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Definitions

Beta = Measures the volatility of the independent variable versus dependent. The slope of a regression model.

Jensen's Alpha = Measuring the excess return of a stock against the market risk premium adjusting for systematic risk. Intercept coefficient of a regression.

Overpricing = Overpricing amount is defined as the (positive) difference between issue price and the first day of listing closing price.

Profit Maximizing = When motives of owners benefit firm financially

Publicly Traded = Outstanding shares are being traded on a stock exchange.

Underpricing/Money Left on the Table = Defined as the (negative) difference between the issue price and the first day of listing closing price.

Win Maximizing = When motives of owners is for "on-field success"

Abbreviations

AR = Abnormal Returns

CAR = Cumulative Abnormal Returns – The cumulated difference between the expected return and the actual return of a stock.

DAX = 30 Largest entities on Frankfurt Stock Exchange

EPS = Earnings Per Share

FTSE = London Stock Exchange

IPO = Initial Public Offering, the issuing and first sale of stocks for a private firm/organization to the public.

MRP= Market Risk-Premium

MLB = Major League Baseball

NBA= National Basketball Association

NFL = National Football League

NYSE = New York Stock Exchange

OMX Copenhagen = Danish Stock Exchange

OMX 30 Stockholm = Swedish 30 Largest Entities on Stock Exchange

ROE = Return on Equity

SEO = Seasoned Equity Offering

1 Introduction

In this chapter the reader will be introduced to Initial Public Offerings (IPO) and the specific topic and background of IPO's within the sports industry. This will let us develop a problem discussion, after which the purpose of this thesis will be stated. Finally the reader will be informed of earlier research regarding this topic that may be of interest.

1.1 Background

Why do organizations go public and what will the ex-post effects of this process be? This is something researchers have been trying to answer over decades within different studies including Bauer & McKeating (2011), Cheffins (1999) and Kesenne (2008) involving Initial Public Offerings (IPOs). This thesis will be specifically focusing on a particular phenomenon regarding IPOs, the effects of an IPO on the current market for professional sport clubs.

1.1.1 Introduction to the topic

When discussing IPOs we need to first look closely at financial markets and what their function is. Financial markets grant individuals, firms and organizations the ability to borrow and invest money, allowing for time consumption. Financial markets allow these parties also to transfer specific risks to the shareholders and to separate ownership from management of the firm.

Firms can take advantage of financial markets by publicly listing the firm, allowing individuals and institutions to purchase shares of the ownership of that particular firm. This move allows for more liquidity and for the firm to gain better access to a low cost capital, which can be used to facilitate project investments and so forth. The process of changing the ownership of a firm from private to public is known as an Initial Public Offering (IPO). Disadvantages of going public include the dispersion of equity holders,

which causes a lack in ownership concentration and the ability for investors to monitor company management. This in turn can be solved through certain regulations on financial disclosure to protect investors but this is a costly and lengthy process (Berk & DeMarzo, 2013).

In general, firms usually make the transition from private ownership to public ownership when it reaches a certain size or structure, however in the case of sport clubs and what they entail, this procedure is far less common (Baur & McKeating, 2011).

1.1.2 History of IPOs

Issuing and offering stocks to the public may sound like a simple way of raising capital for firms/organizations, but there are some common pitfalls connected to an IPO. Two standard pitfalls that firms and organizations have historically experienced when going public are: underpricing of stocks and underperformance (Ritter, 1991). In research conducted by Banerjee, Dai, & Shrestha (2011) they state that many IPOs tend to be underpriced, meaning that the offering price is often lower than the first day's closing price of the stock. This phenomenon creates an opportunity for investors to profit on a short-term basis and it is often described as "leaving money at the table". This phenomenon makes the whole IPO inefficient since the issuer could have received a higher price and thus more capital initially before the first trading day. In Ritter (1991) the author argues that the stock's performance tends to underperform three years ahead after the IPO has been conducted compared to competitors operating in the same industry. He also mentions that evidence of long-run underperformance differs between industries and that it is not as strong as the evidence for short-term underpricing of IPOs. In Banerjee et al. (2011) research tells us that on average the stocks of a Swedish IPO suffer from 21.79% underpricing initially which is five times higher than neighboring country Norway's average result of 4.33%. In the U.S. the average underpricing in the market of IPOs is at a 24% level. This phenomenon creates a window of opportunity to exploit IPOs without actually being interested in a long-term relationship to the companies' development. It should be mentioned that Banerjee et al. (2011) research scope on-

ly stretches between 2000-2006, so the sampling may be biased to some extent. This matter will be further discussed in the section "*Earlier Research*".

In our research we will be looking at different kind of sports clubs that are traded publicly and some operate in different manners regarding share offerings to the public. Primary offerings are the initial sale of a new large block of shares to the public, which will be looked at when considering recent IPO's such as the Manchester United and AIK along with other clubs. The details that will be analyzed are how they perform with respect to seasoned stocks or entities that have been listed for a significant period of time. This will be discussed in further detail later on in this paper.

1.1.3 History of IPOs within sport clubs

When looking at sport clubs, it is currently a rare phenomenon to go public but historically this has not always been the case. Only a small number of sport clubs are currently traded publicly. We will first examine football clubs as an example and England in particular. When the EPL (English Premier League) was founded in 1992, owners of football clubs raced to realize potential earnings in broadcasting and TV-rights etc. In only a few years there were 27 football clubs with listed stock (The Economist 2012). The downside of these clubs being traded publicly was that most of the income earned went often to purchasing new players due to huge competition, rather than to shareholders. Without any payouts or dividends the stock prices suffered and many clubs had to pull out when the stock market took a downward turn in the 2000's leaving the clubs in financial trouble along with unhappy shareholders. Currently in the UK there are now only four clubs with listed stocks (Celtic, Arsenal, Birmingham City and Manchester United).

The latest of these clubs to actually conduct an IPO was Manchester United, a club who was delisted in 2005 before being introduced on the American Stock market with partial admission (Approximately 5% of the market value) in 2012 by owner Malcolm Glazer[1] (Maurice, C., 2014).

[1] (Stock Quote: MANU:NYSE)

A local example in a market both financially and in sporting terms perhaps unknown to most around the world is the case of AIK in Sweden. Since 1999, AIK has been a limited liability company. AIK was introduced to the Nordic Growth Market Stockholm stock exchange through an IPO in 2006. Certain legal restraints are placed on publicly owned sport clubs in Sweden, with a requirement of 51% ownership from the club itself (Andersson & Bäckström, 2011). Throughout our research we will be analyzing AIKs stock price and how it fares when benchmarked against other newly listed entities along with its performance when compared to seasoned equity stocks.

An example of a sport club owned completely by the public is the Green Bay Packers of the National Football League (NFL). Although the Packers never conducted an IPO, instead offering ownership to the community when facing financial struggles the public ownership is a rare phenomenon in North American sports leagues. The Packers have in fact approximately 350,000 owners who are all fans of the club and is currently the only major league sports club in North America that is not privately owned (Zirin, D., 2011). Another example is the Kitchener Rangers of the Ontario Hockey League where the 40 person board of directors is made up of volunteer season ticket holders meaning the club is not therefore under pressure to issue dividends (Kitchener Rangers, 2015). This is a special case and further example of how fans can contribute to the wellbeing of the club while not expecting certain payouts and dividends, an unusual phenomenon in any other business sector. Much like the Green Bay Packers club, the Kitchener Rangers is a club for the community. This community strength is one of the reasons why public sports clubs can survive and compete with privately owned entities and the psychological aspect is something which may be of interest in further research.

Borussia Dortmund is perhaps the best example of a purely publicly owned football club[2] . Unlike Manchester United who offered only 5% of the club when conducting an IPO in 2012, Borussia Dortmund is 81.05% owned by individuals and institutions with no association to the club (i.e. fan club members) (Harty, C, 2014). Borussia Dortmund conducted their IPO in 1999. After conducting the IPO, the extra available funds allowed Borussia Dortmund to sign renowned international football players along with

[2] (Stock quote: BVB:Xetra)

the expansion of its stadium making it the largest in Germany. The years following the 1999 IPO were filled with "on-field" success for Dortmund both nationally and internationally, increasing sales revenues, which contributed to the financial well-being of the club. During the 2003/04 season however the club missed out qualifying for any international competition thus having a huge negative impact on sales revenues and earnings. Over the next two years the club struggled to finance its operating and interest expenses, forcing them to restructure and install a new management board to try and rescue the club (Büchler & Jücke, 2012). In Lewing's (2005) article on the German league and specifically Borussia Dortmund, he states that Borussia Dortmund are struggling to avoid insolvency mainly due to bad investments with regard to player recruitments and not able to complete all rent payments on the arena. He states that the financial situation of Borussia Dortmund and many other publicly listed football clubs means that it is unlikely any other football clubs will go public in the near future. This along with the previous examples in turn shows the difficulties of running a publicly owned sport club and are one of many reasons why many stock prices are faltering.

1.2 Focus of Study

The financial performance of a sports club is understandably often determined by the results on the field along with the other factors already mentioned. Any investments and financial predictions of a sport club have to be based on "on-field" performance and how the club is expected to perform from year to year. Therefore the financials and stock price of a sport club are very sensitive to a drop in form and in missing intended targets, as was the case with Dortmund. This is an important factor therefore to account for when analyzing a sports club's financial performance.

We believe that this area of research is of significant interest for contemporary sport clubs as the focus of their business shifts towards a more competitive market with a more financial oriented management than before. Our ambition is therefore to increase the awareness of the effects of an IPO, both for the public and also the community as well as for the managers of sport clubs. This thesis will mainly focus on the financial impacts of an IPO on sports clubs, considering this specific topic to a large extent has

not been researched, with much research focusing on "on-field" activity, which will be discussed in the section *earlier research*. Our selection of this topic and our research in depth into this specific case of IPOs will benefit potential investors with key financial information and also help supply information that will be of use in the decision making of sports clubs with regard to going public.

1.3 Problem Discussion

With regard to issues such as "underpricing," expressed in the section above by earlier researchers about IPOs in general, do the same issues apply to a case of an IPO of a sport club? We believe that there is a difference in the preferences and background thinking of investors due to the specifics of the industry they are investing in. This is apparent for example when it comes to sport clubs going public, there is often a chance that investing activities will be fan-based due to the love or support of a club (Greenberg, 2013), and not always based on a rational investment consideration with financial gains. In today's modern society people seems to be focusing a lot more on their passions in life, thus the supporter culture among sport clubs has naturally grown over time.

To summarize, the questions we will look at and attempt to answer in this thesis are:

- What is the financial impact of an IPO on a sports club when looking at time series performance indicators?
- How do the prospects look for an IPO of a sports club compared to that of a seasoned stock within the sports market and also benchmarked against the market as a whole?
- Do normal issues regarding IPO's such as underpricing affect a sports club in the same way it does a normal entity?
- What are the pros and cons for a sports club to conduct an IPO (With respect to historical examples among other things)?

1.4 Purpose

What we are going to investigate in this thesis is the possible financial effects of going public for sports clubs initially and the long-term performance of these entities following an IPO. We will look into specific sport clubs and in particular those who have recently performed IPOs along with those that have been public for a longer time and into the general financial performances of these entities. We will attempt to evaluate the financial performance of sport clubs after an IPO when benchmarked against companies in other sectors along with comparing the financial performance of newly listed sports clubs to that of seasoned sport clubs. Also in our research we will be looking at the overpricing and underpricing phenomenon, which arise often when IPOs are conducted and examine whether sport clubs follow a similar pattern to those entities in other markets with regard to the underpricing phenomenon.

We will base our study on and examine European publicly traded football clubs. Our focus will be on their financial performance after the IPO. Very little research has been conducted with regard to the financials within IPOs of sport clubs in the world, and even less with regard to domestic Swedish sport clubs. Thus our ambition is to extend that knowledge gained about the financial performance of publicly traded sport clubs and also the effects of IPOs on sport clubs, especially with a more specific focus on European football clubs. With our results obtained, our purpose is that our research would favor European sport clubs that are investigating the possibility of going public along with potential investors considering entering this market.

1.5 Earlier Research

1.5.1 The Effects of Going Public

There has not been a significant amount of studies conducted about how an IPO affects a sport club in terms of its financial performance. Few individuals have touched on this specific subject, though Cheffins (1999) is one who has analyzed to a certain extent the

case for American sport clubs' possibility to gain in total financial terms from an IPO. Cheffins (1999) also believes that the main reason why sport clubs contemplate going public is that their belief of raising new capital for building large arenas will attract more interest both from supporters of the club and from commercial companies to sponsor and/or establish themselves within the arena, leading to increased revenues. This along with increased TV-rights revenue would help increase the realized value of a publicly traded stock. Cheffins (1999) also mentions that there are many costs connected to an IPO and a loss of flexibility for the club due to legislation and rules of disclosure when you are publicly traded.

Some research has previously been conducted within this field regarding in particular Football clubs and the effect of going public on their performance. As mentioned, a lot of this work is focused on the "on-field" side of things with a lot of studies looking in particular at results (wins and losses) before and after the IPO. Baur and Mckeating (2011) show in one particular study that going public does most commonly not affect "on-field" performance both domestically and internationally and the only real cases where there was a distinctive change was in the lower domestic leagues, where the extra source of capital allowed them to be more competitive than rivals.

In Dobson and Goddard's (2001) book on *The Economics of Football*, they touch on the subject of going public. They discuss sport clubs and how they differ from other organizations and how they have changed over time. They discuss the specific example of Manchester United, when first floated were undersubscribed by 50 per cent and traded under their offer price 18 months after flotation. This brings us back to the topic of overpricing and the studies already mentioned and how it applies to sport clubs. This topic will be discussed in more depth to gain an understanding whether overpricing is a common phenomenon within sports clubs.

When looking at direct influencing factors on the share price level, the TV-revenue contracts of many publicly owned football clubs led to an appreciation of the share prices and is one of the factors affecting share prices and financial well-being.[3] After a big television contract over the period 1992-1997 of 191m GBP, in 1995 the share price was

[3] BskyB - Premier League television contract 1993-1997

affected by expectations regarding a new improved contract and optimistic views (Dobson & Goddard 2001). These optimistic views have shown to have foundation, with the latest deal from 2016 to 2019, a record figure of 5.136bn GBP (Rumsby, 2015) *See Appendix (Figure 9.1)*. Another factor discussed in their research was the potential shareholders offers, (BSkyB bid for Manchester United) positively affecting the share price and the blockage of these movements causing a negative effect. Along with these financial factors they found the "on-field" factors also affected clubs share price. Many mathematical methods have been used to calculate the fluctuations in share price and the contributing factors to these shifts, which we will be looking close at in the method section (Dobson & Goddard, 2001).

In previous research made by Ritter (1991), it was found that there is statistical evidence that companies who have conducted an IPO tend to underperform in terms of their adjusted returns and cumulative average adjusted returns measurements in relation to already established companies on the NYSE in the same industry. The statistical analysis was based on the adjusted returns and cumulative average adjusted returns over a 36-month period for each individual company who conducted an IPO between the years 1975-1984, with the sample size of 1526 IPOs. Ritter, (1991) also explains that this is a sign of overpricing in the long run concerning IPOs since the stock's performance does not always coincide with the financial performance of the company. Ritter's research may not be the most recent one conducted, but he proves a point of underperformance in the long run of IPOs that may be an important factor to be considered before contemplating the process of publicly listing a company.

As briefly introduced in the *introduction* section, Leleux & Muzyka (1997) mention that IPOs have historically been underpriced as Alm et al. (2009) and Ritter (1991) also discuss. This phenomenon seems to be one of the most common issues regarding IPOs as many authors mention it in their articles concerning IPOs. The phenomenon of underpricing "leaves money at the table". The pattern shows that companies' lose a part of their potential earnings from an IPO since the newly issued stocks commonly increase quite rapidly during the first trading days/weeks (Dimovski & Brooks, 2004). Dimovski & Brooks (2004) believes that the pattern of IPOs and the initial gains acknowledge an undervaluation of the company's equity according to the market's movement. Earlier re-

search made by Banerjee et al. (2011) suggests that, on average, in Sweden the IPOs stock price initially increased by 21.79% considering IPOs conducted between 2000 and 2006. The same figure for USA was 24% between 2000-2006 (Banerjee et al., 2011). The figures mentioned by Banerjee et al. (2011) may not be completely accurate and may be somewhat deceiving due to the short time scope of their study. Some particular IPOs can be considered as being overpriced according to research conducted by Shayne & Soderquist (1995). Underpricing or overpricing, both phenomena are evidence for inefficiency in the market of IPOs (Shayne & Soderquist, 1995).

1.5.2 Risk of Becoming Publicly Traded

There has been research done on a new kind of risk exposure to an entity after going public. This is something Greenberg (2013) discusses; the risk of experiencing a hostile takeover after becoming public[4]. This means sport clubs that possess the resources and believe being publicly traded has preferable assets and/or are believed to be mismanaged can purchase a sufficient amount of stocks to become the largest owner and then execute all the changes they prefer even though this is not what the current owners had in mind. Greenberg (2013) also illustrated an example of when this phenomenon could have occurred; when the Major League Baseball (MLB) club *Texas Rangers* went bankrupt in 2010 and subsequently arranged a sale of the club. Two major investors were bidding for the ownership of the club; Mark Cuban (a media tycoon and the owner of the NBA club *Dallas Mavericks*) and Nolan Ryan (one of the greatest pitchers in MLB history and who had also played for Texas Rangers earlier in his career). Nolan Ryan won the bidding war but still he was in the danger zone of a hostile takeover. Mark Cuban could have implemented stealth acquisitions of the club's stocks offered to the public on an exchange and slowly taken over the voting rights of the club, forcing Nolan to cooperate with Mark. Nolan could have also recognized this and implemented defensive mechanisms to prevent a hostile takeover of the club (Greenberg, 2013).

[4] Being listed on a stock exchange for the public.

1.5.3 On-Field Performance Relation to Stock Performance

Greenberg (2013) briefly mentions the sensitivity of a sport club's performance to its stock price and how contracts with players could be established to reassure the absolute best performance from the players. One suggestion by Greenberg (2013) is offering players stock options in their contracts that are tied to an agreement of reaching a certain position in the league standings. This matter has also been covered in a research paper by Renneboog & Vanbrabant (2000) where they created a statistical model[5] investigating the correlation between English football clubs' sport related performance to their stock's performance. The statistical model of choice consisted of a dependent variable explaining the stock's continuous weekly return measured on the subsequent Monday after each week (since most games are played during weekends when the stock markets were closed.) On the other side of the model the explanatory variables were the market return and three different dummy variables which would, individually, be activated if the club experienced a victory, draw or a defeat during the previous week of games.

