

Post IPO performance of private equity backed entities:

Empirical Evidence of the Nordic Market

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Master thesis in Business Analysis and Performance Management &
International Business

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This thesis was written as a part of the Master of Science in Economics and Business Administration program - Major in International Business. Neither the institution, nor the advisor is responsible for the theories and methods used, or the results and conclusions drawn, through the approval of this thesis.

Abstract

Initial public offering of private equity backed entities has been a remarkably popular topic among financial scholars. The allure of growth potential and sophisticated corporate structures has gain private equity backed entities a special place in initial public offering theory. Underpricing and underperformance have been central topics on this research. Financial literature has proposed information asymmetries as the central theory explaining these phenomena. Empirical evidence has shown certification as a mechanism to ameliorate information asymmetry. Further research has confirmed the certification power of private equity sponsors by reducing the underpricing and underperformance of sponsored entities. However, there is evidence that suggests different levels of certification among two different classes of private equity backed firms, buyouts and venture capital firms. Based on information asymmetry theory and value adding mechanisms models, we contend that the certification power of buyout and venture capital firms will differ ultimately reflecting on different degrees of underpricing and underperformance. Using standard methodologies we test the different levels of underpricing and underperformance among buyout and venture capital backed firms. We construct a Nordic sample of private equity sponsored entities that became public within a time horizon of ten years between 1998 and 2008. The results show that for the first day of trading venture capital backed firms are overpriced by 1,1%, while buyouts backed firms show underpricing of 8,4%. Concordantly, in the long run venture capital backed firms tend to over perform buyout sponsored entities by an average of 1,3% per month. While underperformance results are in line with prior empirical evidence the underpricing findings seem to be contradictive. Our results pose additional questions regarding the certifying ability of private equity sponsors in addition to the specific characteristic of the Nordic Markets.

Contents

1	Introduction	1
2	Underpricing and Underperformance	3
2.1	Explaining Underpricing and Underperformance	4
2.1.1	Information Asymmetry.....	4
2.1.2	Certification: Bridging information asymmetry.....	5
2.1.3	Underwriter’s Reputation.....	6
2.2	Theories of Underpricing	7
2.2.1	Signaling	7
2.2.2	Insurance to Underwriter Liabilities	7
2.2.3	Hot and cold Issue Markets.....	8
2.2.4	Irrational Herding	8
2.2.5	Cost Theory.....	9
2.2.6	Winner’s Curse	9
2.3	Theories of Underperformance.....	10
2.3.1	Signaling	10
2.3.2	Legal Liability.....	10
2.3.3	Agency Cost.....	10
3	Buyouts and Venture Capital Transactions	12
3.1	Buyout Transactions.....	13
3.1.1	Underpricing	14
3.1.2	Underperformance	14
3.1.3	Certification	15
3.2	Venture Capital Transactions	15
3.2.1	Underpricing	16
3.2.2	Underperformance	17
3.2.3	Certification	17

4	The Nordic Market	18
4.1	The Stock Exchanges	18
4.2	The Private Equity Industry.....	19
5	Hypothesis	21
5.1	Hypothesis I.....	21
5.2	Hypothesis II	22
6	Methodology	23
6.1	Underpricing.....	23
6.2	Underperformance.....	24
6.2.1	Time Horizon and Comparable Benchmarks	24
6.2.2	Return calculations	25
6.3	The Variables	28
6.3.1	The Benchmarks	28
6.3.2	The Risk Free Rate	29
6.3.3	The Sample Portfolios.....	29
7	Sample Selection and Data Collection	31
7.1	Sample Identification	31
7.2	Buyout and Venture Capital Classification	32
7.3	Data Collection Underpricing.....	33
7.4	Data Collection Underperformance.....	34
8	Results	37
8.1	Underpricing.....	37
8.2	Underperformance.....	37
8.2.1	The Cumulative Abnormal Return.....	38
8.2.2	Single Factor Regression – CAPM	39
8.2.3	Three Factor Regression - Fama-French.....	40
9	Results Discussion.....	42
9.1	Underpricing.....	42
9.2	Underperformance.....	43

10	Limitations	46
10.1	Selection Bias	46
10.2	Methodology	46
11	Conclusion	48
12	References	I
12.1	Interviews and Correspondence	II
12.2	Academic Articles	III
12.3	Databases	XI
12.4	Literature	XI
13	Appendix	XII
13.1	Sample entities	XII
13.2	First Day Return	XV
13.2.1	The Sample - Sorted by First Day Return given Classification	XV
13.2.2	Underpricing mean difference independent two tailed t-test	XVI
13.3	Cumulative Abnormal Returns – Calendar time	XVII
13.3.1	The time series	XVII
13.3.2	Underperformance mean difference independent two tailed t-test	XX
13.4	Single and Three Factor Regression	XXII
13.4.1	Risk Free Rate	XXII
13.4.2	Input Regression	XXV
13.4.3	Robust Regression output	XXVIII

1 Introduction

Facebook's initial public offering (IPO) has resurfaced controversial questions regarding the effectiveness of the market's self-controlling mechanisms. Unsuccessful issuances have powerful ripple effects that distress equity markets but that ultimately affect the economy as a whole. Thus, underpricing and underperformance have been two of the most extensively researched topics regarding initial public offerings. A number of theories have placed information asymmetry as the main driving force behind the underpricing and underperformance phenomena. In the present study we examine the ability of private equity firms (PE) to ameliorate information asymmetries through reputational capital and certification. To achieve these objectives, we investigate two specific types of IPO's; issuances backed by venture capital (VC) and buyout (BO) firms.

There is no universal consensus to explain underpricing and underperformance. Information asymmetry is often referred to as the underlying explanation to underpricing. While investors are weary of bad issuers, underwriters try to assess the market's demand for the new issue. It has been popularly believed that issuers and underwriters try to ameliorate information asymmetry through a discount premium on the offering price. The assumption of underpricing as a sign of quality emphasizes the issuers' quality and ability to recover the money of the IPO discount. When investigating the post IPO long stock performance empirical evidence has shown that non backed IPO entities underperform relative to the market. While underperformance transcends countries and industry specific characteristics research has not been able to give a universal explanation to this phenomena. The explanations are both endogenous and exogenous to the company's performance and center in market timing, agency conflicts and optimal decision making

This study focuses on the differences in certification and reputational capital between two classes of Private Equity (PE) firms Buyout (BO) and Venture Capital (VC) firms. Previous research has suggested that BO and VC are similar in terms of the extent of involvement and contribution they have on the issuer's performance. However, some of the fundamental differences between these two entities lie within the type of investments they undergo and the methods used to create value. While VCs tend to invests in early stage entities with high growth potential, BO's would focus on

larger and more mature companies. Concordantly, BOs companies, compared to VCs, are more prone to obtain the majority control of the firms they invest in. Furthermore, there is evidence that PE backed firms are able to ameliorate the information asymmetry ex-ante IPO. We make the case that the levels of certification between VC and BO differ from each other and can affect not only the first day return, but also the long run stock performance.

Compared to the US and other European countries the Nordic Private Equity industry is relatively young completing its first exit in the late 90`s. The Nordic PE market continued growing throughout the late 2000`s representing approximately 10% of the European fundraising. Limited studies have been performed in the Nordics testing for underpricing and underperformance of PE backed entities. After thorough research and rigorous screening process we identify 104 BO and VC backed IPO`s firms that had become public between the years of 1998 and 2008.

Despite being statistically insignificant, we find the test results to be of interest. The first day returns show VC backed entities to be overpriced by 1,1% while BO backed firms are underpriced by 8,4%. The overpricing contradicts prior empirical evidence and suggests that certain market mechanisms push the offering price above the market`s perceived value. In the long run our results shows that VC backed firms over perform a benchmark index in all our tests while BO backed firms tend to underperform. On average the VC backed firms outperform the BO backed by approximately 14,5% a year. Despite aligning with prior empirical evidence our finding are surprisingly large.

2 Underpricing and Underperformance

An Initial Public Offering (IPO) consists of a firm listing a portion of its shares in a stock exchange to serve as an institution of trade (Jenkinson and Ljungqvist, 2001). The IPO process can be thought of as a pricing mechanism and a mean to create liquidity. The public listing is seen as an opportunity for the investor to value, trade and divest on his investment (Brau and Fawcett, 2006). In this process a financial institution, the underwriter, serves as an intermediary between the market and the issuing company. The underwriter values the firm, estimates an indicative price range and sets the offering price to the market. There are information asymmetries in this process that can create differences between the market's and the underwriter's valuation. Information asymmetries between the issuing company, the underwriter and the market affect their perception of the value of the stock price. As a result the closing price at the first day of trading tends to be higher than the offering price. This is known as the underpricing phenomena or first day returns. A positive first day returns means that the issuing company will lose money in favor of the investors during the first day of trading. While earlier theory focused on the United States IPO market it has become very well documented that underpricing is an international phenomena. In average the underpricing of new issues in industrialized countries is 15 to 18 percent while in developing countries is significantly higher Jenkinson and Ljungqvist (2001).

The information asymmetries forces that existed prior to the IPO event are reduced as the performance of the company reveal its true value. This enables the stock prices to adjust in accordance to the market's demand. Ritter (1991) shows evidence of negative abnormal returns over a three year time horizon. Taking a sample of 1,526 IPOs and matching it to equivalent industry and sized companies Ritter finds that while the newly issued companies had a three year return of 34.47% the benchmark had performed at a 61.86% during the period of 1975-1984. A number of similar studies testing longer time horizons and different markets confirm the underperformance phenomenon Lerner (1994), Loughran and Ritter (1995, 2000), Baker and Wurgler (2000) and Hirshleifer (2001). While some scholars have suggested irrational behavior and a deviation from optimal decision making as the most plausible theory for underpricing, this explanation deviates from the classical view of a self-regulating market Schultz (2001). Alternatively, researchers suggest that underperformance is merely a methodological anomaly.

Brav, Geczy and Gompers (2000) show evidence that through an accurate measurement of excess returns the long run performance disappears.

There have been several attempts to shed light on underpricing and underperformance, yet, there is no universal consensus among researchers to explain these phenomena. Theories stemming from information asymmetries such as signaling, insurance liability, hot issue markets and mispricing have been suggested as potential explanations. Draho (2001) suggests that poor returns can be explained through market mispricing and poor responsiveness to new information. He states that rational investors would arbitrage prices downwards to reduce the chances of underperformance. The existence of underperformance hence would suggest anomalies in a self-regulating market. Following, we present an overview of the most relevant theories explaining underpricing and underperformance of new issues.

2.1 Explaining Underpricing and Underperformance

2.1.1 Information Asymmetry

The problem of information asymmetry was first raised by Hayek (1945). Hayek explains the importance of possessing relevant information in an economic rational order and describes scatter information as an endemic problem of this order. He acknowledges that the market's problems lay not only in how to allocate resources but also in how to best utilize "the knowledge not given to anyone in its totality". He suggests that the defragmented nature of the market's knowledge is not to be solved by concentrating it centrally but rather through an aggregate process of interactions between all the holders of partial knowledge.

Following Hayek's idea of defragmented market knowledge George Akerlof tries to shed light on the issue of quality and uncertainty through the automobile market model. Akerlof (1970) explains how the automobile market is laden with uncertainty as buyers and sellers possess asymmetric information about the qualities of the cars. This asymmetry makes cars of different quality standards be priced equally as it is impossible for buyers to distinguish between good cars and "lemons". Akerlof contends that most cars traded will be lemons as the bad cars will tend to drive out the good.

The concept of information asymmetry and uninformed traders was later taken into the financial markets by Sanford Grossman (1975). Grossman presents a dual model that illustrates how informed and uninformed traders invest on information and how this dynamic reflects on current prices. Grossman suggests the potential existence of “over-informationally” efficient markets that would reveal enough information to prevent informed investors to earn returns for their investment in information. With this model Grossman illustrates how prices convey information to investors. Later on in his paper “On the Efficiency of Competitive Stock Markets where Trades have Diverse Information” (1976) Grossman follows the premise of prices conveying information and he creates a mean variance model to study how the prices aggregate segmented information. In this model Grossman proposes that price perfectly aggregates information within a context of uncertainty or “noise”. Moreover, this model depicts the dichotomy of investing in information namely; when a price system perfectly aggregates information it creates an adverse incentive for data collection.

