in magnitude between market reactions to expected and unexpected match outcomes (Edmans et al., 2007). Literature showed stronger market reactions after unexpected losses (Palomino et al., 2009) and after unexpected match outcomes in European competitions (Scholtens and Peenstra, 2009). The findings of Palomino et al. (2009) are consistent with the theory that price reactions should differ between expected and unexpected match results with respect to defeats. However, this is not the case for victories, since expected wins lead to stronger abnormal returns than unexpected wins do, which implies overreaction of investors prior a victory, probably due to investor sentiment (Palomino et al., 2009).

## *2.6 Transfers*

Besides match results, other valuable information for investors of football clubs, regarding on pitch performance, are transfers. For example, the acquisition of (some) top-players might increase game results or, at least, enhance investors' expectations about performances. Regarding previously discussed literature, if markets are efficient, expectations of match results should be incorporated in the price in advance. Therefore, transfers should affect market prices if investors belief that transfers of players increases on

pitch performances. Furthermore, regarding the shareholder structure of football clubs, transfers could trigger, for example, investor mood or confidence, which could affect stock returns. However, since there is a lack of evidence in finance literature with respect to football transfers (e.g. Stadtmann (2006) found no significant impacts on share prices in regard to acquisitions and divestments of football players), expected market reactions to players transfers will be based on corporate finance literature with respect to mergers and acquisitions (M&A's). In the context of transfers, the paper about human resources turnover of Fotaki et al. (2009) is considered as a starting point for one main reason, which is that the sample of their study consists of football players.

According to Fotaki et al. (2009), acquisitions or divestments are voluntary for professional sport clubs in exchange for a payment, normally, in the form of cash and securities. Therefore, research on voluntary, incorporate asset divestures and acquisitions could be compared to the broad and extensive literature on mergers and acquisitions. In addition, from the corporate finance point of view, the football industry offers a well suited opportunity for testing the wealth effect of acquisitions and divestments, since transfers of players, currently, receive a lot of publicity and relevant news is directly available. Furthermore, in contrast to accounting literature (e.g. see Reilly and Dandekar, 1997) Fotaki et al. (2009) treated human capital as a tangible asset. Football players should be treated as tangible assets since they are the most important assets for football clubs. Moreover, they determine sports performance, which determines success and causes possible earnings (Renneboog and Vanbrabant, 2000).

Corporate finance literature distinguishes between synergetic and non-synergetic theories regarding corporate sales and acquisitions.
The non-synergetic theories are associated with models based on management entrenchment, empire building and managerial hubris (Mulherin and Boone,2000; Fotaki et al., 2009). According to these theories, in general, there exists an asymmetric effect of acquisitions and divestitures on wealth (Mulherin and Boone, 2000). Research showed several arguments that are in line with non-synergetic relations between acquisitions or divestitures and wealth. Following non-synergetic theories, reasons for restructuring are for reasons other than wealth creation (Fotaki et al.,2009) which might explain this particular

relationship. For example, Jensen (1986) pointed out the conflict of interest between corporate managers (agents) and their shareholders, derived from the agency theory. Managers' major incentive, increase in their compensations, is opposite to incentives of shareholders, including maximizing the value of the company (Jensen, 1986). Consequently, if firms grow, managers obtain more resources under their control, which increases compensation (Jensen, 1986). Therefore, managers have motivation to maintain growth even beyond the optimal size of the firm, which lowers efficiency (Jensen, 1986). In addition, Schleifer and Vishny (1989) conducted a model of managerial entrenchment which describes how managers increase their value to shareholder by making specific investments. According to their model, managers entrench themselves in order to protect them from disciplinary forces like for instance the managerial labor market (Fama, 1980) and therefore make themselves more costly to replace. Managers undertake these actions against existing managerial forces because these forces could weaken their job security. These incentives of managers could lead to investments that are not ex-ante value-maximizing (Schleifer and Vishny, 1989). The examples of Schleifer and Vishny (1989), Jensen (1986), might explain the asymmetric relation non-synergetic theories showed. Another issue is managerial hubris, derived from the 'hubris hypothesis' conducted by Roll (1986), which describes how individual decision making processes within bidding firms could lead to over-paying of the bidding firm even though the market indicated a lower price. This will be associated as value destroying by the market, which consequently describes the asymmetric relationship of mergers and acquisitions according to non-synergetic theories.
In conclusion, following the non-synergetic theories, reducing agency costs and increasing specialization achieved by divestitures increase efficiency by creating wealth, while acquisitions decrease wealth due to minimizing corporate focus as well as protecting management from market forces (Mulherin and Boone, 2000; Fotaki et al., 2009).

In contrast to non-synergetic theories, synergetic theories predict a symmetric relation between wealth for both acquisitions as divestitures. Synergetic theories argue that the purpose of restructuring is wealth creation and could be necessary for several reasons (Mulherin and Boone, 2000; Fotaki et al., 2009). The study by Coase (1937), regarding synergetic theories, explained the symmetric relation on the basis of environmental changes that affect management resolutions and relative costs of market pricing. Firms' adaption to

the economic environment could induce an expansion (acquisition) or a reduction (divestiture) in size (Mulherin and Boone, 2000). For example, due to technological renewals[1], firms' efficiency size will be modified which enhance incentives for acquisitions or divestitures (Coase, 1937). Moreover, most of the literature regarding synergetic theories assume that companies are driven by efficient investment considerations (Fotaki et al., 2009). For example, with regard to divestments, according to Schlingemann et al. (2002), the underlying reasons for synergetic theories can be grouped into three leading categories. First, following the efficiency explanation, assets should be allocated to the firms that can exploit them in the most efficient way. Thereby, lowering the degree of diversification in order to make firms more efficient is called the focusing explanation. Lastly, the financing explanation interprets the relaxation of credit constraints after divestments.
In summation, regarding the literature of synergetic theories, literature showed several reasons for a symmetric relationship between both mergers and acquisitions and shareholder wealth, which are mainly efficiency related.

In conclusion, since there is both evidence for asymmetric (e.g. see King et al., 2004) as well as symmetric effects (e.g. see Jensen and Ruback, 1983; Jarell et al., 1988; Mulherin and Boone, 2000) of M&A's on shareholders wealth, the effect of a sale or acquisition of a football player on the stock price of a football club could be both symmetric as it is asymmetric. The two theories both predict that divestitures are wealth creating, however the effect of acquisitions is either wealth creating (synergetic theories) or wealth reducing (non-synergetic theories).
In regard to previous research, Fotaki et al. (2009) expected an asymmetric relation of acquisitions and sales of football players on wealth, in line with non-synergetic theories, for two main reasons. At first, based on the meta-analyses of 93 published research studies on post-acquisition performance by King et al. (2004), there is a negative relation between acquisitions and wealth for the acquiring firm. Second, the arguments concerning synergetic

[1] Although Coase (1937) mentioned the telephone and telegraph as technological innovations, which are not relevant anymore, technological changes nowadays (e.g. the raise of online possibilities) could realize the same effect.

theories, such as efficiency concerns or changes in technology, are not likely to be relevant regarding transfers of football players.
In their study, Fotaki et al. (2009) found asymmetric market reactions to transfers of football players. As they expected, the purchase of football players leads to negative abnormal returns for the acquiring club, while the sale of players result in a reverse effect.

## 3. HYPOTHESES

This study will examine the relationship of the on-pitch performances and transfer policies of eleven listed football clubs across Europe on their stock prices. Using the unique data set of football matches, transfers of players, betting odds and relating stock prices over the past recent years, this study could expand, confirm or disclaim conclusions of existing literature. In addition, because this study will include both the effects of game outcomes and transfers for the same football clubs over the same period, there might be similarities or differences in the response of shareholders to matches relative to transfers.

### *3.1 The effect of on-pitch performances on share prices*

By far, most literature found relates to the significant relationship between football matches and corresponding share prices. Among others, Renneboog and Vanbrabant (2000); Scholtens and Peenstra (2009); Palomino et al. (2009) found positive share price responses after wins, while draws and losses resulted in negative changes in share prices.
According to existing literature, there is a high degree of certainty about the significance of the relation between football matches and share prices. With respect to the previously described literature, this study conducted the following hypothesis:

H1: On-pitch performances of football teams have a positive effect on their share prices in case of victories, while share prices decline in case of draws or victories.

### *3.2 National versus international games*

The magnitude of the effect on share prices differs between national and international games because there are higher revenue concerns for international games in terms of broadcasting rights and sponsorships (Renneboog and Vanbrabant, 2000). Therefore, international football matches have a stronger effect on the share prices of football clubs

relative to national matches (Renneboog and Vanbrabant, 2000; Scholtens and Peenstra, 2009). The second hypothesis of this study is consistent with these findings.

H2: International football matches have stronger effects on share prices of clubs relatively to national matches.

*3.3 Relative importance of matches*

Important matches have greater impact on share prices of football clubs than less important matches (Renneboog and Vanbrabant, 2000; Palomino, 2009; Bell et al., 2012). Promotion and regelation games are important due to the high earnings in the highest league especially when it involves sponsorships and television broadcasting (Renneboog and Vanbrabant, 2000). Also games between close rivals, fighting for the same position in the league table, that, for example, gives the right for European football, are important (Bell et al., 2012). The clubs tested in this study have not played any promotion or relegation games over the last years. However, they still played important matches with respect to championships and qualification for international competitions. This study identifies important matches as played close to the end of the season, since these matches strongly affect the final ranking in the league and therefore have strong influence on, for example, whether or not a club wins their national league. Moreover, play-off games in order to qualify for international competitions upcoming season (in some competitions), the knock-out phase in international competitions and cup finals are all played in the last months of the competition.

H3: Share price responses of football clubs are stronger after important matches, played at last months of the season, relative to less important matches.

*3.4 Expected versus unexpected match outcomes*

If a match result is expected, the share price should reflect this expectation in advance according to the EMH (Edmans et al., 2007; Palomino et al., 2009). If this is the case, there should be no difference in magnitude between unexpected and expected outcomes. However, Palomino et al. (2009) found no evidence of abnormal returns based on released betting odds by bookmakers on trading days. This is not in line with the EMH, since the evidence showed a strong relationship between game results and betting odds and

therefore that betting quotes are well enough predictors of match outcomes (Palomino et al., 2009). If share prices do not correct for betting odds, there should be a difference in response between unexpected and expected match outcomes. Or in other words, the magnitude of the share price effect should be weaker the higher the probability (Palomino et al., 2009). Scholtens and Peenstra (2009) showed a stronger response of unexpected results for European matches, but did not conclude the same for national games. Furthermore, Palomino et al. (2009) found only a stronger effect of unexpected game outcomes for losses, while expected victories lead to stronger price reactions. While there is no consistent evidence regarding expected versus unexpected match outcomes, based on theoretical implications and existing evidence for losses (Palomino et al., 2009) and international games (Scholtens and Peenstra, 2009), this study will test the following hypothesis.

H4: There are stronger market reactions following unexpected match outcomes relative to expected match outcomes.

*3.5 Transfers*

Although there is a lack of evidence regarding the relationship between transfers and share prices, Fotaki et al. (2009) found an asymmetric effect consistent with non-synergetic theories. Therefore, an acquisition of a football player should have a negative effect on the share price, while selling a player should positively affect the price (Fotaki et al., 2009). According to Fotaki et al. (2009) there are two main reasons for a relation consistent with non-synergetic theories. First, based on the meta-analyses of King et al. (2004), there exists a negative relationship between acquisitions and wealth for the acquiring firm. Second, arguments consisting with synergetic theories, which predict a symmetric relation, are not relevant regarding transfers of players. Therefore, this study conducted the next two hypotheses regarding transfers of football players.

H5: An acquisition of a football player negatively affects the share price of the purchasing football club.

H6: A sale of a football player positively affects the share price of the selling football club.

## 4. COMPETITION STRUCTURES AND INSTITUTIONAL ISSUES

This section exhibits information on several competitions and institutional issues regarding football. First, structures of both national as international football competitions and qualification for international leagues will be discussed, followed by important information regarding transfers regulation.

### *4.1 National competitions*

The competition structure for national competitions is more or less the same among football leagues across Europe. Lower ranked teams compete against relegation, while higher ranked clubs compete for the championship and qualification for international competitions the upcoming season. Furthermore, besides the regular competition, clubs of multiple divisions participate in the national cup competition. Similar to the highest places in the league table, the cup winner qualifies for international leagues. With respect to the sample of this study, the different national leagues exist of a minimum of 12 to a maximum of 20 clubs, where all clubs play twice, home and away, against each other with exception of clubs in the Scottish league (this phenomenon will be discussed later on in this section). Since all the clubs in the sample are competing for the highest rankings in their leagues, this study is particularly interested in regulation in the qualification for international competitions. Except for the Dutch and Scottish league, qualification for international competitions in all leagues is based the final ranking in the league table. In addition, as previous mentioned, the winner of the national cup qualifies for international competitions.

However, after regular competition games, there are play-off games for the last ticket for international football upcoming season in the Dutch league. In the play-offs there are four participating teams, namely the numbers four to seven of the league table at the end of the regular season. At first, numbers 4 and 7, and numbers 5 and 6 of the league table play twice (home and away) against each other. The two teams that scored the most goals over the two games, qualify for the final two games of the play-offs, which consists of, again, two matches against each other. If, at the end of the second regular match, the goals scored is equal among two teams, there will be an extension of 30 minutes. Afterwards, if the score is still equal, a penalty shootout will determine the winner of the play-offs, and therefore the qualifier for the qualification tournament of the Europa League in this case.

Furthermore, in the Scottish competition, after the regular season of 33 matches (the league only consists of 12 football clubs who played three times against each other), the league will be divided in two separate sub-competitions. The six top ranked teams compete for the championship, while the bottom six compete against relegation. Moreover, the received points of the first 33 matches will move forward, however after the split, the clubs only compete within the sub-competitions. This could lead to remarkable situations, where clubs with higher scores will be lower ranked after all 38 matches. Since Celtic, the only listed football club in the highest Scottish league, became champion the last four seasons, this section only considers the so called 'championship group', existing of the six top ranked teams. In the 'championship group', all the six teams play five matches, thus only once against each other. Afterwards, the highest ranked teams qualify for European competitions.