Renneboog & Vanbrabant (2000) received a result that stated a positive correlation between the football clubs' performance and their stock's price development meaning a positive result (win) in a game increased the stock's price while a negative/neutral result (defeat/draw) would decrease the stock's price. If a club won, the stock price would on the subsequent trading day increase (on average measured in abnormal return) by almost 1% while a loss or draw would penalize, respectively, the price of the stock by decreasing 1.4% and 0.6%. The above mentioned statistical model again confirms the correlation between "on-field" performances and the financial results of a sport club as mentioned in the "*Background"* section which is shown with the sole purpose of informing the reader about this link.

[5] $\ln P_{i,t} = a_i + b_1 * \ln Market_t + b_2 * Dvictory + b_3 * Ddefeat + b_4 * Ddraw + e_{i,t}$

Statistical model from Renneboog & Vanbrabant (2000)

1.5.4 Valuation of the Firm

With a focus on individual clubs, a study was conducted by Andersson & Bäckström (2011) on the valuation of the football club AIK and with a main purpose in seeing if the firm was over or undervalued. This is directly linked to underpricing/overpricing and the IPO process a firm goes through in setting a share price. This is somewhat linked to the purpose and research that will be conducted in this thesis as it takes into consideration the public identity of the club and its corporate ownership. Results have been discussed regarding recommendations for investments, factors affecting financial ratios and through a comparison with other clubs, the authors found that AIK struggle financially compared to larger structured clubs and would not be a valid or recommended financial decision. Our intentions are to find whether, based on over/underpricing and long-term underperformance studies, sporting entities are generally viable investment decisions.

In Bauer & Mckeating (2011) research, it was stated that a measure of performance after an IPO is the value of the firm and how the financial markets value the firm following the listing (Bauer & Mckeating 2011). Valuing a firm before and after an IPO gives an indicator of how that particular firm has been affected by this process. There are several ways in which one can proceed in valuing a firm i.e. Free Cash-Flow to Firm (FCFF) and Free Cash-Flow to Equity (FCFE) are two commonly known methods. There will be no direct focus on valuation methods in this thesis but we believe it is something that should be mentioned as the valuation method has a bearing on the stock price and thus the stock's performance both in short and long-run. Some of the financial methods brought up by Bauer & McKeating (2011), regarding the performance of football clubs are briefly touched on below.

1.5.5 Earnings per Share (EPS)

Earnings per share (EPS) define how much profit a firm makes in terms of an individual share, in turn allocating the profit of the firm over the number of shares. EPS is one of

the most common ways to measure the performance of a firm over time and is used to set the price of a share amongst other things (Berk & DeMarzo 2013).

In our analysis we do not intend to use this performance based financial ratio in assessing the performance of a sports club after an IPO, as it may be difficult to judge the viability of going public using this model. A key factor to take into consideration and one of the disadvantages when looking at EPS in sports clubs is that they unlike firms in other sectors often do not pay out dividends. Another disadvantage of using this model when performing comparisons to other firms is that it does not take into consideration capital spent on investments and research & development (Menon, 2013). Therefore we will be looking at other specific financial ratios later on such as Cumulative Abnormal Returns (CAR) and alphas (α).

1.5.6 Return on Equity

Return on Equity (ROE) measures the return a firm has had on past investments. ROE is a key ratio often used in analyzing and evaluating return on investments by analysts and financial managers and is obtained by comparing the income of the firm to its investments (Berk & DeMarzo 2013). The level of the ROE shows how successful past investments have been and in that way the performance of the entity in question. A high ROE therefore could translate to profitable investment opportunities found by the firm.

Again, much similar to the other financial models and ratios, this method is based on accounting data which is not always entirely accurate, also it does not include the cost of capital which may be a telling factor when discussing these figures (Bernhardt, 2015). Mixing financial account data and stock price data is something which can be somewhat misleading and can be difficult to form links between the two, meaning most of our focus will be with regards to performance based measures on time series stock data.

1.6 Delimitations

Our ambition with this thesis is to investigate the hypothesis about the effects of an IPO. This study starts with a broader approach on the effects of IPOs mainly in Europe, further on it will be isolated to football clubs going public. The input sample of the clubs' financial performances after an IPO will be restricted to European football clubs mainly since it is more feasible considering the time restriction of this master thesis. Due to this factor and the complexity of reaching all publicly traded European football clubs we decided to spend our limited time collecting quantitative data instead of conducting interviews to obtain qualitative data. We also believe that the qualitative data will not contribute to the same degree as the quantitative data, which will give us unbiased and precise results in the process of achieving our purpose. We will from now on focus solely on quantitative measurements of the financial performance regarding the football clubs listed on the STOXX Europe Football index[6] along with a number of others not listed in the index.

We will limit ourselves to measuring the financial performance in the short-term by calculating the initial discrete return of the first trading day. We measure the long-run performance by calculating continuous returns and sampling daily prices to calculate cumulative abnormal returns (CAR) and the Jensen's alphas for the publicly traded clubs included in our sample *(Table 9.2)*.

One of the limitations when performing time series data studies is the accuracy of the stock prices. We found that different databases gave us different stock prices, meaning we settled for the reliable Datastream software for our data rather than online-based sources. We also decided to not include the Turkish clubs that are publicly traded due to not being able to find suitable sources regarding the risk free rate of interest in the Datastream database. The figures we obtained were too large and would affect the re-

[6] The STOXX Europe Football Index covers all football clubs that are listed on a stock exchange in Europe or Eastern Europe, Turkey or the EU-Enlarged region. The index accurately represents the breadth and depth of the European football industry.

sults of our data too much, completely changing the beta and alpha parameters to give an unfair evaluation when combined with all other entities.

The sample size of our study is another factor that may affect our results. We are performing studies on 20 different football clubs, meaning that the sample size does not reach the central limit theorem[7]. This limits us to statistical models, which do not assume normal distribution, such as the t-test. In the *method* section, we will attempt to introduce the disadvantages of using each specified model.

[7] When the given number of variables is large enough to assume normal distribution (Damodar & Dawn, 2009)

2 Frame of Reference

2.1 Underpricing/Overpricing

Dibrovski & Brooks (2004) explains the underpricing phenomenon as an asymmetry of information between the underwriters and the issuers regarding the market conditions. The issuers often agree on a underprice for the underwriters to avoid marketing costs of the IPO, and instead let the initial capital gain work as marketing in appropriate media. The author defines the asymmetry of information as the main contributor to underpricing, even though he mentions that there are some other less significant factors contributing to underpricing. Banerjee et al. (2011) includes a table of the average underpricing percentage of IPOs in different countries measured on data from IPOs between 2000-2006 (*See Appendix, Table 9.3*). These average percentages will be used as benchmarks when comparing the price paid by underwriters for a share and the price paid at the closing of the first trading day on a stock exchange.

The opposite of underpricing is of course overpricing. Shayne & Soderquist (1995) explains that the market of IPOs is inefficient. The inefficiency could both be explained by underpricing and overpricing of issuing shares, although the authors believe that there has been too much interest in underpricing, thus they focus on the overpricing phenomenon instead. According to Shayne & Soderquist (1995) IPOs are often made during a high market i.e. the market is overvalued thus the result of it cause an overvaluation of IPOs under the circumstances. Loughran & Ritter (1995) also found that one can almost directly see if a company is overpriced, by simply looking at book-to-market value. The authors claim having a low book-to-market value is often a sign to overpricing of the firm's stock.

This to some extent contradicts what more recent authors like Banerjee et al. (2011) and what Dibrovski & Brooks (2004) have found about IPOs. They believe that there is a strong trend of underpricing. What all authors agree on in their different research papers

is however those entities, which have recently conducted IPOs, tend to underperform seasoned stocks[8] in its specific industry.

Shayne & Soderquist (1995) use Loughran & Ritter (1995) data to compare the difference in the performance of seasoned stocks considering two different hypothetical investment strategies against IPOs[9]. First, they buy an equivalent amount of seasoned stocks to what they would have invested in IPOs annually and hold each year's investment for five years ahead. Secondly they benchmarked it against the strategy of purchasing seasoned stocks directly in proportion to the number of IPOs made each year[10] and hold it for five years. Shayne & Soderquist's (1995) could conclude that, according to Loughran & Ritter's (1995) data, the general stock market was overvalued by 22.7% during the period IPOs were made. IPOs are generally sold with 12.5 % premium on top of the overvaluation resulting in a total overvaluation of IPOs to 38% (Shayne & Soderquist, 1995).

2.2 Profit-Maximizers vs Win-Maximizers

Kesenne (2008) discusses the difference in motives and objectives of sport club owners. Owners can either be "profit-maximizers", where their objective is to maximize returns for the owners, or they can be "win-maximizers" where their goal is to maximize success or the utility of success for a given level of profits or losses. Kesenne (2008) found that European football clubs often act as utility maximizers rather than profit maximizers. This differs from for instance American sports clubs and leagues that are run more business-like. (Kesenne, S., 2008) The motives and objectives of sport clubs owners have an effect on how the new capital raised from an IPO would therefore be used. Win-Maximizers are more likely to use gained capital to invest in productive assets such as players or stadium that will guarantee success and therefore utility for the owners. Profit-Maximizers are more prone to use that gained capital to financially restructure the club, by for example reducing debt and to become more stable financially. Gen-

[8] More mature stocks who have been in the market during a longer time.
[9] Based on a sample size of 4,753 IPOs made in the U.S. between 1970-1990.
[10] The return of the strategy was calculated by weighting the returns of the seasoned stocks by the number of IPOs each year respectively.

erally this is a key factor in explaining the differences between sports clubs and firm in a different industry. In a competitive financial market, shareholders and owners are prone to be profit-maximizers as they are keen to reap financial gains from investments. Psychological factors play into that of owners of sports clubs, where the utility of "on-field" success can be just as or more important than financial gains causing irrational decisions regarding the financial well-being of the club.

2.3 Long-Run Performance after IPO

In Leleux & Muzyka (1997) work they examined the long-run performance of European IPOs with negative results, thus finding an underperformance trend in the European IPO market. Leleux & Muzyka (1997) measured the long-run performance by calculating cumulative abnormal returns (CAR) of the newly issued stocks in a time period of 36 months (three years) after the issue. The results from measuring the CAR of the European IPOs over the 36 months gave the authors a similar pattern of the long-run performance as when they conducted a cross-sectional regression, which evaluated both abnormal returns and systematic risk. This finding in Leleux & Muzyka (1997) enforces the result previously found by Rydqvist (1993) and Ritter (1991) regarding the long-run underperformance of IPOs.

Loughran & Ritter (1995) argued in their research that issuers tend to time entering the market with new shares when their firm is relatively overvalued. This to maximize the amount of raised capital limited to the amount of issued shares. Doing this however contributes to a low book-to-market value and therefore the issuing firm's stock will underperform in the longer run when benchmarked against index to equalize previous overvalue (Loughran & Ritter, 1995). In Brav, Geczy & Gompers, P.A. (2000) they also found that long-run performance of newly issued stocks measured in abnormal returns and cumulative abnormal returns often matched the book-to-market value connected to the firm. As much research uses the CAPM[11] to find expected returns and to find connections to valuation and performance of a stock, this model has shown a small ability to explain the cross-sectional returns (Brav et al., 2000). On the other hand the cumula-

[11] Capital Asset Pricing Model

tive abnormal return (CAR) has shown a great ability in replicating cross-sectional data and thus it has been considered an appropriate tool (Leleux & Muzyka, 1997).

Another way to measure the long-run performance of a stock against the market (or another comparable index) is to calculate the Jensen's alpha where you risk-adjust the stock's historical performance against the market (Berk and DeMarzo, 2013). A positive alpha indicates an outperformance of the market the stock is benchmarked against and a negative alpha indicates an underperformance (Flaherty & Li, 2004). One should though be careful with drawing conclusions about the positive alpha, even if it is statistically significant, since positive alphas are often due to chance[12] (O'Sullivan, Hutchinson, & O'Connell, 2009).

[12] Extraordinary events affecting the stock's price development

3 Method

In this section the relevant methods that will be used to analyze our data will be introduced, explained and determine what way we will be able to use the data available to us. One will also be able to read at the potential advantages and disadvantages of each method.

3.1 Methodology

- DEDUCTIVE (*top-down approach;* considering we investigate a hypothesis like underpricing/overpricing and long-run underperformance.)
- METHOD STRATEGY
    - Quantitative⇒ Journals, Financial Ratios, Financial and Accounting statements, Time Series Data.
- PHILOSOPHICAL APPROACH
    - Pragmatism (uses multiple methods with quantitative data, values play a large role in interpreting results, external multiple view chosen to best enable answering of research questions)

(Saunders, Lewis, & Thornhill, 2009)

When deciding on how to construct a method, one must know whether or not they want to test a theory or build an own theory. It is also important to know how to explore and find the data needed to arrive with a conclusion of the results in the end, e.g. through qualitative or quantitative measures. Since our field of study is the financial/business field we intend to use Saunders, Lewis, & Thornhill's (2009) as guidance in the construction process of our method.

We have chosen to focus our study based on quantitative data gathered from earlier research papers and using our own mathematical calculations based on time-series data. Our method will thus be concentrated on solely quantitative methods. We have chosen to conduct the method in a deductive manner, as we believe it will be easier for the objective reader to follow us throughout our work by using this method

In this thesis we have chosen to test existing theories concerning the effects of IPOs previously examined by other authors in the context of corporations outside the sport business, but in our case we will investigate if the same effects apply to sport clubs who have become publicly traded on the stock exchange[13]. We will move from existing theories to collect data to examine the relationship between IPOs and the under/overpricing phenomena and also the theory of the long-run underperformance of IPO stocks compared to existing competitors' stocks in the same sector. Therefore our research approach will be in a deductive manner, as we are planning to test the existing theories earlier mentioned regarding the effects of an IPO, but in the context of a sport club's stock.

The philosophical approach of this thesis will be pragmatism[14]. There will be a strong focus on obtained values that will play a large role in our interpretation of the results, as we also will have a multiple method design in our research approach. The multiple method design is founded on the basis that we will have a small sample size, considering the population of football clubs listed on a stock exchange in Europe is quite small in relation to other populations in a specific listed industry and considering we will still focus on the quantitative and observable data.

3.2 Method

To gain a broad picture of the effects of going public for a sports club, combined methods of different quantitative measures will be used to assess this. When performing research it is important to perform studies that will give objective results, thus our sample must reflect the European IPO market for football clubs. It is also important to remind the reader that many of the models, methods and ratios used below can be altered in some way by the firm publishing them to give an unfair picture of finances and therefore a subjective view on certain issues (Menon, C. 2013). Our key concern here is to give a fair and consistent view on all firms that will be applied. It is important to con-

[13] Sport Clubs which have conducted an IPO

[14] In the view of the authors you should study what interests you and is of value to you, study in the different ways in which you deem appropriate, and use the results in ways that can bring about positive consequences within your value system.

sider all models and methods when giving an assessment and conclusion on the performance of an entity.

3.2.1 Assessing the effect of an IPO using Performance Measures

There are a number of performance-based measures that relate to the stock price of any entity, which help us measure the period after an IPO has been conducted. These will assist us in obtaining key results, giving us useful insights into the performance of sports clubs in a comparable nature and setting of performance-based methods. For this section and for the methods to be introduced below we require historical time series data, based on the stock price movements of the entity or market in question, and to create certain indicators as to how the club or the firm has performed since going public. As will be discussed later in this section, a comparison between a newly listed sports club and seasoned stocks can also be made using these quantitative measures. We will base our methods on the return of the stock/market prices, which will be calculated using a logarithmic approach. This gives us a more accurate and effective return based on our sample size and time period. We used this approach as the returns are continuously compounded, meaning that we can compare certain assets without regard to the number of times they have been compounded. Logarithmic returns can be assumed to being normally distributed over a number of trades, which is beneficial for the accuracy of our data analysis and statistical tests (Hudson & Gregoriou, 2010). Logarithmic returns can be calculated by using the following formula:

$$\boldsymbol{Log}\left(\frac{\boldsymbol{Price\ T}}{\boldsymbol{Price\ T_{-1}}}\right) = \boldsymbol{Continuous\ Return}$$

Once this has been calculated for each period of our dataset, we can continue in performing the calculations based on the following models.

3.2.2 Abnormal Return & Cumulative Abnormal Return

Cumulative abnormal returns is a useful indicator in assessing how an investment fares with respect to its predicted return based on an index or the market. The predicted return is what a potential investor should expect to receive on an investment, based on the particular index price movements (Berk and DeMarzo 2013). The long-run underperformance in relation to seasoned stocks[15] and the market in general, will be measured in terms of the annual growth in stock price for each individual in the sample benchmarked against the annual growth in price for a seasoned competitors stock. As earlier researchers (Ritter; 1991, Rydqvist; 1993 and Leleux & Muzyka; 1997) have used cumulative abnormal returns (CAR) to measure the long-run underperformance we will utilize this measurement to enable comparison of European football clubs IPOs performances in the long run. To do this we will first calculate the abnormal returns on a daily basis as follows:

Abnormal Return = Actual Return – Predicted Return

After this, the abnormal returns are aggregated to find the CAR for each club on a daily basis as well as on a yearly basis. To display the fluctuations and trends in both abnormal returns and cumulative abnormal returns it will be graphed based on the daily results. According to Ritter (1991), the long-run underperformance tends to last between three to six years, leading us to decide to include time-series data regarding the issued stocks five years after their IPO dates. We will also attempt to create an average of all entities we have looked at to create a more clarifying picture of the overall CAR for sport clubs.

[15] More mature stocks which have been in the market during a longer time.

3.2.2.1 Statistical Tests

Once we have gathered the data concerning abnormal returns and CAR, we will undertake a statistical study to validate the statistical significance of our results. We will perform a test measuring whether our null hypothesis (H0) or alternative hypothesis (H1) is correct. This will be conducted using a left tailed t-test. A t-test can be used when we cannot assume normal distribution due to, among other things a small sample size. Since our sample consists of 20 different football clubs, we cannot assume normal distribution and therefore use a t-test which does not require normally distributed data (Damodar & Dawn, 2009). Such a test says that the null hypothesis (H0) is greater or equal to 0 and the alternative hypothesis (H1) is less than 0.

We can obtain a t-value by using the following formula:

$$t - value = \frac{Mean\ of\ Abnormal\ Returns}{\left(\frac{Standard\ Deviation\ AR}{\sqrt{No.\ of\ Observation}}\right)}$$

We thereafter will compare the t-value obtained to the critical value from a statistical t-table[16] leading to an eventually accepting or rejecting the null hypothesis (H0), depending on whether the t-value lies in the critical region or the uncritical region.