2.1.2 Certification: Bridging information asymmetry

Certification has been present in economic theory and has taken different forms. Klein and Leffler (1981) had suggested the idea of unsalvageable capital and increased market prices as means to convey and warrant quality. The first concept refers to the level of assurance on the buyer’s side expressed as a capital commitment in the good being offered. Conversely, Klein and Leffler suggest that the price would signal a superior quality when information asymmetry prevents the buyer to know the true quality of the offer. Price signaling drives its value not from price concentration of information but rather as proof of the company’s commitment i.e. unsalvageable capital. In an economic environment and within the context of IPO we can find the concept of unsalvageable capital through certification theory. Booth and Smith (1986) showed that firm value could be increased if “bonding investments are made to certify new issue price”.

In this paper we present what we consider are two of the most relevant IPO certification mechanisms influencing underpricing and underperformance namely; underwriter and sponsor reputation. Our views are supported by Brau and Fawcett’s (2006) survey performed among 336

CFOs found that the strongest way of signaling quality, apart from having strong cash flows, was to have an underwriter with strong reputational capital. Furthermore, consistent with Megginson and Weiss (1991), Brav and Gompers (1997), Schöber (2008), Hadryd, Mietzner and Shciereck (2010) and Cao (2011) PE backed firms have proven to ameliorate information asymmetry while positively reflecting on both underpricing and underperformance.

2.1.3 Underwriter's Reputation

Booth and Smith (1986) present a model that places significant value on the underwriter's in the IPO process through its ability of certifying quality. Departing from the effects of information asymmetry Booth and Smith contend that an underwriter, through its market reputation, certifies an issue effectively ameliorating the gap between investors' and issuers' information asymmetry. If underwriters manipulate information they will lose a perpetuity or quasi rent in favor of a large onetime gain. Hence, the underwriter has a positive incentive to perform an accurate certification of the company. The study also shows that issuers can increase the firm's value if the company is able to benefit from the underwriters reputation. This to a large extent will be determined by the level of involvement of the investment bank in the issuers' public offering.

Sun, Lee, Li and Jin (2010) try to understand the effects of underwriter's reputation on the issuer's earnings management prior and after an initial public offering. Sun states that management utilizes discretionary accounting within the legal parameters of the general accepted accounting principles in accordance to the need of a company under certain events. He considers in the second case that since there exist a "well established" correlation between share prices and earnings it is possible that an incentive for earnings management could increase prior to a IPO. His hypothesis tries to prove whether there is a negative relation between underwriters' reputation and earnings management prior to the IPO and whether there is a positive relation in operating performance after the issue. The study is able to prove both hypothesis and it explains the hypothesis through the interest of the underwriter before and after the issue. Since reputation is invaluable for highly reputable underwriters in future issues there is a higher incentive for them to estimate more accurately the value of the company prior to the IPO while monitoring the issues performance after the fact.

2.2 Theories of Underpricing

2.2.1 Signaling

There has been empirical evidence suggesting that there is an incentive for companies to underprice their shares as a mean to signal the quality and projected value of a firm. In “Signaling by Underpricing in the IPO Market” Allen and Faulhaber (1989) build a model that attempts to illustrate the circumstances and context in which underpricing would be desirable for the issuer. He divides his sample into good and bad firms based on their expected dividend stream. The stream is dependent upon two instances of the IPO which in term bear different levels of information asymmetry i.e. planning and execution of innovation. These two instances are said to be different in that the investors don’t hold enough information about the quality of the innovation of the issuer. The innovation that the issuer is trying to implement is unknown to the investors. The information gap remains after implementation and is only through the first payment of dividends that the investors are able to readjust their original perceptions of the company. The conclusions of his work found that when information asymmetry exists there will be an incentive to underprice. Allen finds that all things being equal companies will be less underprice should they not issue equity within a reasonable amount of time prior to the IPO. His work also suggests a higher level of underpricing in the case of venture capital involvement.

2.2.2 Insurance to Underwriter Liabilities

In his work “Anatomy of Initial Public Offerings of Common Stock” (1988) Tunic explores the possibility of underpricing acting as an insurance mechanism for unforeseen liabilities arising after the initial public offering process. Tunic contends that as underpricing rewards the investor with an initial stock price lower than the aftermarket value, the reward would ameliorate the probabilities of a potential legal suit brought against the issuer. Tunic hypothesis states that companies that have higher exposure to legal liabilities would tend to increase the discount on the initial offer compared to companies which legal risk is low. To test this hypothesis Tunic analyzes issuances that took place both before and after the Securities Act of 1933. His results confirm that the Act of 1933 had a deep impact in the pricing and returns of unseasoned new issues as it increased the potential liabilities associated with underwriting. While he argues that

these results are perfectly compatible with earlier data asymmetry hypothesis he questions the extent to which the underpricing phenomena can be by explained exclusively through one hypothesis.

2.2.3 Hot and cold Issue Markets

In light of the investors' avid enthusiasm for new issues during the period of 1961-1962 Reilly (1977) study tries to understand the reason triggering this unusual behavior. The study assumes a downward bias in the new issues' stock price and suggests some reasons to explain why this is the case namely; ameliorate uncertainty of the public's valuation, increase probability of the success of issue or decrease the time in which the stocks sell. While Reilly notes that the issuers could be sensitive to the cash left behind, he argues that corporations are not looking to obtain all their planned capital through the initial public offering as they could increase the price of the stock in future issues inasmuch as they keep investors satisfied. Draho (2004) states that during periods of hot issue market first day returns tend to be higher. While 18% first day return is the rule in the American IPO market, the internet hot market

Ibbotson and Jaffe (1975) investigate the nature of hot issue markets and its implications in stock price and aftermarket performance. They find that the presence of hot/cold issue months suggests the probability of following hot/cold issue months is higher. However, he notes that the results are stationary and acknowledges that this tendency will only last for a limited amount of time. The results also indicate that cold market could prove to be more profitable for investors as they could potentially obtain higher offering prices.

2.2.4 Irrational Herding

In "Rational herding in financial economics" Devenow and Welch (1996) describe herding as a common phenomenon in financial economics. He recognizes two different types of herding non rational and rational. The first one involves investors following each other behavior without regards for any rational analysis. Rational herding on the other hand is the phenomena in which optimal decision making is hampered by noise and information asymmetry. The study of herding is based on Principal Agent models that analyze the breach between optimal decision making and non-rational/ rational herding. One of the most popular explanations of the imperfect behavior of

decision making has to do with the agent's reputation. In order to maximize their reputation in the market agents would either decide to "hide in the herd" to be less evaluable or "ride in the herd" to signal quality. These models tend to show that agents, when the market is moving inefficiently, tend to ignore their own research or other optimal decision making.

2.2.5 Cost Theory

Beneviste and Spindt (1989) suggested a cost related theory that places the underwriter as a facilitator for market efficiency. They illustrate their theory with the example of a new financial institution trying to sell equities in the market. Since the market has little knowledge of the new company investors are weary of their equity products. Hence, the entity is forced to create a mechanism to attract investors by reducing their risk aversion. Beneviste and Spindt contend that underpricing is a natural consequence of the entity's need to create reputation capital within the market. Hence, they understand underpricing as a risk premium given to investors to reward them for their risk. Furthermore, they show that the underwriter ability to leverage its expected future cash flows to increase efficiency and hence reduce underpricing.

2.2.6 Winner's Curse

The winners curse suggests that the highest bidding investor has necessarily the highest valuation among all participants. Hence, this implies that the winner could pay more than the fair value of the issue. This problem creates an incentive for investors to exert downward pressure on the issue's price. Conversely, Rock's (1986) model illustrates how the information asymmetries between different investors can create a negative incentive to uninformed investors to participate in an auction. If it is the case that informed investors possess more information about the issuer than uninformed investors then uninformed investors would always win when there is a bad issue and could lose in the case of good issues. Hence, this could potentially create a negative incentive for uninformed investors to participate in auctions decreasing the demand for the issue.

2.3 Theories of Underperformance

2.3.1 Signaling

Jenkinson and Ljungqvist (2001) argue that signaling rather than predict after IPO underperformances requires positive post market returns. Since, companies are trying to signal their quality underpricing would be desirable only if a “high-quality” firm was able to outperform non issuing firms in both price and performance. Jenkinson and Ljungqvist state that defining a “high-quality” company on a testable context has is difficult due to the subjectivity of the term. Moreover, there is not enough empirical evidence to prove the criteria needed to make underperformance desirable.

2.3.2 Legal Liability

Hughes and Thakor (1992) suggest that while the underpricing phenomena can be explained through their legal insurance model, so can underperformance as long as the issuer is co-liable of damages along with the underwriter. In this context Hughes and Thakor refer to damages as additional “dividends” that are to be paid to the stockholders. Hughes and Thakor model is based on the premise that IPO investors are acquiring a package that bundles shares and a “litigation put”. In this way investors would be able to recover a fraction of the losses from the issuer. Hence, they argue that when computing underperformance, failing to control for the litigation put will render spurious results. Janet Alexander (1993) contends this view claiming that “litigation dividends” are not available during the period of time when underperformance is detected namely; the first three or five years of trading. Jenkinson and Ljungqvist (2001) argue that legal liability is not economically significant in many countries thus making the legal liability explanation unlikely.

2.3.3 Agency Cost

Jensen and Mecklins (1976) have explained poor operative performance as a misalignment in the interest of management and shareholders. This theory translated into the post IPO context suggest that as management shares are diluted in the company their pursuit for personal gain will no

longer be in line with the company's interests. Mikkelson et al. (1997) tests US based company's and found a positive relationship between operative performance and management stake on the company. While this theory has some weight in financial literature there has been empirical evidence that questions agency theory as the major factor determining underpricing. Cai and Wei (1997) study the Japanese equity market and fail to find a relationship between changes in management ownership and profitability. Additionally, Loughran and Ritter (1997) link their 1995 study of seasoned equity low stock returns with the operative performance of seasoned firms. Loughran and Ritter contend the Jensen and Mecklins agency cost explanation to underperformance on the basis of the limited change in management of ownership of seasoned firms.

3 Buyouts and Venture Capital Transactions

The Private Equity Industry consist of a variety of transaction types entities where buyout (BO) and Venture Capital (VC) firms stand out as the most distinct. Academic literature has not yet agreed on a scientific definition of buyout firms Schöber (2008). As a whole, BO firms consist of several sub categories such as Leverage Buyouts, Acquisition Vehicle and initial investments in Non-VC firms Schöber (2008). The BO and VC firms have distinctive characteristics which distinguish them from each other and other non-backed backed investments. Compared to a non-backed transaction, both BO and VC will acquire a concentrated portion of the target's equity. Additionally, they partake in a more active role in the portfolio entities operations, hence contributing substantially in its performance. To compare the typical investment target of a BO and a VC we turn to Kohlberg Kravis Roberts (KKR) own description of Buyout industry. The financial criterion for a target BO is typically above average profit margins with strong and predicable cashflow and separable assets which are available for sale, if necessary. Some of the business characteristics are strong market positions, potential for real growth in the future and products which are not subject to cyclical swings or technologic changes (KKR, 1989). On the other hand will a VC only invest in firms with high growth potential, often start-ups with technology or innovation aspects Barry (1990).

Barry (1990) highlights some of the representative characteristics of the VC industry. VC firms are active investors and add value through involvement, participation in management, contribute with specialized knowledge within an industry sector, recruit key personnel, set up distribution lines and contribute with consulting services (Barry, Muscarella, Peavy and Vetsuypens, 1990). The nature of the BO transactions is to buy a majority stake of the entity from its previous private or public owners. The entity and its management will go through a series of changes in its capital structure, management incentives and corporate governance (Kaplan and Stromberg, 2009).

Beyond the structural dissimilarities of BOs and VCs there are significant differences in the way these entities create value. The different value adding mechanisms could have an impact in the backed-entity's operational performance ultimately affecting the markets' perception of the new issue. This assumption is in accordance to empirical evidence showing differences between underpricing and underperformance of BO and VC backed entities. In the following sections we

introduce two different value-adding models in addition to certification theory for both BO and VC.