Lastly, the number of clubs that qualify for European competitions differs per country determined by the UEFA coefficients table. The ranking is based on results of football clubs in European competitions of previous four seasons, measured by country. Appendix C provides a table with relevant information about the number of tickets per national competition. Furthermore, the UEFA coefficients table determines whether clubs are immediately qualified for a European competition, or first should participate in qualification games in order to obtain excess to the main event.

### *4.2 International competitions*

In Europe, there are two different international competitions: the Champions League and the Europa League which are organized by the UEFA. Both competitions will be discussed separately in the upcoming two paragraphs.

#### *4.2.1 Champions League*

Due to mainly the high earnings and participating top class football clubs , the Champions League is the most important club competition in Europe. Therefore, only the best football clubs according to previous season are allowed to participate. The Champions League starts with 32 teams, divided over eight groups each consisting of four clubs. Within the groups, every club plays twice against each other, home and away. Consequently, all the participating clubs play at least six games. The numbers one and two of each group qualify

for the knock-out stage, the numbers three flow into the knock-out stage of the less exited Europa League, while for all numbers four there are no international matches afterwards. Since fees increase heavily as the Champions League progresses, qualification for the knock out stage is considered very important. After the winter break, the champions league continues with the 16 remaining football teams. Before the start of the knock-out stage, a draw connects eight couples of two teams who play at home and away against each other. The winner over two games, continues to the next round, while the loser is finished with international matches regarding the particular season. This goes on until the final. In contrast to group and knock-out matches, the final only consists of one game.
Over the last few years, fees and revenues became unbelievable high. For example, the total fees for the Champions league are €1,25 billion for the upcoming season. Therefore, mainly for less wealthier football clubs, qualification for Champions League is extremely important in order to, for instance, get financial possibilities to attract top class players and not fall behind on competition.

### *4.2.2 Europa League*

Although there are much higher fees concerned in the Champions League, for football clubs just below the top level, the Europa League is a prestigious tournament. For upcoming season, the Europa League has total amount of fees of €381 million. However, compared to the Champions League, the Europa League is still interesting from a financial perspective since the participating clubs have lower budgets than top class teams and therefore the fees from the Europa League will significantly increase their financial possibilities.
The competition structure of the Europa League is approximately the same as for the Champions League. At the beginning of the tournament, 48 participants are divided over 12 groups consisting of four teams each. Similar to the Champions League, the top two teams of the groups qualify for the knock-out stage, however, for the bottom two teams, there are no international matches remaining in the relevant season. The 24 qualified teams will be assembled with the eight numbers three of the Champions League. Thereafter, the knock-out stage of the Europa League has the same course as the knock-out stage regarding the Champions League.

*4.3 Institutional issues*

Regarding transfers of football players, there are several interesting institutional issues to keep in mind. The next two paragraphs discusses the two most relevant issues with respect to this study, the Bosman verdict and transfer windows.

*4.3.1 Bosman verdict*

To understand the present transfer market of football, the 'Bosman verdict', dated from 1995, is crucial. In 1990, the Belgian football player Jean Marc Bosman demanded a free transfer at the expiry of his contract from RFC Liege to the French club Dunkerque at the European Court of Justice. Until then, clubs had to agree upon a transfer fee for players even if a player's contract was expired. Bosman and RFC Liege were in conflict about the high transfer fee RFC Liege demanded from Dunkerque, although the contract of Bosman already ended. Through this, Bosman claimed his freedom of movement of labor based on Article 45 of the EEC Treaty. On the 15$^{th}$ of December in 1995, The European Court of Justice ruled that the system restricted football players in their free movement of labor, which is contrary to Article 45 of the EEC Treaty. Thereafter, every football player was free to go at the expiry of their contract within the European Union via the 'Bosman ruling'. Consequently, the length of contracts (e.g. see Hueble and Swieter, 2002) and transfer fees (e.g. see Fees et al., 2004) increased after the Bosman ruling.

*4.3.2 Transfer windows*

Football clubs are only allowed to trade players within two periods a year through the transfer windows or make a deal with a player without a contract. Consequently, players with a contract could only switch from clubs twice a year. One of the periods is midway through the season during the "winter break", while the other period is between two seasons in the summer. Most of the transfer windows in Europe operate simultaneously. However, some national competitions do not take place together with the majority due to, mainly, climate conditions. For example, Russia or countries in Scandinavia could not play in their winter months because of their extreme weather conditions. Hence, not all the transfer windows are similar in time, which could lead to problems for football teams. Consider, for example Ajax, a team that can no longer trade players after the expiry of the transfer window for central and western Europe. Also consider if a club from Russia, a country where

the transfer market is still open, wants to attract a player from Ajax, the club from Amsterdam is not allowed to attract a substitute player. This could induce unfair competition. Therefore, shareholders of a football club that have to deal with such a situation, might respond stronger to these kind of transfers. Subsequently, clubs that sell players close to or even at the last day before the transfer deadline, could face the same situation.

## 5. DATA AND METHODOLOGY

### *5.1 Sample Selection*

The sample consists of national and international matches of eleven football clubs across Europe starting with the qualification games prior the season 2011-2012 and ending with the last game played belonging to the season 2014-2015, in order to test hypotheses one to four. Necessarily, betting odds linked to the games, for both national as well as international matches, are part of the dataset in order to test hypotheses four. Therefore, both games played in the weekend as well as midweek games are part of the data. Furthermore, due to delisting football clubs and matches played in recent seasons, this sample can be described as an unique data set. The number of matches are picked comparable to relevant literature (e.g. Renneboog and Vanbrabant (2000) and Palomino et al. (2009)).

Additional, players transfers including their fees of the same eleven football clubs are collected to test hypotheses five and six. Moreover, the sample consists of transfers with a (disclosed) transfer fee and date from the past 4 seasons. Unfortunately, some transfers are omitted due to their unreleased transfer fee. Again, the number of transfers in this study is in line with relevant literature. Appendix D exhibits a table with all the relevant transfers. Last, naturally, the stock price returns of the football clubs were collected from the first to the last date with respect to the matches and transfers.

### *5.2 Data Sources*

The games played in the national competitions, including their relevant betting odds, were downloaded from *www.football-data.co.uk.* In contrast to the national matches, there is no such database concerning excel files of international matches. Therefore, the international games and their betting odds were collected manually from mainly *www.oddsportal.com*. The betting odds obtained from this site are an average of several gamble companies (e.g.

William Hill, Bet365, BWin, etc.). Taking the mean odds does not significantly influence match outcome expectations since the odds of the different companies are nearly the same. Furthermore, like international games, due to a lack of databases of European football transfers, the transfers were collected manually. The main sources where transfer data were derived from are *www.footballdatabase.eu* and *www.11v11.com*. Possible missing data (e.g. transfer fee) is, if available, obtained from the sites of the football clubs or other internet websites.

Lastly, daily stock price data for the football clubs and the determined benchmark was obtained from Datastream. Information on the benchmark follows later on in the section "methodology".

*5.3 Variable Description*

Several variables were created in order to define different subsamples related to the hypotheses regarding match outcomes.

At first, matches will be tested differently in case of a win, lose or draw to examine the potential different share price reactions after one of the three possible match outcomes as described in the literature section. So, among all tests, the matches will be examined separately based on their results. Furthermore, not only the share price effect after game results of the whole sample will be tested, but separately for national and international matches as well. Additionally, the distinction will be made between matches played in the last months of the season relatively to matches played in the rest of the season. The matches played in March, April, May and June are defined as important, while matches in the other months are defined as less important. Finally, matches will be divided into four groups based on their ex-ante probabilities for a certain result. These four groups are determined based on matches that were strongly expected to win (SEW), weakly expected to win (WEW), weakly expected to lose (WEL) and strongly expected to lose (SEL).

Like football matches, transfers could be divided into different variables. First, comparable to match results, acquisitions or sales of football players will be treated as two different groups and therefore will be tested separately. Furthermore, within the variables acquisitions and sales, there will be a distinction between "high-end" and "low-end" transfers. "High-end" transfers will be defined as transfers with associated transfer fees of

€7,500,000 and above. Additionally, with “low-end” transfers of players, fees below €7,500,000 are involved. Last, transfers are divided in “end window” and “rest window”. Hereby, the first variable indicates if a transfer took place in the last week of the transfer window while the other transfers took place in the remaining days of the window with respect to the second variable.

*5.4 Summary Statistics*

Panel A of table 1 provides the summary statistics of the matches in the sample. A distinction is made between the type of competition, match outcome, period of the match and ex-ante expectations of game results. SEW, WEW, WEL and SEL are abbreviations for respectively strongly expected to win, weakly expected to win, weakly expected to lose and strongly expected to lose.

The total sample consist of 1893 matches, divided over 1156 national matches and 337 international matches. The major part of the matches resulted in a win (1119), relative to 365 losses and 409 draws. Moreover, 567 matches played are played at the end of the season in the months March, April, May and June. In addition, according to Panel A of table 1 1335 matches were strongly expected to win, while only 125 matches were strongly expected to lose.

In conclusion, the summary statistics regarding football matches indicate that the football clubs in the sample are relatively high ranked teams based on the victories (both national as international) and ex-ante expectations.

Furthermore, panel B of table 1 presents the summary statistics regarding transfers. A distinction is made between clubs, the period of the transfer and the transfer fees. High-end transfers are acquisitions or sales of football players with a related transfer fee of 7,500,000 or above, while end window transfers include transfers in the last week before the closing of the transfer window.

Divided over the eleven football clubs, there are 141 transfers, namely 73 acquisitions and 68 sales. With respect to the total amount of transfers, the clubs earned more than they spend. In addition, there are approximately as much high-end transfers as low-end transfers and most of the transfers took place in the rest of the window.

**Table 1**

| Panel A: Matches | | Win | Lose | Draw | Total |
|---|---|---|---|---|---|
| Games: | | | | | |
| National | | 968 | 265 | 323 | 1156 |
| International | | 151 | 100 | 86 | 337 |
| Total | | 1119 | 365 | 409 | 1893 |
| | | | | | |
| Period: | | | | | |
| End season | | 347 | 114 | 106 | 567 |
| Rest season | | 772 | 251 | 303 | 1326 |
| | | | | | |
| Expectations: | | | | | |
| SEW | | 934 | 158 | 243 | 1335 |
| WEW | | 110 | 68 | 81 | 259 |
| WEL | | 57 | 65 | 52 | 174 |
| SEL | | 18 | 74 | 33 | 125 |
| Panel B: Transfers | Acquisitions | Sales | Total | Expenditures | Earnings |
| Club: | | | | (million €) | (million €) |
| Ajax | 3 | 9 | 12 | 10,5 | 77,5 |
| AS Roma | 13 | 8 | 21 | 141,5 | 122,5 |
| Borussia Dortmund | 8 | 6 | 14 | 109,5 | 139,5 |
| Celtic | 2 | 5 | 7 | 8 | 42 |
| FC Porto | 6 | 9 | 15 | 37 | 283 |
| Juventus | 10 | 5 | 15 | 77,5 | 28 |
| Lazio Roma | 2 | 2 | 4 | 14 | 15,5 |
| Lyon | 3 | 4 | 7 | 35 | 23 |
| Manchester United | 11 | 7 | 18 | 358 | 43 |
| SL Benfica | 6 | 8 | 14 | 23,5 | 130,5 |
| Sporting | 9 | 5 | 14 | 19,1 | 44,5 |
| Total | 73 | 68 | 141 | 833,5 | 949 |
| Fee: | | | | | |
| High-end | 34 | 38 | 72 | | |
| Low-end | 39 | 30 | 69 | | |
| | | | | | |
| Period | | | | | |
| End window | 17 | 15 | 32 | | |
| Rest Window | 56 | 53 | 109 | | |

**Summary statistics**

*5.5 Methodology*

For both market reactions to match outcomes as transfers, an event study will be conducted for the whole sample as for several subsamples. The assumption is that markets are efficient and that investors respond quickly to publicly available information, consistent with the

efficient market hypotheses (Fama, 1970). Thus, if match results or transfer of players contains sensitive information, the share price of football clubs should reflect the continuous input of information about results and transfers.
Furthermore, in addition to the methodology for the event study, this section describes the computation for ex-ante match outcome probabilities derived from betting odds.

### *5.5.1 Event Study*

When Conducting an event study, it is important to successfully identify the particular event date (MacKinley, 1997; De Jong and De Goeij, 2011). Since football matches are played during the weekends or in the evening midweek after the markets are closed, the first trading day after a match is considered as the event date (day 0). The period over which the impact of the event will be measured, also called the event period, will start one trading day before a football match (day -1) to two trading days after (day 1). Which result in a three-day event period (-1,1). The short event window prevents for biased share price reactions due to possible international games during the week, and will generate more significant results as long event windows will reduce the significance (Brown and Warner, 1980 and 1985).
For transfers, however, the date of the official announcement of the transfer will count as the event date (day 0). Moreover, if a transfer took place during the weekend the first trading day afterwards will be identified as day 0. Different from matches, some information or rumors about transfers prior the actual transfer could become publicly available and therefore affect share prices. Therefore, besides a short event window of three days, different time windows over longer periods of time will be examined in order to capture all market reactions related to the transfers.