H_0 = Football clubs' abnormal Returns are ≥ 0
H_1 = Football clubs' abnormal Returns are < 0

If we accept the reject the null hypothesis (H0) we will therefore be able to conclude that the return stocks of football clubs underperform on a daily basis with regards to the return of the stock index or expected return.

[16] Damodar & Dawn (2009)

3.2.2.2 Disadvantages of Abnormal Returns

In a study conducted by Barber & Lyon (1999), they brought up disadvantages when using abnormal returns with regards to misspecifying test statistics. Abnormal returns are generally used after an event to measure the effect of it. However *new listing or survivor bias, rebalancing bias* and *skewness bias* were all factors that were brought up affecting the test statistics and the size of rejection levels when hypothesis testing (Barber & Lyon, 1999). In Coutts, et al. (1995) they discuss how the time frame that one conducts abnormal returns on after an event is poorly specified and is often the choice of the writer. Also differences in trading days and infrequent trading of the firms stock (seen at various points in our data) when comparing to the market index means that the CAR can at times be incomplete (Coutts, A.,et al., 1995).

3.2.3 Jensen's Alpha

The long-run financial performance of the football clubs will also be measured by calculating Jensen's Alpha for each club, also based on daily time-series stock data. Jensen's Alpha will help us determine if the stock has over- or underperformed the national stock index where each individual club is listed. Jensen's Alpha measures the excess return of the stock with respect to the market risk premium[17]. If the stock has a majority of consistently positive excess returns the alpha will be of positive character and if the stock has a majority of consistently negative excess returns the alpha will then be of negative character instead (Berk & DeMarzo, 2013).

[17] Market Risk Premium (MRP). To obtain the MRP we deducted the daily market index return by the daily risk-free rate.

***JENSEN'S ALPHA* = α**

Finding alpha through regression:

$\mathbf{Y=\alpha_0 + \beta_1 X_1 + \varepsilon}$

Y= Excess Return Stock

$\boldsymbol{\beta_1}$= Beta (volatility measure for how the stock follows the market)

$\mathbf{X_1}$= Excess Return Market

ε= Error Term (Residuals)

The dependent variable Y in our study will be the stocks' excess returns run against the independent variable X, the excess return of the market, also known as the market risk premium (Berk and DeMarzo, 2013).

The Alpha (α) should not be significantly different from zero[18]; otherwise it will be a sign of either over- or underperformance (Flaherty & Li, 2004). We will obtain the alphas for all stocks in our sample through running simple regressions, after which we will aggregate the results and find the arithmetic average. Later on the results will be plotted in a graph to show the development of alpha for the listed European football clubs over time. These graphs will work as a tool to simplify the process when analyzing the trend of performances. To validate our results we will also conduct a simple regression of the excess returns of the stocks against the excess return of the market. By running the regression on a yearly basis for each of the 20 football clubs in our sample, along with alpha we can obtain a standard error and confidence intervals. We will analyze our data using confidence intervals at a 95% level, forming lower and upper bounds wherein we are 95% confident alpha will lie. We will be able to here again form a general conclusion of the performance of all football clubs by finding a mean upper and lower bound along with standard error for all football clubs and plotting these along with the mean alpha.

[18] Alpha being statistically insignificant.

3.2.3.1 Statistical Testing for Alpha

Much like the statistical measures used in the previous method, we will be attempting to analyze the statistical significance of the alpha values obtained. To gain a true understanding of football clubs as a whole we will be required to use all data in one specific simple linear regression model. To be able to pair returns of the market on precisely the same time period as that of the stock returns since being listed we will be using the stacked data technique, simply stacking each football clubs stock returns versus market returns to create one unified sample. After this we can run a simple linear regression for a best-fit line and can proceed in testing the validity of our data.

We will again introduce a hypothesis, and test it using a simple t-test. As mentioned in the previous section, the formula for obtaining the t-value is as follows[19]:

$$T - value = \frac{Mean\ of\ Sample}{\left(\frac{Standard\ Deviation\ of\ Sample}{\sqrt{No.\ of\ Obeservations}}\right)}$$

The hypothesis we will be testing is as follows:

$$\mathbf{H_0 = Alpha\ is \geq 0}$$
$$\mathbf{H_1 = Alpha\ is < 0}$$

If we then reject the null hypothesis (H0) we will be able to conclude that the obtained alpha is significantly lower than 0. The hypothesis structure is dependent upon the fact that we are investigating potential long-run underperformance of IPO stocks versus the market and seasoned stocks[20].

We will also conduct an analysis based on the R-Squared statistical measure, used to measure the goodness of fit of a model and how close the data is fitted to the regression line. R-Squared values range from 0% to 100% based on the goodness of fit. A low R-

[19] Damodar & Dawn, 2009

[20] More mature stocks in the same industry that have been in the market during a longer time.

Squared value therefore hints that the model does not explain well any of the variance of the response data around the mean and a high R-Squared value shows that the model to a large degree explains the variance from the mean (Frost, J., 2013). The formula for calculating the R-Squared value is as follows[21]:

$$\boldsymbol{R - Squared = \frac{Explained\ Sum\ of\ Squares\ (ESS)}{Total\ Sum\ of\ Squares\ (TSS)}}$$

By analyzing the R-Squared value we can draw a conclusion with regards to how good of a fit the model is and can be used to form predictions or forecasts regarding the model.

3.2.3.2 Disadvantages of Jensen's Alpha

Possible disadvantages when using Jensen's Alpha, is that the excess return depends heavily on what index you choose to benchmark the stock against. Here one should critically evaluate which type of index that fit every individual case. One should also be careful in using the term "positive alpha" if using an index as benchmark since the stock's value drivers may not be responding to the same value drivers as for the chosen benchmark index (Hedge Fund-Index, 2015). Using an inappropriate benchmark index or risk-free rate will give you an alpha with a small or large bias depending on the magnitude of the inappropriateness.

As O'Sullivan, Hutchinson, & O'Connell (2009) mention in their work, alpha is often misrepresented even though it is statistically significant, meaning that in some cases the alpha may be positive or negative due to special events affecting the stock or fund's performance. Thereby our analysis of the result might be inaccurate since we cannot with one hundred percent certainty know if we avoided a Type 1 error[22] or Type 2 error[23] when rejecting or accepting the null hypothesis respectively (Damodar & Dawn, 2009).

[21] (Damodar & Dawn, 2009). Can also be defined as: R-Squared = 1- (Residual Sum of Squares/TSS)

[22] Rejecting the null hypothesis when it is in fact true.

[23] Accepting the null hypothesis when it is in fact false

3.2.4 Beta

There is more than one way to find the beta for a stock. We have chosen to focus on the regression beta for our listed football clubs since it will give a more valid result than other types of beta calculations considering the data we want to obtain. The beta (β) will be used to measure the volatility of the football clubs stocks in relation to the respective market index for each stock meaning that it will deliver us a sense of how sensitive the stocks are in our sample to a movement in the market as whole (Damodaran, 2013). The beta will be computed by running a regression of the known daily returns of each stock in our sample as the dependable variable against each respective market index daily returns as the independent variable[24]. The regression will only give us an estimate of how volatile the stocks are to the market movements (Damodaran, 2013).

Estimating beta through running a regression carries some limitations. The standard error is small for companies that make up a large part of the index it is regressed against. The result then still, even though low standard error, will not reflect a true measurement of the systematic risk due to the heavy weight of the index it represents. The regression betas will therefore most certainly carry some noise and skewness in its result due to above factors (Damodaran, 2013).

3.2.5 Assessing the performance of an IPO with regards to underpricing and overpricing

The inefficiency apparent in the market of IPOs is generally caused by underpricing or overpricing, meaning that there is a significant difference between the issuing price and the closing price of the first day on a stock exchange (Shayne & Soderquist, 1995). One statement previous researchers all mention is that IPO stocks tend to underperform in

[24] Y= Beta1*X1, where Y is the stock return and X1 is the return of the market. The regression will give us an estimated Beta1 which is the volatility of the stock i.e. how the stock responds to swings in the market as whole.

terms of the stock's price development in relation to already long-run established similar stocks outstanding in the market.

To evaluate the commonly known phenomena over- / underpricing stated by earlier researchers such as Ritter (1991), Leleux & Muzyka (1997) and Shayne & Soderquist (1995) we decided to sample European football clubs IPO prices and their first day's closing price after their IPO date. This data will then be used to compute the initial discrete return[25] for all clubs in our sample representing the level of over-/underpricing[26].

Potentially, there will be a pattern of over- or underpricing when looking at sport clubs listed on a stock exchange. The issuing prices will be gathered from different sport clubs' prospectuses and news articles mainly. The first day's closing price of each individual sport club's stock in the sample will be received from *Yahoo Finance* or *DataStream*.

To measure the short-run performance considering IPOs and under/overpricing we will use our sampled data including IPO prices and first day's closing prices to calculate the initial discrete return of each newly issued stock's first trading day to see if it appreciated or depreciated. The outcome of this simple investigation will be concluded with a table exhibiting each observation in the sample, as we will also calculate the average of the sample to get an overview of the initial returns.

3.2.6 Comparison of firms based on STOXX index and market index

Looking at historical movement in prices of an index compiled of football clubs and comparing it both to the stock exchange or market and firms in other sectors will give us an overall picture of the overall performance of European football clubs over that period of time to a certain extent.

[25] Initial Discrete Return = (Closing Price first day- IPO Price) / IPO Price
[26] Underpricing= IPO Price < First day's closing price
Overpricing= IPO Price > First day's closing price

STOXX.com (2015) offers information on a bundle of all 22 publicly traded European football clubs listed on the Dow Jones *STOXX European Football Index* and historical stock price data and movements of these components (*See appendix 9.4 for list of entities)*. As well as just analyzing individual football clubs and their historical stock price data, we can get a more general picture of how football clubs perform as a whole. Using an index compiled of 22 different football clubs rather than an individual firm and comparing it to a stock exchange index will give us a more fair evaluation of this sector as a whole and gives us a more accurate analysis and conclusion. *"The STOXX Europe Football Index covers all football clubs that are listed on a stock exchange in Europe or Eastern Europe, Turkey or the EU-Enlarged region. The index accurately represents the breadth and depth of the European football industry."* (STOXX.com, 2015). By obtaining historical time series data provided by Datastream, we can later analyze the overall performance of publicly listed European football clubs.

After obtaining historical stock prices since the index started operating in 1991 we will also strive to obtain beta values of the stock movement benchmarked against different indices, which are important factors for investors giving an insight on volatility, and therefore risk amongst other things (King, B 1966).

A correlation analysis between the STOXX index and the market and different indices, helps us in analyzing whether there is a strong or weak link between the two. [27] We intend to select a variety of different indices based on which exchanges the football clubs have been listed. A strong correlation would suggest that the football clubs' stock price moves in a similar pattern to the rest of the market. A beta analysis as mentioned in previous sections will be important in analyzing the volatility of the STOXX index and football clubs in whole when benchmarked against the market. A beta larger than one would imply that the index is more volatile than the market, posing higher risk to an investor. A beta smaller than one would suggest that the index is less volatile and also pose a lower risk to an investor.

We will attempt to create graphs showing the movement of the stock price to give us a clearer picture of how in turn certain events may have affected the price movements. In

[27] Corr x,y = Cov(x,y) / Std.dev (x) * Std.dev (y)

the analysis section we will attempt to trace patterns and draw conclusions from the stock price movements. Along with this we will return to certain events throughout the last couple of decades mentioned in previous sections and how these can have had a direct influence on not only expectations but also the actual price movements. The data and graphs discussed will also give us a clearer picture of the long term over or under-performance of the stock with regard to sports/football clubs as a whole and will assist us in analyzing and drawing conclusions with regard to this phenomenon.

3.2.7 Newly listed stocks versus seasoned stocks

Our intention is to also analyze the performance of newly listed IPOs versus that of seasoned stocks. Seasoned stocks are stocks that have been listed for a specific period of time on the stock exchange (Banerjee et al. 2011). To simplify calculations we will again use the STOXX index as a benchmark for seasoned stocks and select various football clubs from our sample that have recently conducted an IPO. We will then compare the performance of the stock from the date of going public and five years afterwards on a daily basis and compare this to the performance of the STOXX index during the same time period. We will do this by analyzing the abnormal returns for each stock analyzed and the market, which has been explained in previous sections. To proceed with this method and to be able to incorporate all clubs under the same umbrella, we were required to use stacked data. This is due to the fact that all entities in our study have different IPO dates and therefore the returns should be compared to the returns of the STOXX index on precisely the same dates. By stacking the data in this manner we can proceed in running a simple linear regression on the abnormal returns for all stocks, five years after their IPO, and the abnormal returns of the STOXX index (return - risk free rate) in these five-year time frames. By doing this we can analyze the regression data statistics and introduce two important statistical measures that we will be looking more closely at, namely R-squared[28] and the t-statistic[29].

Similar to in the *Jensen's Alpha* section, we will look at the alpha of this regression as to see whether newly listed football under/over-perform when benchmarked against sea-

[28] R-Squared = ESS/TSS (Defined in previous section)
[29] Mean of sample / (Standard Deviation of Sample/ √Number of observations)

soned stocks (STOXX index). This alpha can be compared to the alpha we obtained when comparing football clubs' stocks with regard to different market indexes.

We will again measure the significance of the alpha obtained and the fit of the model using both a t-test and finding an R-Squared value. For the t-test, our hypothesis will be the following:

$$\mathbf{H_0: Alpha\ is \geq 0}$$
$$\mathbf{H_1: Alpha\ is < 0}$$

If we proceed in rejecting our null hypothesis (H0), we can conclude that alpha is significantly lower than 0 and that newly listed football clubs' stock returns underperform when benchmarked against seasoned stock returns. We will again look at the R-Squared value to determine the goodness of fit of the model and compare it to the R-Squared value obtained when comparing stock returns to market returns.

3.2.7.1 Disadvantages of this method

Drawbacks associated with this approach are that just analyzing the stock price gives a false impression in certain circumstances. As a researcher it is difficult to analyze certain peaks and troughs without knowing background information in both "on-field" and financial based happenings. If we instead focus on a historical weighted average across the field of several different entities, we can in some way eliminate this effect. Another disadvantage when using the STOXX index is that certain entities have been added throughout the period it has operated meaning there is a mix of newly listed companies along with seasoned stocks making and analysis of the performance after an IPO difficult. With respect to this remark the STOXX index will give us a useful indicator on how football clubs perform with regard to the market, but struggle to incorporate the period directly after an IPO has been conducted. We will therefore strive to obtain these results by analyzing each entity individually.

With regard to our final study using the STOXX index, using it as a benchmark of seasoned stocks against newly listed stocks, in some cases there will be a slight error due to

the duplication of the stocks we are analyzing being already listed on the STOXX index. Also when looking at some newly listed clubs and comparing them to the STOXX index, all the clubs on the index were listed at different point in time. This makes it difficult to draw concrete conclusions regarding what we consider to be a seasoned stock, i.e. how many years it has been listed.

3.3 Quality Assurance

In our writing of this master thesis, it is crucial to avoid common pitfalls making this work unreliable. Thus we will always bear in mind to use appropriate methods connected to our research goal in an attempt to create a reliable, valid and replicable result. Validity, reliability and replicability will be of high importance in enabling others to use this work as input in further research of this subject. Collecting input data and using it to construct graphs and tables will be of importance when seeking trends, thus the sources have to be critically analyzed. We decided to use Cumulative Abnormal Return (CAR) instead of making a cross-sectional regression that according to Leleux & Muzyka (1997) will show similar results which also simplifies the replicability and thus the validity. To emphasize our ambition to validate our results we will also conduct simple linear regressions on our obtained time series data in an attempt to raise the quality of our research. The simple linear regression will provide us with estimates and t-statistics that will help us to arrive at a conclusion of the results.

4 Collection of Data

In this section the data collection process will be discussed. Where we found the data and why we used certain methods will be important questions that will be answered in this section.

4.1 Time Series Data

4.1.1 Individual Sports Clubs Historical Stock Price

As our intention is to analyze the performance of sports club after an IPO has been performed, analyzing historical stock price movements since the IPO date gives us useful information in our analysis and in drawing conclusions with regard to this. We hand-picked several clubs which we feel are of importance to our research and obtained historical time series data from the Yahoo Finance database and Datastream. For each sport club we have used historical daily time series stock data with time period from the date of the IPO and five years forward. We decided on this time period as to incorporate the performance of the clubs directly after an IPO has been conducted and which has been discussed by Ritter (1991) and in earlier sections as a suitable time period. This particular time series data will assist us in determining if there is long term over-/underperformance, along with looking at specifically dated events and how they have affected the stock price. It will assist us in determining the alpha and beta when benchmarked against the market and also in conducting studies regarding cumulative abnormal returns.

4.1.2 Historical Market Prices

To give us an insight of how each individual stock has performed we obtained market prices that will be used as a benchmark. To give more accurate and precise results, we used the index each stock was listed on as the benchmark for that stock, also known as the expected return of an investment. Similar to the individual stock prices we obtained historical daily time series stock data with the same time period as the individual stock,

from the date when it was listed and five years forward. This allowed us to compare the daily continuous returns precisely to the date allowing for us to make further calculations with regards to excess and abnormal returns.

4.1.3 STOXX Data

The STOXX index compiled of 22 different football clubs (STOXX.com, 2015) and its historical prices were available from their database online providing us with the daily price movements since the introduction of the index in the end of 1991. We used logarithmic returns to calculate the returns of the index.

4.2 IPO Data

There was some difficulty in obtaining the IPO data due the variety of databases to search through and a lack of accessibility regarding IPO data within the databases. Some financial information about the IPOs was difficult to obtain due to restrictions on privacy out with the countries in question. We were able to obtain nine different clubs' full IPO data. Having such a small sample will not be of any use in a statistical test. We then decided to only calculate the first day's initial discrete return by putting the difference of the first day's closing price and the IPO price in relation to the IPO price. After computing this for all nine clubs in the sample we found the mean of the sample. This data will be assessed later on in the analysis were the sample and its components will be further discussed in the light of under-/ overpricing.

4.3 Risk Free Rate

For us to perform calculations regarding excess return of both the stock and the market we were required to obtain a risk free rate as to find the market risk premium. We obtained historical time series data of ten year governmental bonds from Datastream with regard to the country in which the football clubs are located in or with regard to the exchange they are listed on. These governmental bonds accurately measure the risk-free

rate of each particular country. We matched the risk free rates with the daily data and dates used for the individual stock returns as to find the precise risk free rate at that point in time. As mentioned in the delimitations section, we refrained from using the Turkish football clubs as the risk free rate was not viable and affected the overall conclusion of our work.

