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The effects of match results, investor expectations and stock exchange movement for publicly traded football clubs:

The case of Manchester United Football Club

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Abstract

This bachelor's thesis is an attempt to find out if match results, investor expectations and stock market fluctuation affect stock returns for publicly traded football clubs. The number of publicly traded football clubs has decreased a lot in the last 20 years. This study focuses on one specific English football club, the Manchester United. The observed events are the club's matches played on weekends in the top English football league. Because the club listed on the New York Stock Exchange only in 2012, the sample size remains quite thin although large enough for this study to be conducted.

The main tool used in the study is SPSS data analytics software and its multiple regression analysis specifically. Variables included in the regression models are stock market index, match results and investor expectations, which is measured by the stock price change prior to a match weekend.

The results of this study were quite inconclusive. It was a struggle to find statistical significance given the challenges posed by the low sample size. The clearest of results was that the Manchester United stock price does in fact correlate with the stock exchange index chosen for the study. The fact that any significant coefficients were evidenced only in a three-day observation period following a match weekend supports the findings of earlier studies, in that it takes two to three days for a match result to be incorporated into the stock price. The findings also show, that match results do have an impact on the stock price, with wins leading to positive returns while draws and losses generally result in negative returns. Investor expectations did not appear to impact stock returns after a match event in this research.

Keywords	football, soccer, stocks, shares, public, stock, exchange, investors, multiple, regression

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Table of contents

List of figures

List of tables

1 Introduction

This bachelor's thesis researches the impact that football match results, pre-match stock returns and stock market fluctuations have on the share price of publicly traded football clubs. The focus is on the English football giant Manchester United FC.

The professional football industry offers a unique platform for business studies, as the companies (clubs) involved often have objectives other than financial success. The fundamental contradictions between financial success off the pitch and athletic success on the pitch can raise questions about the ultimate goals of professional football clubs: are they more concerned with generating profits or succeeding in football competitions? Financial performance evidence from the English top tier football league, Barclays Premier League, seems to point towards the latter, as the 2013/2014 season was only the first one this century in which the league's clubs were able to record pre-tax profits (Deloitte, 2015). When a club's main objective is athletic success, Sandy *et al.* (2004) regard them as utility maximisers as opposed to traditional profit-maximising companies. They argue that utility maximisation is a norm in European football industry, whereas North American sports industries are motivated by profit maximising.

Since most European football clubs can be viewed as utility maximisers, it raises an interesting question if these clubs can be considered rational investments with potential financial returns to be gained. Sandy *et al.* (2004) note a few cases in the US in which club owners have treated their investments as nothing more than an expensive hobby. Similar developments have happened in English football as well, when Roman Abramovich bought Chelsea FC (BBC News, 2003) and Sheikh Mansour acquired Manchester City (BBC Sport, 2008). Whereas Abramovich and Mansour have injected their own money into their clubs in order to succeed in football competitions, the American Glazer family, who acquired Manchester United back in 2005, have taken an approach closer to profit maximisation by trying to turn the club into a cash cow for themselves (Conn, 2015). In 2012, they made a strategic decision to issue an initial public offering for the club shares in the New York Stock Exchange (de la Merced, 2012). Since

Manchester United is currently the only Premier League club to be listed on any major stock exchange and their owners have shown profit maximising tendencies, it provides an interesting objective for a case study.

Although Manchester United is currently the only publicly traded Premier League club (excluding Arsenal, listed on the ISDX market), there have been tens of English teams traded on stock exchanges. The first club to issue public shares was Tottenham Hotspur back in 1983 and the peak years for public football clubs were in the late 1990s, when over 20 English clubs were listed. The following decade saw most teams getting bought out (or going bankrupt) and consequently being delisted from the exchanges (see appendix 1). Rapidly increasing broadcasting revenues (BBC News, 2015) and financial control measures enforced by the Union of European Football Association (UEFA) (Almunia & Platini, 2012) have reduced the competitive advantage of clubs with billionaire owners. Thus, English football clubs might become potential investment targets soon for profit-maximising investors as well. In this context, researching the stock market performance of Manchester United now could prove to be useful.

Football matches provide an excellent opportunity to test stock market responses to company specific events for four reasons. Firstly, matches are usually played on the weekends when stock exchanges are closed, thus enabling a constant first observation after an event, namely Mondays. Secondly, match results are easily quantified by gained points or by a basic win, draw and loss scale. Thirdly, football matches are played regularly and often, usually at least once a week, so the number of observations is larger than company financial reports for example. Finally, there is no threat of insider trading relating to football matches, as the outcomes are decided on the pitch. This holds true when assuming that match fixing is not an issue.

When examining stock market reactions to match results, a link between match results and investor costs and benefits should be established. Unless match results are price sensitive information for investors, there is no reason why share prices would react to them. Firstly, succeeding in football competitions should in all likelihood increase the merchandise and ticket sales of a club. Secondly, the Premier League rewards clubs for their final position in the league standings, the

higher a club finishes the more “prize” money they are awarded (Premier League, 2015). The top six clubs of Premier League are also qualified to participate in UEFA’s European competitions, which offer significant financial gains for the partaking clubs. The connection between success on the pitch and financial performance is therefore clear.

Football, much like any sport, can provoke immense emotions is people. For publicly traded football clubs that poses challenges as their stock returns and volatility might be affected by their athletic performance. Baker & Wurgler (2007) find that waves of investor sentiment have distinct and important implications on individual firms. Professional football matches are sure to evoke waves of sentiment but the question is if investors are rational operators or prone to sentimental subjectivism, which is why this study includes a method to examine pre-match investor sentiment or investor expectations.

1.1 Research questions and structure of the thesis

This study aims to find out if Manchester United’s share price is affected by the results of their matches, the expectations of investors and the stock market fluctuations. Each factor is examined independently as well as a combination. In order to define a clear goal for this study, the objective will be to answer the following questions:

(1) Do match results affect Manchester United’s share price?

(2) Do investor expectations affect the stock returns of Manchester United?

(3) Do Manchester United’s stock returns reflect the stock market’s movements?

With the objectives of this study defined, the rest of the paper is structured as follows. The next chapter analyses previous academic literature written on public football clubs and their stock returns. Chapter three discusses various research methods and defines the methodology used in this study. Chapter four presents that used data and the research results with reference to the literature analysed in chapter 2. Finally, chapter 5 concludes the study, discusses its limitations and offers recommended future research directions that have risen in the course of conducting this research.

2 Literature review

This section reviews the existing research conducted on the stock performance of sports clubs and how their match outcomes impact their share price. The aim is to discover the established connections between the two and the deficiencies that previous studies might have had in order to justify the research questions evaluated in this paper.

The late 1990s saw a surge of initial public offerings in British football industry. As many as twenty clubs turned public on the London Stock Exchange (LSE) or its Alternative Investment Market (AIM) between 1994 and 1998. Therefore, it is only natural that before the turn of the millennium there had not been studies on the relation between football clubs' athletic performance and their stock returns. Sure, clubs such as Tottenham Hotspur (IPO in 1983) and Manchester United (IPO in 1991) had floated on stock exchanges for years, but before this surge of IPOs, there had not been sufficient data to draw any wider conclusions on the subject.

As with any field of research, the methods utilised have evolved and the results have become more accurate and robust along the years. The earliest study on stock market performance that focused specifically on football clubs and their athletic results was conducted by Renneboog and Vanbrabant (2000). They examined seventeen (17) different publicly listed British football clubs that played either in one of the top two tiers of English football or in the top Scottish football competition. Through three seasons (1995-1998) they found that there is in fact a relation between athletic performance on the pitch and financial performance on the stock exchange. A win resulted in positive abnormal returns of 1% on the next trading day, and draws and losses resulted in negative abnormal returns of -0.6% and -1.4%, respectively. In addition, they calculated cumulative abnormal returns for five trading days following a match and found that the returns seemed to increase. For wins, draws and losses, the five-day cumulative abnormal returns were 1.3%, -1.7% and -2.5%, respectively. However, the five-day observation period contradicts this paper's assumption that the last two trading days of a week, Thursday and Friday, see stock values changing in anticipation of the next

match instead of from last weekend's results. Thus, the results of Renneboog and Vanbrabant might have been contaminated.