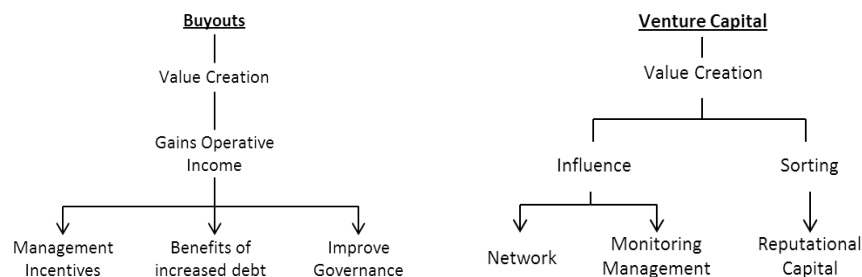


Table 1: Overview of Value Creation Mechanisms by Buyouts and Venture Capital sponsors

3.1 Buyout Transactions

Jensen (1989) et al suggests buyouts, as a value creating vehicle, risen during the 80s. He credits the success of the new buyout market to a superior corporate and capital structure model. The combination of ownership, incentives to private equity professionals and an efficient organizational structure were believed to be the cornerstones fueling the industry's growth. Despite the success the next decade saw most of BO deals defaulting putting an end to the first BO era. During the period of the 1990s to early 2000s the BO industry experienced a dramatic change abandoning most public-to-private acquisitions surviving poorly on private-to-private deals. It was not until the second half of the 2000s that the BO public to private acquisition reemerged. The growth of the BO market has been exponential and shows no signs of slowing down. While at the beginning of 1990s investments in private equity totaled 10 billion USD at the peak of the 2000s it increased to an outstanding 180 billion USD (Reyes, Private Equity Overview and Update 2002).

When trying to understand how BO were able to create value Guo (2011) suggests that most of the evidence points out to large gains in operative income. He explains operative income gains through a reduction in agency cost, improved governance via financial sponsors and central ownership. Guo studies whether LBOs have changed the way they create value over time. Through testing the returns of 192 LBOs for the period of 1990 to 2006 and comparing it against 1980's deals Guo is able to find some significant differences in the characteristics of newer BO

deals. Initially, he finds that companies in recent BO deals are priced more conservatively compared to those in the 1980's. While the levels of leverage are considerably lower in more recent deals, they exert substantial default risk to the companies. His research shows that in average the total value of firms increased after the buyout. He explains this increase in value through the liquidation of unproductive assets while maximizing the efficiency of the remaining assets, rising market or industry sector valuation and larger tax shields.

3.1.1 Underpricing

Hogan, Olson, Kish (2001) study analyzes the first day returns performance of LBO and compare it to original IPOs. Their results show that while original IPOs had an initial return of 13% LBOs had a mean excess return of 7.64%. The study is consistent with the information asymmetry theory as the underpricing is significantly reduced when companies have BO backing. While the study finds that factors such as the number of months the LBO was privately held, overallotment option, the size of issue, insider ownership and the gross spread to have an impact in the returns other factors such as the lead underwriter, whether the deal was syndicated, the number of managers, listing exchange, lockup agreements and auditors proved to have no impact in the returns. These results contrast with other studies that show the later factors to have an impact on returns. Overallotment and insider participation are shown to be more significant in explaining underpricing for LBO deals than for original IPOs while in the case of the size of the offering the opposite is true.

3.1.2 Underperformance

Schöber (2008) studies a sample of BO backed firms to look into their IPO performance. He finds that during the first year BO backed companies have a positive performance benchmarked to the S&P 500. Contrarily, non BO backed firms underperform considerably in the short run. The results in the medium and long term however are similar as both LBO backed and non-backed companies had a negative performance. However, while BO non backed companies experienced negative returns of -51% during the fourth year of the time horizon, BO backed companies' underperformance was considerably milder with a -16.6% return. This suggests that the divergence of the stock price performance of both sample increases over time. Schöber believes

that his results could be explained by a greater interest of investment bankers on the company as there is more information available about BO companies. Additionally, he believes that management experience in leading public companies make them more proficient in terms of operational performance. This last claim is backed by his study showing that 10% of the non-backed companies went bankrupt compared to only a 5% of BO backed. Schöber results could be further confirmed by Cao (2011) that shows that operative performance of BO backed companies experience no significant decline on their operative performance post IPO.

3.1.3 Certification

Despite a gap in theory regarding BO certification we can draw some important parallels from the work of Megginson and Weiss (1991) with regards to the influence of BO firms in the IPO process. Despite the differences between the value adding strategies of VC and BO we contend that BO firms' reputation exerts a certification influence similar to that of VC firms. Furthermore, highly reputable BO firms' management team in addition to a higher transparency in cash flows can reduced ex-ante information asymmetry related issues in the IPO process. Consistent with these views along with Booth and Smith (1986) theory of certification, the results of Hogan, Olson and Kish (2001) and Schöber (2008) can further suggest the BO firms' power of certification. However, research has shown Prior research has shown that the alphas of BO and VC differ in the long run Ljungvist and Richardson (2003), Jones and Rhodes-Kropf (2003), Kaplan and Schoar (2004).

3.2 Venture Capital Transactions

The Venture Capital industry can be tracked back to the dawn of the 1970's. It was not until the end of the 1970's that the VC industry grew to about 211 VC companies with an aggregate industry capital of 2.5 billion USD. One decade later the number of VC companies nearly tripled and the total industry capital grew to 31 billion Venture Economics (1988). The growth was short from over and during the peak of the 2000's the VC industry had already a total of 105 billion USD in investments Gompers (2004). This growth has been spurred by small high growth innovative companies developing new technology. These inherent characteristics of VC backed companies create great information asymmetry gaps.

Sørensen (2007) has suggested that the value creation mechanisms of Venture Capital firms are twofold namely; influence and sorting. He points out that the extent of value added to a company is intrinsically attached to the reputation and experience of the VC. It's throughout this reputational capital that VCs are able to grant access to a larger network of clients, suppliers and management team than less experienced VC (influence). More experienced VCs are also believed to be able to monitor and better managed their companies (influence). Additionally, the reputational capital of VCs can signal unobserved characteristic to public market. Hsu (2004)** In fact shows that companies would accept the offers from VCs with the highest reputational capital at the expense of more economically attractive offers. This effect in turn allows VCs with more experience and reputation to have a higher and better pool of companies to draw from. Further, Sørensen argues that companies backed by VC investors with more experienced will be more likely to go public.

3.2.1 Underpricing

Recently Hadryd, Mietzner and Shciereck (2010) has taken a closer look at underpricing and long performance of issues backed by venture capital and private equity firms. In their study Hadryd, Mietzner and Shciereck argue that a major consideration for underpricing and positive performance would be the magnitude of information asymmetry signaled by the issuer to the investor. Under the assumption that underpricing is a negative function of financial sponsor reputation he tries to distinguish between PE and VC to analyze whether a difference in underpricing or long term performance is observable. He distinguishes PE from VC through the nature of the companies being funded i.e. VC would be smaller high-growth companies while PE targets would have a higher degree of maturity. Additionally he argues that the market for VC companies is not as concentrated as the PE market. Comparatively, he considers those PE targets are more stable and better positioned within their industry. Due to this differences he predicts that PE backed IPOs will have smaller returns and lower underpricing compared to VC backed companies. The study confirms that the level of underpricing is higher in VC than in PE backed IPO.

3.2.2 Underperformance

Brav and Gompers (1997) examine a sample of VC and non VC issues to determine whether there is a significant difference in their long-run performance. Additionally, the study analyzes whether different benchmarks and methods of measuring performance could render different results. Replicating Ritter (1991) and Ritter and Loughan (1995) model Brav and Gompers (1997) are able to show that the returns of non-venture backed IPOs are considerably below those of venture backed companies. Moreover, the results also suggests that underpricing could be a phenomena that is not exclusive of new issues but rather that it has a larger spectrum in the financial markets.

3.2.3 Certification

Meggison and Weiss (1991) in their paper “Venture Capitalists Certification in Initial Public Offerings” study how the presence of venture capital investment can certify the initial public offering of an issuer. The authors contend that the presence of highly reputable VC can work as a substitute or compliment to other certification in the IPO process i.e. auditors and investment bankers. Using matched pairs methodology between companies similar in size and industry Meggison and Weiss are able to confirm that the presence of a VC maximizes the fraction of the proceeds accrued to the issuer in an IPO. According to their results the presence of a VC reduces the degree of underpricing as well as the underwriters spread. Conversely, their research suggests that VC backed firms were able to bring more attractive auditors and underwriters as well as a greater number of institutional investors compared to non VC backed firms.

4 The Nordic Market

4.1 The Stock Exchanges

The Nordic market is particularly intertwined and shares market specific characteristics. Denmark, Finland and Sweden have merged into the Nasdaq OMX and operate jointly with Norex. Westerholm (2006) argues that some of the institutional characteristics of the OMX differ from European markets where new issues had risen and crashed between 1998 and 2001. He explains that the OMX organizes new listings inside the same exchange or with the aim of later filing for the central exchange. The central exchange will typically consist of stricter requirements in terms of size and shareholders dispersion.

Exchange	Company Size	Number of Shareholders and sprad ownership	Other requirements
Sweden OMX-integrated markets			
A-list	Market value 31.8 M€ (300 MSEK)	200, 25% of shares and 10% of votes with < 100% holdings	Minimum share price of 25 SEK List requires 3 years of audited profitable financial statements
O-list	No specific size requirement	500 spread as above	
Finland OMX-integrated markets			
Main List (blue chip)	Market value of 35 M€ Share capital 2 M€ Equity 4 M€	500, 25% of shares and 10% of voters with <10% holdings	3 years audited financials 2 years of financial statements 1 year of financial staments if operative
I-list (mid-cap)	Market value 4 M€	15% publicly held	<2 years. New shares have to be issued
NM-list (growth)	Market Value 2 M€	10% publicly held	if <3 years. Large holdings locked up
Norway. Oslo Stock Exchange			
Main List	Marekt value 37.6 M€ (300 M NOK)	1000, 25% publicly held	3 years of financial statements, for main list one profitable year. Since 2001, high-growth companies with no current earnings must have sufficient liquid assets to operate for 18 moths
SMB	Marekt value 1 M€ (8 M NOK)	100, 25% publicly held	
Primary capital certificates	Marekt value 1 M€ (8 M NOK)	200, 25% publicly held	
Denmark. CPH Stock Exchange			
Main	Share capital at least 2.01 M€ (15 MDKK) Market Value 1.14 M€ (8.5 M DKK)	500, Shares freely negotiable	Operated more than three years

Table 2: Listing requirements among Nordic Countries - Source: Westerholm (2006), P.29.

The Nordic stock exchange has been continuously evolving in the late 2000's. The Swedish listing Nye Marknaden (NM) changed name to First North in June 2006 and in the following years OMX duplicated the model to its remaining Nordic branches. In August 2007 the Norwegian Oslo Børs merged its two lists SMB and Main list into one. The introductory requirements of SMB where replaced by the new list Oslo Axess (Eikrem, 2007).

4.2 The Private Equity Industry

While the US BO and VC industry can be traced back to the mid-80s and late 70s, the Nordic markets did not emerge until the mid-90s. Since its rather late introduction the Nordics have established as an important market in the PE industry. In the 2006-2008 period Nordic PE fundraising totaled 27.8 € billion, equivalent to 10% of total funds raised in Europe (EVCA, 2009). In January 2012 the Nordic (Denmark, Finland, Norway and Sweden) Venture Capital Association, an independent organization for PE firms, was constituted by 250 members. Yet more than half of the capital was collected by six fund raisers alone, all from Sweden. As displayed in the table below, the Swedish accounted for 75% of all the funds raised in the period, giving them the title of being the biggest PE market in the Nordics.

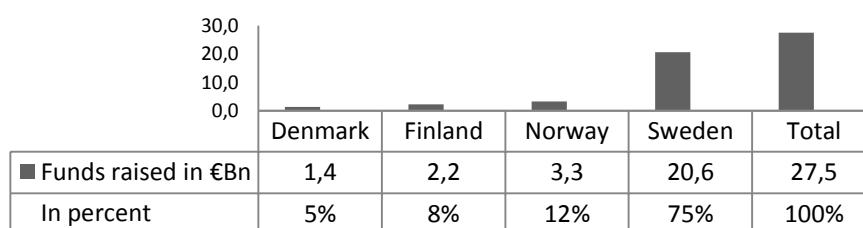


Table 3: Fundraising by country in Nordic Region (2006-2008). Source: EVCA – 2009 Nordic Report, P.10.