4.3.1 Excess Return

Excess return is when the returns found from the changes in stock price are adjusted for risk using the risk free rate obtained in the previous section. The risk free rate shows how much an investor can earn on their capital without taking any risk and in theory simply keeping their capital in the bank. By removing this risk we find the return earned above this amount. We simply calculated by subtracting the daily risk free rate (compounded on a daily basis) from the actual returns to in turn create an excess return on both the stock and the market.

5 Results and Analysis

This section will build on the data section above and will introduce the reader to our results, followed by our analysis of our findings, and how they relate to our specific research questions. The analysis section will lead us to be able to conduct a viable conclusion.

5.1 Jensen's Alpha

Jensen's Alpha can be calculated in a variety of different ways. In our case, we run a regression on the time series data with the dependent variable being the excess return of the stock price and the independent variable being the excess return of the market. The alpha in this case is the intercept of the regression analysis and explains whether the particular stock is "beating" the market after adjusting for risk (Damodaran 2012). Shown below is the alphas obtained for each of the individual football clubs we have obtained time series data for (Table 6-1.1).

Club	Alpha Year 1	Alpha Year 2	Alpha Year 3	Alpha Year 4	Alpha Year 5
Aalborg	-0.34%	-0.41%	-0.41%	-0.23%	-0.23%
AIK	-0.03%	-0.25%	-0.37%	-0.08%	-0.28%
Ajax	-0.34%	-0.25%	-0.34%	-0.18%	-0.32%
AS Roma	-0.20%	-0.47%	-0.43%	0.03%	-0.33%
Benfica	-0.41%	-0.24%	0.09%	-0.28%	-0.35%
Birmingham	-0.45%	-0.47%	-0.57%	-0.11%	-0.46%
BVB	-0.46%	-0.23%	-0.17%	-0.24%	-0.20%
Celtic	0.18%	-0.16%	-0.41%	-0.27%	-0.49%
FC Copenhagen	-0.05%	-0.25%	-0.21%	-0.23%	-0.26%
FC Porto	-0.28%	-0.15%	-0.46%	-0.25%	0.00%
Juventus	-0.40%	-0.10%	-0.16%	-0.15%	-0.02%
Lazio	0.10%	-0.27%	-0.09%	-0.43%	-0.55%
Lyon	-0.27%	-0.48%	-0.12%	-0.08%	-0.21%
Man.Utd	-0.12%	-0.15%	-0.25%	N/A	N/A
Preston NE	-0.23%	-0.41%	-0.56%	-0.41%	-0.42%
Ruch Chorzow	-0.21%	-0.18%	-0.48%	-0.57%	-0.40%
Southampton	-0.37%	-0.29%	0.73%	-0.49%	-0.50%
Sporting Braga	-0.25%	-0.37%	0.05%	-0.36%	-0.06%
Sporting Lisabon	-0.35%	-0.07%	-0.38%	-0.17%	-0.26%
Watford	-0.45%	-0.87%	-0.71%	-0.59%	-0.25%
Average	-0.25%	-0.30%	-0.26%	-0.27%	-0.29%

Table 6-1.1 Alpha Values by Year, Calculated Using Daily Prices, Source: authors' own calculations

We obtained an alpha for each of the five years after the IPO had been performed to in effect show how football clubs perform against the market after an IPO. With this we could also form a graph showing the movement of alphas over those five years. We have compiled graphs including all football clubs and their alphas over this time period (*See Individual Alpha Plots in Appendix section 9.5*). Individual movements are not of complete interest to our study, as we want to draw a general conclusion with regard to sport clubs. With this taken into consideration we also created a graph showing the average alpha of all entities as shown below (Figure 6-1.2). This figure is based on our results and calculations exhibited in *Appendix Table 9.6.* We show alpha as a percentage to give clarity as to how much the football clubs' stocks underperform the market on a daily basis. In this graph we also show the lower and upper 95% confidence levels as to which we expect the alpha to lie within (Lower and Upper Bound). We have also included the standard errors with regard to alpha, which is shown in the error bars. These were gathered through running a regression each year using daily excess returns of the stocks and the market.[30]

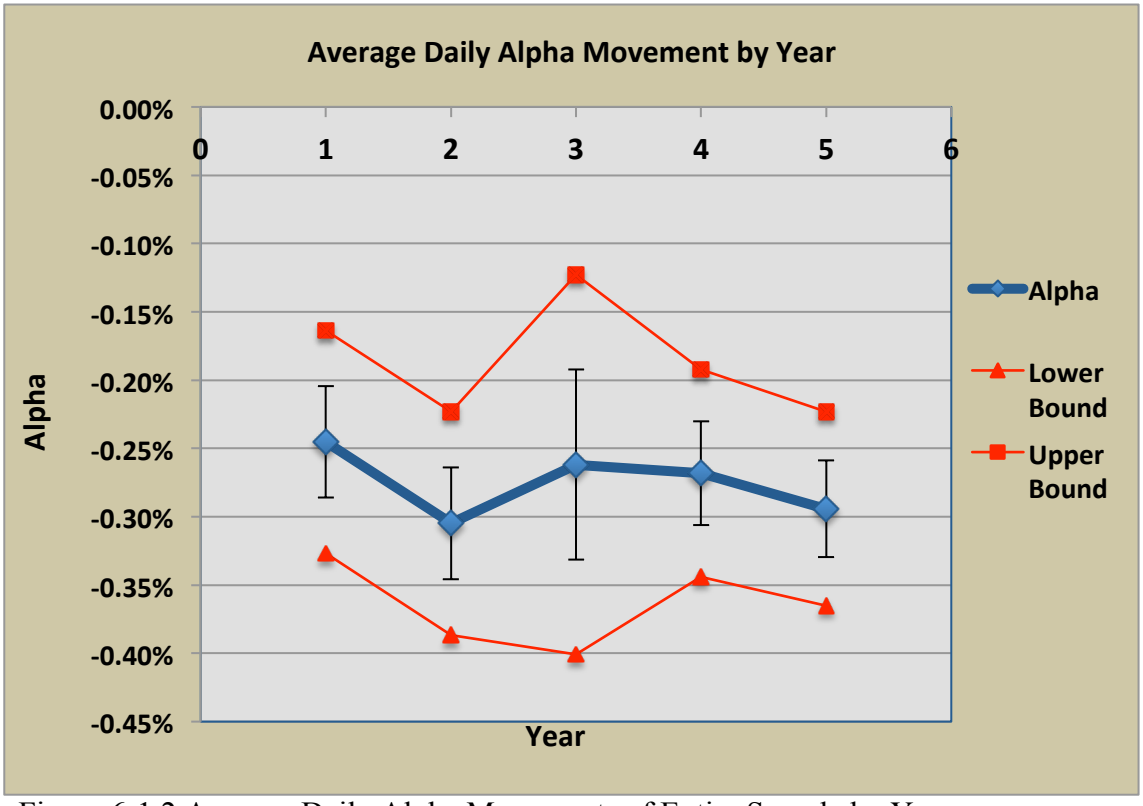

Figure 6-1.2 Average Daily Alpha Movements of Entire Sample by Year.

[30] Confidence Interval = Sample Mean ± T-statistic * Std. Dev Population / √ No. of Observations

5.1.1 Statistical Test

As mentioned in the *method* section, we run a simple linear regression using stacked data of both the stock excess returns and the market excess returns. By running this linear regression we can obtain one alpha for the entire five-year period along with a t-statistic and an R-Squared value. We again found a negative alpha of approximately -0.0027 or 0.27%, which also coincides, with what we find when using the average of all five periods from our data above.

If recalled, our left-tailed t-test hypothesis was stated in the *method* section (*see page 27 of this thesis*)

We then proceed in finding the t-statistic using the formula mentioned in the method section after running the regression and find values of:

Regression Statistics IPO vs. Market	
R Square	0.0055
Adjusted R Square	0.0055
Standard Error	0.0343
Observations	24147

	Coeffi-cients	***Standard Error***	***t Stat***	***P-value***
Intercept	-0.0027	0.0002	-12.2257	0.0000
Excess Return Market	0.1883	0.0163	11.5772	0.0000

ANOVA					
	df	***SS***	***MS***	***F***	***Significance F***
Regression	1	0.1575	0.1575	134.0305	0.0000
Residual	24145	28.3762	0.0012		
Total	24146	28.5337			

Table 6-1.3 Regression IPO vs. Market

As we have a large number of observations (daily pricing, five years, 20 clubs) we can obtain the critical values from the normal-distribution table of -1.645 (95% region) and -2.326 (99% region). (Damodar & Dawn, 2009).

12.2257>2.326>1.645

T-statistic is significant, rejection of H0 at both 95% and 99% regions

A rejection of our null hypothesis means that we confirm that the alpha value obtained is significantly lower than 0. If looking at the ANOVA table above (Table 6-1.3), we obtain a high F-statistic (134.03) and a low P-value for the F-statistic (0.00) confirming the significance of our model and the rejection of the null hypothesis. The F-statistic obtained is far higher than any critical value in the F-distribution table, hence the rejection of H0. (Damodar & Dawn, 2009)

After running the aforementioned regression, we also obtained an R-Squared value of 0.55% (Table 6-1.3). This indicates that the model is a bad fit when incorporating the variance from the mean. It is important not to fixate on the R-squared value, as we have high significance levels in our test statistics. The low R-squared means that this model is not suitable for making future predictions and expectations as to where the alpha will lie. The low R-squared value can be explained by first off, a large number of observations, and secondly, the returns on stocks tend to fluctuate largely around the mean.

The negative alpha obtained and the statistical significance of this shows a clear sign of the football clubs' underperformance when benchmarked against the market. In plotting the alpha's yearly, compiled using daily returns, it is clear that the alpha lies at a constant level around -0.27%. This is the average of how the alpha performs on a daily basis throughout each year[31]. If we compound this to an annual rate, we have an annual underperformance of approximately -51%.

$$\text{Yearly Rate} = (1+\text{Daily Rate})^{\text{no of days}}-1$$

$$\mathbf{-0.51 = (1+-0.0027)^{260}-1}$$

This is an obvious underperformance when benchmarked against the market, making the football clubs' the "losing" stock over this time period.

[31] Assume 260 trading days in a year

When also plotting monthly data for the alpha values *(Appendix 9.7),* we see that at only three points does the stocks return actually "win" against the index, otherwise constantly lying below 0 with no clear upward trend. Our confidence intervals in our graph showing yearly alpha levels (Figure 6-1.2), show us that the alpha should always lie below 0. This indicates a constant underperformance through the alpha level confirming our previous results.

The low alpha results found (less than zero) are in line with our expectations of underperformance of newly listed football clubs. From earlier research and studies based on performance after an IPO by authors such as Ritter (1991), Leleux & Muzyka (1997) and Shayne & Soderquist (1995), there has been a clear tendency of underperformance of these stocks over a three to six year period. Also looking at background and the history of football clubs' listings, we see a picture of publicly listed clubs often in financial trouble and that more and more clubs have instead delisted themselves from the market.

One point that is of concern for an investor is that the alpha does not have any specific trend upwards from the IPO date up until five years later. An interesting measure would be to undertake further studies which identifies the period after this, when the stocks become more seasoned, to see if the alpha begins to work its way towards 0 or a positive performance. We have attempted to measure this to some degree in our comparison between the STOXX index and different market indexes as a whole, which will be discussed later on. In our further research, we will recommend to some extent a similar study to our based on the alpha movement, but with either a larger time period or also a period starting five years after the IPO has been conducted.

5.2 Cumulative Abnormal Returns

The CAR analysis is based on obtaining abnormal returns, meaning the difference between the return of a stock and the predicted return. This is obtained through again using the returns of both the individual stock price and the market price. This gives us an abnormal return, showing the difference in ones return if investing in the individual stock versus the market. Cumulative abnormal returns are when the abnormal returns are summed together over a certain period to instead show how much the differences in returns are over a certain period of time. In our case we decided on a time period of five years. Below we show in a diagram the average cumulative abnormal returns on both a monthly basis (Figure 6-2.1). In *Appendix 9.8* one can find the yearly CAR development for each individual club. We also see in *Appendix 9.9* the daily CAR development.

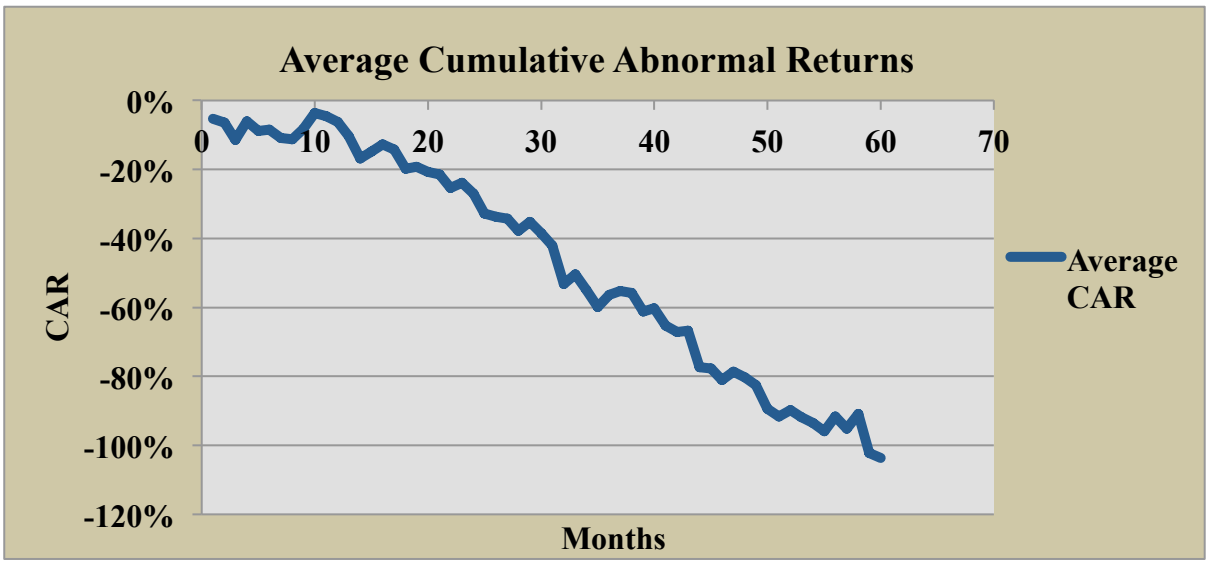

Figure 6-2.1 Cumulative Abnormal Returns Plotted Monthly[32]

[32] CAR can reach levels below -100% (Kothari & Warner, 1997)

5.2.1 Statistical Test

After obtaining the abnormal returns for all 20 football clubs in a five-year period after being listed, we conducted a statistical t-test to identify if the results were statistically significant. In the *method* section, we show a formula of how we obtain the t-value.

With such a large sample (25448 observations) we used infinite degrees of freedom in a statistical t-table to find a critical level of 1.645 at with 95% confidence and 2.326 with 99% confidence (Damador & Dawn). When looking at samples of this size we can also assume normal distribution of the data. As we are conducting a left-tailed t-test, these figures can also be seen as negative critical values, as they are on the left tail of the distribution. As also mentioned in the *method section*, our hypotheses are as stated on page 24 of this thesis.

From our regression studies we obtained the following data:

Observations	25448
STD DEV	0.03612038
Mean AR	-0.000778717
T-statistic	-3.439176242
Left tail critical t-value	-1.645

Table 6-2.2

As **3.439>2.326>1.645**, in absolute values, we can reject the null hypothesis (H0) and confirm that the abnormal returns of our sample are in fact less than 0.

There is an obvious negative trend, confirmed by our statistical testing, when analyzing the CAR of all 20 football clubs stocks over a five-year period after their IPO was conducted. This is again as mentioned, the difference between the expected returns (market returns) and the actual returns so as to see the progress of how much an investor would receive with respect to what they expect to receive. The stocks clearly underperform when benchmarked against the market and fail to recover at any point during this five-year period. This method is quite a telling one when looking from the point of view of an investor. The abnormal returns on the investment accumulate over the five year period to a final CAR of -102%. CAR is a process of cumulating abnormal returns and differs from buy-and-hold strategy, meaning that it can reach levels below -100% (Kothari & Warner, 1997).

In the *frame of reference* section, we introduced studies conducted by Loughran & Ritter (1995) and Leleux & Muzyka (1997), in where they analyzed long-run underperformance by also using the CAR method. The results from our studies are in line with the results found by these authors. Leleux & Muzyka (1997) found a clear underperformance of newly issued European stocks since their IPO for a 36-month period (Leleux & Muzyka, 1997). We decided on using a 60-month period and found similar results, a statistical significant underperformance of European football clubs when applying the CAR model.

5.3 Beta

Similar to the calculation of Jensen's Alpha, the Beta of returns can be obtained by running a regression of the excess stock price data against the excess market price data. The beta is simply the slope of the regression analysis, showing how volatile the stock is with regard to the market after adjustment for risk, this is explained in more detail in the previous *method* section. Shown below is a table presenting the beta of the excess returns for each of the sports clubs (Table 6-3).

Club	Beta
Aalborg	0.11
AIK	0.20
Ajax	0.17
AS Roma	0.35
Benfica	0.21
Birmingham	0.11
BVB	0.15
Celtic	0.10
FC Copenhagen	0.19
FC Porto	0.28
Juventus	0.29
Lazio	0.35
Lyon	0.24
Man.Utd	0.47
Preston NE	0.03
Ruch Chorzow	0.10
Southampton	0.51
Sporting Braga	0.18
Sporting Lisabon	0.15
Watford	-0.31
Average	0.19

Table 6-3 Table Showing Beta Coefficients for Sample

Shown in the table above (Table 6-3) are the beta values for each of the 20 clubs analyzed after running a regression of the excess returns of each stock versus the excess returns of the index it is listed on. We have calculated an average beta to give a general picture of how volatile the stocks of a sports club are against the market. As seen, the average of all betas is 0.19 meaning that the stocks are a significantly less volatile and pose less risk to an investor than the market as a whole. In an unusual individual case, Watford FC can be seen as having a negative beta, this means that the stock tends to move in a direction opposite to the market movement.

Taken in a context alone, this would imply that for a risk-averse investor, stocks of football clubs would represent a valid investment. We however need to look at the low beta in the light and with regard to our other studies, and form a conclusion whether this in fact would be a good investment even for those with a low appeal for risk. We also have in some instances, football clubs' stocks which are not traded regularly or not traded at all some days, this would affect the observed beta as volatility is then low, and on the days of no trading and therefore no returns, meaning there is zero risk.