The stock price impact of sports clubs' athletic performance has since been studied by many authors and there is extensive evidence that match results have an effect on stock price behaviour, regardless of the country that the club is from. Brown and Hartzell (2001) find that match outcomes impact the share price of American NBA team Boston Celtics. Ferreira (2004) studied two Portuguese football clubs, Sporting and Porto, and found that match results had an impact on Sporting's share price with every outcome, whereas only draws had a statistically significant effect on Porto's share price. Stadtmann (2006) found matches to have a significant impact on share prices of German football club Borussia Dortmund. Scholtens and Peenstra (2007) analysed eight European football clubs and found that wins have a positive and losses have a negative impact on their stock prices. Palomino *et al.* (2009) and Bell *et al.* (2011) follow Renneboog and Vanbrabant (2000) by analysing British football clubs and their stock returns after football matches and both find similar results. Bernile and Lyandres (2011) expand the sample by including 20 European football clubs in their study. They find similar evidence to the previous authors. Wu (2011) analyses the Italian football club Juventus but only finds significant stock market impacts when they played in the UEFA Champions League. National league matches were found to have a "negligible" effect. Berument and Ceylan (2012) examine clubs from Turkey, Spain, UK and Chile and find that match results affect the clubs' stock price. Sarac and Zeren (2013) find similar results when examining three Turkish clubs. Godinho and Cerquiera (2014) study 13 European clubs from six countries individually, and find that in 12 of the 13 cases, match outcomes influence their stock performance. All in all, the evidence is extensive and thorough: it covers multiple countries, competitions and clubs and even other sports and continents have shown proof of the linkage between match results and stock performance. In all this literature, a study by Zuber (2005) is referred to multiple times as showing contradicting evidence but unfortunately this research paper was unavailable when this study was prepared.

Berkowitz and Depken (2014) study the asymmetric reaction of stock markets to athletic performance of football clubs. They find that losing a game of football predicts losing in the future more than winning predicts winning in the future. This leads to the asymmetry in stock returns where losses have a larger negative impact than wins have a positive one. There is plenty of existing literature supporting this argument: Renneboog and Vanbrabant (2000), Ferreira (2004), Scholtens and Peenstra (2007), Palomino *et al.* (2009) Bernile and Lyandres (2011) and Berkowitz and Depken (2014) all find that losses have a stronger impact on stock returns than wins do. Thus, a loss of a game affects investor sentiment on the team's future performance and therefore negative abnormal returns on Thursday and Friday will be attributed to the following event in this study. Berkowitz and Depken (2014) also reveal that bad news (i.e. losses) are implemented in the share price faster than good news, which is found also by Palomino *et al.* (2009) in their research. They state that it takes two to three days for a winning performance to be fully included in the price whereas bad news experience very little lag. Nonetheless, they argue that it only takes a maximum of three days for stock markets to adjust for the new information from football matches, which supports the method used in this research.

Since football clubs play in different competitions and, based on several existing club characteristics, have varying goals regarding their performance in them, it is likely that not all the matches have an equal importance to the teams. Previous research has introduced various means to measure match importance, one of them being the different competitions that clubs participate in. Competitions such as the UEFA Champions League and the UEFA Europa League (formerly known as UEFA Cup), which include clubs from all around Europe, have significant financial opportunities for partaking clubs and succeeding in them is highly regarded worldwide. Renneboog and Vanbrabant (2000) found that these European Cup matches had a slightly larger impact on stock returns than national league or cup matches. Scholtens and Peenstra (2007) come to the same conclusion, especially losing in European competitions results in much higher negative abnormal returns than in national league matches. Wu (2011) finds that Champions League games have a stronger effect on the stock returns of Italian football club Juventus than its national league matches do. Sarac and Zeren

(2013) find a significant negative coefficient for three Turkish clubs when they play in either of the European cups. However, since Turkish clubs are not among the best teams in Europe, the results might only indicate that the clubs had lost most of their European cup matches. Stadtmann (2006) found that the coefficient for Champions League games compared to national league games for German club Borussia Dortmund was higher but not statistically significant. Since this study is only concerned with matches played in the national competition, these results only showcase the fact that different matches have dissimilar implications on share price.

In addition to varying competitions, match importance has been measured in national leagues by relative performance inside the league. Every national competition culminates towards the end of the season when clubs battle for promotion/championship and against relegation, each with major financial incentives for clubs as described earlier. Previous studies on the subject have included various tools to measure match importance. Renneboog and Vanbrabant (2000) arbitrarily divided the season into two and considered matches played in the last three months to be most important. Their sample covered only three teams fighting for the important places so results might be distorted. Nonetheless, they found extreme implications on stock price for these “important” matches. Wins on promotion matches resulted in abnormal returns of 3.2% on the following day (cumulated to 4% during the week), whereas as losses were followed by abnormal returns of -3.1% (cumulated to -2.1%). Relegation matches had an even stronger impact with winning resulting into returns of 5.8% (cumulated to 10.4%) and losing resulting into returns of -6.5% (cumulated to -13.8%). Palomino *et al.* (2009) discover similar effects from end-of-the-season match results, although only the matches played by promotion candidates show statistical significance in their research. Defining important matches by a set date is not the most valid method though, since fundamentally all points are of equal value. Thus, earning three points in the first match and earning three points in the last match are in absolute terms equal. It is when these methods are taken into a context of other teams’ performance when match importance could be measured more competently.

Subsequent studies have built on Renneboog and Vanbrabant's foundation by creating different models to more efficiently define match importance in national competitions. Ferreira (2004) utilised a variable called "relative points to victory" (RPV) to account for matches with different magnitudes of importance. This variable changes depending on the respective club's point difference to the league leader at the time of the match they play (or to the team in 2nd place if the team in question leads). Ferreira's method is much more dynamic and thus yields improved results, which show that stock returns tend to increase when the difference in RPV increases (the club reduces the gap to the leader or increases its lead at the top) and vice versa. However, not all teams have realistic objectives of winning the league. Some might aim to avoid relegation and some might aim to qualify for European cups. Therefore, using the same model for every club is not realistic. Bell *et al.* (2011) introduce models for measuring match importance through rivalry score and proximity to the end of the season. They find that rivalry score, measured by the closeness of the projected league position of the two playing teams, is only significant for one of the 19 clubs they examine. Similarly to Renneboog and Vanbrabant (2000), they discover that the match's proximity to the end of the season does have an impact on the share price, although their result is more modest. Perhaps the most advanced measure of match importance so far was introduced by Godinho and Cerqueira (2014). In the footsteps of Bell *et al.* (2011), they create a rivalry concept in which they calculate the percentage of the possible league points the examined club has acquired and then find the team with the closest percentage to it. They argue that this "rival" is projecting to be in the same league position as the club under examination, which means the result of the "rival's" game should have an impact in the club's stock performance as well. This addresses the issue of using a same objective for each club. Through this measure they find match importance to be a relevant factor.

Even though literature on this subject is extensive, only a handful of authors have incorporated investor sentiment analysis in their research. The work done by Berument *et al.* (2006, 2009, 2012) aims to form a link between football clubs' international success and the entire stock market returns on the clubs' home exchange. In their first study, they observe three of the biggest Turkish football clubs and only find one of them to be affecting the returns in Istanbul Stock

Exchange via match results against foreign rivals. In their following research, they complement the study by showing that the degree of fanaticism for clubs affects the stock market implications of their results; more fanatic supporters react more strongly which implicates the significant impact that investor sentiment has in the markets, although measuring fanaticism is very hard and often based on subjective assumptions. In their latest study, they build their case even further by finding that countries like Spain and the United Kingdom, whose clubs are considered stronger, suffer from (negative) abnormal stock market returns only when their clubs lose whereas countries with generally weaker clubs like Chile and Turkey, only enjoy positive returns when their clubs happen to win. This implies that investors in stronger football countries expect their teams to succeed and when they do not, investors are disappointed which leads to negative market reactions. On the other hand, countries with weaker clubs are affected by investor sentiment that does not expect their teams to win which nullifies the negative effect that a loss might have to the stock market. Although Berument *et al.* (2006, 2009, 2012) study the implications to a national stock market whereas this research focuses on an individual company, this kind of investor sentiment is exactly what this research aims to analyse.