Studies of the capital flow in the Nordic Venture Capital market show that the majority of investments are made by national funds located in their country of incorporation. Between 2006 and 2008 approximately 30% of the funding was originated from Non-Nordic European investors (EVCA, 2009). During this period also the region experienced a significant amount of cross border interaction between the Nordic markets. Concordantly, during the period between 2007 and 2010, the total shares of venture investment received from other Nordic countries was as follows, Denmark (12%), Finland (20%), Norway (6%) and Sweden (15%) Maula (2010).

The PE Industry's activity fluctuates with economic cycles. The Nordic equity market has shown a formidable growth that began at the end of the 1990's. In terms of investment exits value increased during the booms of the 1999-2004 and 2005-2010 periods Creandum (2011). The distribution of fund raising and investment exits varies over the economic cycles. From the funds

raised in the 2006-2008 period, approximately 58% and 89% in 2007 and 2008 were identified as BO funds. Early stage- and later stage Venture Capital represented on average 18% in 2007, where the Europe wide-average is 13% EVCA (2009). The Nordic region is said to be one of the most attractive regions for a VC, as the countries are ranked high in “Best Countries to start a company”, “R&D as % of GDP”, “Global competitiveness index” and “Corruption Perception Index” (Small Business Administration’s Office of Advocacy, OECD (2010) Factbook, World Economic Forum, Transparency international CPI (2010), Creandum (2011). The highly qualified labor in addition to transparent business practices and favorable regulation policies are said to be factors fostering the growth in the Nordic PE market Westerholm (2006).

Trade sales were the preferred vehicle of PE firms to disinvestments in 2008, accounting for almost 25% of the exits. Other popular exits are sales to other private equity houses, repayment of principal loans, sales to management and write-off’s. Public offerings on the other hand only accounted for 8% and 4% in 2007 and 2008. In the same years, the disinvestment by sector for the BO and VC is displayed in Table 4. The exit in volume is greater than of the VC and their target sectors differ. The BO tend to have a more even distribution of exits across the sectors, while having a greater weight on “Business & Industrial products/services”. The VC’s have seemingly a relatively high focus on “communications”, “Computer & Electronics” and “Life Science”.

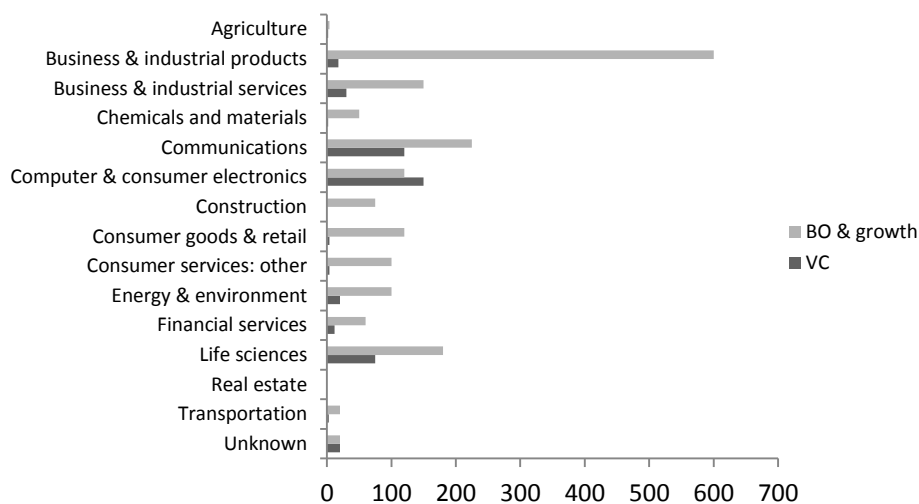


Table 4: Disinvestment by Sectoral distribution of Buyout & growth and Venture Capital in € million, (2007 – h1 2009), source; EVCA Nordic Report, 2009, P.25 and P.32.

5 Hypothesis

Since this study centers in both underpricing and underperformance, we present two hypotheses that aim to explore these two phenomena in a PE context. Both hypotheses try to predict the differences in first day and long run returns of both BO and VC backed entities. We based our reasoning on prior economic theory and financial empirical evidence.

5.1 Hypothesis I

Consistent with Hayek (1945), Akerlof (1970) and Grossman (1975, 1976), we acknowledge the importance of conveying quality through strong market mechanisms as a way to ameliorate information asymmetry gaps. Signaling, insurance to underwriter liabilities, hot and cold issues and irrational herding, have taken information asymmetry as the departing point to explain underpricing. These theories explain underpricing as a way to convince the market of the quality of an issue. Klein and Leffler's (1981) concept of unsalvageable capital as a company's commitment to signal quality, suggests the possibility of certification as a guarantee to investors. Booth and Smith (1986) support this view by suggesting the possibility of increasing a firm's value through bonding investments that certify a new issue. Megginson and Weiss (1991), Brav and Gompers (1997), Schöber (2008), Hadryd, Mietzner and Shciereck (2010), and Cao (2011) confirm this through empirical evidence showing that PE backed firms have proven to ameliorate information asymmetry by conveying superior quality to the market.

Despite the ability of PE backed firms to certify issuers, we believe that the extent to which they do so can vary among sponsors ultimately reflecting on the underpricing and underperformance of a new issues. Since VC and BO sponsors create value utilizing dissimilar mechanisms we contend that these differences will create diverse levels of certification. The different levels of certification would derive from the effectiveness of BO and VC mechanisms to bridge information asymmetry gaps. Despite VC firms' ability to certify issuers, we believe their ability to ameliorate the uncertainty stemming from future performance is lower compared to that of BO backed firms. As per Brau and Fawcett (2006) showing cash flows as one of the most powerful vehicles to convey quality, we believe that BO should show less underpricing compared to VCs as the information asymmetry between projected and expected performance ex-ante IPO should be less.

H_1 : Entities sponsored by venture capital firms will present higher underpricing than companies backed by buyout sponsors. We state the null and alternative hypothesis as follows.

$$H_0: \mu_{\text{Underpricing Buyouts}(1)} = \mu_{\text{Underpricing Venture Capital}(2)}$$

$$H_1: \mu_{\text{Underpricing Buyouts}(1)} \neq \mu_{\text{Underpricing Venture Capital}(2)}$$

5.2 Hypothesis II

While in underpricing the sponsors' certifying effect can be explain through information asymmetry we consider that in the long run it's the sponsors' ability to create value that affects the issuers' performance. While VCs are known to invest on early stage and high growth companies, BO will add value through efficacy and market timing mechanisms Jensen (1989). In other words, VC growth could be linked to growth in cash flows and sales while this would not be the case for BO backed entities. Consistent with the findings of Brau and Fawcett (2006) that cash flows send investors a stronger sign of strong performance and enhanced value, we consider that VC backed firms' stock performance will be better than for BO backed firms. The rational is in accordance with Ljungvist and Richardson (2003), Jones and Rhodes-Kropf (2003), Kaplan and Schoar (2004) studies showing higher alphas for firms backed by VC compared to BO backed firms in the long run. While these studies have several limitations in terms of their selection biased and their assumptions of BO's beta being equal to one, we consider that they show evidence of the existence of our value adding hypothesis. Furthermore, it gives BOs and VCs different dimensions of certifications when looking at long term returns.

H_{II} : Entities sponsored by venture capital firms will present lower underperformance compared to companies backed by buyout sponsors. We state the null and alternative hypothesis as follows:

$$H_0: \mu_{\text{Buyouts underperformance}(1)} = \mu_{\text{Venture Capital underperformance}(2)}$$

$$H_1: \mu_{\text{Buyouts uncerperformance}(1)} \neq \mu_{\text{Venture Capital Underperformance}(2)}$$

6 Methodology

In this chapter we first present the methodologies used to measure and compare underpricing between VC and BO. Subsequently, we introduce some of the most commonly used approaches to measure long term underperformance among newly issued stock. Underpricing and Underperformance methodologies have not been internationally standardized (Schöber, 2008). To introduce and explain the reasoning behind our models we present a brief discussion of the most relevant methodologies to date. We present an overview of our selected methodologies in Panel 1.

		Sample size		Period	Frequency	Benchmark		Weighting	
		BO	VC						
Underpricing:		27	40	1998 2008	D	-	-	-	-
Methodology	First Day return: (BO, VC, BO in excess of VC)								
Sample Metrics	Offering Price, Raw Closing Price								
(Significance test)	(Two Tailed - Independent t-test)								
		Sample size		Period	Frequency	Benchmark		Weighting	
		BO	VC						
Underperformance:		39	54	01.09.1998 01.09.2010	M	MSCI Nordic	Nordic Index	Equally	Value
Methodology	The Cumulative Abnormal Return – Calendar Time: (BO, VC, BO in excess of VC)								
Sample Metrics	Market Value (MV), Total Return Index (RI),								
(Significance test)	(Two Tailed - Independent t-test)								
Methodology	Single Factor Regression – CAPM: (BO, VC, BO in excess of VC)								
Sample Metrics	(MV), (RI)								
(Significance test)	(P-Values)								
Methodology	Three Factor Regression – Fama-French (2012): (BO, VC, BO in excess of VC)								
Sample Metrics	(MV), (RI), Book to Market (B/M)								
(Significance test)	(P-Values)								

Panel 1: Overview of Selected Methodologies for testing Underpricing and Underperformance

6.1 Underpricing

The methodologies involved in measuring underpricing have differed greatly throughout time. Schöber (2008) has noted that returns are calculated within different post IPO-after market periods across academic literature. Furthermore, while most scholars have chosen raw initial returns as their preferred methodology to measure first day returns others have made the case in favor of adjusted initial returns. Perhaps one of the greatest disagreements among scholars consists of what quoted price should be used in computing the first day returns. Academic

literature shows closing prices, bid prices, mean between bid and ask prices as valid methods to calculate first day returns. Per Beatty and Ritter (1986) claim that market returns are very small compared to adjust for them, we utilize unadjusted offering and closing prices.

$$Initial\ return_i = \frac{Closing\ Price_{i,t+1} - Offering\ Price_{i,t}}{Offering\ Price_{i,t}}$$

In order to compare the levels of underpricing between BO and VC backed firms we performed a Two-Tailed Independent t-test on first day returns.

$$S_{X_1X_2} = \frac{\bar{X}_1 - \bar{X}_2}{S_{X_1X_2} \cdot \sqrt{\frac{2}{N}}}$$

6.2 Underperformance

There have been different methodologies attempting to accurately measure underperformance of new issues. In this section we briefly present some of the most popular methodologies used to date along with the reasoning behind our choices. Firstly we present the time horizon and

However this section is three fold. Before the models for measurement are present in the second section, we address the chosen time horizon and matching approaches for the sample returns. The third section is devoted to the variables, where the aim is to highlight the model and measurements content.

6.2.1 Time Horizon and Comparable Benchmarks

Prior research has tested the Long Run IPO Performance within a time frame of three to five years. Due to the market size and information constraints of the Nordic markets we decided to analyze the underperformance of PE Nordic entities within the first three years of its issuance. The data is retrieved and calculated on a monthly basis to increase the number of observation in our data set. To reduce the effects of price stabilization on a test sample Ritter (1991) suggests removing the first 21-days of trading after the IPO. Additionally we adjust the beginning and ending periods in the time to ensure having two entities at any given point in time.

When measuring the long run underperformance of new issues we found two prevalent methodologies in academic literature namely comparable companies and a benchmark index. Loughran and Ritter (1995) proposed a model where comparable firms would be matched solely based on size. However, other studies have matched firms to other comparable characteristics such as market capitalization and book-to-market equity. Fama (1998) contends that the matching approach allows to control for cross sectional variation in average returns due to sample attributable effects. However, one of the most noted disadvantages of the matching methodology is the selection biased. As noted by Norli (2000) the matching sample is limited to those companies that have not issued equity in prior years. Furthermore, Draho (2004) states that the assumption that matching companies have similar cash flow, risk characteristics and similar expected returns is questionable. We fear that this last imperfection to be magnified when our sample are traded in four different markets and decide to benchmark our sample against a broader index. To capture the Nordics as a whole we decide to use the MSCI Nordic Countries Index (MSCI Nordic), which is a common benchmark among financial peers such as Bloomberg and Financial Times. In addition we supplement with a self-constructed ad-hoc Nordic Index, which will be the underlying index for the Fama-French Three Factor Regression.