5.4 STOXX Index for bundle of Football Clubs

As mentioned in the method section, we intend to compare the STOXX index to other indexes to in some way create an overall understanding of the performance of publicly listed football clubs compared to the markets as a whole. Below is a graph showing the movement of the stock price versus that of different indices using 31 December 1991 as the base trading day (Figure 6-5.1).

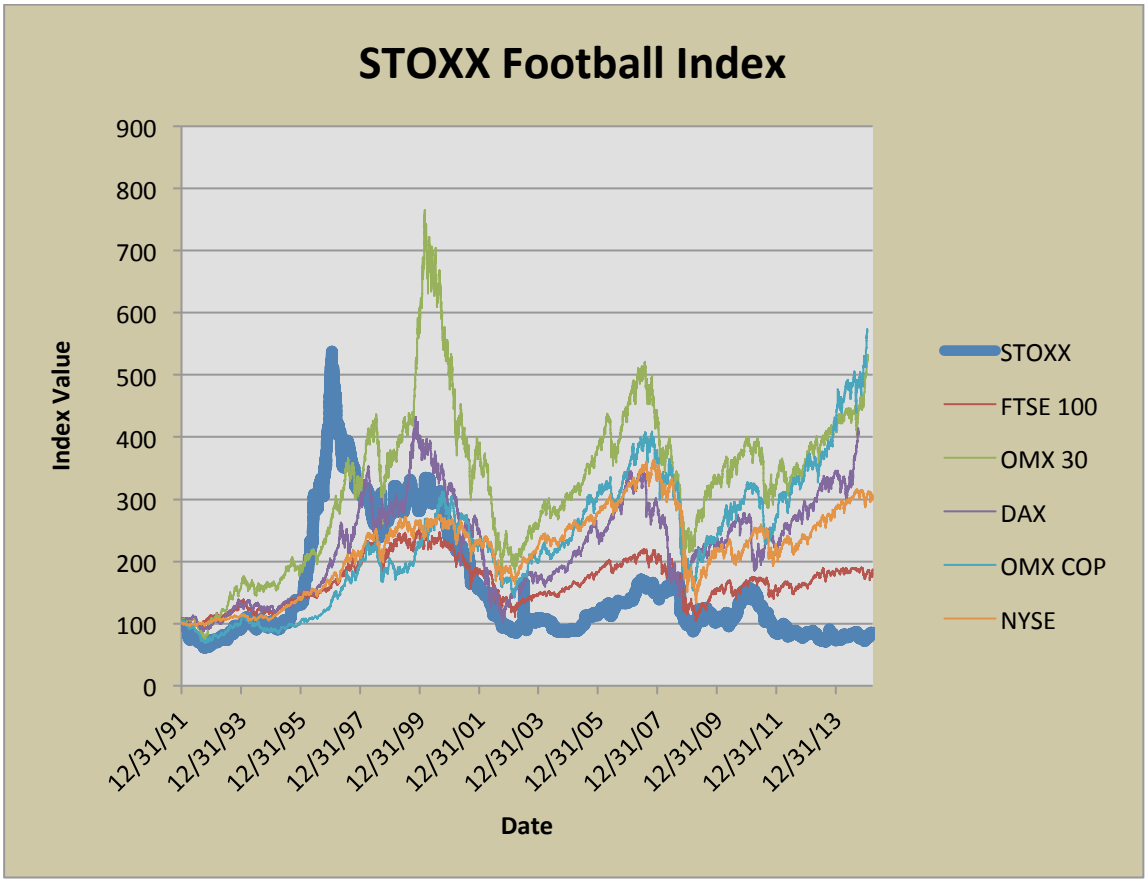

Figure 6-5.1 STOXX Performance versus Different Indices

Also shown below is a table showing the beta figures for the STOXX index versus each specific market index (Table 6-5.2). The beta coefficient also identifies the volatility of the STOXX football index with respect to the market.

	Vs. FTSE	Vs. OMX 30	Vs. DAX	Vs. Copenhagen	Vs. NYSE
Beta	1.44786	0.27237	0.43171	-0.12996	0.15462

Table 6-5.2 Beta Coefficients, STOXX vs. Market Indexes

We did this by obtaining a beta value in which we can clearly see whether the index is more volatile with higher risk when greater than 1, or less volatile and posing smaller risk to a potential investor when less than 1. Shown in the table above are also the Betas for the STOXX index versus each market index (Table 6-5.2).

In the *background* section, several key factors were explained and the affect they had on the share price of sports clubs over time. We will again bring up these factors when analyzing the STOXX football index, which follows the path of the stock price since 1991. On the graph shown above (Figure 6-5.1) we see that only in one specific period of time did the STOXX index outperform the different market indexes. This can be clearly in the period throughout 1996-97, with a peak somewhere close to the end of 1996. The performance of football clubs' stock price in the 1990's is closely linked to the expectations from the general population regarding the financial well-being of football clubs in this period of time. In this period of time, confidence was high due to the new TV-contracts, and a high influx of money into the football clubs. As money was spent directly on new players and other inventory, without any payouts or dividends to shareholders, share prices dropped due unhappy investors. This led to financial trouble for many sports clubs and hence a downward spiral in the stock price.

When looking at the beta values obtained, and showed in the table above (Table 6-5.2), we can see that the beta is in fact quite low when regressed against different markets. We can see however that there is a high beta coefficient when regressed against the FTSE index. This means that over the specific period of time, from when the STOXX index was introduced, it has been more volatile and therefore more risky to an investor than the FTSE index. The lower betas when regressed against the other markets, suggest the STOXX index was less volatile and therefore less risky than these. An unusual scenario occurs when the STOXX index is regressed against the OMX Copenhagen index, where a negative beta shows that the STOXX index has in fact moved in an opposite direction to this particular market. As the STOXX index generally has a lower beta overall than the markets, we can say that it has a low volatility and lower risk than the market. We tend to think of markets as having a low risk, as they are our expected return when making an investment, so an individual who is risk-averse can perhaps consider an investment in the STOXX index. As the sports, or in particular football sector is a very specific and different market, the stock prices are not directly linked to what factors may affect other sectors on the market, this may explain somewhat the low beta coefficients.

5.5 IPO vs. Seasoned Stocks Performance

Here we present the data of newly listed stocks versus seasoned stocks (STOXX European Football index). In the tables below we can see the results of running a regression of newly listed stocks' excess return and their progression over a five year period after their IPO date versus the STOXX European Football index's excess return as a benchmark. We also show in a scatter plot below the regression line between newly listed stocks excess return and the STOXX index excess return (Figure 6-6.2). In addition to this result we also ran a regression of newly listed stocks' excess return and the excess return of the market to enable a comparison of the two different models as whole and their alphas and betas. The first mentioned model's result represents the study of IPO stocks tendency to underperform the seasoned stocks[33] in the same industry in the long run of three to six years. The second mentioned model represents how the stocks have performed against the market in the same long-run period.

Regression Statistics IPO vs. Seasoned Stocks (STOXX)					
R Square	0.0142				
Adjusted R Square	0.0142				
Standard Error	0.0341				
Observations	24147				
	Coeffi-cients	***Standard Error***	***T Stat***	***P-value***	
Intercept	-0.0023	0.0002	-10.0186	0.0000	
Excess STOXX Return	0.3435	0.0184	18.6743	0.0000	
ANOVA					
	df	***SS***	***MS***	***F***	***Significance F***
Regression	1	0.4062	0.4062	348.7295	2.81E-77
Residual	24145	28.1274	0.0012		
Total	24146	28.5337			

Table 6-6.1 Regression IPO vs. STOXX Index

[33] More mature stocks in the same industry who has been in the market a longer time

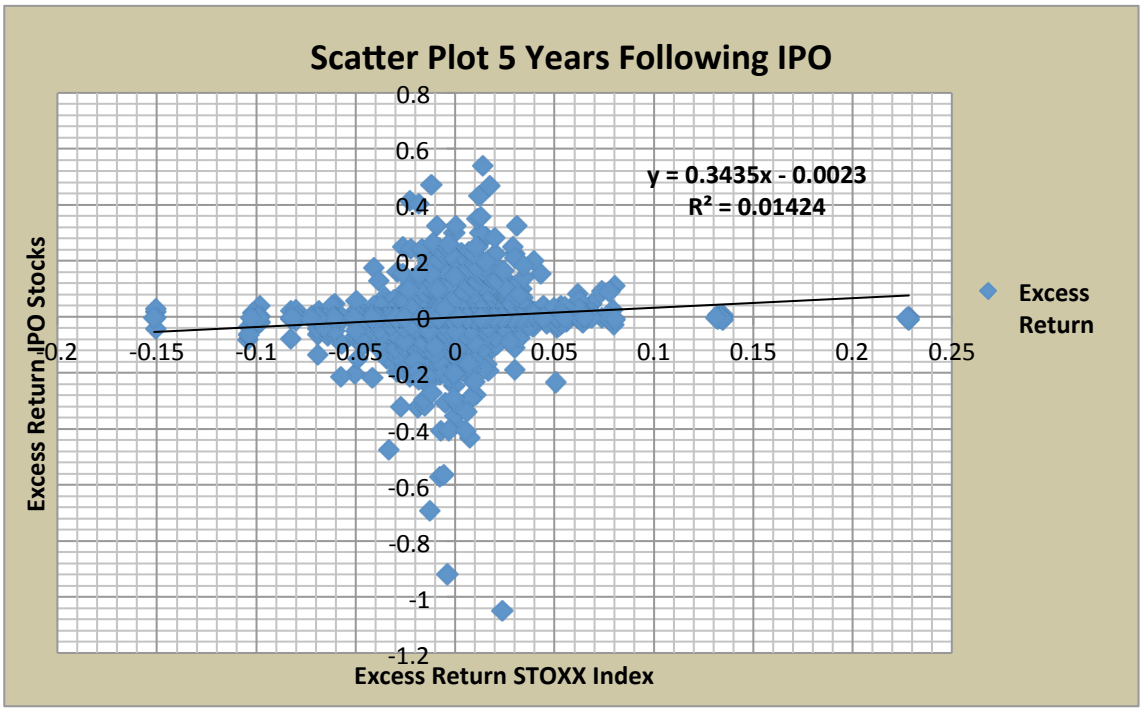

Figure 6-6.2 Scatter (IPO vs STOXX) Plot Five Years Following IPO Date

5.5.1 Statistical Test

Similar to the regression that we run in the *Jensen's Alpha* section, we ran a simple linear regression on excess returns. In this instance we instead used the football clubs' excess stock returns as our dependent variable, and the STOXX excess return as the independent variable. We stacked the data again so that we could use the excess returns of the STOXX index would coincide with the dates and time periods observed for each football clubs' stock return. Running the regression gives us an intercept/alpha of -0.0023 alternatively -0.23% (Table 6-6.1).

We again have a large number of observations, so assume infinite degrees of freedom giving us critical values of -1.645 (95%) and -2.326 (99%) for a left tailed test. Again normal distribution of the data is assumed.

To recall, our hypothesis is the same as on page 33 of this thesis. We can thereafter again find a t-value that coincides with our new data by using the formula mentioned in

the *Method* section, under *Jensen's Alpha*. We obtain a statistical value of T-value = -10.02 (Table 6-6.1) or in absolute value 10.02.

10.02>2.326>1.645

The t-statistic is significant; we therefore reject H0 and accept H1.

This confirms that alpha is significantly less than 0 and in fact newly listed stocks underperform seasoned stocks in the same sector over a five-year period after the IPO. If also looking at the ANOVA table above (Table 6-6.1), we obtain a high F-statistic (348.73) and a low P-value for the F-statistic (0.00) confirming the significance of our model and the rejection of the null hypothesis. The F-Statistic is far higher than any critical value in the F-distribution table (Damodar & Dawn, 2009).

When looking at the R-Squared value, we obtain a value of 0.014, or 1.4% (Table 6-6.1). This means that this particular model does not explain the variance around the mean to a large extent. However, we are still able to use the model due to the high statistical significance levels, but will limit us in making predictions and expectations regarding future levels in alpha.

From our results we can quite clearly conclude that the newly listed football clubs' stock returns underperform seasoned stocks within the same sector and their returns. By first examining the value of alpha, we obtained a value of -0.23% using daily stock price and returns data (Table 6-6.1). This means that the period between and IPO has been conducted and five years later the average return of a newly listed firm is 0.23% less than seasoned stocks. This figure seems to be quite minimal, but one needs to be reminded that this is a daily alpha. If we compound this to yearly, we obtain an alpha of approximately -44.4%.

$$\text{Yearly Rate} = (1+\text{Daily Rate})^{\text{no of days}} - 1$$

$$\mathbf{-0.444 = (1+-0.0023)^{260}-1}$$

This is therefore in fact a very large amount being lost when investing in a newly listed stock. If we compare this to the alpha found in the *Jensen's Alpha* section (Table 6-1.3),

we find that the alpha is not as low in this case, meaning that the newly listed stocks underperform seasoned stocks in the same sector less than they do the market index. This could be due to the fact that the stock in turn has a bigger link to seasoned stocks within the same sector as opposed to the weak link to all stocks listed on the general stock exchange. Factors that generally affect one football club may also potentially affect another, meaning the stock prices will fluctuate in a similar manner whereas factors affecting the market such as commodities will not have a direct effect on football clubs.

We can also compare the R-squared values from this regression, with respect to the regression run using the market indexes. The R-squared value is higher in the case of football clubs' stocks being benchmarked against seasoned stocks within the football industry rather than the market as a whole. Even though the R-squared value is still very low and will not allow us to make any predictions with regard to alpha, the higher R-squared was expected due to the similar nature of the firms. We expect that situations that will affect one football club is most likely to affect another or the football industry as a whole in the same way and therefore for the variance to be closer to the mean.

Again we do not want to draw any vast conclusions from the R-squared value as it is extremely low and is not of high importance to our specific work. The high statistical significance levels allow us to draw conclusions from the alphas obtained and use it in determining the overall underperformance of football clubs' stocks.

5.6 IPO Data

In this section we present the IPO data we have found in preparation for our analysis with regards to over-/underpricing. In the table below, nine different clubs' full IPO data is presented. Our intention was to obtain IPO data of all 20 clubs used in our data sample. Due to privacy and lack of transparency from all clubs we were only able to obtain the IPO prices from the clubs in the below table. The initial discrete returns are based on the difference between the IPO price and the first day closing price. The mean is simply the average of all initial discrete returns in the sample. The sample consists of nine European football clubs. The size of the sample makes it difficult to analyze the results but it should be mentioned that the whole population is approximately 30 publicly traded clubs in Europe. Proportionally we have a large piece of the population in our sample but still it is a small number of observations.

Name	IPO Date	IPO Price	First day's closing price	Initial discrete return
AIK	31 July 2006	6.00 kr	6.67 kr	0.1117
BVB	30 Oct 2000	€11.00	€10.23	-0.0700
Man. United	10 Aug 2012	$14.00	$14.00	0
Juventus	19 Dec 2001	€3.70	€3.49	-0.0568
Roma	22 May 2000	€5.50	€3.30	-0.4000
Lyon	9 Feb 2007	€15.20	€24.20	0.5921
Benfica	22 May 2007	€5.00	€6.00	0.2000
Sporting	2 June 1998	€5.00	€6.51	0.3020
Silkeborg	1 April 1989	65.80kr	65.80 kr	0
			Mean	**0.0754**
			Mean (Excluding Lyon)	**0.0109**

Table 6-7 IPO Underpricing

At first glance, the mean of the initial discrete returns exhibit a positive number, meaning that there is some money left on table and thus there is an evidence of underpricing and not overpricing (Ritter, 1991; Dibrovksi & Brooks, 2004; Banerjee et al., 2011). As Dibrovksi & Brooks (2004) argues, there seems to have been an asymmetry of information in the IPOs of our sample. The mean value of 0.07544613 suggests that there is an underpricing of approximately 7.54% in the IPO market for European football clubs. Shayne & Soderquist (1995) results are then contradicting to our result since they suggest that there is a premium of 12.5% paid by the underwriters of the IPO. In our result,

however, it shows that there is a premium given to the underwriters of the IPO in the form of a 7.54% initial capital gain.

When we take a closer look at the specific observed football clubs in the sample (Table 6-7) we notice that there is a large deviation of positive and negative initial returns which complicates the analysis of the our results. The result considering Olympique Lyonnais IPOs initial return is considered to be an outlier of the higher degree since that specific observation boost the positive mean value of our sample. If this outlier had been excluded we would instead arrive with a less positive value of 0.010863739, approximately an underpricing of 1.10%. To enhance the argument of Olympique Lyonnais being a large outlier we can compare their degree of underpricing to the French IPO markets average underpricing level found in Banerjee et al. (2011). In their research they found the average of underpricing being 11.30% while Olympique Lyonnais in our case has an underpricing level of 59.21%.

When we then compare our 7.54% underpricing to the result of Banerjee et al. (2011), exhibited in *Table 9.3* of this thesis appendix section, there is a clear difference from their global average underpricing result of 29.11%, however if we instead look at their median value of 8.18% we can see that our result then does not differ by much. Comparing our average result to the authors median one may not be seen as appropriate but it could also suggest that Banerjee et al. (2011) data also includes outliers since their mean result deviates quite much from their median result. It could thus be the case that our result may actually be closer to the reality than expected. Including outliers creates a biased result, which can be avoided by conducting more extensive research with a larger time frame to diminish the effect of outliers on the result. When looking at the specific observations of the results from Table 6-7 we can even observe that some clubs stocks were overpriced, meaning that they depreciated on the first trading day on the market in relation to the IPO price. Due to our sample's characteristics we thus cannot say whether or not the result exhibits the truth.

We must recognize that comparing our result strictly to the result of Banerjee et al. (2001) is not completely the best way to proceed since their work is based on different kinds of issuing companies while our study solely looks on European football clubs who

issued stocks on a public exchange. As we mentioned above, our sample is small and our result is biased through outliers thus we cannot validate our results regarding underpricing with an appropriate statistical analysis. We could have conducted a t-test but it would not explain more than the data we already obtained explains due to the characteristics of our sample regarding IPO underpricing of European football clubs. This leaves us, unfortunately, with an inconclusive result regarding the over-/underpricing phenomenon earlier discussed (Shayne & Soderquist, 1995; Ritter 1991; Banerjee et al, 2011).

6 Conclusion

Obtaining concrete quantitative results allows us to draw certain conclusions about the financial performance of sports and in particular football clubs after an IPO has been conducted. The different models and methods used give us a useful insight into different aspects of the performance of not only the stock price when benchmarked against different markets and entities but also of recurring phenomena such as underpricing and long-term underperformance. As mentioned in the early stages of this paper, previous studies have been conducted, analyzing these phenomena in different markets and one of our intentions has been to analyze whether these studies hold true in the specific market of sporting entities and their performance on the stock exchange.