Second, after identifying the events, the MSCI All Country Mid Cap Europe Index was determined as a benchmark in order to calculate normal stock return behavior (De Jong and De Goeij, 2011). Since the sample consists of football teams among different countries across Europe and to correct for market capitalization of the clubs, this index seemed an appropriate benchmark.
The normal return of the football clubs was calculated using the market model, using an OLS regression of daily stock price returns of the football clubs on the benchmark over the sample period of all games in order to obtain the beta's and alphas of each club. It is likely

that, at least some of, the football clubs may suffer from non-trading (Palomino et al., 2009). Due to non-synchronous trading, clubs' beta's may be biased downwards (Dimson, 1979). To correct for this, three lags and leads of market returns are added to the market model, similar to Palomino et al. (2009) did in their study. Therefore the considered model for normal or expected returns from daily returns over the period 27 July 2011 to 1 June 2015 for each of the 11 clubs is as follows:

$$NR_{it} = \alpha_i + \sum_{\tau=-3}^{+3} \beta_{i\tau} r_{m,t+\tau} + \varepsilon_{i,t} \;\; i = 1, \dots, 11, t = 1005 \qquad \text{(a)}$$

After obtaining the normal return the computation for the abnormal returns for each club at time t is as follows:

$$AR_{it} = r_{it} - a_i - r_{m,t} \sum_{\tau=-3}^{+3} b_{i\tau} \;\; i = 1, \dots, 11, t = 1005 \qquad \text{(b)}$$

Where $a_i$ and $b_{i\tau}$ are the OLS estimators from equation (a).

Next, we are interested in the average abnormal return (AAR) at day (0) and the cumulative average abnormal return (CAAR) over a period of days within the event period. This is because abnormal returns can be caused by other information and therefore it is not important to analyse abnormal returns solely (De Jong and De Goeij, 2011). The average abnormal return reflects the mean of all abnormal returns at day t across all football teams, while the cumulative abnormal return is the sum of AARs over a period of days. Differences from zero from AAR(t) or CAAR(t,t) often indicates abnormal stock price performance (De Jong and De Goeij, 2011) Equations (c) and (d) denoting the calculation of average abnormal returns and cumulative abnormal returns:

$$AAR_t = \frac{1}{N} \sum_{i=1}^{N} AR_{it} \qquad \text{(c)}$$

$$CAAR = \frac{1}{N} \sum_{t=t1}^{t2} AAR_t \qquad \text{(d)}$$

Finally, the results based on the obtained AARs and CAARs should be supported by statistical tests (De Jong and De Goeij, 2011). Since the assumptions under a normal t-test (e.g. all abnormal returns are identically distributed, variance of abnormal returns across firms is equal) are often too strong (De Jong and De Goeij, 2011), a weighted average of abnormal returns is used. This allows for reducing the latter problem with the test. In order to do this, first the time series standard deviation was calculated using the two equations below:

$$\overline{AR_i} = \frac{1}{(T_2 - T_1)+1} \sum_{t=T_1}^{T_2} AR_{it} \quad \text{(e)}$$

Where $(T_2 - T_1)$ is considered the estimation window, which is in this case the sample equal to the sample period, and $\overline{AR_i}$ the time series average for each firm over the sample period. Using $\overline{AR_i}$ the time series standard deviation $s_i$ is calculated by the equation:

$$s_i = \sqrt{\frac{1}{T_2 - T_1} \sum_{t=T_1}^{T_2} (AR_{it} - \overline{AR_i})^2} \quad \text{(f)}$$

With this standard deviation, the standardized abnormal return ($SAR_{it}$) for each firm at time t can be calculated by dividing abnormal returns by the above obtained standard deviation. The mean of all standardized abnormal returns across all football clubs gives the average standardized abnormal return ($ASAR_t$). The $ASAR_t$ is for calculating the test statistic with equation (g):

$$TS = \sqrt{N} * ASAR_t \quad \text{(g)}$$

The same procedure can be followed relative to the cumulative average standardized abnormal returns in order to obtain the following test statistic:

$$TS = \sqrt{\frac{N}{T}} * CASAR_t \quad \text{(h)}$$

*5.5.2 expected game outcomes*

Betting odds for both national as international games were collected from several brokers as described earlier (e.g. William Hill, Bet365, BWIN etc.). Since there is evidence that betting quotes are good predictors for game outcomes and markets do not respond to the release of the odds (Palomino et al., 2009), there should be a distinction in reactions after matches based on their expectations of what could be derived from the odds.

To transform betting odds into ex-ante expectations about game outcomes, the same methodology is used as Palomino et al. (2009) described in their study. In order to do so, first betting odds were transformed in probabilities of win, draw and loss following equation (i):

$$ProbWin_i = \frac{x_{iw}^{-1}}{x_{iw}^{-1}+x_{id}^{-1}+x_{il}^{-1}} \quad \text{(i)}$$

Where $x_{ij}$ is the betting odd for team $i$ for outcome $j$(w,d,l) and the same equation holds for probabilities of losses and draws. The reward for the bettor consists of the amount of money betted times $x_{ij}$, excluding the initial bid.

Four dummy variables are created depending on the probability of a win, in order to categorize expectations of matches in to strongly expected to win (SEW), weakly expected to win (WEW), weakly expected to lose (WEL) and strongly expected to lose (SEL).

Following Palomino et al. (2009), the dummies were created based on the conditions below:

-SEW is equal to one if $ProbWin > 0.45$, and zero otherwise

-WEW is equal to one if $ProbWin \in [0.35,0.45]$, and zero otherwise.

-WEL is equal to one if $ProbWin \in [0.25,0.35]$, and zero otherwise.

-SEL is equal to one if $ProbWin < 0.25$, and zero otherwise.

Furthermore, beside match outcome expectations based on betting odds, streaks are used to determine a certain expectation. A streak of three similar match outcomes indicates a strong expectation of the same outcome for the upcoming match. Since this study deals with normally high ranked football clubs, three losses or draws are highly infrequent. Therefore, only winning streaks are taken into account.

## 6. RESULTS

This section contains empirical findings as a result of several event studies and OLS regressions among several variables. The results will be divided into two groups, the first group consists of the results with respect to football match outcomes, while the second group contains results related to transfers.

### *6.1 Match related results*

This paragraph shows the results relating to the first four hypotheses of this study in chronological order.

#### *6.1.1 On-pitch performance effect on stock price returns*

First, the results from an event study concerning the on-pitch performance of the football clubs, exhibited in table 2, will be discussed. The total sample, including national and international matches, is used to test whether wins have positive effects and draws and loss cause negative returns.

**Table 2**

| | | | Reaction to matches | | |
|---|---|---|---|---|---|
| Panel A: | Total Matches | N | AAR(0) | CAAR(-1,1) | CAAR(0,1) |
| Win | | 1119 | 0.0042*** | 0.0073*** | 0.0033*** |
| (t-stat) | | | (4.5502) | (7.0771) | (3.8314) |
| Draw | | 409 | -0.0089*** | -0.0081*** | -0.0101*** |
| (t-stat) | | | (-4.9723) | (-4.5255) | (-5.9365) |
| Loss | | 365 | -0.0139*** | -0.0113*** | -0.0129*** |
| (t-stat) | | | (-9.153) | (-7.8551) | (-8.7757) |

**Table 2 presents the results of an event study for wins, ties and losses for the total sample regarding the (cumulative) average abnormal return at day (0) and over the windows (-1,1), (0,1). The statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

If hypothesis 1 is correct, a win should positively trigger share prices of football clubs while a draw or loss negatively affects share price returns. According to the results shown in table 2 a victory indeed positively affects share prices the first trading day after a match, over the whole event period and for the first two trading days after a match. The stock price returns increase by 0.42% on the first trading day following a match and is significant at the 1% level. Over the three day event period, CAAR(-1,1), stock prices tend to increase with 0.73% after a

win while for the same result a positive effect of 0.33% is found over the two following trading days after a match. Both effects are significantly different from zero at the 1% level. The stronger effect over the whole event period in comparison with CAAR(0,1) indicates also a positive effect at day (-1). This suggests that investors might anticipate on a win, probably due to overconfidence, which could be due to the sample of football teams considered. Since the football teams are all labelled as top teams in their national competition, the expectations of winning by investors are likely higher. The number of victories relative to defeats and draws confirm this assumption.

Losing a game has a negative effect of 1.39% the first trading day after a match which is slightly higher than the negative effects of 1.13% and 1.29% over the three day event period and two day period after a match. All are significantly different from zero at the 1% level. The effect on share prices after a loss tend to be larger than after a win, this is in line with previous research from, among others, Renneboog and Vanbrabant (2000), Bell et al. (2012) and Scholtens and Peenstra (2009).

Similarly to losses, draws are followed by negative (cumulative) average abnormal returns the day after a match, AAR(0) as for the both event periods CAAR(-1,1) and CAAR(0,1). However, with declines of 0.89%, 0.81% and 1.01% (all significant at the 1% level), the effect is smaller with respect to losses. Still, these effects are higher than for victories.

In conclusion, all the findings are in line with previous research and with hypothesis 1. Among others, Renneboog and Vanbrabant (2000); Scholtens and Peenstra (2009); Palomino et al. (2009) all found positive effects on share prices after victories and negative effects after defeats and draws. The stronger effects to defeats relative to victories are in line with the prospect theory of Kahneman and Tversky as described in the literature section and further supports previous research on football games.

### *6.1.2 National versus international matches*

International matches provide high earnings (especially the Champions League) for football clubs and therefore might be more important to the clubs relative to national matches. On the other hand, qualification for international matches could only be enforced by positive results in national leagues. Renneboog and Vanbrabant (2000) and Scholtens and Peenstra (2009) found stronger market reactions after international games in comparison with

national games. Table 3 provides market reactions after match outcomes for both national as international competitions and the difference between the two.

**Table 3**

| | | | Reaction to matches | | |
|---|---|---|---|---|---|
| Panel A: | National | N | AAR(0) | CAAR(-1,1) | CAAR(0,1) |
| Win | | 968 | 0.0049*** | 0,0071*** | 0.0038*** |
| (t-stat) | | | (4.7273) | (6.3375) | (3.8201) |
| Draw | | 323 | -0.0087*** | -0.0063*** | -0.0088*** |
| (t-stat) | | | (-4.3885) | (-2.9337) | (-4.5801) |
| Loss | | 265 | -0.0133*** | -0.0112*** | -0.0129*** |
| (t-stat) | | | (-7.9866) | (-7.1259) | (-7.7980) |
| Panel B: | International | | | | |
| Win | | 151 | -0.0006 | 0.0058*** | -0.0030 |
| (t-stat) | | | (-0.4744) | (2.9183) | (-0.5248) |
| Draw | | 86 | -0.0094** | -0.0187*** | -0.0187*** |
| (t-stat) | | | (-2.2964) | (-5.3220) | (-5.3651) |
| Loss | | 100 | -0.0156*** | -0.0132*** | -0.0147*** |
| (t-stat) | | | (-4.4853) | (-3.7258) | (-4.4260) |
| Panel C: | Differences Int.-Nat. | | | | |
| Win | | | -0.0055 | -0.0013 | -0.0069 |
| (t-stat) | | | (-1.6214) | (-0.8085) | (-0.1852) |
| Draw | | | 0.0008 | 0.0123** | 0.0099** |
| (t-stat) | | | (0.1991) | (1.9699) | (2.1506) |
| Loss | | | 0.0023 | 0.0019 | 0.0017 |
| (t-stat) | | | (0.4381) | (0.2646) | (0.0521) |

**Table 3 presents the results of an event study for national games (Panel A) and international games (Panel B) regarding the (cumulative) average abnormal return at day 0 and over the windows (-1,1), (0,1). Panel C provides the differences between the two groups for the abnormal returns. The statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

Market reactions after national matches are approximately the same as stock price reactions for the whole sample, probably because the whole sample consists mainly of national matches relative to international matches. Victories lead to positive effects of 0.49% at AAR(0), 0.71% over the whole event period and 0.38% for the period of two days after a match (all significantly different from zero at the 1% level). The results concerning victories

again indicate a positive effect at day (-1), suggesting an anticipation on a victory by investors. As expected and in line with regard to the whole sample, losses have a negative effect at the 1% significance level of 1.33% (AAR(0)), 1.12% (CAAR(-1,1)) and 1.29% (CAAR(0,1)). In addition, the market reactions to draws are negative and all significantly different from zero.

Based on related literature, hypothesis 2 expected a stronger effect after international matches with respect to matches played in the national leagues. The results in table 3 confirm hypothesis 2, comparing panel A with panel B for defeats and draws. The negative reactions after defeats in international games of 1.56%, 1.32% and 1.47% for AAR(0), CAAR(-1,1) and CAAR(0,1) are slightly more negative than the reactions after national games (all are significant at the 1% level). The same holds for the significant negative reactions after games resulting in a draw (effect for AAR(0) is only significant at the 5% level after a draw). These findings are consistent with relevant literature and hypothesis 2. However, market reactions on the day after a victory in international games have a negative sign. Although this effect is not significant, this is remarkable mainly because the cumulative average abnormal return over the whole event period is on the other hand positive (0.58%) and significantly different from zero at the 1% level. This could be explained by the average abnormal return the day before the match, which gives a positive reaction of 0.89% (significant at the 1% level). This result could be interpreted by overreaction or overconfidence of investors the day prior the match, which is adjusted the day afterwards. As a result of the ex-ante positive effect before a match, the effect over the whole event period after an international victory is positive (0.58%) and significantly different from zero at the 1% level. However, the effects tend to be smaller relative to national matches over the event period (0.71% relative to 0.58%), contrary to hypothesis 2.

So far, by comparing international and national matches, reactions after international draws and defeats are in line with previous research and hypothesis 2, however, this does not hold for victories. According to the results in panel C, the differences with respect to losses are not significantly different from zero over all the three event windows. This indicates that there are no differences in market reactions related to losses, conflicting with hypotheses 2. The same holds for victories with respect to AAR(0), CAAR(-1,1) and CAAR(0,1). Also, these findings are contrary to hypothesis 2. Remarkably, the only finding in line with hypothesis 2 is the difference in magnitude after international games for draws for CAAR(-1,1) and

CAAR(0,1). The different market reactions after draws are both statistically different from zero at the 5% level.
In conclusion, the findings are not in line with hypothesis 2 and previous research (e.g. Renneboog and Vanbrabant, 2000; Scholtens and Peenstra, 2009) for victories and defeats but only for draws over the event periods (-1,1) and (0,1).