Palomino *et al.* (2009) find evidence of investor overreaction when a club records a win. They hypothesise that market reaction should be weaker the higher the pre-event probability (which they measured via betting odds) of the actual outcome is. However, their findings show that abnormal returns following a win are higher, the higher the probability of winning was pre-event. This points towards investors overreacting to winning. Losing on the other hand does not suffer from the same effect. They show that the higher the probability of a loss, the smaller the negative abnormal return afterwards is. In addition, they observe that abnormal returns after a win are stronger in a five-day window than in a two or three-day window. Although they do not make the same distinction as this study, the findings support the choice made in this study, in that Thursday and Friday returns are attributed to the investor expectations on the upcoming match as there is a new wave of positive returns on those days. A win in the last match strengthens positive investor sentiment which in turn affects expectations on the upcoming match. Additionally, in the wake of Baker & Wurgler (2007), who find

that companies with low capitalisation are more sensitive to investor sentiment, Palomino *et al.* (2009) also provide evidence that smaller companies (i.e. football clubs) experience stronger abnormal results than bigger clubs. Their reasoning for it is that larger clubs usually have large institutional owners that are more stable and objective than individual investors, who might have stronger emotional ties to the club or the sport. By splitting their sample into two (smaller/bigger clubs), they find that the smaller half of the clubs experience twice as strong share price reactions to match results after both wins and losses, which supports the view that investor sentiment is a valid factor when measuring stock returns. Another reason for such results might be that for the smaller clubs, athletic success is more essential for their financial success whereas bigger clubs might have established stable businesses that rely less on individual matches or even seasons.

Bernile and Lyandres (2011) focus their research directly to investor sentiment regarding football results and stock returns of multiple European clubs. Their objective is "to assess the effect that investors' biased expectations and irrational reactions have on the efficiency of stock prices around value-relevant events". They define two distinct forms of investor sentiment. Much like Palomino *et al.* (2009), they describe a situation where investors apply correct probabilities to event outcomes but react irrationally to them after the event due to emotions. Secondly, Bernile and Lyandres (2011) argue that investors can be overly optimistic (or pessimistic) when approximating the possibilities of upcoming event outcomes, resulting in a pre-event value that differs from the discounted post-event value with rational probability distribution. Contrary to the findings of Palomino *et al.* (2009) who showed evidence of investor sentiment in the form of post-event overreaction, Bernile and Lyandres (2011) find evidence that investors tend to overestimate (pre-event) the probability of winning by 5 per cent which leads to a mean abnormal return of -0.9% after the examined matches. In other words, they find that investors have subjective irrational ex ante expectations (biases) for their clubs and thus, on average, get disappointed by the results.

Betting odds have been used extensively in the literature to try and proxy investor expectations as well as match result probability. Brown and Hartzell (2001) were

among the first ones to use betting market point spreads to control market expectations with regard to match result outcomes' impact to the share price of sports clubs. In the case of NBA team Boston Celtics, they find the explanatory power of betting odds to be marginal. However, basketball matches only have two possible outcomes (compared to three in football) and given the fact that NBA is played in North America and basketball is a marginal sport in the United Kingdom, these results might not have much relevance to the case of Manchester United.

Stadtmann (2006) used bookmaker betting odds to control for match expectations in the case of German Bundesliga club Borussia Dortmund. He argues that only the unexpected portion of the result should affect share prices. By calculating expected probabilities of each match's outcome via betting odds, he is able to define the part of the actual outcome that was not expected and compare that to the following stock returns. He finds that the unexpected portion of the outcome is significant only in the UEFA Cup, not in national league matches or the Champions League. Scholtens and Peenstra (2007) incorporate the same method when they study eight European football clubs for four years but fail to find evidence that bookmaker odds are integrated in stock prices. Palomino *et al.* (2009) study the predictive accuracy of betting odds and find them to be very good predictors of football match outcomes, which is later supported by Bell *et al.* (2011). With the two distinct proven relationships (match results affect stock prices and betting odds are good predictors of results), Palomino *et al.* (2009) seek to find out if investors process betting odds as new information and thus incorporate it into share prices. However, their research shows no signs that the release of betting odds affects stock markets. They propose that it might be a result of low information salience compared to that of actual match results. Sarac and Zeren (2013) applied bookmaker odds in their regression model to measure match importance, however they do not disclose the way it is meant to be interpreted thus leaving the rationale of the variable vague. Berkowitz and Depken (2014) support Palomino *et al.* (2009) with their findings that betting odds provide very little explanation to stock market reactions. Godinho and Cerqueira (2014) follow Stadtmann (2006) by examining the unexpected points earned by a club in relation to outcome probabilities derived from betting odds. They find

that for 11/13 examined clubs the unexpected amount of points they earn (or do not earn) affects their share price.

Betting exchanges provide a different platform for betting compared to bookmakers. These exchanges offer a marketplace that operates under the law of supply and demand. They do not post their own odds. Instead, bettors can buy and sell contracts (bets) from each other and these prices are thus better predictors of expectations than bookmaker odds. Most authors have not noticed this benefit in their research. Bernile and Lyandres (2011) were the first ones to study betting exchanges, football results and stock market reactions simultaneously. By analysing contracts traded on the exchanges, they suggest that investors are unable to form unbiased opinions about upcoming events thus leading them to over- or underestimate the probabilities of winning and losing, as stated before. While there is no way to prove that people involved with betting are concurrently investing on the stock markets, it does provide a decent measure of public expectations.

Although bookmaker and betting exchange odds have been shown to be good predictors of match outcomes, Palomino *et al.* (2009) have shown that the stock markets do not react to them thus making them price insensitive information. They refer to the fact that betting odds are not as salient as match outcomes, which is why they are overlooked by investors. In addition, bookmakers are not motivated by correct match predictions. Instead, their goal is to maximise profits so the odds they publish are aimed to exploit the biases of bettors (Levitt, 2004). He finds that by exploiting these biases, bookmakers can increase their profits by 20 to 30 per cent. Consequently, bookmaker odds are not to be seen as an accurate proxy for public expectations. Furthermore, betting exchange odds are valid proxies for expectations, but fail to predict match outcomes as accurately as bookmaker odds. This research does not utilise betting odds to measure or predict anything, which in itself is a limitation, but previous research has shown that using betting odds has its own deficiencies as well.

In conclusion, there are multiple existing studies researching the connection between sports clubs' athletic performance and share price reactions. Most studies find a statistically significant link between the two. The studies have

shown various alternative approaches such as match importance, asymmetric stock price reactions and investor expectations based on betting odds. Match importance has been evaluated through different views and the studies find that international cup matches, matches played later in the season and matches played by clubs in the top or bottom of the league table have a stronger impact on the respective clubs' share price. Most authors find that match results have an asymmetric impact on share price where wins have a weaker impact than losses. Investor expectations have also been shown to have a statistically significant impact on the share price performance following a match. However, investor sentiment has only been studied by a couple of authors so conducting more research on the subject is justified. In addition, none of the previous studies have considered that investors' sentiment measured by share price fluctuation prior to a match might have an impact to the stock returns after the match. The following chapter discusses research methodology.

3 Research methodology

The previous chapter summarised the relevant researches conducted in the past. As one would expect, the methods of statistical analysis at this basic level remain virtually same as they were fifteen years ago when the first similar studies were written. This chapter describes the prevailing research methodology of present day and justifies the methodology used in this research.

3.1 Different research designs and methods

Research methods can generally be divided into two different classes: qualitative and quantitative researches. The very basic distinction between the two is that quantitative research revolves around hard numerical data, whereas qualitative research is based on non-numerical data (Saunders *et al.*, 2007). Qualitative studies aim to develop theory whereas quantitative studies are conducted to test existing theories (University of Wisconsin, 2016). Since this study is of quantitative nature similarly to the existing literature analysed in chapter 2, the following paragraphs examine common methods in quantitative analysis.

Correlation tests are a simple way to analyse relationships between two variables. As Saunders *et al.* (2007) describe, a correlation between two concepts can be none, positive or negative. When there is no correlation found between the two examined variables, no relationship between them can be suggested. A positive correlation suggests that when one variable either increases or decreases, the other variable shows similar progression. A negative correlation indicates that the two variables develop into opposing directions. The result value of a correlation calculation is called the correlation coefficient and its value is always between -1 (perfect negative correlation) and +1 (perfect positive correlation). Perfect correlation means that the two examined variables behave exactly in a same way; either they move the same exact amount in the same direction (positive) or the exact same amount in opposing directions (negative). As Saunders *et al.* (2007) state, a perfect correlation is extremely unusual in business research.

There are two dominant correlation methods used in statistical analysis, Pearson's product moment correlation coefficient and Spearman's rank correlation coefficient (Saunders *et al.*, 2007). Spearman's correlation is used

when at least one of the variables is a ranked variable, also called ordinal variable, which is when the individual observations can be put into an order from smallest to largest.

Whereas correlation measures the relationship between only two concepts, a regression analysis can examine multiple variables. A regression test measures the relationship between a dependent variable and one or more independent variables (Saunders *et al.*, 2007). The independent variables are assumed to affect the progression of the dependant variable which is measured by a regression coefficient. This coefficient can take a value between 0 and +1 which represents the proportion of the variance in the dependent variable that can be statistically explained by the chosen independent variables (Saunders *et al.*, 2007). In essence, the regression coefficient (also called r^2 value) displays the explanatory power of the regression model in relation to the chosen dependent variable. In multiple regression models, where there are more than one independent variables, an adjusted r^2 value, which takes into account the number of independent variables in the model, can also be observed. Regression results also display the correlation coefficients of the independent variables against the dependent variable, in the context of the regression model.