We find clear signs of underperformance by newly issued stocks over a five-year period after an IPO using different methods. Our study and results regarding Cumulative Abnormal Returns show a clear negative downward trend over a five-year period after an IPO and hence a statistical significant sign of underperformance with regards to a sample of football clubs. Finding a negative Jensen's Alpha in turn confirmed our predictions of underperformance and clarified that overall football clubs' stocks were "losers" when benchmarked against different indexes and also against seasoned stocks after adjusting for risk. This confirms in fact that sports clubs do in fact follow the same pattern as other newly listed entities with clear signs of investment underperformance.

When looking directly at the underpricing phenomenon we obtain inconclusive results regarding underpricing, due to the small population and even smaller sample including an extreme observation skewing the results. We do however obtain indications of underpricing being present in the IPO market for European Football clubs but only at a lower level (7.54%) than previous researchers found in the general global market for IPOs, which was 29.11% (Banerjee, Dai, & Shrestha, 2011). However, any statistical evidence due to the characteristics of our sample could not support this indication. Further research is of interest to find more data and stronger evidence on this matter.

We also look briefly at different indicators such as the beta coefficient between newly listed football clubs' stock price and different indexes. This to a certain degree gives us indicators on the volatility and risk of these entities along with how closely the stock price is linked to the movements of the market. We find that football clubs are less volatile and therefore less risky for a potential investor as well as having a low correlation coefficient when benchmarked against the same markets.

We also performed a study regarding newly listed football clubs stocks' against seasoned stocks in the same sector, finding that again there was a statistically significant underperformance when applying the Jensen's Alpha method. This was according and in line with previous studies regarding newly listed stocks versus seasoned stocks and confirmed that football clubs' stocks follow a similar pattern to other entities in other industries.

When looking at the negative alpha individually it may seem that investors should shy away from these stocks. However considering the low beta values when benchmarked against the market, these stocks may be useful in a portfolio as a hedging tool and for diversification (Berk & DeMarzo, 2013). A low beta shows that football clubs stocks are less volatile than the market and would be of interest for a risk-averse investor as well as low correlation showing the weak link between this particular sector and the general market.

From our research performed on the history of going public within the sporting sector, we found it to be less and less common and that sports clubs' are in fact shying away from performing an IPO (Lewing, 2005). This is mainly due to the financial difficulties publicly traded sports clubs have had when attempting to compete with rival clubs and at the same time please their shareholders. This was again apparent when comparing the STOXX index to different stock exchanges, showing how events affected the performance of football clubs. Over the period since the introduction of the index the STOXX index has fallen to a level below all different market indexes benchmarked against.

7 Further Research

An interesting investigation for further research would be in valuing a sports club to find a share price that fairly reflects the value of the firm. This could be conducted by FCFF and FCFE valuation methods. When conducting this study it would be interesting to keep in mind the underpricing and underperformance phenomena brought up in this thesis. We feel models of this nature along with our results regarding over-/underpricing along with long-term underperformance would be of interest to a sport club considering going public and in determining their initial IPO price efficiently or according to their IPO strategy.

As we did not arrive at any strong and valid conclusion regarding over-/underpricing of the European football clubs and we partly leave this subject open for further research in the future. One requires a larger sample to obtain a more reliable, valid result and conclusion through a suggested statistical test. Initially we had the ambition of obtaining all publicly listed European football clubs' IPO price, this data was however less feasible than estimated. We suggest that future researchers allocate more time in their planning to retrieve a good source for information about the clubs and even expand to sports clubs outside of the European boundaries to gain a larger sample size.

An interesting study to conduct would be with regard to the low beta values. One could attempt to further investigate the benefits of including football clubs stocks which have a low beta coefficients but also a negative alpha in a portfolio. This could be analyzed by creating a sample portfolio where one includes general stocks along with a variety of stocks from our particular sample.

Further studies including Jensen's Alpha would be to conduct a similar method, benchmarking individual football clubs' stocks against the STOXX index to analyze whether each individual stock has a positive or negative influence on the index.

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9 Appendix

9.1 Rise in TV Contracts Premier League

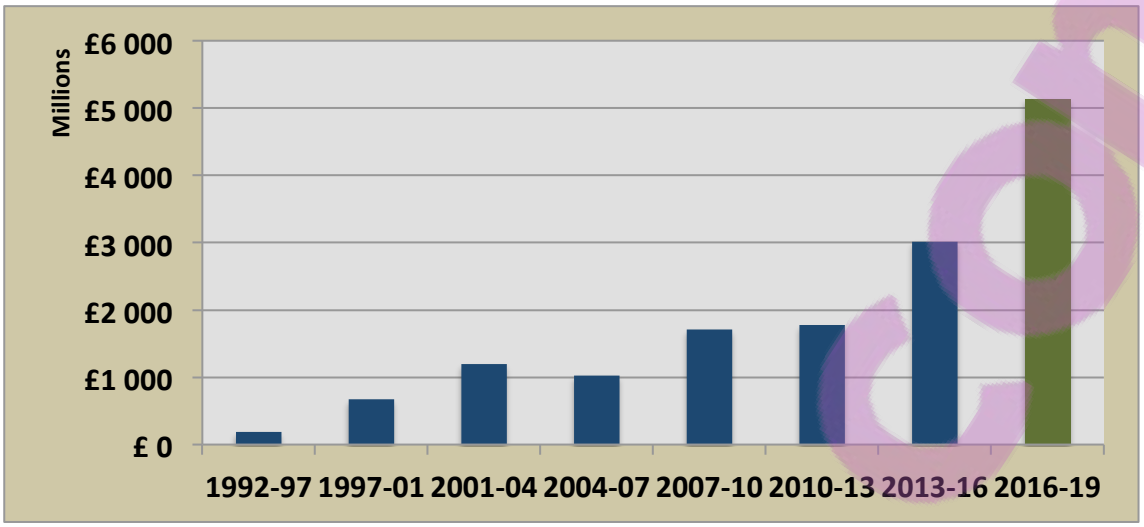


Figure 9.1 Rise in the Size of TV Contracts English Premier League (Rumsby, 2015)

9.2 Football Clubs included in Sample

Team	Country
Aalborg	Denmark
AIK	Sweden
Ajax	Netherlands
AS Roma	Italy
Benfica	Portugal
Birmingham	England
BVB	Germany
Celtic	Scotland
FC Copenhagen	Denmark
FC Porto	Portugal
Juventus	Italy
Lazio	Italy
Lyon	France
Man.Utd	England
Preston NE	England
Ruch Chorzow	Poland
Southampton	England
Sporting Braga	Portugal
Sporting Lisabon	Portugal
Watford	England

Table 9.2 Football Clubs included in our sample

9.3 Underpricing (in percentage) Country by Country

Nation	Mean	Median	N
Australia	16.59	5.08	696
Austria	23.76	3.35	34
Belgium	10.36	3.79	32
Brazil	18.37	7.67	46
Canada	39.13	6.02	784
China	57.14	33.43	590
Denmark	13.48	6.67	27
Finland	14.61	2.44	25
France	11.30	2.29	353
Germany	43.13	15.65	333
Greece	14.44	2.29	53
Hong Kong	22.21	5.26	479
India	25.01	18.90	9
Indonesia	52.25	23.11	48
Ireland	10.29	11.73	25
Israel	23.34	11.90	42
Italy	7.87	0.85	215
Japan	45.14	20.71	890
Luxembourg	26.68	25.00	15
Malaysia	31.18	14.21	295
Netherlands	20.00	4.94	44
New Zealand	20.66	3.33	38
Norway	4.33	0.80	45
Philippines	17.27	4.00	19
Poland	45.50	16.81	23
Russia	8.82	8.00	10
Singapore	24.88	9.47	296
South Africa	12.94	9.60	18
South Korea	54.57	36.18	192
Spain	10.98	5.88	45
Sweden	21.79	7.24	73
Switzerland	14.41	4.75	39
Taiwan	17.25	6.70	260
Thailand	19.15	5.11	143
United Kingdom	23.29	9.21	840
United States	24.00	5.00	1700
All	**29.11**	**8.18**	**8776**

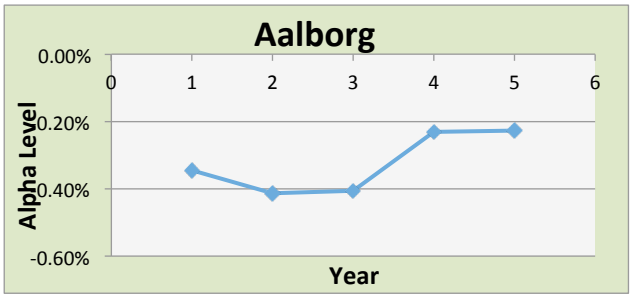
Table 9.3 IPO Underpricing by Country in Percentage, Banerjee et al. (2011).

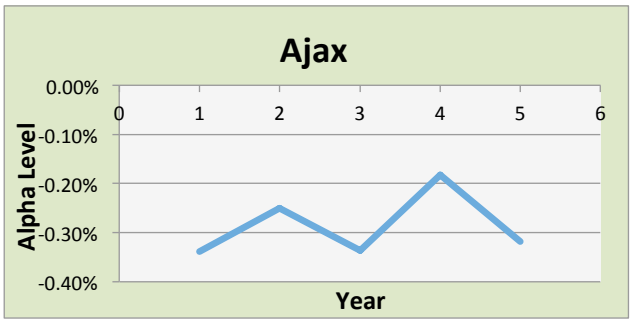
9.4 Entities Included in STOXX index

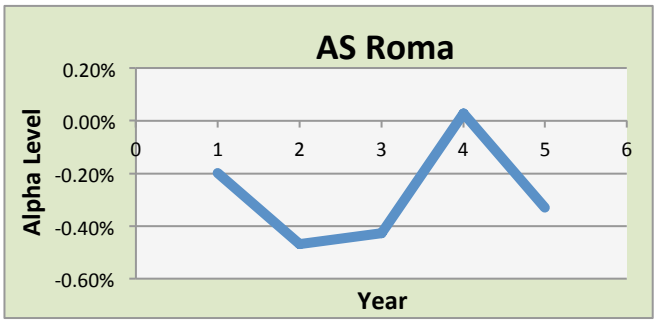
Team	Country
Aalborg	Denmark
AIK	Sweden
Ajax	Netherlands
Aarhus Elite	Denmark
AS Roma	Italy
Besiktas	Turkey
Borussia Dortmund	Germany
Brondby IF B	Denmark
Celtic	Scotland
Fenerbahce	Turkey
FC Porto	Portugal
Galatasaray	Turkey
Juventus	Italy
Lazio	Italy
Olympique Lyonnais	France
Parken Sport & Entertainment (FC Copenhagen)	Denmark
Ruch Chorzow	Poland
Silkeborg	Denmark
Sport Lisboa E Benfica	Portugal
Sporting	Portugal
Teteks AD Tetovo	Macedonia
Trabzonspor Sportif Yatir	Turkey

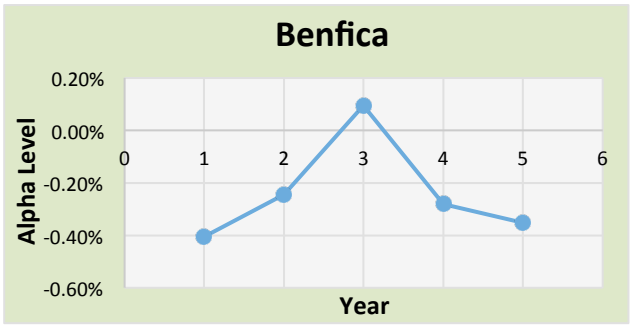
Table 9.4 All entities included in STOXX index

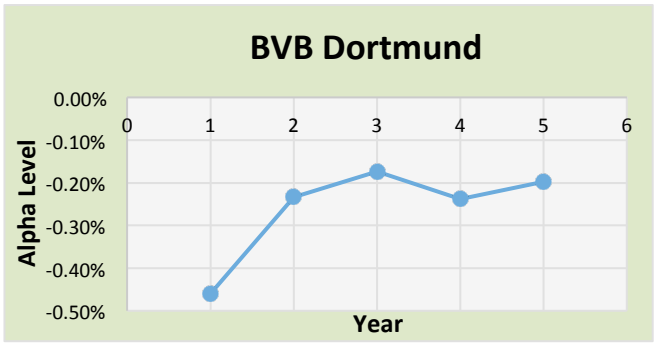
9.5 Alpha Movements for Individual Football Clubs