*6.1.3 Importance of matches*

The literature suggests a stronger effect after relatively important matches in comparison with less significant matches. Therefore, hypothesis 3 supports the findings of among others Renneboog and Vanbrabant (2000). To test the hypothesis, matches were labelled as important if they were played at the end of the season in the months March, April, May and June and less important otherwise. There are no promotion or relegation matches in the sample due to high ranked football clubs, therefore the importance of matches is mainly based on winning the league or qualification for international competitions in the upcoming season. Table 4 displays the results among important matches, less important matches and their differences.

The first thing that is apparent when analysing table 4, is the non-significant reaction to a victory for matches at the end of the season. This could indicate an overreaction the day prior the match. Indeed, there is a positive significant effect at the 1% level of 0.77% at day (-1). The positive effect on day (-1) might be explained by an overreaction, possibly due to overconfidence, prior to a match and therefore, it is adjusted the following day. Market reactions after the rest of season matches are all positive for victories, significant at the 1% level (0.55%; 0.46%; 0.70%) and about the same as for the total sample of matches. Nevertheless, the results for victories do not support hypothesis 3. The returns are higher for the rest of the season compared to the end of the season, except for the total event period, however, the effect for the end of season matches is not significant neither is the effect for the difference between end of season and rest of season matches according to panel C.

**Table 4**

| | | | Reaction to matches | | |
|---|---|---|---|---|---|
| Panel A: | End Season | N | AAR(0) | CAAR(-1,1) | CAAR(0,1) |
| Win | | 347 | 0.0014 | 0.0080 | 0.0004*** |
| (t-stat) | | | (0.8478) | (0.4215) | (3.3157) |
| Draw | | 106 | -0.0119*** | -0.0081** | -0.0152*** |
| (t-stat) | | | (-3.1786) | (-2.3439) | (-4.2866) |
| Loss | | 114 | -0.0151*** | -0.0206*** | -0.0210*** |
| (t-stat) | | | (-3.8746) | (-5.1720) | (-5.432) |
| Panel B: | Rest Season | | | | |
| Win | | 772 | 0.0055*** | 0.0046*** | 0.0070*** |
| (t-stat) | | | (4.9155) | (6.3006) | (4.3362) |
| Draw | | 303 | -0.0078*** | -0.0082*** | -0.0089*** |
| (t-stat) | | | (-3.6064) | (-3.9015) | (-4.2833) |
| Loss | | 251 | -0.0134*** | -0.0092*** | -0.0070*** |
| (t-stat) | | | (-9.1549) | (-5.8454) | (-6.7743) |
| Panel C: | Differences End-Rest | | | | |
| Win | | | -0.0041 | 0.0034 | -0.0066 |
| (t-stat) | | | (-1.6267) | (0.2481)) | (-1.2011) |
| Draw | | | 0.0042 | -0.0001 | 0.0063 |
| (t-stat) | | | (0.0902) | (-0.0419) | (0.9932) |
| Loss | | | 0.0017 | 0.0114** | 0.0140* |
| (t-stat) | | | (0.3507) | (2.0056) | (1.8974) |

**Table 4 presents the results of an event study for important games at the end of the season (Panel A) and less important games at the rest of the season (Panel B) regarding the (cumulative) average abnormal return at day 0 and over the windows (-1,1), (0,1). Panel C provides the differences between the two groups for the abnormal returns. The statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

The results for defeats and draws (all significantly different from zero at the 1% level) over the rest of the season correspond with the results of table 2, for the total sample of matches. Comparing panel A with panel B, investors responded more strongly to losses at the end of the season with respect to the rest of the season. Despite the non-significant difference of the day after a defeat, for the two and three day event period the differences are significantly different from zero at the 5% and 10% level, following panel C. Therefore, there is evidence of a stronger market reaction to more important games after defeats, especially over the whole event window (-1,1).

The differences in the importance of games are not significant for games ending in a draw. Although the effect tends to be stronger for end of season matches at day (0) and the window (0,1), comparing panel A and B, we cannot conclude this effect is significantly stronger based on panel C.

Based on the abnormal returns, hypothesis 3 only holds for losses, while the effect for matches at the end of the season, resulting in a victory or draw have no stronger effect comparing with the rest of the season. In conclusion, losses at the end of the season are more important for investors, probably due to the greater impact these games have on the final position in the league table. While, victories and draws do not trigger stronger investor reactions at the end of the competition.

To check for robustness, important matches were redefined. The table in appendix E provides the results with matches defined as important if they were played post March. Redefining important games lowers the statistical power and resulting in market reactions contrary to hypothesis 3 for all three match results. This might indicate that games in March could be defined as important games.

### *6.1.4 Match outcome expectations*

Betting odds are good predictors for match outcomes, nevertheless there are no market reactions after the announcement of the odds (Palomino et al., 2009). Therefore, there should be a difference in market response between expected and unexpected match results (Palomino et al., 2009). In line with the literature, hypotheses 4 expects stronger reactions in case of unexpected match outcomes relative to expected match outcomes. Previous research found showed stronger market reactions for European games (Scholtens and Peenstra, 2009) and for losses (Palomino et al., 2009). Match outcome expectations are based on betting odds and winning streaks, as defined in section 5.5.2. Table 5 provides the results with respect to expectations based on betting odds and table 6 provides the same based on winning streaks.

**Table 5**

| | Reaction to matches | | | |
|---|---|---|---|---|
| | SEW | WEW | WEL | SEL |
| Panel A: AAR(0) | | | | |
| Win | 0.0025*** | 0.0087*** | 0.0214*** | 0.01333** |
| (t-stat) | (2.66186) | (3.0677) | (3.9213) | (2.1948) |
| N | 934 | 110 | 57 | 18 |
| Draw | -0.0131*** | -0.003153 | -0.0072 | 0.0060 |
| (t-stat) | (-5.4394) | (-1.2660) | (-1.3108) | (0.8833) |
| N | 243 | 81 | 52 | 33 |
| Loss | -0.0141*** | -0.0181*** | -0.0176*** | -0.0065 |
| (t-stat) | (-7.2244) | (-4.9554) | (-4.8448) | (-1.4315) |
| N | 158 | 68 | 65 | 74 |
| Panel B: CAAR(-1,1) | | | | |
| Win | 0.0050*** | 0.0175*** | 0.0180*** | 0.0310*** |
| (t-stat) | (4.2286) | (5.4336) | (4.2677) | (4.5345) |
| N | 934 | 110 | 57 | 18 |
| Draw | -0.0120*** | -0.0117*** | 0.0034 | 0.0097 |
| (t-stat) | (-4.8779) | (-2.8789) | (0.9589) | (0.0448) |
| N | 243 | 81 | 52 | 33 |
| Loss | -0.0111*** | -0.0179*** | -0.0148*** | -0.0023 |
| (t-stat) | (-6.0358) | (-4.7536) | (-2.8471) | (-1.3955) |
| N | 158 | 68 | 65 | 74 |
| Panel C: CAAR(0,1) | | | | |
| Win | 0.0011 | 0.0092*** | 0.0175*** | 0.03492*** |
| (t-stat) | (1.4330) | (3.6176) | (3.7249) | (4.5453) |
| N | 934 | 110 | 57 | 18 |
| Draw | -0.0134*** | -0.0107*** | -0.0031 | 0.0044 |
| (t-stat) | (-6.1087) | (-2.6510) | (-0.0171) | (0.0940) |
| N | 243 | 81 | 52 | 33 |
| Loss | -0.0141*** | -0.0165*** | -0.0168*** | -0.0035 |
| (t-stat) | (-6.0917) | (-4.9881) | (-3.6932) | (-1.1635) |
| N | 158 | 68 | 65 | 74 |

**Table 5 presents the results of an event study for all games based on their ex-ante outcome expectations regarding the (cumulative) average abnormal return at day 0 and over the windows (-1,1), (0,1). SEW, WEW, WEL and SEL respectively denotes games that were strongly expected to win (SEW), weakly expected to win (WEW), weakly expected to lose (WEL) and strongly expected to lose (SEL). The statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

Panel A indicates stronger reactions to winning when a defeat is expected in comparison with expected victories, significant at the 1% level except for SEL which is significant at the 5% level (market reactions of 0.25% and 0.87% for strong and weak expectations of winning compared to 2.14% and 1.13% for strong and weak expectations of losing). The reaction

after victories is consistent for the cumulative average abnormal returns over both event windows (0,1) as (-1,1), given in panel B and C, where all the effects are statistically different from zero at the 1% level, except for games strongly expected to win over the period (0,1). Especially if a game is strongly expected to end in a loss, market reactions are high with 3.49% and 3.10% after a win for CAAR(0,1) and CAAR(-1,1). This strong effect clearly stands out in contrast to the effect after a strongly expected victory (0.11% for CAAR(0,1) and 0.50% for CAAR(-1,1), where only the latter is significant at the 1% level). If you compare the difference of results after a win for matches that are strongly expected to end in a win versus other matches, there is a significant stronger reaction following the other matches of 1.06% at the 1% level. All these findings for post-win market reactions, are in line with hypothesis 4. Where previous research also expected this effect, they did not find similar results for a win for a sample including national and international games (Palomino et al. (2009) and Scholtens and Peenstra (2009) only found this effect for losses and European matches). Remarkable, Palomino et al. (2009) concluded that investor sentiment causes share prices reactions of football clubs based on overreactions of investors after strongly expected wins. In contrast, the results of this study indicate rational reactions after expected wins with respect to unexpected victories.

The magnitude of the share price effect the day after a loss, is nearly similar for matches that were strongly expected to win, weakly expected to win and weakly expected to loss (all significant at the 1% level). However, with negative effects of 1.41%, 1.81% and 1.76% for SEW, WEW and WEL, compared with games that were strongly expected to lose, there is a high difference (SEL shows a negative effect of 0.65%). This indicates a stronger reaction to unexpected match outcomes, in line with previous research and hypothesis 4. Although, SEL is not significant regarding losses over all the event windows, the difference of 0.92% between matches that were strongly expected to lose and the other matches is significantly different from zero at the 5% level. Therefore, the results indicate that investors stronger react to unexpected match outcomes with respect to losses, as hypothesis 4 suggest. Furthermore, if a game is strongly expected to win, there is a significant difference in reactions after victories compared to defeats. For example, the day after a highly expected win, the market reaction tend to be lower than for the day following an highly unexpected loss (relatively 0.25% to -1.41%). In addition, the difference is significantly different from zero at the 1% level for all the three event windows. Subsequently, this effect should be the

opposite for games that were strongly expected to lose. Although unexpected wins tend to have stronger effects relative to expected losses, the differences are not significant for all the three event windows.

Although the reactions tend to be stronger for matches that were expected to win after draws (e.g. a negative reaction for SEW of 1.31% the day after a draw compared to a negative reaction of 0.60% for SEL), due to a lack of significance for matches expected to end in loss, there is no evidence for a decent comparison between expected and unexpected match outcomes.

To conclude, there is strong evidence, supporting hypothesis 4, that the stock price effect for football clubs for unexpected match outcomes is stronger relative to expected match outcomes after victories. In addition, with regard to losses, there is weak evidence that investors stronger react to unexpected match outcomes, as previously showed by Palomino et al. (2009).

To check for robustness of these findings, in addition the expectation of game outcomes is defined in an alternative way using streaks. If there is a streak of 3 similar game outcomes prior a match, there is a relatively strong expectation the upcoming match will end in the same result. For instance, if a club won three matches in a row, the next match is likely expected to result in a victory. Since the sample consists of relatively top teams in their competitions (both national and international), streaks of draws or losses are rare. Therefore, only matches after winning streaks are tested, results are presented in table 6.

**Table 6**

| | | Reaction to matches | | |
|---|---|---|---|---|
| | N | AAR(0) | CAAR(-1,1) | CAAR(0,1) |
| Panel A: | | | | |
| Win | 263 | 0.0102*** | 0.0122*** | 0.0204*** |
| (t-stat) | | (4.3672) | (4.0188) | (5.5923) |
| Draw | 91 | -0.0116** | -0.0103*** | -0.0057** |
| (t-stat) | | (-2.5382) | (-2.9929) | (-2.3273) |
| Loss | 57 | -0.0225*** | -0.0257*** | -0.0193*** |
| (t-stat) | | (-4.1557) | (-4.0067) | (-3.6429) |

**Table 6 presents the results of an event study for wins, ties and losses of the total sample after a winning streak of three matches regarding the (cumulative) average abnormal return at day 0 and over the windows (-1,1), (0,1). The statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

If a football club realized a streak of three games, the expectation that the next game will also result in a win is relatively high, comparable with the variable SEW. Therefore, in case of a loss following a streak, the reaction should be negative and stronger in comparison to a win. Table 6 shows that this holds for the market reaction the day after the match and over the whole event period (positive reaction of 1.02% the day after a win compared to a negative reaction of 2.25% after a loss, all significantly different from zero at the 1% level). Moreover, the difference between victories and losses following a streak is significantly different from zero at the 1% level the day after the match. The results are consistent with the previously establish conclusions based on table 5 and are in line with hypothesis 4.

*6.1.5 Regression results*

This section contains results of multiple OLS-regressions in order to support the findings of the event studies and their related hypotheses.

First, a model is constructed in order to explain daily abnormal returns of football clubs for the first trading day and first two days after a match by match outcomes and multiple control variables. The following regression model will be estimated:

$$(C)AR_{it} = \alpha_0 + \beta_1 WIN + \beta_2 LOSS + \beta_n ControlVariables + \varepsilon_i \qquad \text{(I)}$$

In this model, the dependent variable $(C)AR_{it}$ denotes the (cumulative) abnormal return for the first and first two trading days after a match. WIN (LOSS) is a dummy variable equal to one if a team won (lost) a match and zero otherwise. Furthermore, the control variables contain several (dummy) variables related to hypotheses two and three, year dummies to control for time effects and team dummies to control for firm fixed effects. Both year dummies and team dummies increase the explanatory power of the model. The (dummy) variables corresponding with hypotheses two and three are at first EndSeason, which is a dummy variable equal to one if a match was played in the last months of the season, concerning March, April, May and June, and zero otherwise. Second, International is a dummy variable equal to one if a match is played in an international competition, for example the Champions League, and zero otherwise. In addition, the two variables Home and GoalDiff are included to correct for the possible effect the variables might have on the abnormal returns. Home is a dummy variable equal to one if a football club plays at home

and zero otherwise, while GoalDiff is a variable that indicates the difference in goals scored between the two teams. The results of regression model (I) are presented in table 7.