Regression tests also include the ANOVA (analysis of variance), which includes a method called the F test. The F test result displays the statistical significance of the entire regression model (Saunders *et al.*, 2007). In addition to the ANOVA, regressions tests can include tests of multicollinearity. Multicollinearity tests can prove that the results are not inflated by any correlation between the independent variables. Multicollinearity is measured by the VIF (variance inflation factor) value.

3.2 Research methodology chosen for this research

Since this research analyses specific variables that are measured by absolute numerical values, a quantitative research is the natural approach. Share price fluctuation is measured daily in a measurable value that is specific to the company in question. Football match results are also easily quantified by the points earned by a football club, although a dummy variable is created for the purposes of this study. Stock market indices are somewhat similar to stock prices in that they are measured by a simple numerical value and are observed daily.

These quantitative datasets supposedly have a relationship and this research aims to find evidence to support that assumption.

This research is conducted in three forms of statistical analysis. Each test is run with the popular statistical analysis software IBM SPSS, version 23. Firstly, a simple correlation of the chosen variables (stock market index, match result, investor expectations) to the Manchester United share price is conducted. These results give a simple implication of the relationship (or lack thereof), between the variables and the club's share price. Secondly, all the variables are incorporated into a multiple regression model to find out the combined impact they have on the stock returns of Manchester United. Finally, a primitive arithmetic average analysis is conducted on the effect that wins, draws and losses respectively have on Manchester United's stock market returns.

The correlation coefficients in this study are estimated with Pearson's product moment correlation coefficient because none of the variables chosen in the study are ordinal (rank) variables.

The final regression model is constructed as follows:

$$\Delta MANU_t = \beta_0 + \beta_1 \Delta NYSE_t + \beta RESULT + \beta \Delta MANU\_exp_t$$

where *ΔMANU* indicates the percentage change in Manchester United's stock price after a match, *ΔNYSE* indicates the percentage change in the NYSE Composite Index after a match by Manchester United, *RESULT* is a dummy variable that takes the value of one when the club wins, and zero when the club loses or draws. Earlier studies (Renneboog & Vanbrabant, 2000; Scholtens & Peenstra, 2007) have shown that in addition to losses, also draws result in negative abnormal returns for football clubs. Thus, constructing the variable this way is justified. *ΔMANU_exp* indicates the change in Manchester United's stock price before a match. *ΔMANU* and *ΔNYSE* are observed in a one day and three day periods following a match weekend. *ΔMANU_exp* is observed in a one day and two-day time periods preceding a match weekend. The use of varying

observation periods leads to a total of four different combinations of the chosen time periods.

In addition to the regression test, IBM SPSS runs simultaneously the ANOVA (analysis of variance), of which the F value is observed to measure the statistical significance of the mode. This study also examines the multicollinearity of the regression model in order to ensure that the results are not inflated by correlation between independent variables. Multicollinearity is measured by a VIF (variance inflation factor) value. The lower bound of VIF is 1 and values higher than 2.5 are considered to be significantly inflating (Allison, 2012).

3.3 Conclusion

In conclusion, this study is conducted as a quantitative research examining share prices, stock market index and football match results which is in accordance to the existing research describes in chapter 2. The data is analysed through three different forms of statistical analysis: correlation tests, multiple regression analysis and arithmetic average calculations with notice to the limitations in each of them. The following chapter displays the data analysis and the results of the research.

4 Data analysis and research results

4.1 Data description and analysis

The data being analysed in this research consists of three separate datasets: match result data for Manchester United, stock price data for Manchester United and market index data for the New York Stock Exchange (NYSE).

Firstly, the athletic performance data of Manchester United is derived from the official website of the Barclays Premier League. The dataset includes the club's results from the last four Premier League seasons with a sample period beginning from 20/08/2012 and ending on 20/04/2016. As the 2015-2016 season was still underway at the time of this research, the last few matches are left out of the sample. The data collected from the Premier League website contains match dates and match results (win, draw, loss).

Because of the nature of this research, some observations had to be cut from the final sample. Since Manchester United's shares are listed on the NYSE in the United States, the matches played on weekdays had to be left out as the NYSE is not closed during them due to time zone differences. The usual kick-off time for matches played on weekdays is around 8pm BST (British Standard Time), which equals to 3pm EST (Eastern Standard Time) while NYSE trading hours continue until 4pm EST. The fact that the club's shares could be traded during the match might contaminate the results which is why these matches are not included. In addition, the matches played on weekends that have another match played on a weekday in the same week or the following week are not included. Since this study analyses the stock market implications of investor expectations, this way it can be ensured that the stock price reactions are attributed to the correct matches and there is no overlap between the reactions to one match and the expectations to the next match. After these two adjustments to the sample, the number of observations is 90. Manchester United won 52 of the matches, drew 14 and lost 24 resulting in a winning percentage of 57.80%.

In addition to the match results, the historical share price information for Manchester United is obtained from the NYSE official website. This dataset contains information from the club's initial public offering in 2012 (first share quote on 10/08/2012) all the way to the present day. This research uses the closing

prices recorded around the adjusted sample of matches. Since each of the analysed matches is played on the weekend, the closing share prices on Wednesday, Thursday and Friday prior to them and on Monday and Wednesday after them are analysed. The share price of Manchester United ranges from $12.18 (15/09/2012) to $19.04 (05/05/2013) in the examined period.

To control for systematic risk or market-wide effects, this study includes the NYSE Composite Index into the research. The NYSE Composite Index measures the performance of all stocks traded on the NYSE and thus gives a valid comparative for the Manchester United stocks. The NYSE Composite Index data was obtained from the NYSE official website. Index values were analysed in accordance to the dates that Manchester United share prices were analysed. The NYSE Composite Index value ranges from 7896.878 (15/11/2012) to 11239.66 (21/05/2015) in the examined period.

4.1.1 Normality tests

Regression tests, like many other statistical tests, lean on an underlying assumption that the examined data is normally distributed. In a perfectly normally distributed dataset, the frequency peak of the data is in the centre with two symmetrical tails on each side (Saunders *et al.*, 2007). The peak and the tails are measured by kurtosis and skewness values. These give an indication on the nature of the dataset; if it is heavily tailed on one side or if the peak is way higher than the normal distribution line.

Normality can be analysed in two different ways: a numerical or a visual examination (Saunders *et al.*, 2007). The numerical normality test has multiple models of which the Kolmogorov-Smirnov test and Shapiro-Wilk test are included in SPSS. Visual analysis of normality is done through interpreting histograms of the data sample. The visual analysis is more subjective than numerical tests as the histograms are judged on a case-by-case basis. However, in a small sample such as the one used in this study, the numerical tests can prove to be too strict on the data while visual tests can be interpreted to show a relatively normal distribution.

To enhance the normality and address the heteroscedasticity of the examined sample, outliers were dropped from the sample. A total of five observations were excluded because one of the variables examined on that specific event was considerably different from other values of the same variable in the dataset. After this adjustment, the final number of observations is 85.

Tabachnick and Fidell (2012) recommend the minimum sample size for correlation and regression to be $n > 50 + 8m$ (m = number of independent variables, also known as predictors). Since this study uses three predictors in the final regression model, the minimum sample in accordance to Tabachnick and Fidell (2012) should be $50 + 8 * 3 = 74$ therefore making the sample of 85 valid. Wilson and Morgan (2007) suggest a minimum sample size for the same tests to be around 50. Thus, even though the sample is not extensive, it is reasonable to analyse it.

The normality of the used data is examined visually through histograms and presented in figures 1-10 below, along with the kurtosis and skewness values as well. In addition, normality test results are presented, although with the limited data sample used in this study, most of them do not vouch for normality of data. Logarithmic functions can often be used to transform non-normal data to a normal state (Tabachnick & Fidell, 2012) but since the stock return variables often have a negative value, logarithms cannot be utilised here. However, by judging the histograms, skewness values and kurtosis values, the dataset distribution is found to be normal enough to enable regression tests to be run. The following paragraphs analyse the normality of the four variables used in the regression model.