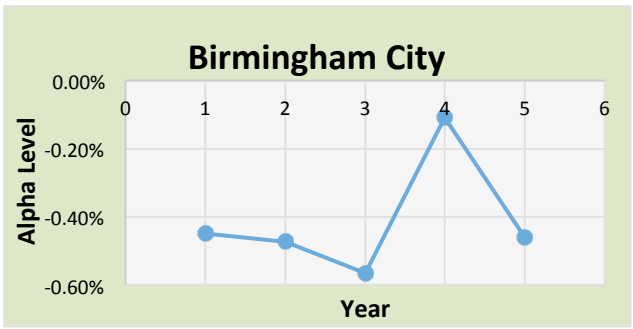


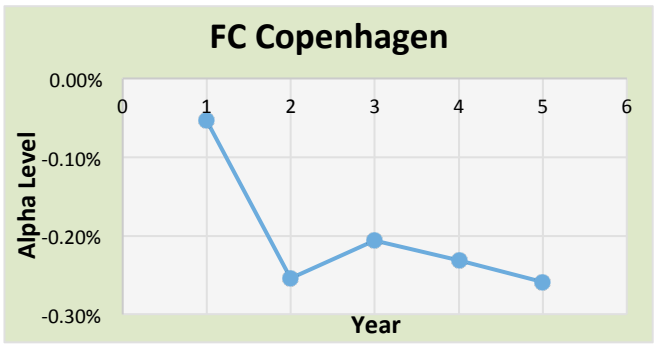


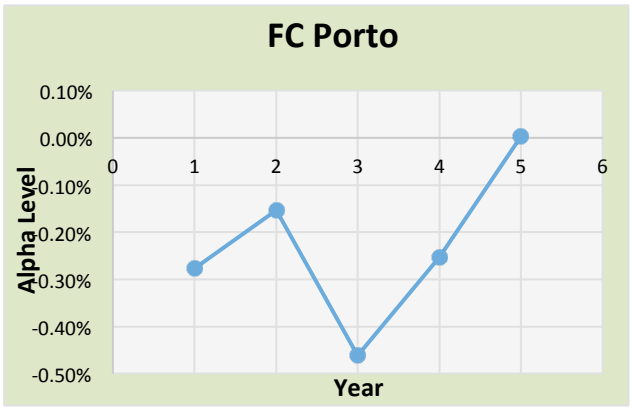


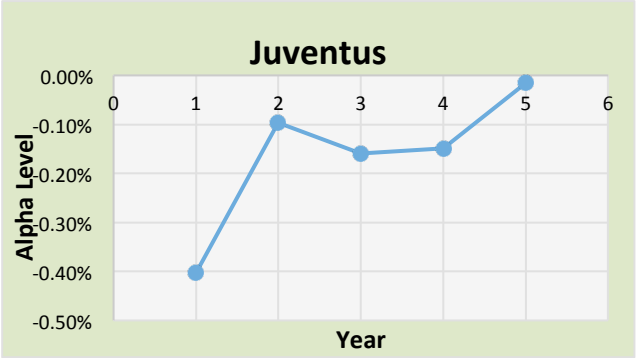




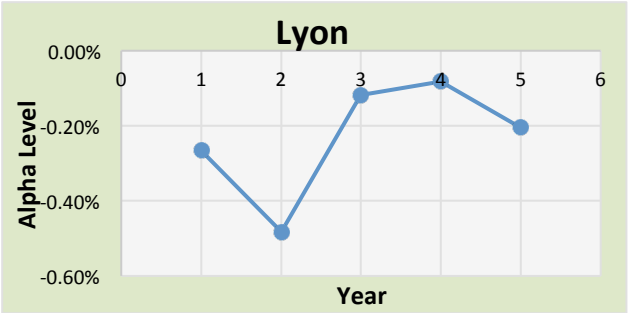


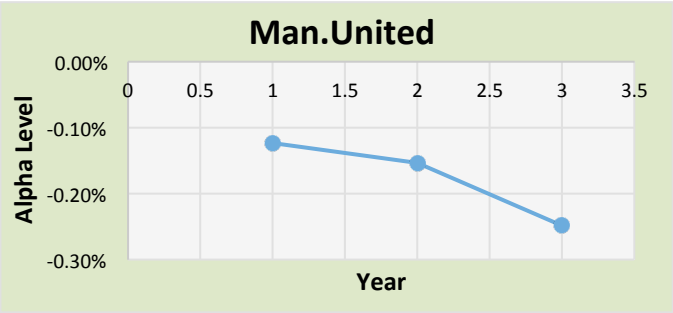


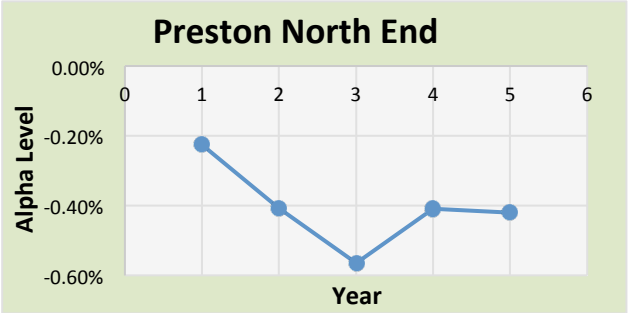


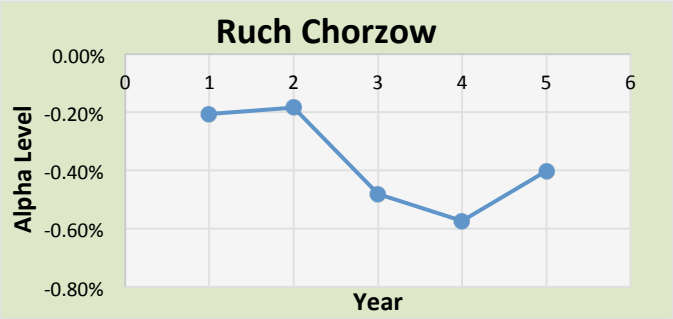

Juventus
Alpha Level
0.00%
-0.10%
-0.20%
-0.30%
-0.40%
-0.50%
0 1 2 3 4 5 6
Year

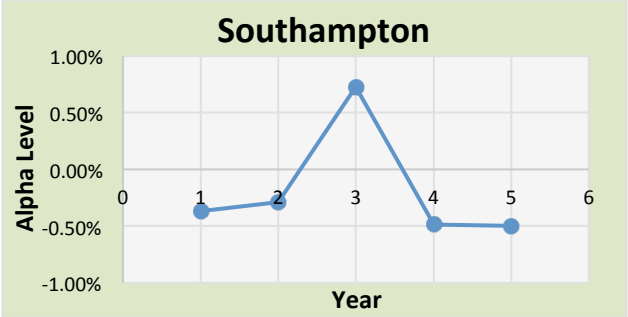

Lazio
Alpha Level
0.20%
0.00%
-0.20%
-0.40%
-0.60%
0 1 2 3 4 5 6
Year

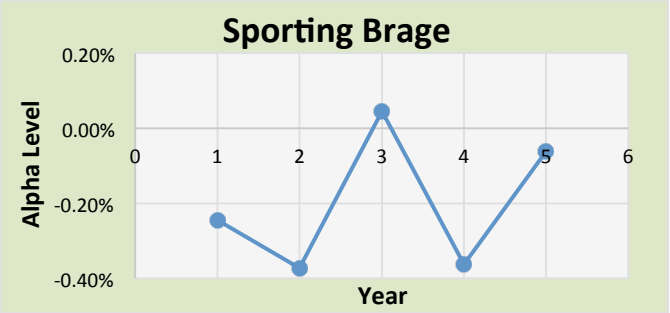

Lyon
Alpha Level
0.00%
-0.20%
-0.40%
-0.60%
0 1 2 3 4 5 6
Year

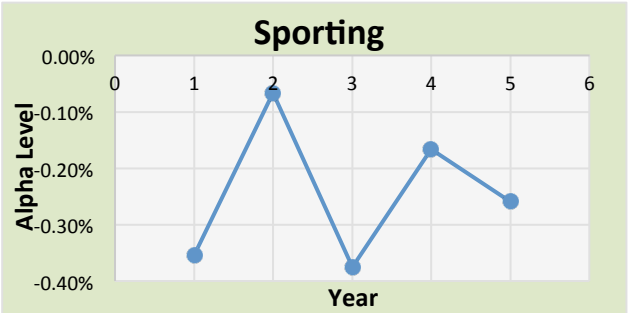

Man.United
Alpha Level
0.00%
-0.10%
-0.20%
-0.30%
0 0.5 1 1.5 2 2.5 3 3.5
Year

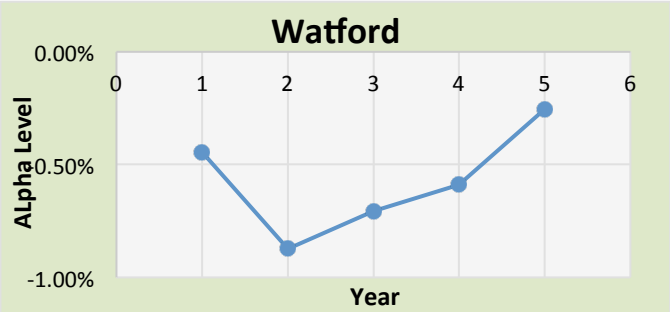

Preston North End
Alpha Level
0.00%
-0.20%
-0.40%
-0.60%
0 1 2 3 4 5 6
Year


Ruch Chorzow
Alpha Level
0.00%
-0.20%
-0.40%
-0.60%
-0.80%
0 1 2 3 4 5 6
Year


Southampton
Alpha Level
1.00%
0.50%
0.00%
-0.50%
-1.00%
0 1 2 3 4 5 6
Year


Sporting Brage
Alpha Level
0.20%
0.00%
-0.20%
-0.40%
0 1 2 3 4 5 6
Year


Sporting
Alpha Level
0.00%
-0.10%
-0.20%
-0.30%
-0.40%
0 1 2 3 4 5 6
Year


Watford
Alpha Level
0.00%
0.50%
-1.00%
0 1 2 3 4 5 6
Year

9.6 Result Table for Alpha Calculations

	Year 1		L/B	U/B	Year 2		L/B	U/B
Team	Alpha	Std Error	C.I. 95%		Alpha	Std Error	C.I 95%	
Aalborg	-0.345%	0.091%	-0.524%	-0.165%	-0.413%	0.271%	-0.947%	0.120%
AIK	-0.026%	0.230%	-0.480%	0.428%	-0.246%	0.211%	-0.660%	0.169%
Ajax	-0.338%	0.131%	-0.596%	-0.081%	-0.251%	0.144%	-0.534%	0.033%
AS Roma	-0.198%	0.092%	-0.378%	-0.017%	-0.469%	0.204%	-0.870%	-0.068%
Benfica	-0.407%	0.264%	-0.926%	0.112%	-0.244%	0.129%	-0.498%	0.010%
Birmingham	-0.448%	0.120%	-0.683%	-0.212%	-0.474%	0.108%	-0.686%	-0.261%
BVB	-0.460%	0.182%	-0.817%	-0.102%	-0.233%	0.203%	-0.633%	0.166%
Celtic	0.184%	0.256%	-0.320%	0.687%	-0.164%	0.240%	-0.637%	0.309%
FC Copenhagen	-0.054%	0.216%	-0.479%	0.371%	-0.254%	0.166%	-0.581%	0.074%
FC Porto	-0.277%	0.144%	-0.560%	0.006%	-0.154%	0.136%	-0.421%	0.114%
Juventus	-0.402%	0.124%	-0.647%	-0.158%	-0.097%	0.164%	-0.420%	0.226%
Lazio	0.099%	0.255%	-0.404%	0.601%	-0.267%	0.205%	-0.670%	0.137%
Lyon	-0.266%	0.105%	-0.474%	-0.059%	-0.483%	0.152%	-0.781%	-0.184%
Man.Utd	-0.123%	0.117%	-0.353%	0.106%	-0.153%	0.122%	-0.394%	0.088%
Preston NE	-0.226%	0.065%	-0.354%	-0.098%	-0.408%	0.024%	-0.456%	-0.360%
Ruch Chorzow	-0.207%	0.275%	-0.747%	0.334%	-0.184%	0.473%	-1.115%	0.746%
Southampton	-0.366%	0.081%	-0.525%	-0.206%	-0.290%	0.130%	-0.545%	-0.035%
Sporting Braga	-0.246%	0.240%	-0.718%	0.226%	-0.373%	0.392%	-1.146%	0.400%
Sporting Lisabon	-0.353%	0.125%	-0.599%	-0.107%	-0.066%	0.216%	-0.492%	0.360%
Watford	-0.446%	0.145%	-0.731%	-0.160%	-0.873%	0.401%	-1.664%	-0.083%
Average	-0.245%				-0.305%			

	Year 3		L/B	U/B	Year 4		L/B	U/B
Team	Alpha	Std Error	C.I. 95%		Alpha	Std Error	C.I. 95%	
Aalborg	-0.405%	0.257%	-0.912%	0.102%	-0.231%	0.130%	-0.487%	0.025%
AIK	-0.370%	0.255%	-0.873%	0.132%	-0.080%	0.248%	-0.569%	0.409%
Ajax	-0.336%	0.165%	-0.661%	-0.011%	-0.183%	0.192%	-0.561%	0.195%
AS Roma	-0.427%	0.197%	-0.815%	-0.040%	0.029%	0.272%	-0.506%	0.564%
Benfica	0.094%	0.220%	-0.339%	0.528%	-0.281%	0.190%	-0.654%	0.093%
Birmingham	-0.565%	0.146%	-0.853%	-0.277%	-0.109%	0.252%	-0.605%	0.388%
BVB	-0.174%	0.190%	-0.549%	0.201%	-0.239%	0.133%	-0.501%	0.023%
Celtic	-0.413%	0.212%	-0.831%	0.005%	-0.273%	0.110%	-0.490%	-0.056%
FC Copenhagen	-0.206%	0.160%	-0.521%	0.108%	-0.231%	0.196%	-0.618%	0.156%
FC Porto	-0.462%	0.119%	-0.696%	-0.227%	-0.252%	0.241%	-0.727%	0.223%
Juventus	-0.160%	0.082%	-0.320%	0.001%	-0.148%	0.081%	-0.309%	0.012%
Lazio	-0.090%	0.165%	-0.414%	0.235%	-0.431%	0.149%	-0.726%	-0.137%
Lyon	-0.118%	0.129%	-0.371%	0.135%	-0.082%	0.134%	-0.346%	0.183%
Man.Utd	-0.248%	0.133%	-0.512%	0.015%	N/A	N/A	N/A	N/A
Preston NE	-0.565%	0.106%	-0.773%	-0.357%	-0.408%	0.046%	-0.500%	-0.317%
Ruch Chorzow	-0.481%	0.359%	-1.188%	0.226%	-0.573%	0.370%	-1.301%	0.156%
Southampton	0.725%	0.551%	-0.360%	1.811%	-0.485%	0.140%	-0.761%	-0.210%
Sporting Braga	0.045%	0.305%	-0.556%	0.646%	-0.363%	0.368%	-1.088%	0.362%
Sporting Lisabon	-0.376%	0.141%	-0.653%	-0.098%	-0.166%	0.307%	-0.771%	0.439%
Watford	-0.705%	0.275%	-1.246%	-0.164%	-0.590%	0.188%	-0.961%	-0.219%
Average	-0.262%				-0.268%			

Table continues on next page

	Year 5		L/B	U/B
Team	Alpha	Std Error	C.I. 95%	
Aalborg	-0.226%	0.163%	-0.548%	0.095%
AIK	-0.284%	0.245%	-0.767%	0.199%
Ajax	-0.318%	0.194%	-0.700%	0.064%
AS Roma	-0.330%	0.165%	-0.654%	-0.006%
Benfica	-0.353%	0.382%	-1.105%	0.398%
Birmingham	-0.460%	0.222%	-0.897%	-0.022%
BVB	-0.197%	0.187%	-0.566%	0.171%
Celtic	-0.495%	0.086%	-0.664%	-0.325%
FC Copenhagen	-0.259%	0.132%	-0.518%	0.000%
FC Porto	0.002%	0.173%	-0.338%	0.342%
Juventus	-0.016%	0.246%	-0.501%	0.469%
Lazio	-0.552%	0.301%	-1.144%	0.040%
Lyon	-0.206%	0.118%	-0.439%	0.028%
Man.Utd	N/A	N/A	N/A	N/A
Preston NE	-0.420%	0.058%	-0.535%	-0.305%
Ruch Chorzow	-0.401%	0.354%	-1.097%	0.296%
Southampton	-0.498%	0.149%	-0.792%	-0.203%
Sporting Braga	-0.063%	0.487%	-1.022%	0.897%
Sporting Lisabon	-0.259%	0.138%	-0.530%	0.012%
Watford	-0.254%	0.291%	-0.827%	0.319%
Average	-0.294%			

Table 9.6 Alpha, Standard Error and Confidence Interval yearly for each football club.

9.7 Alpha Return Monthly

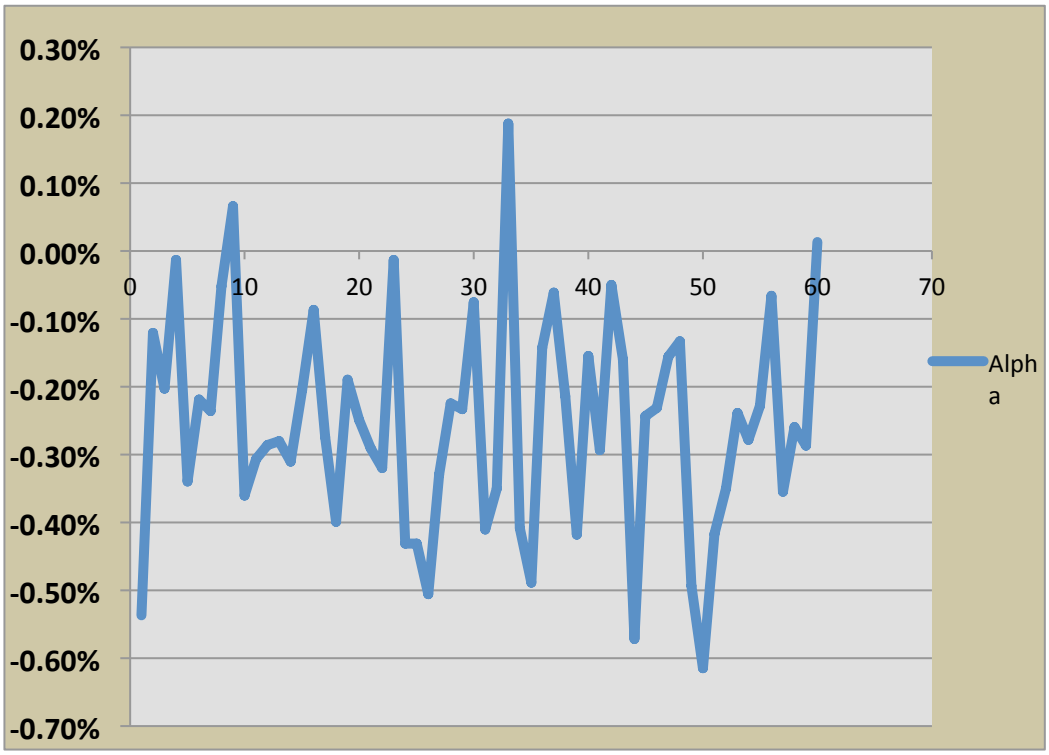
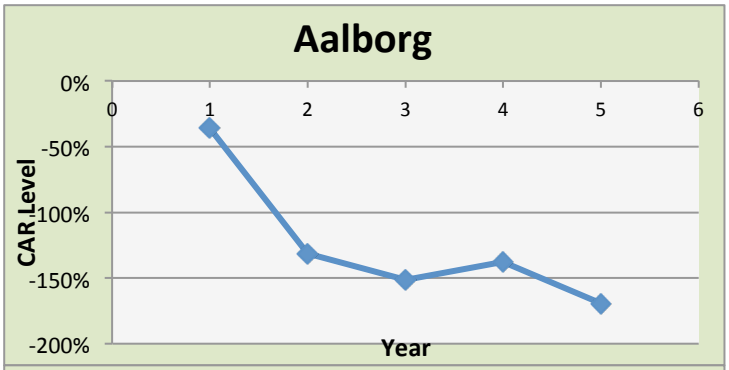
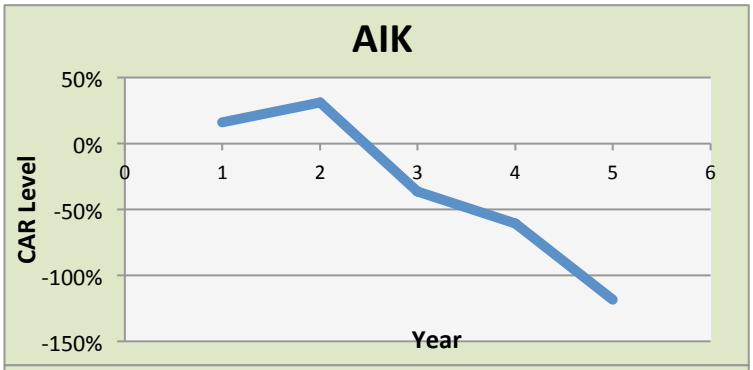
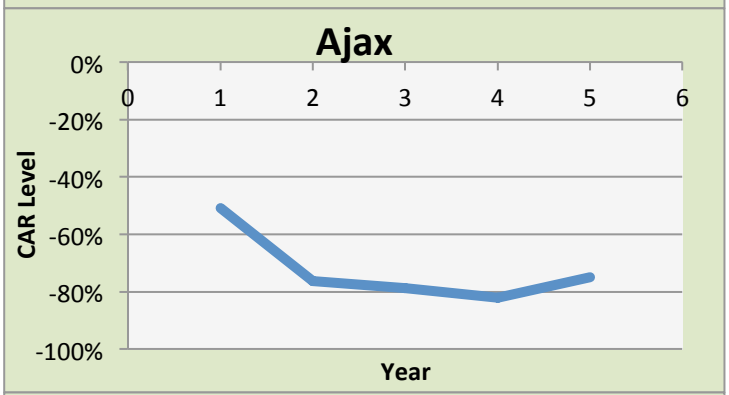


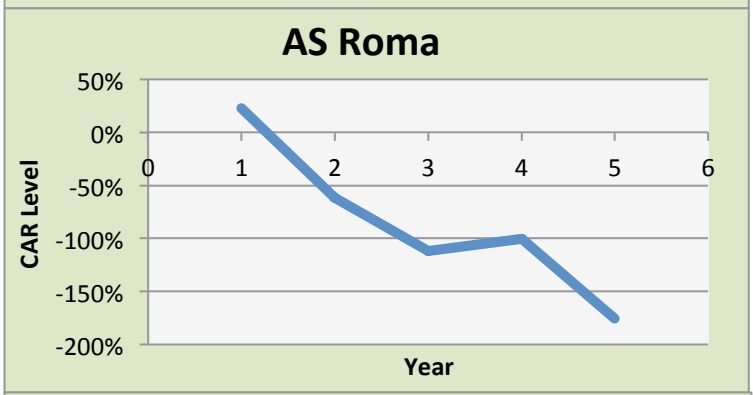
Figure 9.7 Combined Alpha Movements Monthly

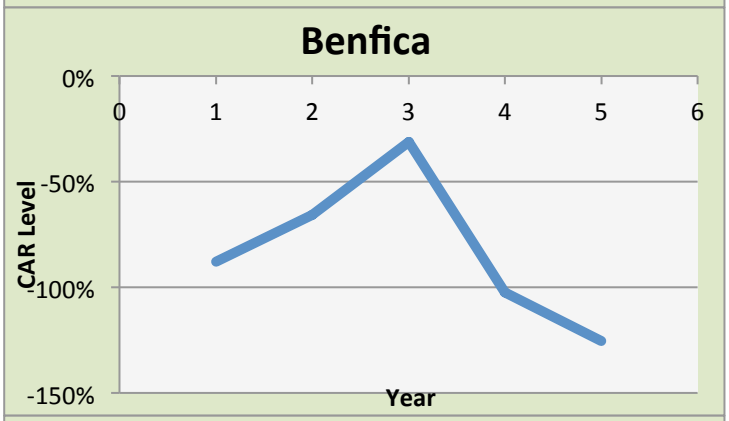
9.8 CAR Movements Yearly for Individual Clubs