6.2.2 Return calculations

One important aspect of our methodology involves the choice of time regime used to perform the return calculations. Financial theory has presented us with two possibilities, the event and calendar time approach. The event time approach consists in calculating returns in a time regime that is relative to the entities' issuance date. A considerable amount of studies have preferred the use of event time approach. However, Brav Gompers (1997) and Gomper and Lerner (2003) have shown evidence of a cross-sectional dependence between IPO stocks when using the event time approach. Schöber (2008) Contends that a cross-sectional dependence can influence the results of return calculations overestimating the t-statistics in an event time regime. The calendar time approach on the other hand is able to correct the cross-sectional dependence by tracking the performance of a portfolio in calendar time. Fama (1998) contends that the calendar time approach is superior to the event regime in that it controls for heteroskedasticity and gives more weight to calendar months preceding high IPO activity. Since the distribution of IPO issuances

across our time horizon fluctuates due to hot IPO periods we have decided to follow the calendar time approach per Fama (1998) and Schöber (2008).

6.2.2.1 Cumulative Abnormal Return

The Buy and Hold Abnormal Return (BHAR) and the Cumulative Abnormal Returns (CAR) are the two most commonly used methodologies to calculate abnormal stock returns. The BHAR is said to be the difference between the IPO sample and the benchmark compounded monthly over the time horizon. Draho (2004) argues that one of the advantages of the BHAR is that it incorporates compounding emulating better the investor's experience. However, he acknowledges that compounding creates statistical problems such as extreme skewness and inflated abnormal returns. While he argues that these same problems could affect the CAR he recognizes that the extent to which results are affected is considerably less. Additionally, the time required to adjust abnormal returns is likely to be overstated Fama (1998). The CAR on the other hand, while calculating the returns similarly to the BHAR, differs in that it accumulates the excess returns throughout the time horizon. Fama (1998) argues that the strengths of the CAR model are threefold. Asset pricing models assume normally distributed returns, returns are normalized better on a monthly basis rather than yearly and prices adjust sooner after abnormal returns. We deem the CAR as the better of the two methodologies and the cumulative abnormal returns are measured by the given formula:

$$ar_{i,t} = R_{i,t} - R_{m,t} \qquad AR_t = \sum_{i=1}^N w_i ar_{i,t} \qquad CAR_{1,T} = \sum_{t=1}^T AR_t$$

Where, $R_{i,t}$ and $R_{m,t}$ represents return on the entities and a benchmark portfolio respectively. The abnormal return AR_t is accumulated in accordance to the entities classification resulting in $CAR_{BO_{1,T}}$, $CAR_{VC_{1,T}}$ and $CAR_{BO-VC_{1,T}}$. We elaborate on the weights of the abnormal returns on section 6.3.3.1. Note that in calendar time measurements, the accumulation and weighting of portfolios' returns are calculated in actual trading dates.

6.2.2.2 Single Factor Regression - Capital Asset Pricing Model

Draho (2004) suggests that one of the strongest advantages of the asset pricing model is that it offers the possibility of constraining and identifying anomalies in the cross section analysis. Moreover, asset pricing models allow researchers to build simple statistics around the model to test for abnormal return hypothesis. The asset pricing approach is based on risk pricing theoretical background and has three main models; capital asset pricing model (CAPM), Fama-French three factor model and the arbitrage pricing theory (APT). In this paper however we focus exclusively on the first two as we have found them predominant in financial literature.

The CAPM is founded on the premise that the only relevant risk factor for a firm is its market return. The model states that the expected return for stock equals the risk-free interest rate plus stock's beta times the Market Risk Premium Merton (1987). The stock's abnormal return is calculated as the difference between the post-IPO realized return in excess of the free risk rate and the net expected return. Hence, when regressing the net realized return on excess of the market risk premium we can measure underperformance through the intercept, alpha α_p . The formula is as following, where $R_{p,t}$ represents the return on the sample portfolio, R_f , the estimated Nordic Risk Free Rate and $R_{m,t}$ the return on benchmark index.

$$R_{p,t} - R_f = \alpha_p + \beta_p (R_{m,t} - R_f)$$

6.2.2.3 Three Factor Regression – Fama-French

Fama and French (1993) tested stock returns using a three factor model that is similar to the CAPM, but it includes two additional factors to the equation. As opposed to CAPM, the Fama and French model is not an equilibrium relationship and it controls for the size and value effects on returns.

$$R_{p,t} - R_f = \alpha_p + \beta_p (R_{m,t} - R_f) + s_p SMB + h_p HML$$

As with the Single Factor Regression – CAPM, $R_{p,t}$ represents the return on the sample portfolio, R_f is the estimated Nordic Risk Free Rate and $R_{m,t}$ is the return on benchmark index. The

additional factors controlling for the size and value effects are the Small Minus Big (SMB) and High Minus Low (HML).

$$SMB = \frac{1}{3} (Small\ Value + Small\ Neutral + Small\ growth) - \frac{1}{3} (Big\ value + Big\ neutral + Big\ growth)$$

$$HML = \frac{1}{2} (Small\ Value + Big\ Value) - \frac{1}{2} (Small\ Growth + Big\ Growth)$$

Fama and French had developed a methodology to build the benchmark portfolios using two different types of sorting; size and value. In latter versions, size breakpoints are determined by the median of the NYSE market equity, while the book-to-market is given by the 30th and 70th NYSE percentiles. However, as of 2012 and per their paper “Size, Value, and Momentum in International Stock Returns” Fama and French offer a new sorting methodology for size that find the breakpoints at the top 90% and the bottom 10% of the market cap respectively. Per Fama (1997) the size factor or SMB is the equally weighted average of the returns on three small stock portfolios for the region in excess of the average of the returns on three big stock portfolios. The HML factor is calculated as the equally weighted average of the returns of the two high book-to-market portfolios for a region minus the average of the returns for the two low book-to-market portfolios. The factors are estimated from the ad-hoc Nordic Index.

6.3 The Variables

6.3.1 The Benchmarks

The MSCI Nordic and the ad-hoc Nordic Index are set as comparable benchmarks to our sample portfolios. The returns are calculated as following, where, $W_{m,t}$ represents the value of the underlying benchmark:

$$R_{m,t} = \frac{W_{m,t+1} - W_{m,t}}{W_{m,t}}$$

As it will be discuss in detail further, the underlying values between MSCI Nordic and Nordic index differs. The MSCI Nordic is given in the data type Total Return Index and the $W_{m,t}$ is

obtained directly. However the Nordic index is retrieved as Market Value in order to obtain the consistency when estimating the Fama-French Factors. The $W_{m,t}$ is the accumulated MV for the underlying entities which make up the index.

6.3.2 The Risk Free Rate

The Nordic region, excluding Iceland, consists of four individual markets resulting in a variety of risk free rates $R_{i,c}$. Since there is no common free risk rate for the region we construct a free risk rate that is weighted to the benchmark index. The weights are then accumulated MV by country ($\sum_{i=1}^N MV_{i,c}$) in respect to the total MV of the Nordic Index ($\sum_{i=1}^N MV_{i,m}$), by monthly periods.

$$R_{i,f}Nordic = w_i R_{i,c} \quad , \text{where} \quad w_i = \frac{\sum_{i=1}^N MV_{i,c}}{\sum_{i=1}^N MV_{i,m}}$$

6.3.3 The Sample Portfolios

Monthly returns for each portfolio are calculated in accordance to the underlying data of its benchmark index. The value in the end of the period $W_{i,t+1}$, either in RI or MV, is subtracted and divided by the period starting value $W_{i,t}$.

$$R_{i,t} = \frac{W_{i,t+1} - W_{i,t}}{W_{i,t}} \quad R_{P,t} = \sum_{i=1}^N w_i R_{i,t}$$

The BO and VC portfolio are created by separating the entities according to its classification and accumulating the product of the IPO samples weighted return.

6.3.3.1 Return-weighting

An important part of calculating returns involves choosing the weighting methodologies; equally or value (market capitalization) weighted returns. Ritter (1995) has shown evidence proving that the choice of weights in the sample portfolios could affect the results. Loughran and Ritter (2002) demonstrate that the equally weighted approach underestimates by half the abnormal return of small firms during hot IPO periods compared to market weighted returns. However, Brav, Gezcy and Gompers (2000) make the case that each methodology has strengths depending on the scope and the time horizon of the study. Draho (2004) suggest that value weighted methodology is best

when trying to quantify investors' average wealth post IPO. Conversely, equally-weighting captures more accurately mis-pricing ex ante IPO while detecting managerial timing with more precision. Both methods have their strengths and weaknesses. To measure the performance with and without regards the entities relative size, the portfolios are weighted with respect to both methodologies. The BO and VC sample portfolios and the CAR calculations are weighted in accordance to the following formulas.

Equally Weighted: $w_i = 1/n$,where n is number of samples in portfolio.

Value Weighted: $w_i = MV_{i,t} \cdot \sum_{i=1}^N MV_{i,t}$,where the value weighting are based on the Market Value $MV_{i,t}$, regardless of sample return measurement and comparing benchmark.

7 Sample Selection and Data Collection

There is no uniform approach on sample identification and classification methodologies among scholars. In this chapter we briefly discuss commonly used methodologies along with a description of the selection criteria and resources used for the Nordic BO and VC sample identification.

7.1 Sample Identification

When creating our data set we first determined a time horizon that would deem relevant to our analysis. In order to capture a significant sample for our tests we set a ten year time horizon that extends from 1998 to 2008. The data set extends three years after our time horizon until January 2012 in order to study the performance of companies issued in 2008. Since our study focuses exclusively on the performance of VC and BO we researched existing methodologies of BO and VC classification. Schöber (2008) acknowledges the challenges involved in the classification of PE entities partially because of the fragmented information available but also because of the different stages of investment that entities can undergo. Muscarella and Vestsuypens (1989), Kaplan (1991), Gertner and Kaplan (1996), Chou (2001), Cao and Lerner (2006) performed the classification through industry publications, financial newspapers, IPO prospectuses and other financial databases. However, scholars warn of the limitations of online databases and the dangers of not cross-referencing with alternative sources. As a *prima facie* approach we decided to analyze the classification of VC and BO offered by Bureau Van Dijk, Zephyr and Orbis databases. The search query identified 93 PE backed companies. After an initial screening we noted that the classification was inconsistent and inaccurate and hence we decided to construct our list from alternative sources.

We form our first search criteria for identifying our sample objects:

- I) The entity completed an Initial Public Offering in the time period of 1998-2008.
- II) The Private Equity sponsoring took place prior to the entities Initial Public Offering.

III) The entity has received sponsoring from a Private Equity firm which is a member of either of the Danish, Finnish, Norwegian or Swedish Venture Capital association.

After a thorough research we obtained an initial list of issuances within our time horizon from the Danish, Finnish, Norwegian and Swedish stock exchanges, including the exchanges for smaller companies such as Oslo Axess and the First North's. The IPO's are cross checked against investment exits from the Nordic Venture Capital Association's (N-VCA) members list containing 251 PE firms and the Argentum Online Database. The cross checking is performed through PE websites and PE professionals (see appendix). We identified 134 entities which have received funding from 45 of the 251 members of Venture Capital association. We find that certain PE firms are behind the majority of exits by IPO with the following distribution of the nine most active: NorgesInvestor AS (10), NorthZone (6), Norvestor with Norsk Vekst ASA (6), HealthCap AB (5), Convexa Capital (4), EQT (4), Verdane Capital Advisor (4), Capman (3) and IK Investment Partners (3).

7.2 Buyout and Venture Capital Classification

To determine the selection criteria between the BO and VC portfolios we bundle Leverage Buyouts (LBO), Management Buyouts (MBO) and "Other Non-VC" into one Buyout category following Schöber's (2008) methodology. The "Other Non- VC" category consists of capital from financial sponsors that target fund recapitalization, acquisitions and investment in "New Non-VC type Companies". This means that our BO portfolio should consist of entities which have received support from a wide-range of BO type entities. Our VC backed portfolio should then consist of entities which clearly have received sponsoring from classic VC firms

As an implicit effect of the financial sponsor's differences in investment strategies, we would expect to find quantitative variances in terms of growth rates, equity stake hold and target's age. The differences between Buyout and Venture capital strategies are not mutually exclusive in terms of quantifiable characteristics. Additionally, during a conference call with Staale Myrstad, Partner in NorgesInvestor Management AS, further limitations were revealed. It is said to be a common practice for Nordic PE firms to invest through holding companies. The holding companies are controlled and managed by the Private Equity investors, while the capital could be

leverage by debt, hence a LBO deal. This practice implies that LBO transactions are less likely to be revealed through its financial statement. To reduce possible biases to our sample, we resort to a qualitative approach. We based our primary source of information on phone interviews and email correspondence with key personnel in the PE Nordic Industry. As a secondary source we rely on information obtained through PE websites, financial news articles, IPO's prospectuses and other market sources. Additionally, we utilized Argentums database of PE entities to further verify our classification.