Figure 1

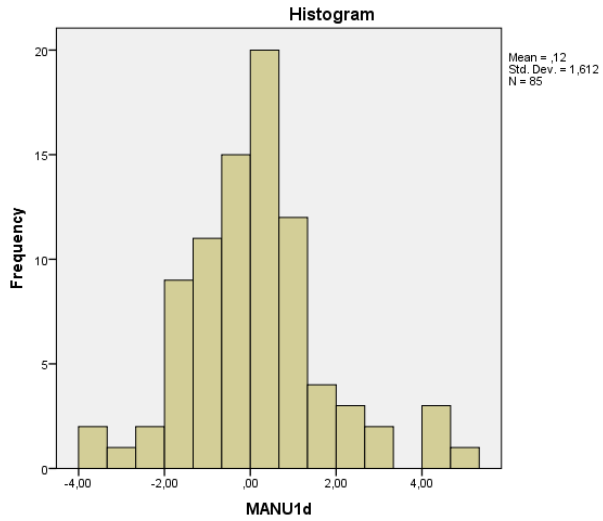
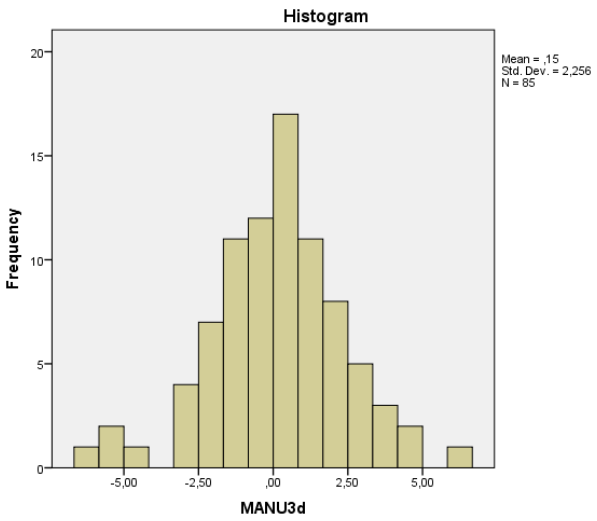


Figure 2



Figures 1 and 2 show the data for the stock price movement after a match weekend in one and three-day observation periods. The histograms show that the data is reasonably normally distributed.

Figure 3

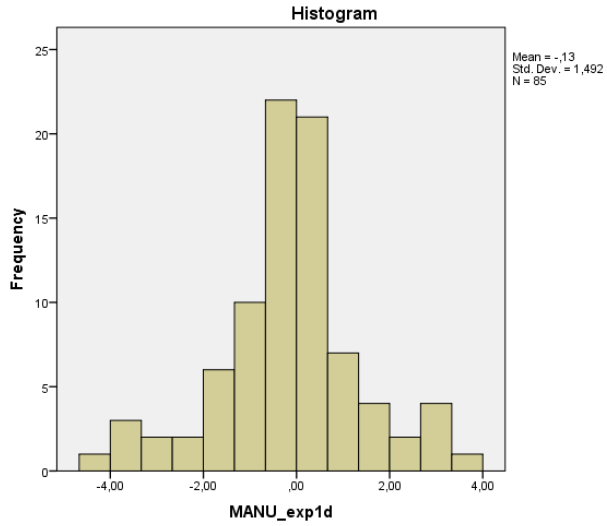
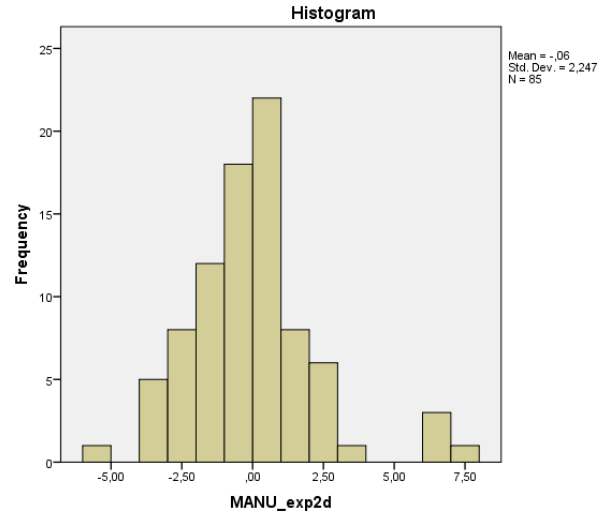


Figure 4



Figures 3 and 4 show the data the stock price movement prior a match weekend in one and two-day observation periods. The histograms show that the data is reasonably normally distributed, although the small sample size leads to a somewhat fragmented distribution.

Table 1 – Skewness and kurtosis values of the ManU stock return dataset

	MANU1d	MANU3d	MANU_exp1d	MANU_exp2d
Skewness	.610	-.197	-.256	1.057
Kurtosis	1.656	.828	1.306	2.692

Table 2 – Numerical normality tests for the ManU stock price movement dataset

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
MANU1d	,126	85	,002	,950	85	,002
MANU3d	,058	85	,200*	,983	85	,347
MANU_exp1d	,131	85	,001	,953	85	,003
MANU_exp2d	,113	85	,009	,919	85	,000

Although variable showing the three-day stock returns of Manchester United is the only one to pass the Shapiro-Wilk normality test (significance > .05) displayed in table 2, a glance at figures 1-4 reveals that the data is reasonably normally distributed with some irregularities and a couple of minor outliers that increase skewness. This causes the failure of Shapiro-Wilk normality tests. The impact of removing the outliers before running the tests is obvious, since skewness and kurtosis values have decreased noticeably to acceptable levels and MANU3d variable passed the Shapiro-Wilk test, which it did not do previously. These test results with the outliers still included are available by request from the author.

Figure 5

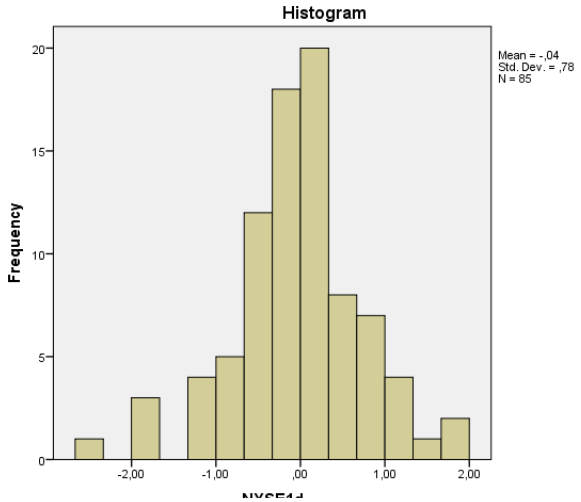
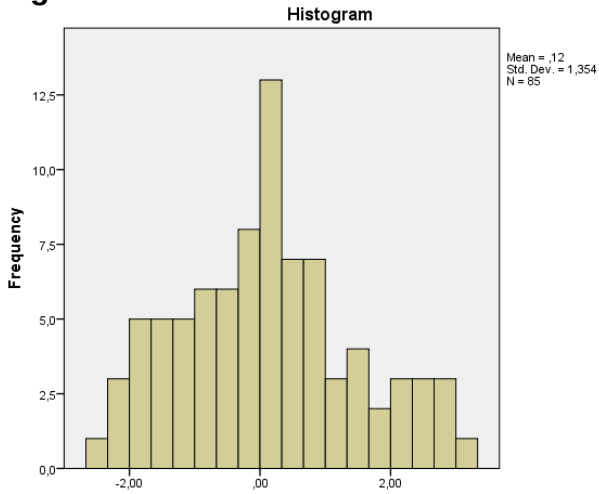


Figure 6



Figures 5 and 6 show that the data for NYSE Composite index fluctuation is also relatively normal in one and three-day observation periods.

Table 3 – Skewness and kurtosis values for the NYSE index dataset

	NYSE1d	NYSE3d
Skewness	-.247	.310
Kurtosis	1.422	-.421

Table 4 – Numerical normality tests for the NYSE index dataset

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
NYSE1d	,092	85	,070	,972	85	,061
NYSE3d	,067	85	,200*	,976	85	,108

Both NYSE Composite Index variables pass the Shapiro-Wilk normality test, although narrowly. NYSE1d's kurtosis value is quite high because two observations that are distinctly separate from others.

Running a normality test on the created dummy variable would be futile given that it has only two possible values. The distribution of the dummy variable is 51 observations with a value of one (wins) and 34 observations with a value of zero

(losses and draws). Since the frequencies are relatively level, the use of the dummy is justified.

In conclusion, the data collected from the Barclays Premier League website and the NYSE website for the past four seasons of Manchester United appears to be acceptable for further statistical analysis. The sample size is adequate and datasets are distributed normally, which is a key matter in regression tests.