**Table 7**

| Dep. Variable | AR(0) | CAR(0,1) |
|---|---|---|
| WIN | 0.01053*** | 0.0131*** |
| | (3.44) | (3.14) |
| LOSS | -0.0084** | -0.0047 |
| | (-2.54) | (-1.05) |
| EndSeason | -0.0048** | -0.0077*** |
| | (-2.25) | (-2.65) |
| International | -0.0035 | -0.0051 |
| | (-1.41) | (-1.33) |
| Home | -0.0065*** | -0.0089*** |
| | (-3.42) | (-3.48) |
| GoalDiff | 0.0019** | 0.0016 |
| | (2.01) | (1.23) |
| Year Dummies | Yes | Yes |
| Team Dummies | Yes | Yes |
| N | 1886 | 1783 |
| $R^2$ | 0.050 | 0.0343 |

**Table 7 presents the results of regression model (I) regarding the (cumulative) abnormal returns at day (0) and over the window (0,1). WIN (LOSS) is a dummy variable equal to one if the team wins (loses) and zero otherwise. The dummy variables EndSeason, International and Home, are equal to one if a match is played at the end of the season, in an international competition of at home. Goaldiff is the difference between the number of goals scored and those conceded in a game. The t-stat of the estimated coefficients are in parentheses and the statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

The results of the regression indicate a positive effect for victories on abnormal returns on the first and first two trading days after the event, both significant at the 1% level. In contrast, losses are followed by negative stock price reactions at day 0 (significant at the 5% level). However, over the period (0,1) this effect is not significantly different from zero. The regression results confirm hypothesis 1 and the findings in section 6.1.1.

International games tend to have a negative effect on returns of football clubs, indicating that international losses have stronger effects than wins, in line with Renneboog and Vanbrabant (2000). Still, there is no reliable evidence for hypothesis 2 with respect to wins and losses due to insignificant coefficients and the lack of evidence previously demonstrated.

Based on earlier findings, hypothesis 3 only holds for losses, since there is only a larger effect among losses at the end of the season. Hence, the negative relation between End Season

and both AR(0) and CAR(0,1), significant at the 5% and 1% level, is consistent with previous conclusions regarding hypothesis 3.

Additionally, there is a strong significantly negative effect for home played matches at both AR(0) and CAR(0,1) , while the difference in goals scored positively affects the abnormal return on the first trading day after a match. The negative sign for home games could indicate a stronger expectation for wins and therefore a relative stronger negative impact on realized losses or weaker market reactions with respect to away matches. Furthermore, the positive sign for GoalDiff suggest stronger effects for matches won with a larger difference in goals scored compared to losses with a larger goal difference.

Altogether, the results with respect to the regression model (I) support the results obtained from earlier performed event studies in previous sections. Furthermore, the independent variables in the regression model explained approximately 5% and 3.5% of the variance in abnormal returns. This is about the same for regressions in relevant literature (for instance, Palomino et al., 2009). The low $R^2$ may be the result of low predictability for abnormal returns of football clubs or due to missing variables that explain the variance among the returns.

In addition, a second OLS regression model is determined in order to support the findings with reference to hypothesis 4. Different from the first model, the dependent variable (cumulative) abnormal returns will be divided into two groups, representing (cumulative) abnormal returns after victories and defeats. This is to test the effect of the independent variables on separate match outcomes. Furthermore, the independent variables WIN and LOSS will be replaced by four dummy variables that determine expected game outcomes; strongly expected to win (SEW), weakly expected to win (WEW), weakly expected to lose (WEL) and strongly expected to lose (SEL). Model (II) takes into account the same control variables as model (I) did. Regression model (II) is estimated as follows:

$$(C)AR_{itj} = \alpha_0 + \beta_1 SEW + \beta_2 WEL + \beta_3 SEL + \beta_n ControlVariables + \varepsilon_i \qquad \text{(II)}$$

Where $(C)AR_{itj}$ the denotes the (cumulative) abnormal return for club $i$ at day $t$ for result $j$ (victory or defeat). Table 8 contains the results regarding regression model (II)

**Table 8**

| | Win | | Loss | |
|---|---|---|---|---|
| Dep. Variable | AR(0) | CAR(0,1) | AR(0) | CAR(0,1) |
| SEW | -0.0080* | -0.0111* | 0.0005 | -0.0037 |
| | (-1.87) | (-1.83) | (0.07) | (-0.40) |
| WEL | 0.0136** | 0,0114 | 0.0019 | -0.0023 |
| | (2.13) | (1.26) | (0.27) | (-0.22) |
| SEL | 0.0074 | 0.0271* | 0.0075 | 0.0067 |
| | (0.74) | (1.89) | (1.04) | (0.64) |
| EndSeason | -0.0096*** | -0.0084** | -0.0001 | -0.0097 |
| | (-2.58) | (-2.22) | (-0.01) | (-1.37) |
| International | -0.0084** | -0.0056 | -0.0013 | -0.0033 |
| | (-2.37) | (-0.99) | (-0.23) | (-0.38) |
| Home | -0.0022 | -0.0048 | -0.0016 | -0.0032 |
| | (-0.87) | (-1.39) | (-0.9) | (-0.47) |
| GoalDiff | 0.0027*** | 0.0025* | -0.0022 | -0.0026 |
| | (2.69) | (1.75) | (-0.81) | (-0.69) |
| Year Dummies | Yes | Yes | Yes | Yes |
| Team Dummies | Yes | Yes | Yes | Yes |
| N | 1115 | 1064 | 364 | 343 |
| $R^2$ | 0.0345 | 0.0308 | 0.0248 | 0.0348 |

**Table 8 presents the results of regression model (II) regarding the (cumulative) abnormal returns at day (0) and over the window (0,1). The dummy variables SEW, WEL and SEL indicate whether a team is strongly expected to win (SEW), weakly expected to lose (WEL) or strongly expected to lose (SEL). The dummy variables EndSeason, International and Home, are equal to one if a match is played at the end of the season, in an international competition of at home. Goaldiff is the difference between the number of goals scored and those conceded in a game. The t-stat of the estimated coefficients are in parantheses and the statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

According to table 8 , there is a negative effect on abnormal returns of football clubs after a victory, if a win is strongly expected (weakly significant at the 10% level). That means, after a win, there will be a lower positive abnormal return if the expectations of a win were high in advance, in comparison with lower expectations of winning (WEW, WEL and SEL). Therefore, weak and strong expectations of losing should result in positive effects on abnormal returns after a win. Following table 8 the signs are indeed positive and significant for WEL, the first trading day a match (0.0136, significant at the 5% level), and SEL, over the first two trading days after a match (0.0271, significant at the 10% level). For victories, the regression model shows that there is a stronger reaction after an unexpected match outcome with respect to an already expected match outcome. These results support hypothesis 4, the findings in section 6.1.4 about match outcome expectations and suggestions of relevant literature (e.g. Palomino et al., 2009; Scholtens and Peenstra, 2009).

In addition, the negative effect for victories regarding matches played at the end of the season might indicate overconfidence of investors, which leads to an overreaction, prior a match. Section 6.1.3 already showed a positive effect on day (-1), which is in line with the results of regression model (II). The negative sign could indicate that investors adjust their overreaction after the match. Furthermore, the negative effect for international games after a win indicate the same. Likewise, the average abnormal return one day before an international match is positively and significantly different from zero at the 1% level. However, this conclusion only holds for abnormal returns the day after an international win, due to a lack of statistical power over the event period (0,1) based on the regression model (II).

The coefficients for GoalDiff after a win confirm the suggestion based on the regression model (I), especially comparing to the coefficients after a loss. Although the findings after a loss are not significant, the positive significant relation between GoalDiff and a win indicate a stronger reaction after a win the larger the difference in goals scored as suggested before, especially for day (0). Unfortunately the effect for home games after a win are not significant. Nevertheless, the negative sign is consistent with the results in the table 7.

Even though most of the signs confirm previous results after defeats, all of the coefficients estimated by the regression are not significant. Therefore, no conclusions can be based on the last two columns of table 8. Last, the variables explain around 3% of the variation in abnormal returns after both victories as defeats.

### *6.2 Transfers*

This paragraph contains the results for both event studies and regressions related to transfers of football players and the thereto related hypotheses five and six. Furthermore, results of some additional test on subsamples are included in this section.

#### *6.2.1 Transfer effect on stock price returns*

First, the effect of acquisitions and sales of football players will be discussed. Table 9 exhibits the stock returns for five different event windows. These windows are relatively long in comparison with the event windows used for football matches. Since, for most of the transfers, related information (e.g. rumors) is publicly available several days before the

official transfer announcement, it is not likely that short event windows contain all market reactions.

**Table 9**

| | | Reaction to transfers | | | | |
|---|---|---|---|---|---|---|
| | N | CAAR(-1,1) | CAAR(-5,5) | CAAR(-10,10) | CAAR(-15,15) | CAAR(-20,20) |
| Acquisitions | 73 | 0.0063** | 0.0017** | 0.0026*** | 0.0134 | 0.0121 |
| (t-stat) | | (1.9605) | (2.1824) | (3.5440) | (0.0115) | (0.1032) |
| Sales | 68 | 0.0154** | 0.0038 | 0.0003 | 0.0094 | 0.0142 |
| (t-stat) | | (2.3104) | (0.4297) | (0.6018) | (0.0784) | (0.1180) |

**Table 9 presents the results of an event study regarding the cumulative average abnormal returns of transfers over the windows (-1,1), (-5,5), (-10,10), (-15,15) and (-20,20). The statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

Table 9 shows some remarkable results. At first, acquisitions of football players tend to have positive effects on stock price returns of football clubs for all five event periods (respectively 0.63%, 0.17%, 0.26%, 1.34% and 1.21%) in contrast to expected negative returns according to Fotaki et al. (2009) and hypothesis 5. In addition, the effects for the windows (-1,1), (-5,5) and (-10,10) are significant at the 5% and 1% level and not significant for the two largest event windows. The results for acquisitions are in line with synergetic theories with respect to mergers and acquisitions. However, the arguments concerning synergetic theories (described in the literature section) are not likely to hold for football transfers. A possible explanation seems to be related to the shareholder structure for football clubs. According to Renneboog and Vanbrabant (2000) the major part of the shares are hold by fans. Therefore, the effect for transfers might be the related to investor sentiment (Edmans et al., 2007; Bell et al., 2012). For example, when a listed football club attracts a top class player, fans might expect better results and are subsequently more confident. Since fans are primarily interested in game results and attracting top class players increased their performance expectations, acquisitions could positive influence stock returns.

Furthermore, in line with hypothesis 6, sales tend to have positive effects for all event windows. However, only the market reaction within the event window (-1,1) is significantly different from zero at the 5% level. Although this finding is consistent with literature regarding mergers and acquisitions, probably the effect related to divestitures of players is due to investor sentiment. For example, it seems unlikely that football fans react positively to reducing agency costs or increasing specialization as suggest by non-synergetic theories.

In contrast, it is more likely that mood of investors affect their investment decisions with respect to the shareholder structure of football clubs.
In addition, there is no evidence for a difference in magnitude between sales and acquisitions due to a lack of significance (e.g. 1.07% difference for a three-day window with a test statistic of 0.9598).
To conclude, while the results do not support hypothesis 5, however, they do support hypothesis 6. If the effects could be explained by the behavior of fans, presumable influenced by their sentiment regarding their favorite football club, it might be important to distinguish transfers in to categories based on their related fees. This is assuming that the level of players increases with their transfer fees. Comparing transfers based on their fees, could be interesting due to stronger expected reactions to "top-transfers". For example, if a player is attracted for tens of millions it is likely that this affect investors more strongly than compared to transfers with a fee of a couple of millions.

### *6.2.2. "High-end" versus "low-end" transfers*

Following the assumption that level of players increase with their transfer fees, acquisitions and sales of football players will be divided into two sub samples; "high-end" and "low-end" transfers. "High-end" transfers are transfers with a related fee of €7,500,000 and above, while "low-end" transfers have lower fees. Table 10 shows the results for both groups.

According to panel A of table 10, acquisitions of football players have positive effects on stock price returns for large event windows (significant at the 1% level). This result is in line with table 9, however the previous table showed significant effects for short event windows regarding acquisitions. The effect tends to be stronger for "high-end" transfers with respect to acquisitions for large event windows, while "low-end" transfers have larger influences for short event windows. These differences are weakly significant at the 10% level for the windows CAAR(-1,1), CAAR(-15,15) and CAAR(-20,20). It is unclear why these differences between event windows occur, which could be encouraging for further research.