To ensure the validity of our sample portfolios we rigorously fulfilled criteria number two, where the transactions are to take place prior to the IPO. When missing information regarding investment entry and exit we excluded the entities classified as BO. The sample size is presented below showing the distribution of BO and VC across the countries in the Nordic region.

Sample size - Distribution by Classification and Country			
	BO	VC	Total
DK	0	5	5
FI	5	4	9
NO	21	27	48
SE	19	23	42
Total	45	59	104

7.3 Data Collection Underpricing

In order to measure underpricing two major components are required, namely closing and offering price. To obtain the offering prices and closing prices of the Norwegian firms we used the Oslo Børs website. Similarly, we were able to obtain the data for the Danish sample from the Nasdaq OMX website. However, the information available for the rest of the region was considerably more scattered. In the case of the Swedish sample Ulf Persson, Economic and Statistical researcher for the Nasdaq OMX Stockholm provided us with the IPO offering prices for our sample. Joha Manu, market surveyor of the Nasdaq OMX Helsinki, confirmed that the offering prices data was unavailable for the Finnish market. Jessica Gutierrez senior finance officer from Bank of America Merrill Lynch through *Bloomberg* was able to provide us with a great portion of the missing offering prices. In case of the closing prices we resorted to the Nasdaq OMX website. For the rest of the missing closing prices we used *Thomson Financial*

Datastream. After adjusting our sample for missing offering or closing prices the sample size distribution is as follows.

Sample size Underpricing - Distribution by Classification and Country			
	BO	VC	Total
DK	0	5	5
FI	2	1	3
NO	13	23	36
SE	12	11	23
Total	27	40	67

7.4 Data Collection Underperformance

Thomson Reuters Financial Datastream (Datastream) was a valuable resource to obtain the data required to perform the underperformance calculations. As explained in the methodology section post IPO performance is tested through the CAR, the single factor regression and the Fama-French three factor regression model. The tests require entity stock data, a risk free rate, a benchmark index and its corresponding SMB and HML Fama-French Factors. The data behind the SMB and HML factors consist of Size, Book to Market and Returns for the entities in a benchmark index. In the absence of existing SMB and HML factors for the Nordic markets we constructed our own.

We considered the MSCI Nordic as a representative index for our data set. However due to disclosing policies we could not gain access to the composition of the index. Therefore, we were unable to use the MSCI index to perform the Fama-French model. We utilized instead our self-constructed ad-hoc Nordic Index. The Nordic Index is constructed through 1931 entities actively traded in our selected time horizon. To maintain consistency between the size and returns of the factor calculations, the index is calculated through the Market Value (MV) of the entities. *Datastream* does not provide the MV for the MSCI Nordic, the data is obtained as Total Return Index (RI). The MV is the product of the Price-adjusted (P) and the number of shares (NOSH). P adjusts for subsequent capital actions and NOSH is updated whenever new tranches of stock are issued, or in case of other capital changes. The RI is equal to Price Index (PI), plus dividends being reinvested, where PI is a product of NOAH and Price Unadjusted (UP). The content of the two data types should be similar, however, when compared slight differences occur. To assure consistency in the input, the Fama-French Factors are only regressed to the ad-hoc Nordic Index.

The BO and VC portfolio returns are calculated by RI and MV for the MSCI Nordic and ad-hoc Nordic Index, respectively.

One of the particular characteristics of our sample is that it is composed of four different countries with five different currencies. To control for currency exposure the MV and RI are obtained in US Dollars.

The estimated Nordic Risk Free Rate (RF) is the product of the individual countries 10 year Government bonds and the accumulated MV for each country divided by the ad-hoc Nordic Index total MV.

The stock data is obtained in monthly periods and values are given by the first day of the month. For newly listed companies the data is not noted until the first month after the IPO. To follow Ritter's methodology the first data point is eliminated. In the other end of the time horizon stock data after 36 months of trading is removed. A cross check of IPO dates indicate variety between our primary sources and the *Datastream*. The end underperformance sample size as the following:

Sample size Underperformance - Distribution by Classification and Country			
	BO	VC	Total
DK	0	5	5
FI	4	4	8
NO	18	26	44
SE	17	19	36
Total	39	54	93

While the sample selection period stretched from the 1st of January 1998 until the 1st of January 2012, the first and last IPO were noted on the 4th of April 1998 to the 14th of November 2007. After removing the first month of trading, adjusting the end periods to control for less than two observations per period and assuring symmetry between the BO and VC portfolios, the final time series extends from September 1st 1998 through September 1st 2010. The sample is constituted by 145 observations and for any given point in time the number of active companies in each portfolio varies from 3 to 17 and 2 to 28 for BO and VC respectively. From the portfolio sample size distribution displayed beneath in table 5, we note the sample size to peak in 2001 and first quarter of 2008, for both portfolios.

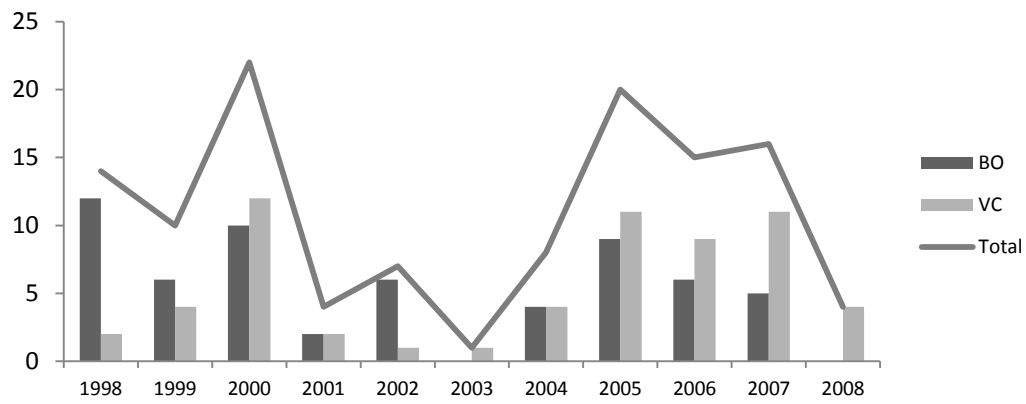


Table 5: Distribution of performance sample size over time series (01.09.1998-01.09.2010)

8 Results

In this chapter we introduce the results from the various underpricing and underperformance measurements in addition to a brief interpretation of our findings. A summary of the outputs is shown in Panel 1 to 5, while the original outputs are included in the appendix. The results are further elaborated in the discussion section.

8.1 Underpricing

In order to test the null hypothesis we study the mean differences between the two PE entities. We achieve this by performing a two tailed independent t-test that includes BOs and VCs first day returns. As shown in Panel 2 we can see that the means of the BO and VC sample are in accordance with Hypothesis 1. Buyout firms have a mean first day return of 8,4% while VC backed entities show a -1,1%, suggesting underpricing and overpricing for BO and VC respectively. The mean difference shows that BO backed entities have a 9.5% higher returns than VC backed firms. However, both the t and the p value of our sample are considerably low. Hence, at a confidence level of 95% we are not able to reject the null hypothesis. Nevertheless, we found that our results could be considered slightly significant when looking at a .80% confidence level.

	Buyout	Venture Capital
Mean	0,0838	-0,0107
<i>Std. Deviation</i>	<i>0,32</i>	<i>0,18</i>
Independent T-test:		
<i>(Mean Difference)</i>		<i>0,095</i>
<i>(Degrees of Freedom)</i>		<i>65</i>
<i>(Sig. 2-tailed)</i>		<i>0,168</i>
<i>(t-value)</i>		<i>1,39</i>
<i>*95% confidence interval</i>		

Panel 2: Results Underpricing of Buyout and Venture Capital Sponsored Entities

8.2 Underperformance

The performance is measured as the CAR in calendar time using the single factor regression (CAPM) and the Fama-French three factor regression Fama-French (2012). The results are presented in monthly periods through Panel 3a, 4a and 5a respectively. Panel b illustrates the results when estimated over longer time periods to offer a broader scope of our findings.

8.2.1 The Cumulative Abnormal Return

In order to test our second hypothesis we verify the mean differences between the returns on BO and VC to determine whether we can reject the null hypothesis. To achieve this we perform four independent t-test that compare returns of BOs and VCs divided in four different categories: equally weighted, value weighted and using the MSCI index and our ad-hoc Nordic Index. As shown in Panel 3a the t-values of the four t-tests are not significant at a 95% confidence level. This is further confirmed when looking at the two tailed significance level of the four t-test (see appendix). However, the mean difference suggests that VC backed entities tends to outperform the BO backed firms in terms of cumulative abnormal return. When benchmarked to the ad-hoc Nordic Index, the weighting seems to have less effect on the outcome, relative to the MSCI Nordic Benchmark. The monthly mean difference is approximately -1.3%(monthly) or -14,5%(yearly), but could be deemed slightly lower as the MSCI Nordic test indicates -1.0%(monthly)/-30,4%(yearly) and -0.8%(monthly)/-25,1%(yearly), for the Equal (EW) and Value weighting (VW).

Benchmark:	Nordic Index						MSCI Nordic					
	Equally Weighted			Value Weighted			Equally Weighted			Value Weighted		
	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)
Mean	0,004	0,017		-0,005	0,008		0,016	0,027		0,014	0,023	
Std. Deviation	0,11	0,12		0,09	0,12		0,18	0,19		0,20	0,21	
Independent T-test:												
Mean Difference	-0,013			-0,013			-0,010			-0,008		
(t-value)	(-0,99)			(-1,09)			(-0,48)			(-0,35)		

Panel 3a: Results Cumulative Abnormal Return – Calendar time

Benchmark:	Nordic Index						MSCI Nordic					
	Equally Weighted			Value Weighted			Equally Weighted			Value Weighted		
	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)
Time period:												
Montly (n=1)	0,40 %	1,70 %	-1,30 %	-0,50 %	0,80 %	-1,30 %	1,60 %	2,70 %	-1,00 %	1,40 %	2,30 %	-0,80 %
Yearly (n=12)	4,91 %	22,42 %	-14,53 %	-5,84 %	10,03 %	-14,53 %	20,98 %	37,67 %	-11,36 %	18,16 %	31,37 %	-9,19 %
3 Years (n=36)	15,46 %	83,47 %	-37,57 %	-16,51 %	33,22 %	-37,57 %	77,08 %	160,94 %	-30,36 %	64,96 %	126,74 %	-25,11 %

Panel 3b: Results Cumulative Abnormal Return – Calendar time – Estimated Return over time

To offer a broader scope to our results we present the returns on a monthly, yearly and 3 year time horizon. The returns are calculated as $R_y = (1 + R_m)^n - 1$, where n is number of monthly periods in R_y .

8.2.2 Single Factor Regression – CAPM

Performance is measured by regressing the equally and value weighted BO, VC and BO in excess of VC portfolios to the RMRF factor. The RMRF is the market risk premium, as the excess return on MSCI Nordic or our ad-hoc Nordic Index (RM), subtracted by the estimated Nordic Risk Free Rate (RF). The RMRF parameter, Beta β_p , adjusts for the systematic risk relative to the market security line (SML) Jensen (1967). As shown in Panel 4a the RMRF factors are significantly different from zero for all BO and VC portfolio regressions given their low p-values. The BO's tend to adjust for a greater portion of the systematic risk and have higher fluctuations to the SML than of the VC counterpart, given the overall higher beta's. The portfolios Beta seems to be affected by size as we get mix results between the Equal (EW) and Value weighting (VW). The Beta for VC are below or close to 1 when equally weighted and 1,1 or above when value weighted. The BO Beta are close to or above 1 in all regressions and reach a high of 1,3, when value weighted portfolios are regressed toward the Nordic Index.