4.2 Research results analysis

4.2.1 Correlation results

Stock market index correlation

The NYSE Composite market index is used to measure if Manchester United's stock price is affected by movements in the entire stock exchange. Firstly, the correlation between the index and Manchester United's stocks was examined through simple correlation formula in order to justify the index's inclusion in the final regression model. Instead of limiting the sample to only the proximity of matches included in the final sample, the correlation is calculated on the entire period from 20/08/2012 to 20/04/2016 resulting in a larger sample of 922 observations. The results of this correlation calculation are presented in table 5 and figure 7.

Table 5 – Correlation between ManU stock price and NYSE Composite index

		NYSE
MANU	Pearson Correlation	,471**
	Sig. (2-tailed)	,000
	N	922

Figure 7

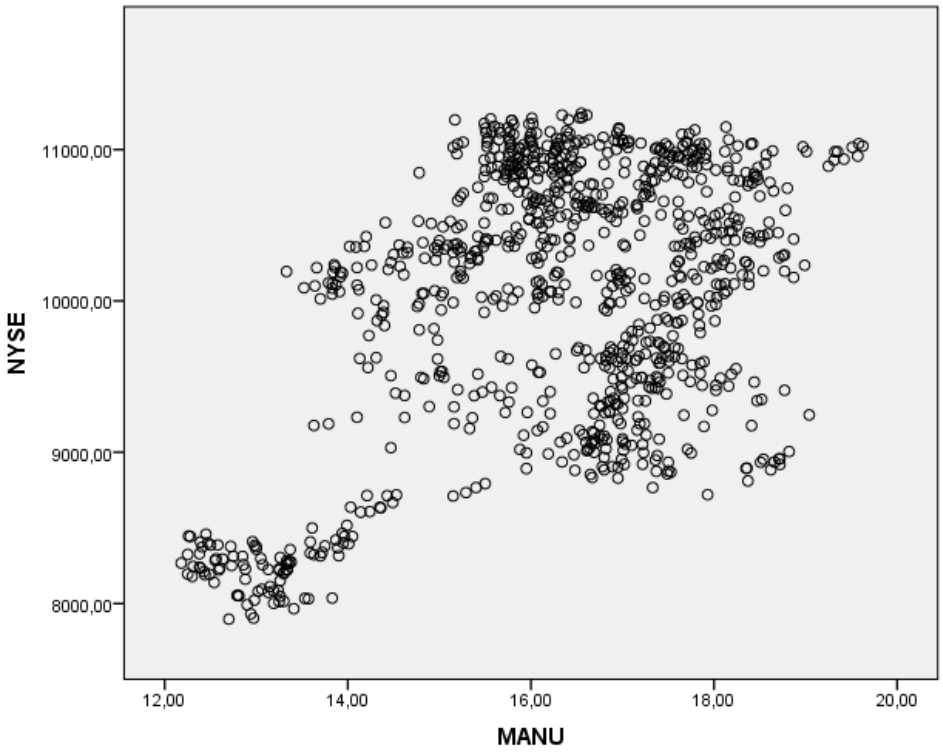


Figure 7 reveals that the Manchester United share price and the chosen NYSE Composite index do have a correlation.

The results show a moderately strong positive correlation of .471 between the variables that is statistically significant at the 1% level, which is in accordance with the results of Stadtmann's (2006) similar study. When examining figure 7, the observations can be pictured to be on a straight line with an upward trajectory, indicating that when one variable's value increases, the other one's does as well. This result is fairly consistent with Manchester United stock's beta value of .37162 (Yahoo Finance, 2016). Clearly the Manchester United stock fluctuates somewhat in a similar manner to the other stocks traded on the NYSE thus justifying the inclusion of market index in the final regression model.

Match result correlation

Match outcome was measured by a dummy variable similarly to Stadtmann (2006) researched partly in his study. The relationship is examined to the one day returns and three day returns of Manchester United stock after a match weekend.

Since there are only two possible values that a dummy variable can take and the sample size is only 85 observations, the results of this correlation relationship should be considered with a measure of caution. The results of this correlation calculation are presented in Table 6.

Table 6 – Correlation between Manchester United's match results and stock price fluctuation after a match weekend

		MANU1d	MANU3d
RESULT	Pearson Correlation	,080	,148
	Sig. (2-tailed)	,467	,177
	N	85	85

Match result dummy variable has a weak correlation of .080 and .148 to the returns of Manchester United's stock returns in one and three-day observation periods, respectively. Neither of these correlations is statistically significant though, implying that the match outcomes do not have a relationship with the stock returns following a match weekend.

However, a simple dummy variable is not the most accurate method of measuring athletic performance in relation to stock price fluctuation. Previous authors (as described in section 2) have attempted to measure, in accordance with the news model, only the unexpected portion of the match results to increase the efficiency of their research results. Some of them have also created models to measure match importance via the relative performance of examined clubs inside the respective competition. Perhaps variables like these would display higher significance in the case of Manchester United as well.

The reason for a low and insignificant correlation of match results to share price could also be, as noted by Bell *et al.* (2011), that some investors of football clubs could be the club's fans who have a strong emotional tie to the club and being a shareholder in the company is a form of supporting the club for them. These fans are less likely than traditional rational investors to sell their shares even if the club is not performing well on the pitch. However, given the size of Manchester United's share base and the fact that it is traded on the largest stock exchange in

the world (Erbar, 2014), it is fair to assume that fans holding on to their own shares should not significantly distort the results.

Investor expectations

Investor expectations are measured by the stock price fluctuation preceding a match weekend in a one and two-day window. Since the correlation function of SPSS is unable to distinct between matches that the club won, drew or lost, a reasonable correlation for the pre-event returns and post-event returns is impossible to derive from the data because the assumption is that when investors expect an outcome that is the opposite of the actual outcome, the correlation is negative and when they expect an outcome that actually happens, the correlation is positive. Although the number of wins is more than twice the amount of losses, there would certainly be contamination in the results. Therefore, a correlation calculation without controlling the match outcome is not a valid one to examine and investor expectations are only analysed in the final regression model.

In conclusion, the correlation tests are only able to find a correlation between the NYSE Composite Index and Manchester United's stocks, which is moderately positive. The other two variables considered are not suited for correlation tests though and their usefulness will be evaluated in the regression tests.

4.2.2 Multiple regression results

One day observation period

The descriptive statistics of Manchester United stock's returns on the day after a match (Monday) are displayed in table 7. The mean abnormal return of Manchester United's stock on the day after a match weekend in the examined sample is .1183 and the median abnormal return is .0782 which, with the assumption that wins result in positive returns and losses in negative returns, correspond with the fact that the club won more than half (60.00%) of the examined matches. An interesting observation is that the minimum (-3.92%, 26/04/2014) value was recorded after a decisive 4-0 win. Since that match was played late in the season, it could be that match importance factors regarding final league position are the explanation, in accordance with Renneboog & Vanbrabant (2000). Reason could also be in corporate governance related

factors which Stadtmann (2006) found to have an impact on football clubs' share price. These events could be new signings and player transfers, club investments or ownership changes, to name a few.

Table 7 – Descriptive statistics for the ManU stock price movement one day after a match weekend

MANU1d

N	85
Mean	,1183
Median	,0782
Std. Deviation	1,61178
Range	9,03
Minimum	-3,92
Maximum	5,11

The regression model formed for this study includes three variables: match result, market index and investor expectations. Match result is observed for the specific event examined, market index is observed for the same observation period as the club's stock returns and investor expectations are observed in two different time periods: one day and two days prior a match. Tables 8, 9 and 10 show the results of the regression calculation where investor expectations are observed in a two-day window.

Table 8 – Regression model summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,163[a]	,027	-,010	1,61946

a. Predictors: (Constant), MANU_exp2d, RESULT, NYSE1d

Table 9 – Analysis of variance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,785	3	1,928	,735	,534[b]
	Residual	212,434	81	2,623		
	Total	218,218	84			

Table 10 – Coefficiency statistics

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,053	,278		-,191	,849
	RESULT	,306	,360	,093	,848	,399
	NYSE1d	,183	,228	,088	,802	,425
	MANU_exp2d	,075	,079	,105	,954	,343

The adjusted R square value of the model presented in table 8 is -.010 implying that the model has no explanatory power towards the variance in the dependent variable (Manchester United stock's return). In addition, the ANOVA (analysis of variance) displayed in table 9 shows that the significance level of the model is only at .534 which is not statistically significant, implying that the model does not have enough variables or the correct variables to satisfyingly explain the variance of the club's stock returns and reject the possibility of chance in the regression model's results.