**Table 10**

| | | Reaction to transfers | | | | |
|---|---|---|---|---|---|---|
| Panel A: "high-end" | N | CAAR(-1,1) | CAAR(-5,5) | CAAR(-10,10) | CAAR(-15,15) | CAAR(-20,20) |
| Acquisitions | 34 | -0.0063 | -0.0012 | 0.0206*** | 0.0459*** | 0.0509*** |
| (t-stat) | | (-0.6270) | (-1.3595) | (5.4952) | (10.3250) | (13.0654) |
| Sales | 38 | 0.0124 | -0.0074** | -0.0002 | 0.0130** | 0.0089 |
| (t-stat) | | (1.4433) | (-2.4125) | (-0.0061) | (2.1271) | (1.4913) |
| Panel B: "low-end" | | | | | | |
| Acquisitions | 39 | 0.0173*** | 0.0041* | -0.0132 | -0.0149 | -0.0218 |
| (t-stat) | | (3.2694) | (1.7132) | (-0.3130) | (-0.2023) | (-0.6746) |
| Sales | 30 | 0.0194* | 0.0184*** | 0.0010 | 0.0048 | 0.0211*** |
| (t-stat) | | (1.8582) | (3.4023) | (0.9196) | (1.2788) | (5.4654) |
| Panel C: Difference high-low | | | | | | |
| Acquisitions | | -0.0236* | 0.0053 | 0.0337 | 0.0608* | 0.0727* |
| (t-stat) | | (-1.8896) | (0.2831) | (1.2775) | (1.9337) | (1.8263) |
| Sales | | -0.0070 | -0.0259 | -0.0012 | 0.0082 | 0.0123 |
| (t-stat) | | (-0.4851) | (-1.4476) | (-0.0605) | (0.2444) | (0.2895) |

**Table 10 presents the results of an event study regarding the cumulative average abnormal returns for high-end transfers (Panel A) and low-end transfers (Panel B) over the windows (-1,1), (-5,5), (-10,10), (-15,15) and (-20,20). Panel C provides the differences between the two groups over all the windows. The statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

Furthermore, the results in panel A with respect to “high-end” player sales show a negative effect over the window (-5,5) of 0.74%, while abnormal returns increase with 1.30% over the window (-15,15), both significant at the 5% level. Assuming that transfer fees increase by the level of players, investors are negatively affected by leaving top class players over the window (-5,5), probably because it will reduce their expectations about on pitch performance. Additionally “Low-end” sales tend to have a positive effect over the same window, when comparing panel A and B, significant at the 1% level (respectively -0,74% for “high-end” sales relative to 1,84% for “low-end” sales). However, according to panel C, the difference is not significant. Therefore, we cannot conclude that investors respond negatively to outgoing transfers of more expensive players.

Altogether, the results tend to indicate some differences between transfers based on their fees. However, there are no clear explanations for these results. Therefore, there is need for further research to determine the right conclusions.

*6.2.3 Outgoing transfers nearby the transfer deadline*

Since transfers are only allowed in the determined transfer windows, it is hard to replace a player who left close to the transfer deadline. Therefore, there might be a stronger (negative) effect for outgoing transfers closer to the end of the transfer window relative to transfers in the rest of the window. Furthermore, it is assumed that such a transfer was not expected by investors and clubs many days in advance. This is because clubs could anticipate on a possible transfer by attracting an adequate replacement, which could reduce the effect on stock returns. Therefore, shorter event windows are used relative to earlier test on transfers. Table 11 presents the results.

**Table 11**

| | | Reaction to transfers | | |
|---|---|---|---|---|
| Panel A: EndWindow | N | CAAR(-1,1) | CAAR(-3,3) | CAAR(-5,5) |
| Sales | 16 | 0.0148* | 0.0022 | -0.0120** |
| (t-stat) | | (1.8915) | (0.5312) | (-2.5659) |
| | | | | |
| Panel B: RestWindow | | | | |
| Sales | 53 | 0.01562 | 0.0154*** | 0.0086* |
| (t-stat) | | (1.5968) | (2.6937) | (1.9001) |
| | | | | |
| Panel C: Difference End-Rest | | | | |
| Sales | | -0.0008 | -0.0132 | -0.0206 |
| (t-stat) | | (-0.0455) | (-0.6311) | (0.9723) |

**Table 11 presents the results of an event study regarding the cumulative average abnormal returns for transfers at the end of the window (Panel A) and transfers over the rest of the window (Panel B) over the windows (-1,1), (-3,3) and (-5,5). Panel C provides the differences between the two groups over all the windows. The statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

The results in table 11 are especially relevant for the window (-5,5). Over this period, outgoing transfers at the end of the transfer window tend to have a negative effect of 1.2% on stock price returns, significantly different from zero at the 5% level. Comparing this with the positive effect of 0.86% (significant at the 10% level) for relevant sales over the rest of the window, the presumption for asymmetric effects between sales at the end of the window and the rest of the window seems to hold. However, according to panel C, the difference is not significantly different from zero. Therefore, further research has to examine the assumed theory, for example, by extending the sample.

*6.2.4 Regression results*

To support the results with regard to transfers and explain the variation in abnormal returns around outgoing and incoming transfers, this paragraph exhibits OLS regressions for several event windows. This is in order to explain the cumulative abnormal returns around transfers. Similar to the regressions with respect to game results, the dummy variables WIN, LOSS, DRAW and GoalDiff are included in the regression model. WIN (LOSS, DRAW) is equal to one if a match is won (lost, draw) within the week preceding a transfer and zero otherwise, while GoalDiff captures the difference in goals scored for the relevant games. Furthermore, EndWindow and SummerTransfer are dummy variables equal to one if a transfer took place in the last week of the transfer window or in the transfer window between seasons and zero otherwise. Additionally, the variable FEE captures the relevant transfer fee. Last, year dummies and team dummies are added to capture time and firm fixed effects. Therefore, the following regression model is determined:

$$CAR_{itj} = \alpha_0 + \beta_1 WIN + \beta_2 LOSS + \beta_3 DRAW + \beta_4 GoalDiff + \beta_5 EndWindow + \beta_6 SummerTransfer + \beta_7 FEE + \beta_n ControlVariables + \varepsilon_i \quad \text{(III)}$$

$CAR_{itj}$ denotes the cumulative abnormal return for club $i$ at time $t$ for an acquisition or sale $(j)$ of a football player. Adding player characteristics (e.g. age, goals scored in the previous season), selling club characteristics and buying club characteristics (e.g. league position in the season prior the transfer) did lower the significance of the model, therefore these variables were omitted. Table 12 contains the results for cumulative abnormal returns around acquisitions (panel A) and sales (Panel B).

Both panel A and B only show a few significant results. Therefore, the regression model fails to effectively explain the variation in abnormal returns around incoming and outgoing transfers. However, it is not clear which variables do explain these abnormal returns. Besides, long event periods lower the significance (Brown and Warner, 1980 and 1985), for example due to multiple non-transfer related events that might affect stock price returns of football clubs. Further research could determine new control variables to enhance the regression model.

**Table 12**

| | Reaction to transfers | | | | |
|---|---|---|---|---|---|
| Panel A: Acquisitions | CAR(-1,1) | CAR(-5,5) | CAR(-10,10) | CAR(-15,15) | CAR(-20,20) |
| WIN | -0.0078 | -0.1378 | -0.1473 | -0.0154 | -0.1412 |
| | (-0.14) | (-1.48) | (-1.48) | (-0.15) | (-1.13) |
| LOSS | 0.0159 | -0.1379 | -0.0759 | -0.0096 | -0.1497 |
| | (0.26) | (-1.38) | (0.71) | (-0.09) | (-1.17) |
| DRAW | 0.0027 | -0.0317 | -0.0140 | -0.0641 | -0.1143 |
| | (0.07) | (-0.48) | (-0.20) | (-0.89) | (-1.31) |
| GoalDiff | 0.0099 | 0.0758 | 0.0157 | -0.0889 | -0.0346 |
| | (0.20) | (1.23) | (0.24) | (-1.32) | (-0.43) |
| EndWindow | -0.0059 | 0.0412 | 0.0507 | 0.0862* | 0.1181* |
| | (-0.22) | (0.94) | (1.03) | (1.69) | (1.92) |
| SummerTransfer | 0.0184 | -0.0616 | -0.1685** | -0.1776** | -0.1467 |
| | (-0.38) | (-0.78) | (-1.98) | (-2.13) | (-1.46) |
| FEE | -0.0011 | -0.0014 | -0.0026* | -0.0005 | -0.0017 |
| | (-1.43) | (-1.10) | (-1.81) | (-0.38) | (-1.00) |
| Team Dummies | Yes | Yes | Yes | Yes | Yes |
| Year Dummies | Yes | Yes | Yes | Yes | Yes |
| N | 72 | 71 | 70 | 69 | 69 |
| $R^2$ | 0.0577 | 0.0626 | 0.0931 | 0.1232 | 0.1181 |
| Panel B: Sales | | | | | |
| WIN | -0,0285 | -0,0848 | -0,088 | -0,0776 | 0,1961 |
| | (-0,51) | (-1,17) | (-1,17) | (-0,61) | -1,18 |
| LOSS | 0,0466 | -0,0069 | 0,017 | 0,0693 | 0,3792* |
| | -0,71 | (-0,08) | -0,2 | -0,47 | -1,96 |
| DRAW | -0,0624 | -0,0934** | -0,0253 | -0,0757 | 0,0499 |
| | (-1,95) | (-2,28) | (-0,60) | (-1,04) | -0,53 |
| GoalDiff | -0,0113 | 0,0077 | 0,024 | -0,0159 | -0,1299** |
| | (-0,57) | -0,3 | -0,9 | (-0,35) | (-2,20) |
| EndWindow | 0,0474 | 0,0286 | 0,0434 | 0,1036 | 0,006 |
| | -1,54 | -0,73 | -1,06 | -1,48 | -0,07 |
| SummerTransfer | -0,0695 | -0,0801 | -0,1459** | -0,403*** | -0,3922*** |
| | (-1,51) | (-1,35) | (-2,38) | (-3,25) | (-2,88) |
| FEE | -0,0009 | -0,001 | -0,0008 | 0 | -0,0026 |
| | (-1,12) | (-0,91) | (-0,70) | -0,02 | (-1,06) |
| Team Dummies | Yes | Yes | Yes | Yes | Yes |
| Year Dummies | Yes | Yes | Yes | Yes | Yes |
| N | 66 | 66 | 66 | 66 | 60 |
| $R^2$ | 0.0613 | 0.1770 | 0.0965 | 0.1132 | 0.1675 |

**Table 12 presents the results of regression model (III) regarding the cumulative abnormal returns over five event windows. Goaldiff is the difference between number of goals scored and those conceded in a game. The dummy variables EndWindow and SummerTransfer, are equal to one if a transfer took place at the end of the transfer window or between two seasons in the summer window. The t-stat of the estimated coefficients are in parentheses and the statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

According to panel A, incoming transfers in the transfer window between seasons negatively influence abnormal returns with 16.85% and 17.76% (both significant at the 5% level) over the windows CAR(10,10) and CAR(-15,15). Following Dobson et al. (2000), clubs charge a premium for transfers during the season, which might explain the negative relation. However, since previous results show a positive effect of acquisitions (e.g. 0.26% for (-10,10), significant at the 1% level), the negative relation could indicate a stronger positive reaction for acquisitions during the season. This might be explained by investor sentiment, for example investors might positively react to quality enrichment for the last half of the season in order to, for example, win the league. Although, further research should find the proper explanation. Furthermore, the positive relation (weakly significant at the 10% level) for EndWindow is more interesting regarding sales compared to acquisitions.
With respect to CAR(-5,5) panel B shows, in line with the findings in section 5.1, that football matches ending in a draw has negative effects on stock returns. However, the positive effect after a loss and negative effect for GoalDiff, are striking with the results in section 5.1 over the window (-20,20). A possible explanation might be the low number of matches played around transfers. For example, the sample consists of only three lost football matches in the week prior an outgoing transfer. In addition, similar to findings in panel A, SummerTransfer tend to have a negative effect for large event windows. This might indicate stronger stock price response to transfers during the season, probably because clubs are generally not able to attract adequate replacements during the season.

*6.3 Robustness of results*

Football stocks are probably affected by non-trading. According to several sources, betas of non-synchronous trading stocks could be biased. Therefore, the Dimson model (1979), using lags and leads, is used regarding the computation of the normal return. Similar to Palomino et al. (2009) three lags and leads are added to model (a) in order to control for possible underestimated betas.
Furthermore, an alternative way of calculating stock returns using log returns and abnormal returns with respect to a different benchmark (MSCI All Country Europe Index) did not affect results and conclusions.
In addition, regarding event induced variance, the test statistic of Boehmer et al. (1991) is used to check whether this test statistic will lead to the same conclusions. Appendix F

exhibits the computations of, and the results with the Boehmer test statistic regarding to day (0) for the total sample, international matches, important matches and less important matches. In general, the test statistic of Boehmer et al. (1991) is lower, which could weaken the power of significance of some results. However, according to appendix F, the conclusions remain the same for all the market reactions.
Lastly, in order to determine the months where important games are played, appendix E presents the results when important games were defined as post March. As previous discussed in section 6.1.3, the results have lower statistical power and are contrary to hypothesis 3. This might indicate that games in March could be defined as important games.

## 7. LIMITATIONS

According to the "weekend effect", stock prices tend to be lower on Monday compared to other days of the week (French, 1980; Lakonishok and Levi, 1982). Since, with respect to football matches, the major part of the events regarding this study took place during the weekends, the abnormal returns could be biased. However, based on the results exhibited in table 3, there is no significant difference between national matches (played in the weekends) and international matches (played during the week) at day (0). Therefore, it is considered, that this limitation did not affect the results.

Furthermore, stock returns could be affected by other events. For example, Stadtmann (2006) concluded for Borussia Dortmund that, besides match outcomes, corporate governance related news triggered stock returns. Therefore, the abnormal returns around match outcomes and transfers could be caused by non-event related information. Regarding football matches, non-events are probably not a major limitation, due to small event windows. However, non-events could be a major limitation regarding the large event windows around players transfers. Probably due to this limitation, regression model (III) fails to explain the variation in abnormal returns around football transfers.

In addition, abnormal returns around football matches could be affected by transfers and vice versa. However, since there are hardly no football matches during the transfer windows, there are only a few matches played around players transfers. Therefore, this is not considered as a major limitation.

## 8. CONCLUSION

The last section consists of conclusions relative to stock price returns of football clubs around matches and transfers extended with interesting fields for further research. In addition, the results will be explained from an investor perspective regarding the efficient market hypothesis and behavioral finance.