The Intercepts in the regression represents the abnormal return, alpha α_p , between the underlying portfolio and its benchmark index. The p-values are high in all tests and exceed both a 5% statistical alpha. Hence we cannot reject the null hypothesis and the intercepts are not significantly different from zero. The BO in excess of VC (BO-VC) maintains a steady intercept of -1,3% (monthly)/-14,1% (yearly) across all regression, both for EW and VW portfolios and regressed to both benchmarks. However, the results fluctuate more when the portfolios are analyzed individually. The BO can be said to show negative abnormal returns, where it underperforms compared to the benchmark indexes in three of the four regressions. In the lower end of the results, BO underperform with -0,8%(monthly)/-9,9%(yearly) and at its best it overperform by 0,4% (monthly)/4,8% (yearly) when EW in Nordic Index . The BO's have smaller fluctuations between the extremes than the VC's. While all of the VC's intercepts are positive the fluctuations between the results are severe, they stretch from 0,09%(monthly)/1,14%(yearly) to

1,6%(monthly)/79,5%(yearly). The intercepts fluctuates the most between the indexes, when portfolios are equally weighted.

The explanations of the variables are relatively poor for all of the single factor regressions. The Value weighted BO portfolio, holds the highest explanation with an R-squared of 0,62. However, similar degrees of explanations were found in the work of Gompers and Lerner (2003), while exploring the Post IPO long-run performance in the US.

Benchmark:	Nordic Index						MSCI Nordic					
	Equally Weighted			Value Weighted			Equally Weighted			Value Weighted		
	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)
Intercept (P-Value)	0,004 (0,65)	0,016 (0,12)	-0,012 (0,32)	-0,007 (0,29)	0,006 (0,52)	-0,013 (0,21)	-0,005 (0,34)	0,007 (0,49)	-0,013 (0,30)	-0,009 (-0,02)	0,001 (-0,02)	-0,013 (0,21)
RMRF (P-Value)	1,076 (0,00)	1,028 (0,00)	0,047 (0,673)	1,339 (0,00)	1,258 (0,00)	0,081 (0,55)	1,006 (0,00)	0,892 (0,00)	0,088 (0,42)	1,219 (0,96)	1,138 (0,91)	0,077 (0,58)
R-squared	0,39	0,29	0,00	0,62	0,42	0,00	0,60	0,26	0,00	0,58	0,39	0,00

Panel 4a: Results Single Factor Regression – CAPM

Benchmark:	Nordic Index						MSCI Nordic					
	Equally Weighted			Value Weighted			Equally Weighted			Value Weighted		
	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)
Time period:												
Montly (n=1)	0,39 %	1,64 %	-1,25 %	-0,68 %	0,63 %	-1,31 %	-0,53 %	0,72 %	-1,28 %	-0,86 %	0,09 %	-1,32 %
Yearly (n=12)	4,78 %	21,53 %	-14,00 %	-7,86 %	7,79 %	-14,68 %	-6,22 %	8,99 %	-14,34 %	-9,87 %	1,14 %	-14,73 %
3 Years (n=36)	15,04 %	79,48 %	-36,40 %	-21,77 %	25,25 %	-37,90 %	-17,52 %	29,46 %	-37,15 %	-26,78 %	3,45 %	-37,99 %

Panel 4b: Results Single Factor Regression – CAPM – Estimated over time

8.2.3 Three Factor Regression - Fama-French

In addition to the Market Risk Premium (RMRF), the portfolio returns are regressed to the SMB and HML factors, adjusting the performance for size and value premiums. Our findings show strong similarities in terms of RMRF and R-squared for both indexes while their intercepts are dissimilar. In both weight measurements the BO and VC portfolios show a reduction in their abnormal return. However, the VC's consistently overperform relative to the benchmark index, where the performance for BO is dependent on the weighting. In the three factor regression, the difference between the BO and VC is reduced in both EV and VW weighted. The BO-VC decreases to -0,6% (monthly)/-19,8% (yearly) and -0,98% (monthly)/-29,8% (yearly), for EW

and VW respectively. When portfolios are value weighted the BO-VC are unaffected compared to previous results. The p-values are similar to the single factor regression, confirming no significance among the results.

The interpretation of the Fama-French (2012), display interesting results, especially for the VC portfolios. When equally weighted both the SMB and HML factors are significantly different from zero as the p-values are lower than the 5% statistical alpha. Further will all portfolios, BO and VC, hold positive SMB and negative HML values, again similar to the work of Gompers and Lerner (2003). However the VC-EW holds the greatest values with 0,59 (SMB) and -0,39 (HML), both significant. The SMB loadings, which are remarkably lower than one, could imply the sample returns to be less explained by the size factor. While HML factor implies that companies with High B/M show higher returns than those of Low B/M, the negative loadings in the VC sample implies an inverse relationship. Companies with a lower B/M, as high market value relative to book value, have performed better than its counterparts.

Benchmark:	Nordic Index					
	Equally Weighted			Value Weighted		
	BO	VC	(BO - VC)	BO	VC	(BO - VC)
Intercept	0,003	0,009	-0,006	-0,007	0,002	-0,010
(P-Value)	(0,76)	(0,38)	(0,62)	(0,25)	(0,79)	(0,35)
RMRF	1,087	1,162	-0,075	1,359	1,132	0,040
(P-Value)	(0,00)	(0,00)	(0,53)	(0,00)	(0,00)	(0,80)
SMB	0,048	0,599	-0,551	0,098	0,267	-0,169
(P-Value)	(0,71)	(0,01)	(0,02)	(0,41)	(0,08)	(0,34)
HML	-0,032	-0,399	0,367	-0,065	-0,178	0,113
(P-Value)	(0,71)	(0,01)	(0,02)	(0,41)	(0,08)	(0,34)
R-squared	0,39	0,34	0,02	0,62	0,43	0,02

Panel 5a: Results Three Factor Regression – Fama-French (2012)

Benchmark:	Nordic Index					
	Equally Weighted			Value Weighted		
	BO	VC	(BO - VC)	BO	VC	(BO - VC)
Time period:						
Montly (n=1)	0,30 %	0,91 %	-0,62 %	-0,73 %	0,25 %	-0,98 %
Yearly (n=12)	3,72 %	11,51 %	-7,14 %	-8,41 %	2,99 %	-11,17 %
3 Years (n=36)	11,57 %	38,65 %	-19,92 %	-23,16 %	9,23 %	-29,92 %

Panel 5b: Results Three Factor Regression – Fama-French (2012) - Estimated over time

9 Results Discussion

In this chapter we interpret our results and its implications towards our hypothesis. Additionally, we relate our findings to existing financial, economic theory and empirical evidence.

9.1 Underpricing

In accordance to information asymmetry theory empirical evidence has shown the existence of underpricing of new issuances Ibbotson (1975), Reilly (1977), Ritter (1984). However, we have contended in this thesis the possibility of ameliorating information asymmetry through certification. There is empirical evidence of certification through association ex-ante IPO. Gompers (1997) had suggested the possibility of ameliorating information asymmetry through PE backing. Hadryd, Mietzner and Shciereck (2010) show differences in the levels of underperformance and underpricing among different PE entities suggesting different levels of certification.

We have found, through a two tailed independent t-test, to have no significant mean differences at the 95% confidence level in first day returns of BO and VC entities. Despite the size of the sample we found a slight significance at the 80% confidence level. When looking at the mean of the two samples, however, we found that the results are not in accordance with our H1 hypothesis. VC present negative average returns close to 1% suggesting that these entities had been overpriced. Buyouts on the other hand show an underperformance of 8%.

Empirical evidence has shown that underpricing among BO entities is considerably lower compared to non-BO backed entities Hogan Olson and Kish (2001), Ang and Brau (2002), Browman and Graves (2005). The BO underpricing has been shown to average between 2.0% and 7.6%. These figures are considerably lower to the 18.6% figure published by Ritter (2011) for international IPOs. Our study is in accordance with these findings showing an initial BO underpricing of 8%. Consistent with Booth and Smith (1986), Megginson and Weiss (1991), Olson and Kish (2001) and Schöber (2008) our findings suggest that BO backed entities do ameliorate the information asymmetry between the issuer and the market.

Barry (1990) found that a VCs reputation had an inverse relationship with respect to the issuers underpricing. This means that the better the reputation of the sponsor the less money on the table

the issuer would leave. This goes in line with information asymmetry and certification theories. In our study we have found not only that VCs are not underpriced but that they show slight overpricing. Following information asymmetry theory our work suggests that the information asymmetry gap between underwriters and the market has reduced enough for the market to judge the underwriter's valuation more critically. In other words investors could be exerting downward pressure on the offering price lowering the offering price. While a negative first day return is not a desirable outcome for the underwriter and both the institutional and market investors, for the issuer it means that there was no money left on the table. This is consistent with Barry's findings regarding the power of a VC sponsor in reducing underpricing. However, while the information asymmetry could have been reduced from an investor perspective the underwriter could still be considerably uncertain about the market's demand of the new issue. Our results could suggest that the underwriters could potentially be overestimating the markets appetite for the new issue. Alternatively, the overpricing could be interpreted as an investors' premium to the issuer to incentivize its growth.

Meggison and Weiss (1991) empirical evidence of VC certification shows that PE backed company exercise a signaling influence on the market. Through information asymmetry and certification theory we have contended that BO and VC have different degrees of certification. We have based these views on Jensen (1989) and Sørensen (2007) concepts of value adding value mechanisms of BOs and VCs. Browman and Graves (2005) and Barry (1990) show that BO and VC have significantly less underpricing than on PE backed companies. Our findings are in line with Browman and Graves (2005) and Barry (1990) empirical evidence. Furthermore, our findings also shed light on the differences in certification among BO and VC backed entities.

9.2 Underperformance

Underperformance has been extensively documented in finance literature in the past two decades Ritter (1991), Loughran (1994), Loughran, Ritter (1995, 1997), Schultz (2003). Levis (2008) and Cao (2011) have recently looked at the effects of PE sponsoring in underperformance. Their work has suggested the possibility that PE backing can reduce the long term underperformance in new issuances. However, when distinguishing among PE entities the results have not been

homogeneous. While Schöber (2008) found that buyouts underperform in the long run, Levis (2008) shows evidence of over-performance for venture capital entities. We contend that these differences could be attributed to differences in levels of certification explained through their specific value adding mechanisms.

By studying the mean differences between the cumulative abnormal returns of BOs and VCs, we found that at a 95% confidence level we were unable to reject the null hypothesis. The p-values from the regression models indicate similar results, where the abnormal returns are not significantly different from zero. However, we are able to draw valuable observations and find that VC backed entities outperform the BO's by approximately 1.3% (monthly) / 14% (yearly) for both the CAR and Single Factor Regression. The over performance is reduced in the three factor regression, where the VC portfolio displays significant influence from the SMB and HML factors. These results relates to empirical evidence, as Schöber (2008) found the BOs to underperform the market throughout a three year time horizon. Similarly, our work reflects Levis (2008) findings showing VC backed entities over performing the market.

Schöber (2008) had shown that leveraged buyouts had better long term stock performance compared to other buyout firms. He attributed this difference in performance to the superior information available to investors from the issuer's prior public information. This theory could be validated in the first year cumulative returns as the buyouts are able to over perform the index. However, when looking at his results for 3 to 5 year returns buyouts are considerably underperforming against the market. This suggests that the information asymmetry theory could only explain short term adjustments between underwriter and market valuations. In line with Schöber results our findings suggest that in a three year time horizon BO backed entities will underperform the market. This could show that factors outside information asymmetry theory could better explain the long run underperformance of BO firms. We have made the case in this thesis that the value adding mechanisms of sponsors are responsible for the underperformance of BO firms.

Our results are similar to those obtained by Levis (2008) showing over performance of the VC sponsored entities compared to the market. While our results are not significant they shed light on

the ability of VC companies to create value. If we take into consideration the underpricing and underperformance results of the VC we can see a clearer picture of the Nordic markets feelings towards BOs. Despite a growing market for VC backed firms, it seems that investors are weary of the potential performance of VC issues. However, as the price stabilizes VC backed entities seem to be able to attract investors. This could be explained through strong cash flows performance of the new issues. Alternatively, we could explain these results through industry market specific characteristics such as industry concentration.

Jensen (1989) and Sørensen (2007) had shown the differences in value adding mechanisms between BOs and VCs respectively. While cash flows are not an essential value adding mechanisms for BOs, VCs are more sensitive to them. Brau and Fawcett (2006) had shown evidence that markets regard cash flows as the strongest signal of quality of an issuer. Concordantly, we have contended that the industry value adding characteristics of buyout companies would limit the projected growth of the company effectively limiting the certification effect of the sponsors over the issuer. Our results show that in accordance to this reasoning BO backed entities have underperformed compared to VC backed. While our results are not statistically significant they shed light on the market's perception of value between these two PE entities.