The coefficients for match result, NYSE index and pre-match stock returns are .306, .183 and .075, respectively. All the coefficients are weak and furthermore,

none of them are statistically significant. All in all, this version of the model does not show evidence of anything other than lack of it.

Tables 11, 12 and 13 present the regression results when the investor expectations are observed in a one day period instead of two.

Table 11 – Regression model summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,190[a]	,036	,000	1,61142

a. Predictors: (Constant), MANU_exp1d, NYSE1d, RESULT

Table 12 – Analysis of variance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7,888	3	2,629	1,013	,392[b]
	Residual	210,331	81	2,597		
	Total	218,218	84			

a. Dependent Variable: MANU1d

b. Predictors: (Constant), MANU_exp1d, NYSE1d, RESULT

Table 13 – Coefficiency statistics

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,014	,278		-,051	,960
	RESULT	,267	,358	,082	,746	,458
	NYSE1d	,190	,226	,092	,842	,402
	MANU_exp1d	,155	,118	,144	1,315	,192

When changing the investor expectation variable to cover only a one day window prior a match weekend instead of the two-day window described above, the results are quite similar. This version of the regression model has no explanatory power either, as can be observed from the adjusted R square value presented in table 11. Only noteworthy difference to the earlier results is an increase in the correlation and significance of pre-match stock performance's coefficient, although it is not statistically significant either. Thus, it can be concluded that none of the chosen variables have a significant impact to the one day stock returns of Manchester United in the following day of a match weekend.

The multicollinearity tests for both version of the model did not present any concerns regarding the results. All VIF values were under 1.02, well within acceptable levels.

Three-day observation period

Palomino *et al.* (2009) suggest that it takes two to three days for a football match outcome to be fully incorporated into a club's share price and therefore this study analyses the returns of Manchester United in a three-day period as well. The descriptive statistics of the three-day stock returns are displayed in table 14 below. The data is somewhat coherent with the one day returns examined earlier, with a mean abnormal return of .1461 and a median of .2363. A couple of interesting observations emerge as the maximum value (6.16, 11/01/2015) was actually recorded after a 0-1 loss to Sunderland and the minimum value (-6.13, 07/02/2016) was not recorded after a loss but instead after a draw. All in all, the minimum and maximum values are lower and higher in this extended observation period, indicating that match results are incorporated into the share price with a lag of at least three days, which is consistent with the work of earlier authors as well.

Table 14 – Descriptive statistics for the ManU stock price movement three days after a match weekend

	MANU3d
N	85
Mean	,1461
Median	,2363
Std. Deviation	2,25553
Range	12,29
Minimum	-6,13
Maximum	6,16

The regression results for a three-day observation period following a match weekend are displayed in tables 15, 16 and 17 below.

Table 15 – Regression model summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,282[a]	,080	,045	2,20366

a. Predictors: (Constant), MANU_exp2d, NYSE3d, RESULT

Table 16 – Analysis of variance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33,997	3	11,332	2,334	,080[b]
	Residual	393,344	81	4,856		
	Total	427,342	84			

a. Dependent Variable: MANU3d

b. Predictors: (Constant), MANU_exp2d, NYSE3d, RESULT

Table 17 – Coefficiency statistics

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,382	,383		-,998	,321
	RESULT	,836	,493	,183	1,694	,094
	NYSE3d	,313	,179	,188	1,744	,085
	MANU_exp2d	,156	,107	,155	1,450	,151

a. Dependent Variable: MANU3d

The adjusted R square value presented in table 15 is .045, suggesting that the model explains 4.5% of the variance in three-day stock returns of Manchester United following a match weekend. Contrary to the earlier analysis with a one day observation period, this model shows statistical significance at the 10% level in the ANOVA presented in table 9, as the significance value is <.10. Thus, the model created for this research can be considered statistically significant when examining the three-day stock returns of Manchester United.

The coefficients in table 17 show considerable changes to the previous model. Match results have a very strong positive coefficient of .836 that is statistically significant at the 10% level. This result indicates that a one unit increase in the dummy variable leads to a .836 unit increase in the dependent variable, in this case the three-day stock returns after a match. Essentially, with the coding of the dummy, the results mean that a win causes a .836 unit increase in the three-day stock returns of Manchester United. The NYSE Composite Index variable is also significant at the 10% level with a moderately strong positive coefficient of .313. The investor expectation coefficient has a low value of .156 but is not statistically significant.

Tables 18, 19 and 20 display the regression results when the investor expectation variable is observed in a one day observation period rather than two days.

Table 18 – Regression model summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,262[a]	,069	,034	2,21649

a. Predictors: (Constant), MANU_exp1d, RESULT, NYSE3d

Table 19 – Analysis of variance

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29,402	3	9,801	1,995	,121[b]
	Residual	397,940	81	4,913		
	Total	427,342	84			

a. Dependent Variable: MANU3d

b. Predictors: (Constant), MANU_exp1d, RESULT, NYSE3d

Table 20 – Coefficiency statistics

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,332	,386		-,859	,393
	RESULT	,773	,495	,169	1,560	,123
	NYSE3d	,316	,180	,190	1,754	,083
	MANU_exp1d	,174	,162	,115	1,070	,288

a. Dependent Variable: MANU3d

When switching the investor expectation variable to cover only a one day period prior to a match instead of two days, the explanatory power of this model version, displayed by the adjusted R square value in table 18, drops to 3.4% and the ANOVA results do not show statistical significance for the model. With this time period, only the NYSE index variable is significant (at the 10% level) with a coefficient of .316. Match result coefficient lost its significance in this new version

and investor expectation coefficient remains relatively same to the previous version.

Multicollinearity test results for the multiple regression tests on the three-day stock return of Manchester United were similar to the one day stock return versions. The highest VIF value is 1.022 which is far from an alarming level.

In conclusion, the regression model is found to be statistically significant only when examining the three-day stock returns of Manchester United's shares with the investor expectation variable's observation period being two days instead of one. In that version of the model, match result dummy variable had a very strong positive coefficient and NYSE index had a moderately strong positive coefficient both of which were statistically significant at the 10% level. The regression analysis did not find any significant relationship between investor expectations, measured by pre-match stock returns, and post-match stock returns.

4.2.3 Average stock returns after wins, draws and losses

One of the initial objectives of this study was to examine the effect that different match results have for the club's share price separately from each other. The assumption is that wins result in positive returns and losses in negative. However, due to the limited sample size this research covers, the regression results of models where the match result variable is held constant would be unavailing. Tabachnick and Fidell (2012) recommend that in a regression model where one of the variables is held constant, the sample should include at least $104 + m$ (m = number of independent variables, also known as predictors) observations. Thus, the sample of 85 observations is too limited for this.

In order to gain a basic understanding of the impact of different of match results, this chapter examines simple arithmetic means and medians of the stock returns of Manchester United following wins, draws and losses, independently. The returns are examined in a one and three day periods following a match weekend. Tables 21, 22 and 23 showcase the findings for wins, draws and losses, respectively. The left side represents one day returns and right side the three-day returns.

Table 21 – Manchester United's stock returns after a win

MANU1dW	
N	51
Mean	,2228
Median	,2959
Std. Deviation	1,76646
Range	9,03
Minimum	-3,92
Maximum	5,11

MANU3dW	
N	51
Mean	,4167
Median	,4082
Std. Deviation	2,26522
Range	10,61
Minimum	-5,62
Maximum	4,99

Table 22 – Manchester United's stock returns after a draw

MANU1dD	
N	11
Mean	-,1512
Median	-,1186
Std. Deviation	1,33297
Range	4,66
Minimum	-2,89
Maximum	1,77

MANU3dD	
N	11
Mean	-,9423
Median	-,5631
Std. Deviation	2,40796
Range	9,48
Minimum	-6,13
Maximum	3,35

Table 23 – Manchester United's stock returns after a loss

MANU1dL	
N	23
Mean	,0155
Median	,0000
Std. Deviation	1,39531
Range	6,36
Minimum	-1,77
Maximum	4,59

MANU3dL	
N	23
Mean	,0667
Median	-,1268
Std. Deviation	2,08772
Range	9,35
Minimum	-3,19
Maximum	6,16

The club's stock returns after a win are positive as expected and the returns in a longer observation period are stronger than in the shorter one. These values would indicate that wins are followed by positive stock market returns and that in a three-day observation period, market adjusts more efficiently to the match outcome information. Since both medians are positive, it can be said that wins result into a positive stock return in more than half of the examined events.

Draws are followed by negative stock returns on average, which is in line with previous research of Renneboog & Vanbrabant (2000) and Scholtens & Peenstra (2007). Interestingly, the effects seem to be the strongest after draws compared to other match results. However, as the sample size is only eleven matches, no conclusions should be drawn from these.