### *8.1 Match outcomes*

Several studies described the relationship between match results and stock price returns with respect to football clubs. For example, Renneboog and Vanbrabant (2000) found positive effects after victories, while defeats and draws were followed by negative stock price reactions. In line with relevant research, this study found positive reactions of 0.42% to the first trading day following victories, while stock price returns declined with 0.89% and 1.39% at day (0) respectively after draws and defeats. In addition, similar market reactions occurred throughout the whole event period (-1,1) and over the first two trading days following football matches (0,1). Furthermore, just as previous research suggests (e.g. Renneboog and Vanbrabant, 2000; Scholtens and Peenstra),the effect tend to be stronger with respect to defeats relative to victories.

Furthermore, relevant literature showed stronger responses after matches played in international competitions compared to matches regarding national competitions. According to Renneboog and Vanbrabant (2000), this is because of the higher financial rewards earned in international leagues. However, based on the results of this study, market reactions only tend to be stronger after international matches result in a draw over the event windows (-1,1) and (0,1). For victories and defeats, we cannot conclude stronger reactions following international games. Furthermore, investors tend to overreact prior an international win, probably due to overconfidence, which is adjusted the day after and explains the non-significant effect at day (0).

According to hypothesis 3, important matches should result in stronger marker reactions relative to less important matches. Important games could be identified as promotion and relegation games (Renneboog and Vanbrabant, 2000) or matches between rivals competing for the same league position (Bell et al., 2012). In this study, matches were labelled as

important if they were played at the end of the season (March-June). Matches played at the end of the season could be important since these matches have greater impact on final league positions and could determine for example if clubs qualify for international competitions with associated high earnings.
In contrast to the assumption of hypothesis 3, there is no evidence for stronger market reactions after important games regarding wins and draws. Furthermore, investors tend to overreact the day prior an important win, probably due to overconfidence. However, consistent with Renneboog and Vanbrabant (2000) and Bell et al. (2012), losses are followed by stronger market reactions over the whole event period (-1,1) and to a lesser extent over the period (0,1).

In addition, there is strong evidence that investors stronger react to unexpected match outcomes relative to expected match regarding victories, based on both betting odds and winning streaks. This finding expands existing literature that suggests stronger market reactions after unexpected losses (Palomino et al., 2009) and European matches (Scholtens and Peenstra, 2009). Furthermore, there is weak evidence with respect to stronger market reactions to unexpected match outcomes after losses, in line with Palomino et al. (2009).

*8.2 Transfers*

In contrast to hypothesis 5, non-synergetic theories and Fotaki et al. (2009), acquisitions of football players tend to have positive effects on stock price returns over all the event periods (significant over the windows (-1,1), (-5,5) and (-10,10)). However, this effect is not remarkable when considering the shareholder structure of football clubs. Since the major part of shareholders of football clubs are fans (Renneboog and Vanbrabant, 2000), it is likely that investor sentiment affects stock price returns around players transfers. For example, attracting top class players could enhance investors' expectations about on field performance which could lead to positive stock price returns.

Furthermore, in line with hypothesis 6 and non-synergetic theories, results show a positive market reaction after player sales over the period (-5,5) significant at the 5% level. However, with the shareholder structure of football clubs in mind, the effect is not certainly due to

arguments based on literature regarding mergers and acquisitions. Therefore, similar to acquisitions, investor sentiment could affect stock price returns around outgoing transfers.

In addition, the results exhibited in section 6.2.2 presume stronger (positive) market reactions after "high-end" acquisitions over longer event windows, while over short event windows "low-end" transfers generate stronger market response. These differences are weakly significant and occur for unclear reasons. If fees increase with the level of players, "high-end" acquisitions should positively affect stock price returns since attracting top class players increase investors' expectations about on pitch performance, in line with the results for long event windows. Remarkably, however, the results for short event windows show opposite reactions.
Moreover, relative to player sales over the window (-5,5), "high-end" sales negatively affect stock price returns, compared to a positive reaction of player sales over the same window (both significant at the 5% and 1% level). This could indicate that investors negatively react to outgoing transfers of top class players. Unfortunately, the results provide no hard evidence.

Furthermore, over the window (-5,5), investors tend to negatively respond to outgoing transfers close to the transfer window deadline in contrast to positive market reactions on outgoing transfers over the rest of the transfer window. This is probably because football clubs are generally not able to attract adequate replacements at the end of the window. However, due to weak evidence, this only is a presumption based on likely responses of football fans.

### *8.2.1 Recommendations for further research*

Lastly, there is a major unexplored field in research regarding market reactions towards football transfers. Therefore, further research into market reactions to transfers with respect to transfer fees or outgoing transfers close to the transfer deadline could find interesting results, probably in line with presumptions of sections 6.2.2 and 6.2.3. Moreover, further research should focus on determining the variables that explain the variation in abnormal returns around transfers of football players, since regression model (III) fails to properly explain this variation.

*8.3 Market theories in finance*

Although some results could indicate that investors in football stocks act rationally (e.g. positive market reaction after wins and negative after losses), it is more likely that investor sentiment determines stock price returns of football clubs. For example, overreactions prior international and important games might indicate that investors base their investment behavior on mood or confidence (Edmans et al., 2007; Bell et al., 2007). Furthermore, Palomino et al. (2009) found overreactions after expected victories, due to investor sentiment. In addition, Bernile and Lyandris (2011) showed irrational behavior of football bettors on the betting exchange in terms of overestimating the probability of success. Therefore, stock price returns across football clubs are likely to be explained by investor sentiment, in line the field of behavioral finance, and not by rational decisions of investors regarding the efficient market hypothesis.

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## APPENDIX A

Table 13 presents all currently listed football clubs from Europe.

**Table 13**

| Club | Country |
|---|---|
| Aalborg Boldspilklub | Denmark |
| AFC Ajax | Netherlands |
| AIK Football | Sweden |
| Arhus Elite | Denmark |
| AS Roma | Italy |
| Besiktas | Turkey |
| Borussia Dortmund | Germany |
| Brondby IF | Denmark |
| Celtic | Scotland |
| Fenerbache Sportif Hizmet | Turkey |
| Futebol Clube do Porto | Portugal |
| Galatasaray | Turkey |
| Juventus | Italy |
| Lazio | Italy |
| Manchester United | England |
| Olympique Lyonnais | France |
| Parken Sport | Denmark |
| Ruch Chorzow | Poland |
| Silkeborg | Denmark |
| Sport Lisboa e Benfica | Portugal |
| Sporting | Portugal |
| Teteks AD Tetevo | Macedonia |
| Trabzonspor Sportif Yatir | Turkey |

## APPENDIX B

Table 14 contains the eleven European football clubs used in this study. In addition, table 14 exhibits the national league the clubs play in, their home country and the date of the initial public offerings.

**Table 14**

| Club | Competition | IPO Date | Country |
|---|---|---|---|
| AFC Ajax | Dutch Eredivisie | 11-05-1998 | Netherlands |
| AS Roma | Serie A | 22-05-2000 | Italy |
| Borussia Dortmund | Bundesliga | 30-10-2000 | Germany |
| Celtic | Scottish Premier League | 01-09-1995 | Scotland |
| Futebol Clube do Porto | Primeira Liga | 01-06-1998 | Portugal |
| Juventus | Serie A | 19-12-2001 | Italy |
| Lazio | Serie A | 06-05-1998 | Italy |
| Manchester United | Premier League | 10-08-2012 | England |
| Olympique Lyonnais | Ligue 1 | 08-02-2007 | France |
| Sport Lisboa e Benfica | Primeira Liga | 21-05-2007 | Portugal |
| Sporting | Primeira Liga | 21-05-2007 | Portugal |

## APPENDIX C

Table 15 presents the coefficients, the related ranking and the total number of participants that are allowed to participate upcoming season in international competitions of the relevant countries. Furthermore, the last four columns show how the clubs are divided over the Champions League (CL), Qualification for Champions League (QCL), the Europa League and Qualification for Europa League (QEL), where the numbers denotes the final ranking of last season. In addition, Cup and Play-Off denotes the winner of the national cup or play-offs.

**Table 15**

| Country | Coefficient | Ranking | # Participants | Cl | QCL | EL | QEL |
|---|---|---|---|---|---|---|---|
| Germany | 65749 | 2 | 7 | 1, 2, 3 | 4 | 5, 6, Cup | 7 |
| England | 64221 | 3 | 7 | 1, 2, 3 | 4 | 5, 6, Cup | 7 |
| Italy | 60439 | 4 | 6 | 1, 2 | 3 | 4, 5, Cup | 6 |
| Portugal | 44165 | 5 | 6 | 1, 2 | 3 | 4, Cup | 5, 6 |
| France | 43832 | 6 | 6 | 1, 2 | 3 | 4, Cup | 5,6 |
| Netherlands | 30979 | 10 | 5 | 1 | 2 | Cup | 3, Play-Off |
| Scotland | 16300 | 24 | 4 | - | 1 | - | 2,3, Cup |

**APPENDIX D**

All the transfers in the sample of this study are included in table 16. The transfer fee is denoted in millions € rounded to half a million, while the date refers to the date of the official announcement of the transfer. There are 141 transfers in the sample, where a transfer is denoted twice when both involved clubs are part of the sample of football clubs.

**Table 16**

| | Player | From | To | Fee | Date |
|---|---|---|---|---|---|
| 1 | H. Fournier | Reims | Lyon | .5 | 24-5-2014 |
| 2 | N. Zimling | FC Mainz 05 | Ajax | .5 | 31-8-2014 |
| 3 | A. Plea | Lyon | Nice | .5 | 2-7-2014 |
| 4 | J. Tanaka | Kashiwa | Sporting | .5 | 22-6-2014 |
| 5 | R. Rabia | Al Ahly | Sporting | 1 | 3-8-2014 |
| 6 | J. Holebas | Olympiacos | AS Roma | 1 | 30-8-2014 |
| 7 | K. Mendez | Penarol B | AS Roma | 1 | 6-1-2015 |
| 8 | K. Vermeer | Ajax | Feyenoord | 1 | 2-9-2014 |
| 9 | D. Hoesen | Ajax | FC Groningen | 1 | 1-7-2014 |
| 10 | Eliseu | Malaga | SL Benfica | 1 | 24-7-2014 |
| 11 | M. Sarr | Lyon | Sporting | 1 | 26-7-2014 |
| 12 | A. Henriquez | Manchester United | Dinamo Zagreb | 1 | 11-8-2014 |
| 13 | M. Sarr | Lyon | Sporting | 1 | 26-7-2014 |
| 14 | P. Oliveira | Guimaraes | Sporting | 1 | 1-7-2014 |
| 15 | Cristian Pasquato | Udinese | Juventus | 1.5 | 30-6-2014 |
| 16 | P. Evra | Manchester United | Juventus | 1.5 | 21-7-2014 |
| 17 | P. Evra | Manchester United | Juventus | 1.5 | 21-7-2014 |
| 18 | C. Jallet | Paris Saint-Germain | Lyon | 1.5 | 23-7-2014 |
| 19 | Evandro | Estoril | FC Porto | 1.5 | 30-6-2014 |
| 20 | T. Watt | Celtic | Standard Liege | 1.5 | 28-7-2014 |
| 21 | C. Pasquato | Padua | Juventus | 1.5 | 20-6-2014 |
| 22 | L. Rose | Valenciennes | Lyon | 2 | 17-7-2014 |
| 23 | F. Montero | Seattle | Sporting | 2 | 2-7-2014 |
| 24 | M. D'Allesandro | AS Roma | Atalanta Bergamo | 2 | 4-7-2014 |
| 25 | A. Sanabria | Sassuolo | AS Roma | 2.5 | 24-7-2014 |
| 26 | J. Shieber | Borussia Dortmund | Hertha BSC | 2.5 | 3-7-2014 |
| 27 | R. Zivkovic | FC Groningen | Ajax | 2.5 | 2-7-2014 |
| 28 | Simeon Slavchev | Litex Lovech | Sporting | 2.5 | 19may2014 |
| 29 | Park Ji-Sung | Manchester United | QPR | 3 | 9-7-2012 |
| 30 | EmanueleGiaccherini | Cesana | Juventus | 3 | 25-8-2011 |
| 31 | V. Aboubakar | Lorient | FC Porto | 3 | 24-8-2014 |
| 32 | L. Benito | FC Zurich | SL Benfica | 3 | 1-7-2014 |
| 33 | S. Scepovic | Sporting | Celtic | 3 | 29-8-2014 |
| 34 | J. Silva | Estudiantes | Sporting | 3.5 | 9-8-2014 |
| 35 | Guillermo Varela | Penarol | Manchester United | 3.5 | 7-6-2013 |
| 36 | Bebe | Manchester United | SL Benfica | 3.5 | 25-7-2014 |