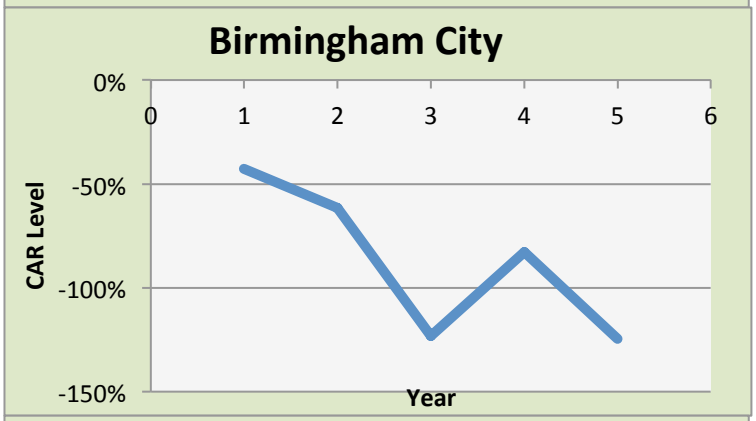


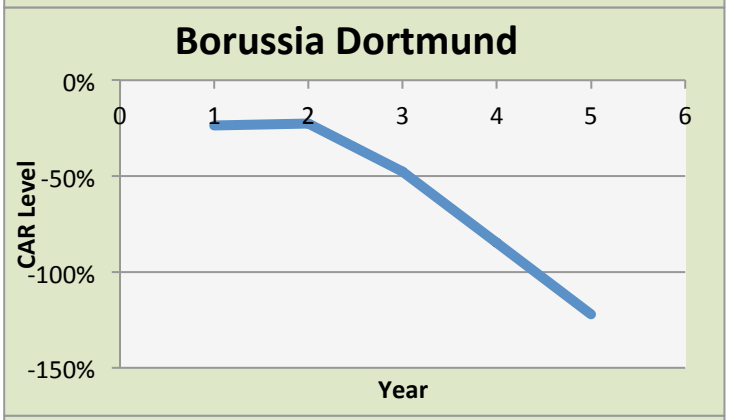


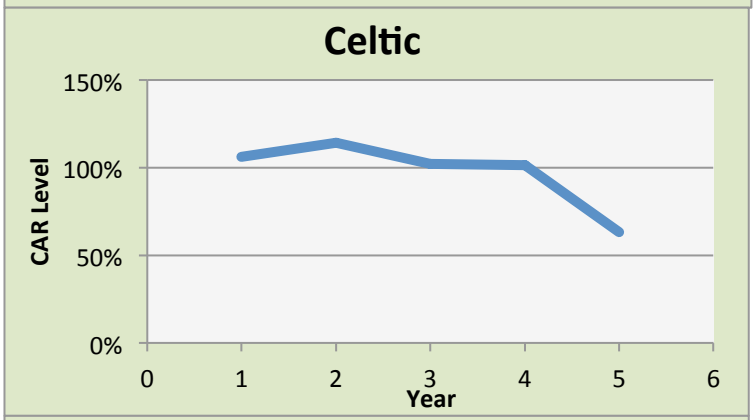


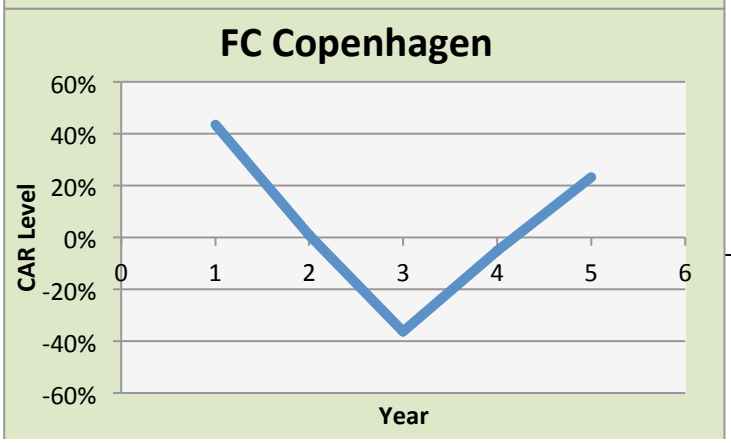


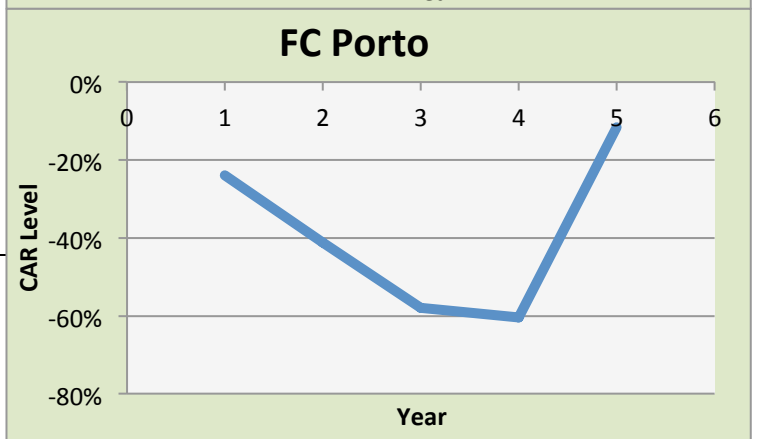


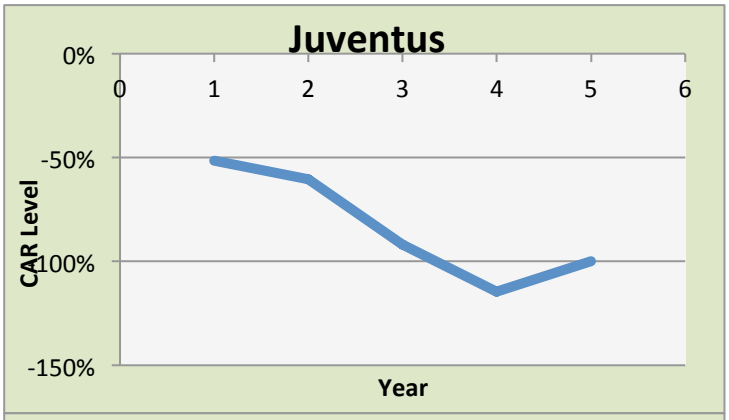


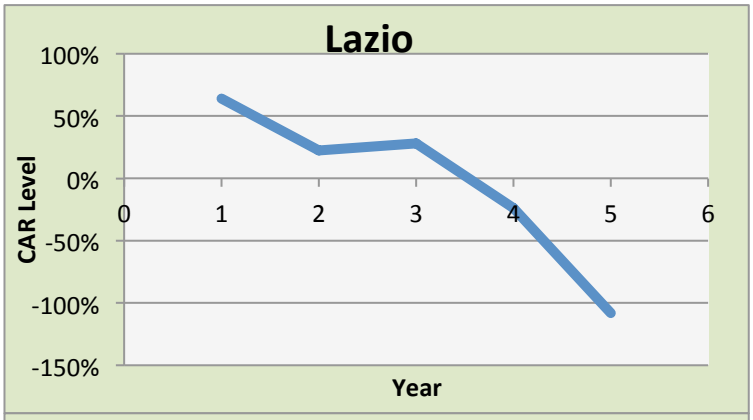


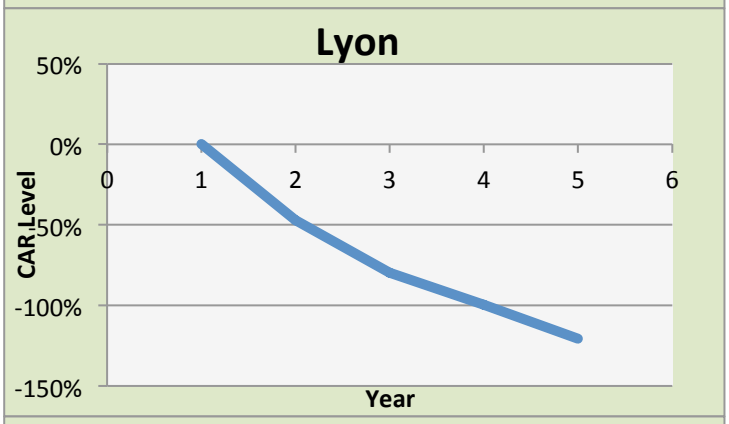


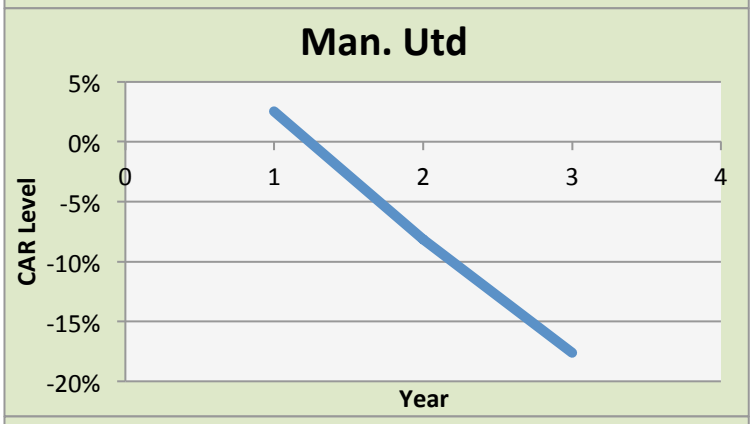


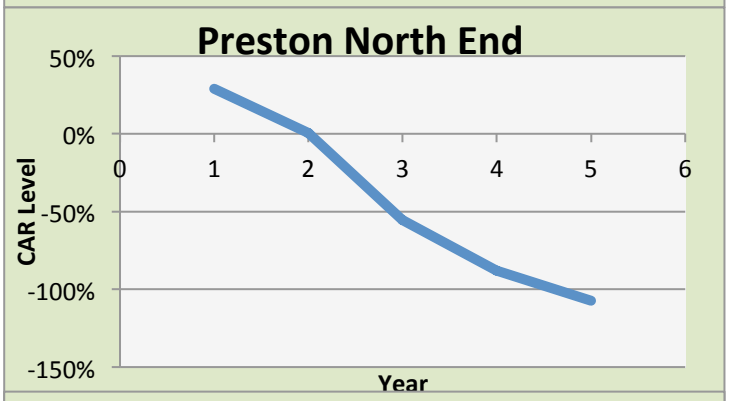


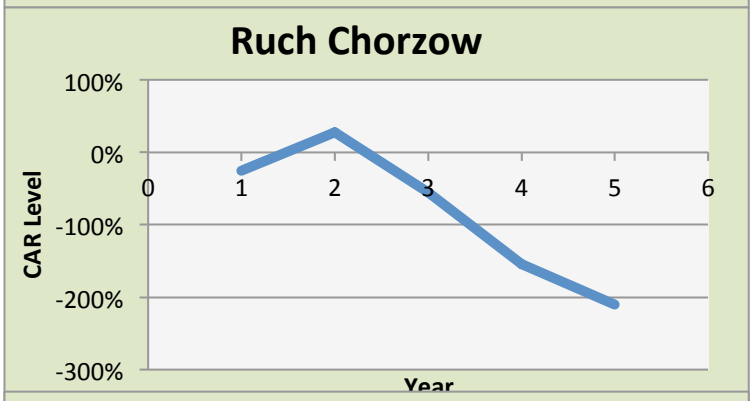

Juventus
0%
-50%
-100%
-150%
CAR Level
0 1 2 3 4 5 6
Year

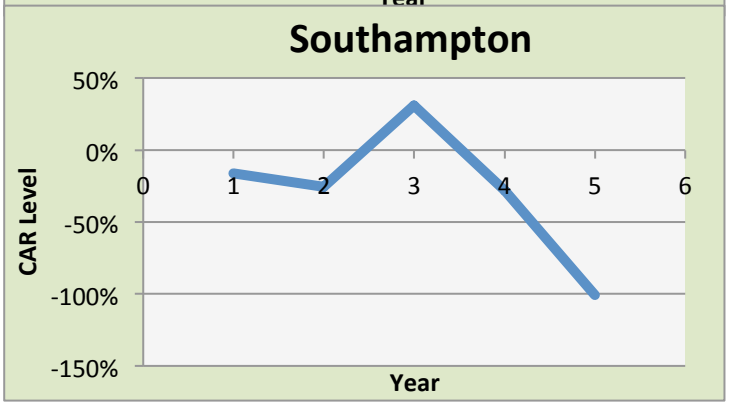

Lazio
100%
50%
0%
-50%
-100%
-150%
CAR Level
0 1 2 3 4 5 6
Year

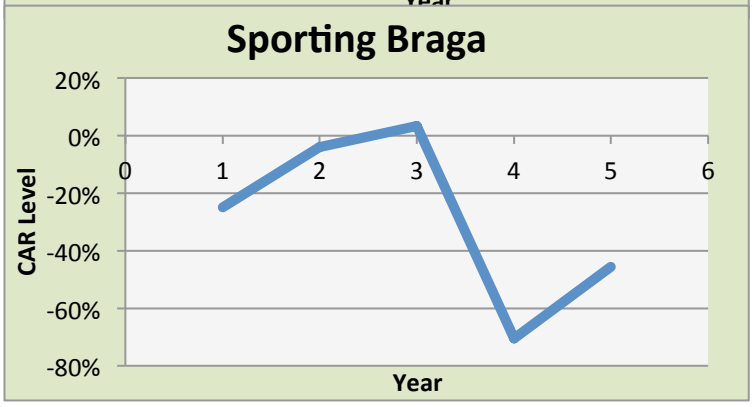

Lyon
50%
0%
-50%
-100%
-150%
CAR Level
0 1 2 3 4 5 6
Year

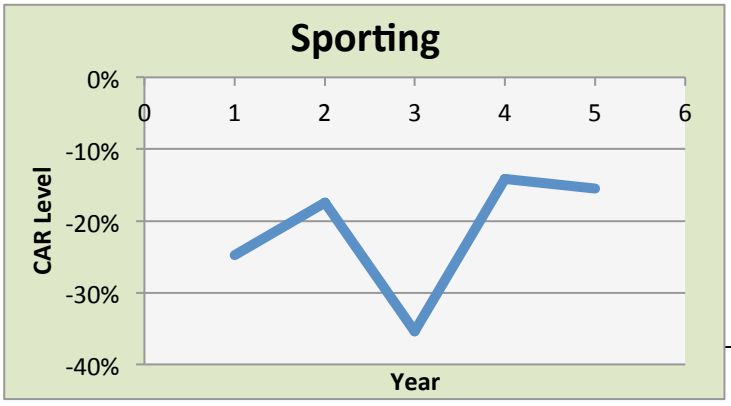

Man. Utd
5%
0%
-5%
-10%
-15%
-20%
CAR Level
0 1 2 3 4
Year

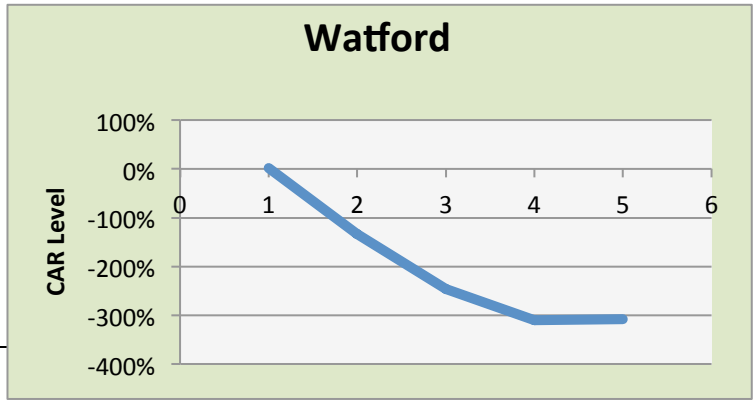

Preston North End
50%
0%
-50%
-100%
-150%
CAR Level
0 1 2 3 4 5 6
Year


Ruch Chorzow
100%
0%
-100%
-200%
-300%
CAR Level
0 1 2 3 4 5 6
Year


Southampton
50%
0%
-50%
-100%
-150%
CAR Level
0 1 2 3 4 5 6
Year


Sporting Braga
20%
0%
-20%
-40%
-60%
-80%
CAR Level
0 1 2 3 4 5 6
Year


Sporting
0%
-10%
-20%
-30%
-40%
CAR Level
0 1 2 3 4 5 6
Year


Watford
100%
0%
-100%
-200%
-300%
-400%
CAR Level
0 1 2 3 4 5 6

9.9 Average CAR Daily Development

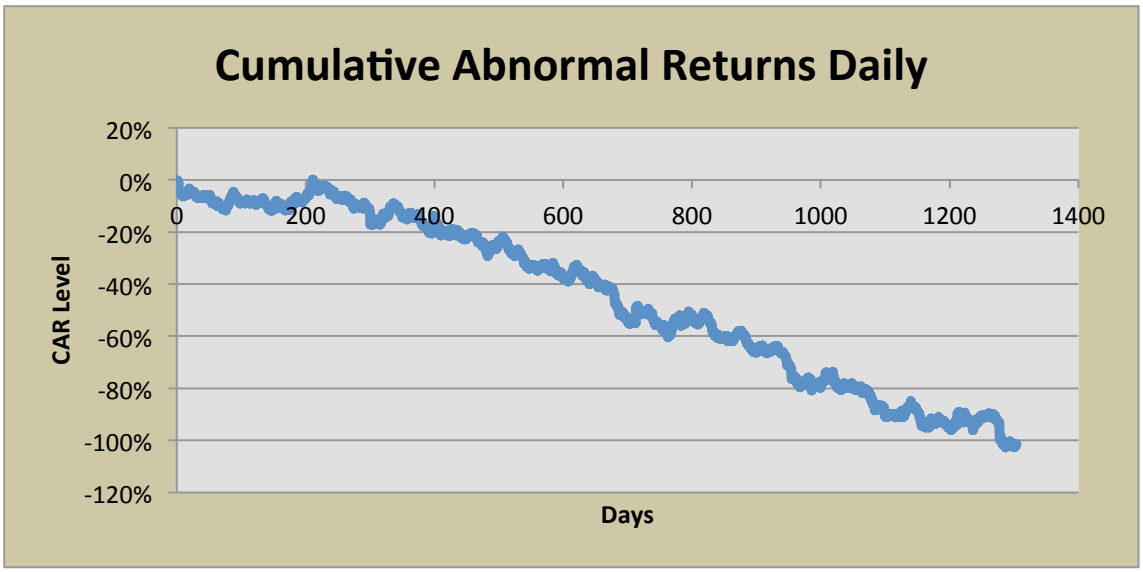


Figure 9.9, Cumulative Abnormal Return daily development over five years after IPO.