Losses are assumed to bring negative stock returns afterwards but in the three-day observation period, the mean stock return for the club is a positive .0667%. However, given that the sample size is so small, the median is negative and that the data had a few extremely high positive values (after losses) amongst it, this result is probably not a very accurate one. In a one day period, the mean is also slightly positive and the median is at zero.

These very simple calculations do not hold much weight in a scientific sense as more complex methods have been used in the existing literature as well as in this paper already. However, they do give a crude implication on how the share price of Manchester United reacted to match outcomes in the sample period, which admittedly is very small.

4.3 Summary of results and their relation to existing literature

In conclusion, the correlation results showed a significant relationship between Manchester United's share price and stock market index. In the regression tests, market index was the only variable to show statistical significance in two of the four versions, similarly to Stadtmann's (2006) observation from Germany. Regression tests do not indicate that investor expectations, in the way they are measured here, affect the post-match returns of Manchester United. In two of the regression models though, the investor expectation variable's significance was quite close to being statistically significant so further research might be

warranted. Match results coefficient was found to be significant only in one of the four versions which is not as robust as previous studies' results. Important to notice is that in the regression tests, there were no variables that showed statistical significance at the 5% or 1% level which has been quite usual in the previous studies. Thus, the results are not as binding as they could be. In the arithmetic calculations, the results showed much better returns after losses than previous research has shown, while draws and wins were in accordance. However, these results should not be regarded highly as they are crude numbers from a small sample size. Manchester United is the first European football club to be listed on an American stock exchange, which might have had an impact on the results.

5 Conclusion

This paper studied the impact of match results, investor expectations and stock market movements on the stock returns of Manchester United following their matches in the Barclays Premier League from 2012 to 2016. The research was conducted as an empirical quantitative case study and the data was examined using basic statistical analysis tools of correlation, multiple regression and arithmetic averages. The regression tests found no significant relationships when examining Manchester United's one day stock returns after a match weekend. When examining the three-day stock returns however, the results indicate that match results and stock market movements do affect the behaviour of the club's share price. Only the investor expectation variable was found statistically insignificant in each test, although only by a small margin. To answer the research questions defined in chapter one based on these results, match results do affect Manchester United's share price, investor expectations do not affect the stock returns of Manchester United and Manchester United's stock movements do reflect the movements in the stock exchange in a moderate manner, as the correlation test displays.

5.1 Limitations of the study

There are certain limitations regarding the methodology and data collection of this study. Firstly, the data sample examined consists of only 85 observations which can be considered quite small, although academically valid as explained in the

earlier chapters. Secondly, the correlation and arithmetic average analyses are very basic and do not hold much academic value on their own. Finally, there are some inherent limitations to regression analysis. Namely the assumption of linearity (Saunders *et al.*, 2007), although it is widely accepted in statistical analysis. Linearity assumption means that the data is expected to fall on a straight line although having data like that is very unusual. In addition, the regression model is based on an assumption of normal distribution of data. Much like linearity, normal data distribution is highly unlikely to appear in statistical research though.

5.2 Recommendations for further research

Since Manchester United is now listed on the NYSE and was previously listed on the London Stock Exchange, a comparative study between these two time periods might provide interesting findings. In addition, investor expectations variable showed promise in this study, but a more extensive study on it could be undertaken to provide more evidence on the subject. Overall, this study wavered on the edge of reasonability and a more robust research on the subject would be needed.

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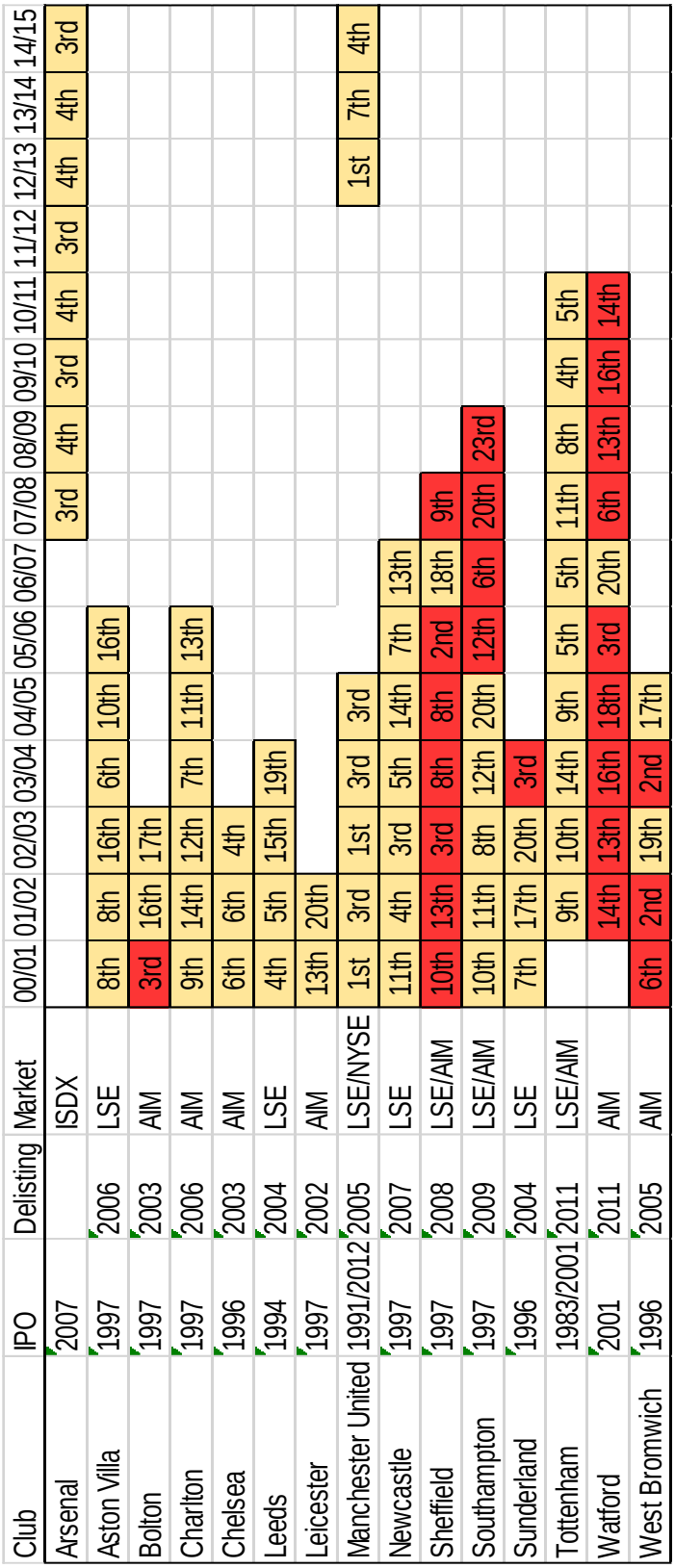
Appendix 1 – Publicly traded Premier League clubs in the 21st century



Club	IPO	Delisting	Market	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15
Arsenal	2007		ISDX								3rd	4th	3rd	4th	3rd	4th	4th	3rd
Aston Villa	1997	2006	LSE	8th	8th	16th	6th	10th	16th									
Bolton	1997	2003	AIM	3rd	16th	17th												
Charlton	1997	2006	AIM	9th	14th	12th	7th	11th	13th									
Chelsea	1996	2003	AIM	6th	6th	4th												
Leeds	1994	2004	LSE	4th	5th	15th	19th											
Leicester	1997	2002	AIM	13th	20th													
Manchester United	1991/2012	2005	LSE/NYSE	1st	3rd	1st	3rd	3rd								1st	7th	4th
Newcastle	1997	2007	LSE	11th	4th	3rd	5th	14th	7th	13th								
Sheffield	1997	2008	LSE/AIM	10th	13th	3rd	8th	8th	2nd	18th	9th							
Southampton	1997	2009	LSE/AIM	10th	11th	8th	12th	20th	12th	6th	20th	23rd						
Sunderland	1996	2004	LSE	7th	17th	20th	3rd											
Tottenham	1983/2001	2011	LSE/AIM		9th	10th	14th	9th	5th	5th	11th	8th	4th	5th				
Watford	2001	2011	AIM		14th	13th	16th	18th	3rd	20th	6th	13th	16th	14th				
West Bromwich	1996	2005	AIM	6th	2nd	19th	2nd	17th										

English football clubs that have been listed on a stock exchange and simultaneously played in the Barclays Premier League in the 21st century

Tan cells = Premier League

Red cells = First division

Numbers inside cells indicate final league position on the specific season