| | | | | | |
|---|---|---|---|---|---|
| 37 | Bebe | Manchester United | SL Benfica | 3.5 | 25-7-2014 |
| 38 | F. Quagliarella | Juventus | Torino | 3.5 | 18-7-2014 |
| 39 | Kelvin Wilson | Celtic | Nottingham Forrest | 3.5 | 9-8-2013 |
| 40 | Andre Castro | FC Porto | Kasimpasa | 3.5 | 1-7-2014 |
| 41 | Virgil van Dijk | FC Groningen | Celtic | 3.5 | 21-6-2013 |
| 42 | O. Cardozo | SL Benfica | Trabzonspor | 4 | 4-8-2014 |
| 43 | Elias | Sporting | Corinthians | 4 | 14-7-2014 |
| 44 | A. Talisca | Bahia | SL Benfica | 4 | 5-7-2014 |
| 45 | Derk Boerrigter | Ajax | Celtic | 4.5 | 30-7-2013 |
| 46 | F. Peluso | Juventus | Sassuolo | 4.5 | 3-7-2014 |
| 47 | Marcos Rojo | Spartak Moskva | Sporting | 5 | 9-7-2012 |
| 48 | Ricky van Wolfswinkel | Sporting | Norwich City | 5 | 1-7-2013 |
| 49 | L. Marrone | Sassuolo | Juventus | 5 | 2-7-2014 |
| 50 | Aly Cissokho | Lyon | Valencia | 5 | 23-8-2012 |
| 51 | M. Vucinic | Juventus | Al-Jazira Abu Dhabi | 5 | 4-7-2014 |
| 52 | Eljero Elia | Juventus | Werder Bremen | 5.5 | 9-7-2012 |
| 53 | Djibril Cisse | Lazio | QPR | 5.5 | 31-1-2012 |
| 54 | Eric Dier | Sporting | Tottenham Hotspur | 5.5 | 2-8-2014 |
| 55 | Marco Parolo | Parma | Lazio Roma | 6.5 | 30-6-2014 |
| 56 | Maarten Stekelenburg | Ajax | AS Roma | 6 | 1-8-2011 |
| 57 | Filip Djuricic | Heerenveen | SL Benfica | 6 | 1-7-2013 |
| 58 | E. Garay | SL Benfica | Zenit St. Petersburg | 6 | 30-6-2014 |
| 59 | MaartenStekelenburg | Ajax | AS Roma | 6 | 1-8-2011 |
| 60 | B. Cristante | AC Milan | SL Benfica | 6 | 1-9-2014 |
| 61 | Alexander Buttner | Manchester United | Din. Moscow | 6 | 24-6-2014 |
| 62 | Stefano Sturaro | Genoa | Juventus | 6.5 | 29-6-2014 |
| 63 | Y. Brahimi | Granada CF | FC Porto | 6.5 | 23-7-2014 |
| 64 | S. Defour | FC Porto | Anderlecht | 6.5 | 13-8-2014 |
| 65 | Maarten Stekelenburg | AS Roma | Fulham | 6.5 | 5-6-2013 |
| 66 | Toby Alderweireld | Ajax | Atletico Madrid | 7 | 2-9-2013 |
| 67 | Gary Hooper | Celtic | Norwich City | 7 | 26-7-2013 |
| 68 | N. Sahin | Real Madrid | Borussia Dortmund | 7 | 1-7-2014 |
| 69 | M. Yanga-Mbiwa | Newcastle | AS Roma | 7.5 | 1-9-2014 |
| 70 | Eliaquim Mangala | Standard Liege | FC Porto | 7.5 | 16-8-2011 |
| 71 | D. Sinkgraven | Heerenveen | Ajax | 7.5 | 31-1-2015 |
| 72 | B. Martins Indi | Feyenoord | FC Porto | 7.5 | 15-7-2014 |
| 73 | T. Jedvaj | AS Roma | Bayer Leverkusen | 8 | 1-7-2014 |
| 74 | S. Kagawa | Manchester United | Borussia Dortmund | 8 | 31-8-2014 |
| 75 | S. Kagawa | Manchester United | Borussia Dortmund | 8 | 31-8-2014 |
| 76 | Michael Bradley | AS Roma | Toronto FC | 8.5 | 13-1-2014 |
| 77 | Vurnon Anita | Ajax | Newcastle United | 8.5 | 16-8-2012 |
| 78 | S. De Vrij | Feyenoord | Lazio Roma | 8.5 | 30-7-2014 |
| 79 | S. De Jong | Ajax | Newcastle United | 8.5 | 30-6-2014 |
| 80 | Eljero Elia | Hamburger SV | Juventus | 9 | 31-8-2011 |
| 81 | Emanuele Giaccherini | Juventus | Sunderland | 9.5 | 16-7-2013 |
| 82 | Libor Kozak | Lazio | Aston Villa | 10 | 2-9-2013 |

| | | | | | |
|---|---|---|---|---|---|
| 83 | Tiago Ilori | Sporting | Liverpool | 10 | 2-9-2013 |
| 84 | G. Siqueira | SL Benfica | Atletico Madrid | 10 | 6-6-2014 |
| 85 | A. Ramos | Hertha BSC | Borussia Dortmund | 10 | 2-7-2014 |
| 86 | M. Ginter | SC Freiburg | Borussia Dortmund | 10 | 17-7-2014 |
| 87 | Adrian | Atletico Madrid | FC Porto | 11 | 11-7-2014 |
| 88 | Lucas Barrios | Borussia Dortmund | Guangzhou | 11.5 | 1-7-2012 |
| 89 | Gervinho | Arsenal | AS Roma | 11.5 | 8-8-2013 |
| 90 | Erik Lamela | River Plate | AS Roma | 12 | 6-8-2011 |
| 91 | K. Kampl | Red Bull Salzburg | Borussia Dortmund | 12 | 1-1-2015 |
| 92 | Jan Vertonghen | Ajax | Tottenham Hotspur | 12 | 12-7-2012 |
| 93 | F. Forster | Celtic | Southampton | 12.5 | 9-8-2014 |
| 94 | Angelo Ogbonna | Torino | Juventus | 13 | 11-7-2013 |
| 95 | K. Manolas | Olympiacos | AS Roma | 13 | 25-8-2014 |
| 96 | Bojan Krikic | Barcelona | AS Roma | 13 | 2-7-2013 |
| 97 | Fabio Borini | AS Roma | Liverpool | 15 | 9-7-2012 |
| 98 | S. Doumbia | CSKA Moscow | AS Roma | 15 | 30-1-2015 |
| 99 | A. Gomes | SL Benfica | Valencia CF | 15 | 17-7-2014 |
| 100 | J. Iturbe | FC Porto | Hellas Verona | 15 | 2-7-2014 |
| 101 | Fernando | FC Porto | Machester City | 15 | 25-6-2014 |
| 102 | Dani Osvaldo | Espanyol | AS Roma | 15 | 25-8-2011 |
| 103 | J. Oblak | SL Benfica | Atletico Madrid | 16 | 16-7-2014 |
| 104 | Christian Eriksen | Ajax | Tottenham Hotspur | 16 | 30-8-2013 |
| 105 | Hugo Lloris | Lyon | Tottenham Hotspur | 16.5 | 31-8-2012 |
| 106 | Shinji Kagawa | Borussia Dortmund | Manchester United | 17 | 22-6-2012 |
| 107 | Shinji Kagawa | Borussia Dortmund | Manchester United | 17 | 22-6-2012 |
| 108 | Carlos Tevez | Man City | Juventus | 17 | 27-6-2013 |
| 109 | Victor Wanyama | Celtic | Southampton | 17.5 | 10-7-2013 |
| 110 | D. Blind | Ajax | Manchester United | 17.5 | 2-9-2014 |
| 111 | D. Blind | Ajax | Manchester United | 17.5 | 1-9-2014 |
| 112 | C. Immobile | Torino | Borussia Dortmund | 19.5 | 30-6-2014 |
| 113 | M. Rojo | Sporting | Manchester United | 20 | 19-8-2014 |
| 114 | M. Rojo | Sporting | Manchester United | 20 | 19-8-2014 |
| 115 | A. Morata | Real Madrid | Juventus | 20 | 19-7-2014 |
| 116 | D. Welbeck | Manchester United | Arsenal | 20 | 1-9-2014 |
| 117 | Marco Reus | Monchengladbach | Borussia Dortmund | 21 | 2-7-2012 |
| 118 | Pablo Osvaldo | AS Roma | Southampton | 21 | 18-8-2013 |
| 119 | Wilfried Zaha | Cristal Palace | Manchester United | 21 | 25-1-2013 |
| 120 | Ciro Immobile | Torino | Borussia Dortmund | 22 | 3-6-2014 |
| 121 | J. Iturbe | Hellas Verona | AS Roma | 22 | 16-7-2014 |
| 122 | Javi Garcia | Benfica | Man City | 22 | 31-8-2012 |
| 123 | Kevin Strootman | PSV Eindhoven | AS Roma | 23 | 1-7-2013 |
| 124 | E. Perez | SL Benfica | Valencia CF | 25 | 29-12-2014 |
| 125 | M. Benatia | AS Roma | Bayern Munich | 25 | 26-8-2014 |
| 126 | L. Markovic | SL Benfica | Liverpool | 25 | 15-7-2014 |
| 127 | Nemanja Matic | Benfica | Chelsea | 30 | 15-1-2014 |
| 128 | Joao Moutinho | FC Porto | Monaco | 30 | 24may2013 |

| | | | | | |
|---|---|---|---|---|---|
| 129 | Robin van Persie | Arsenal | Manchester United | 34 | 17-8-2012 |
| 130 | Erik Lamela | AS Roma | Tottenham | 36 | 30-8-2013 |
| 131 | Luke Shaw | Southampton | Manchester United | 38 | 27-6-2014 |
| 132 | Marouane Fellaini | Everton | Manchester United | 39 | 2-9-2013 |
| 133 | Ander Herrera | Athletic Bilbao | Manchester United | 41 | 26-6-2014 |
| 134 | Axel Witsel | Benfica | Zenit | 42 | 3-9-2012 |
| 135 | Mario Gotze | Borussia Dortmund | Bayern Munich | 44 | 2-7-2013 |
| 136 | Radamel Falcao | FC Porto | Atletico Madrid | 49 | 18-8-2011 |
| 137 | Juan Mata | Chelsea | Manchester United | 52 | 25-1-2014 |
| 138 | E. Mangala | FC Porto | Manchester City | 54 | 11-8-2014 |
| 139 | James Rodriguez | FC Porto | Monaco | 54 | 23-5-2013 |
| 140 | Hulk | FC Porto | Zenit | 55 | 3-9-2012 |
| 141 | A. Di Maria | Real Madric | Manchester United | 75 | 26-8-2014 |

**APPENDIX E**

Table 17 exhibits the market reaction for important games at the end of the season (Panel A) and for less important games at the rest of the season (Panel B). To check for robustness, the important games in table 17 are denoted as post march, in contrast to the results of table 4 where important matches are defined as post February.

**Table 17**

| Panel A: | End Season | N | AAR(0) | CAAR(-1,1) | CAAR(0,1) |
|---|---|---|---|---|---|
| Win | | 215 | -0.0031 | 0.0024 | -0.0056** |
| (t-value) | | | (-0.9547) | (0.4904) | (-1.6631) |
| Draw | | 68 | -0.0122*** | -0.0103** | -0.0177*** |
| (t-value) | | | (-2.6231) | (-1.8772) | (-3.7526) |
| Loss | | 69 | -0.0118** | -0.0218*** | -0.0192*** |
| (t-value) | | | (-2.3240) | (-4.091) | (-3.8244) |
| Panel B: | Rest Season | | | | |
| Win | | 904 | 0.0059*** | 0.0085*** | 0.0054*** |
| (t-value) | | | (5.5342) | (7.6450) | (5.0853) |
| Draw | | 341 | -0.0082*** | -0.0076*** | -0.0085*** |
| (t-value) | | | (-4.2730) | (-4.0911) | (-4.7955) |
| Loss | | 296 | -0.0144*** | -0.0087*** | -0.0113*** |
| (t-value) | | | (-9.0444) | (-6.7004) | (-7.8524) |
| Panel C: | Differences End-Rest | | | | |
| Win | | | -0.0899*** | -0.0061 | -0.0110*** |
| (t-value) | | | (3.0445) | (1.0649) | (2.5848) |
| Draw | | | 0.0041 | 0.0027 | 0.0092* |
| (t-value) | | | (0.07503) | (0.3400) | (1.3272) |
| Loss | | | -0.0026 | 0.0131* | 0.0079 |
| (t-value) | | | (0.4449) | (1.4668) | (0.9260) |

**Table 17 presents the results of an event study for important games at the end of the season (Panel A) and the rest of the season games (Panel B) for the average abnormal return at the event date AAR(0) and the two and three day cumulative average abnormal returns CAAR(-1,1) and CAAR(0,1). Panel C provides the differences between the two groups for abnormal returns at day 0 and the windows (-1,1) , (0,1). The statistical significance of the t-value at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

**APPENDIX F**

Table 18 shows the market reactions at day (0) for the total sample of matches (Panel A), international matches (Panel B), important matches (Panel C) and less important matches (Panel D). In addition to only a normal test statistic, the Boehmer test statistic is included to check for robustness of the findings. Although, the statistical power of the results is lower with respect to the Boehmer test statistic, all conclusions remains the same.

**Table 18**

| Panel A: Total Sample | WIN | DRAW | LOSS |
|---|---|---|---|
| AAR(0) | 0.0042 | -0.0089 | -0.0139 |
| (t-stat) | (4.5500)*** | (-4.9727)*** | (-9.1528)*** |
| (Boehmer t-stat) | (4.1196)*** | (-4.5022)*** | (-8.2869)*** |
| N | 1119 | 409 | 365 |
| Panel B: International | | | |
| AAR(0) | -0.0006 | -0.0094 | -0.0156 |
| (t-stat) | (0.4744) | (-2.2964)** | (-4.4853)*** |
| (Boehmer t-stat) | (0.4328) | (-2.0764)** | (-4.0610)*** |
| N | 151 | 86 | 98 |
| Panel C: Important | | | |
| AAR(0) | 0.0014 | -0.01195 | -0.0151 |
| (t-stat) | (0.8478) | (-3.1786)*** | (-3.8746)*** |
| (Boehmer t-stat) | (0.7676) | (-2.7750)*** | (-3.6380)*** |
| N | 347 | 106 | 114 |
| Panel D: Less important | | | |
| AAR(0) | 0.0055 | -0.0078 | -0.0134 |
| (t-stat) | (4.9155)*** | (-3.6064)*** | (-9.1549)*** |
| (Boehmer t-stat) | (4.6304)*** | (-3.6468)*** | (-7.5407)*** |
| N | 772 | 303 | 251 |

**Table … presents the results of an event study for all games (Panel A), international games (Panel B), important games (Panel C) and less important games (Panel D) for the average abnormal return at the event date AAR(0). The statistical significance of the test statistic at the 1%, 5% and 10% level, are denoted by respectively ***, ** and *.**

The computations of the Boehmer test statistic are as follows:

$$S_t^* = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(SAR_{it} - ASAR_t)^2} \quad \text{(j)}$$

$$TS_\tau = \sqrt{N} * \frac{ASAR_t}{S_t} \sim N(0,1) \quad \text{(k)}$$

The computations of the (Average) Standardized Abnormal Return are explained in section 5.5.1