10 Limitations

10.1 Selection Bias

The main selection biases are originated when identifying entities for our sample and collection their respective data. The sample findings are to a great extent obtained by the Nordic members of the Venture Capital Associations per January 2012. This selection methodology can generate two biases. The first bias is in regards to PE firms being represented for the screening process. By solely relying on the “N-VCA” members list per January 2012 we lack information from the firms who have proceeded with an IPO in Nordic market, but are non-members for this given date. The prospects could be international firms, delisted PE firms or other non-members. However, when we find international firms such as 3i and KKR in our PE firm sample the magnitude of this fault might be minor. In contrary can the lack of information from delisted members could raise red flags. In our market research we come across only one delisted PE firm, Norsk Vekst ASA. In this case their funds were transferred to Norvestor, who backs a significant portion of our end IPO sample. The second bias relates to the PE firms transparency toward their exited investments. If a PE Firms reduce transparency toward exit with poor post IPO performance, our results can be conceived as overstated.

The sample portfolios offering price, closing price and stock data are collected from various sources. For the first two mentioned the stock exchanges have been our primary source of information, while supplemented with *Datastream* and *Bloomberg*. When comparing the data sources we find small signs of variances, which could imply minor inconsistencies to the input in the underpricing analysis. The inconsistency in long run performance should be slim as all stock data is obtained from *Datastream*. Certain stock exchanges do not hold information for delisted entities, and stock data for entities subject to mergers or acquisitions are missing. This is clearly imposing a survival bias to our sample, both in the Underpricing and Underperformance analysis.

10.2 Methodology

In addition to the selection and data collection biases we acknowledge a number of limitations in our methodology

Due to the limitations of our sample we were not able to further inspect additional factors that would shed more light on the different levels of certification between buyouts and venture capital backed companies. Regressing the reputation of a sponsor to the returns of the issuer could have given us more evidence to judge the certification effect in underpricing. Furthermore, controlling for industry concentration, size and book to market could had provided more clarity in the actual effect of certification.

We acknowledge that using an asset pricing model to measure underperformance has a number of limitations. As noted by Draho (2004) the power of the Fama French model to detect underperformance is low. Brav and Gompers (1997) contend that companies with low book to market ratios tend to have negative intercepts indistinctive of new stock issuance. Hence, the model is biased to find underperformance. Additionally, further analysis of companies cash flows and other operative performance benchmarks could have shed more light on the impact of value adding mechanisms in

Due to the limitations of our sample we were not able to further inspect additional factors that would shed more light on the different levels of certification between buyouts and venture capital backed companies. Regressing the reputation of a sponsor to the returns of the issuer could have given us more evidence to judge the certification effect in underpricing. Furthermore, controlling for industry concentration, size and book to market could had given us more us clarity in the actual effect of certification.

11 Conclusion

This study has tested the Nordic markets to look for differences in underpricing and underperformance of new issues among two specific classes of IPOs, BO and VC backed firms.. We have found that in line with previous empirical evidence buyout and venture capital backed entities have different levels of certification. Using independent two tailed t tests and regression analysis our results show that in average venture capital backed firms are overpriced by 1 % while buyout backed firm are underpriced by 8%. In the long run venture capital firms outperform buyout firms by an average of 1.3% per month. While the long run results are in line with prior research the underpricing finding contradict earlier research. These results are interesting as they suggest that VC backed firms in the Nordic could potentially have different strategies that favor early stage entities. Moreover, it poses interesting questions about the characteristics of the Venture Capital firms in the Nordic equity markets, their ability to certify and the priority they have on their investments.

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Tøsti, Harald.	Investment Director, Reiten & Co Strategic Investments AS
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12.3 Databases

Argentum.no – Online Market Database

Bloomberg Terminal

Bureau Van Dijk, Zephyr and Orbis

Thomsen Reuters Financial Datastream

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13 Appendix

13.1 Sample entities

Included samples													
	Entity	Region	List	Investor prior to IPO	Fund	Fund invest	Fund exit	Date of IPO	Date of delisting	Classification	Source PE Funding	Source Classification	
1	24SEVENOFFICE ASA	NO	Axess	Agder Energi Venture				22.06.2007		VC	www.aeventure.no	www.aeventure.no	
2	Ability Group ASA	NO	SMB	Altor Equity Partners	Altor 2003	2004		03.07.2006		BO	Jesper Eliasson, Altor Private Equity	SVCA.se	
3	Aerocrine AB	SE	OMX Main	HealthCap	(1. Investor Growth Capital) (2. CapMan Life Science IV) (3. Swedestart Life Science)	1999	2007	15.06.2007		VC	www.healthcap.se + Argentum.no	Argentum.no	
4	Affectogenimap Oyj	FI	MAIN LIST	Fenno Management, CapMan and Equitec				01.06.2005		VC	Jonne Kuittinen, FVCA + business.highbeam.com	Jonne Kuittinen, FVCA	
5	Akva Group ASA	NO	SMB	Teknoinvest Management AS				10.11.2006		VC	www.newsweb.no	www.teknoinvest.no	
6	Aidata Solution Oyj	FI	MAIN LIST	Capman	Fenno Rahasto Finnventure Rahasto I, II & III	1997	2001	27.10.1999		VC	Argentum.no	Argentum.no	
7	Alfa Laval AB	SE	O-list	IK Investment Partners	IK 2000	2000	2005	17.05.2002		BO	www.ikinvest.com + Argentum.no	Argentum.no	
8	Algeta ASA	NO	-	NorgesInvestor	NorgesInvestor III	2003	2009	27.03.2007		VC	www.norgesinvestor.no	Staaale Myrstad, Norgesinvestor	
9	APL ASA	NO	SMB	Hitecvision + Energyventures	Energy Ventures I			18.03.2005	14.06.2007	VC	Lisbeth M. Iversen, Economist, Menon	Argentum.no	
10	Apptix ASA	NO	SMB	Convexa	Convexa Capital IV AS			08.04.2002		VC	www.convexa.no	Argentum.no	
11	A-Rakennusmies Oyj	FI	MAIN LIST	MB Funds + Capman		1995	1998	30.04.1998		MBO	Andreas Rokne, Capman + www.mbfunds.fi	Andreas Rokne, Capman	
12	Aresa (Aqualife)	DK	First North	ApS Falkenhøj - Ole Andersen	VF Venture (Vækstkapital)			14.02.2006		VC	falkenhøj.dk	Argentum.no	
13	Artema Medical AB	SE	O-list	Affärsstrategerna AB	Affärsstrategerna Fund(s)	1990	2001	04.05.1999	14.12.2001	VC	www.astrateg.se + Argentum.no	Claes-Göran Fridh, Affärsstrategerna AB	
14	Axxessit	NO	SMB	Convexa Capital + Norgesinvestor				04.06.2004	07.09.2005	MBO	www.convexa.no	IPO Prospectus	
15	Badger explorer ASA	NO	Main	Convexa Capital	Convexa Capital IV AS	2005		12.06.2007		VC	www.convexa.no	Argentum.no	
16	Ballingslov AB	SE	O-list	EQT	EQT 1	1998	2002	19.06.2002	12.12.2008	BO	www.eqt.se + Argentum.no	Argentum.no	
17	BE Group AB	SE	-	Nordic Capital + Tracton	Nordic Capital Fund III, IV & V	1999	2006	24.11.2006		BO	Argentum + www.nordiccapital.com	Argentum.no	
18	BioGåta Biologics AB	SE	O-list	Centrecourt AB				28.05.1998		VC	www.centrecourt.se	SVCA.se	
19	BioInvent International AB	SE	O-list	AB Chalmersinvest + Innovations kapital	(Industrifonden)			2010	12.06.2001	VC	www.inikap.se	SVCA.se + Argentum.no	
20	Biosensor Applications Sweden AB	SE	-	Transferator AB	Verdane Capital V K/S	2005	2007	22.06.2006		VC	www.transferator.se + Argentum.no	Argentum.no	
21	Biotec Pharmacon ASA	NO	SMB	Norgesinvestor + Verdane	Norgesinvestor	1997	2005	04.11.2005		VC	www.norgesinvestor.no	Staaale Myrstad, Norgesinvestor	
22	Birdstep Technology ASA	NO	SMB	POD Investment	Finnventure Rahasto V	2000	2009	12.06.2002		BO	www.podinvestment.se	Argentum.no + www.priveq.se	
23	Bjerge ASA	NO	SMB	Norvestor		1997	2005	17.12.2004	14.12.2010	CM	www.norvestor.no	Rebecca Farr, Norvestor	
24	C Technologies AB	SE	O-list	Centrecourt				15.06.2000		VC	www.centrecourt.se	SVCA.se	
25	Cermaq ASA	NO	Main List	Norgesinvestor	Norgesinvestor II	1999	2005	24.10.2005		BO	Argentum.no	Argentum.no	
26	CityMail Sweden AB	SE	O-list	Procuritas	Procuritas Capital Partners II (PCP II)	1997	1998	01.07.1998	23.01.2006	BO	www.procuritas.se	www.procuritas.se	
27	Claviv Pharma ASA	NO	SMB	Neomed	NeoMed Innovation III LP	2001	2010	07.07.2006		VC	www.neomed.net + Argentum.no	Argentum.no	
28	Consorte Group	NO	SMB	Norgesinvestor + Herkules kapital + Norvestor	Norgesinvestor 2, Herkules Private Equity Fund III	1999	2006	13.06.2001	30.12.2008	VC	www.norgesinvestor.no	Staaale Myrstad, Norgesinvestor	
29	Customax	NO	SMB	Norgesinvestor	Norgesinvestor	1997	2000	19.06.2000	22.06.2001	VC	www.norgesinvestor.no	Staaale Myrstad, Norgesinvestor	
30	Dibs AB	SE	First North	Verdane	Verdane Capital V K/S	2005	2009	18.06.2007		VC	Argentum.no + www.verdanecapital.com	Argentum.no	
31	Duni AB	SE	OMX Main	EQT Partners	EQT I & III	1997	2008	14.11.2007		BO	www.eqt.se + Argentum.no	Argentum.no	
32	Elien AB	SE	First North	Verdane	Verdane Capital V K/S	2006	2007	30.08.2007		VC	Argentum.no	Argentum.no	
33	Endomines AB	SE	First North	Teknoventure Management Oy + Suomen Teollisuusjoiutus Oy		2003	2007	19.06.2007		VC	www.noweco.fi	Mauri Visuri, Teknoventure Management	
34	Enlight International AB	SE	First North	Litorina	Litorina Fund I & II	2002	2006	08.09.2005		VC	Argentum.no + www.litorina.se	Argentum.no	
35	Exel Oyj	FI		Sponsor Capital		1997	2000	02.05.2000		LBO	www.sponsor.fi	Marit Suominen, Sponsor Capital	
36	Exligon A/S	DK	Main- DK	Scandinavian Life Science Venture	Scandinavian Life Science Venture Bio Fund Teknoinvest VIII KS	2000	2008	29.05.2007		VC	www.sisinvest.com	Argentum.no + www.unquote.com	
37	Expert Eliag	NO	Main	Norgesinvestor	Norgesinvestor	1997	2003	14.04.2000	23.10.2007	BO	www.norgesinvestor.no	Staaale Myrstad, Norgesinvestor	
38	Fingerprint Cards AB	SE	O-list	Affärsstrategerna AB	Affärsstrategerna Fund(s)	1997	2003	23.06.1998		VC	www.astrateg.se	Claes-Göran Fridh, Affärsstrategerna AB	
39	Funcom	NO	SMB	Northzone Ventures, Nordic Venture Partners	NVP II Northzone IV K/S	2004	2008	13.12.2005		VC	Stine Foss, Northzone + Argentum.no + www.nordic.com	Argentum.no	
40	Gant Company AB	SE	O-list	3i		2003		28.03.2006	20.03.2008	BO	www.3i.com	SVCA.se + Argentum.no	
41	Generic AB	SE	First North	Industrifonden				17.11.2008		VC	www.industrifonden.se	www.industrifonden.se	
42	Genmab	DK	Mainmarke	NB Capital + Apax	NB Capital			18.10.2000		VC	www.nbcapital.net	Argentum.no + www.nbcapital.net	
43	Global IP Solutions	NO	Main	Kistefos Venture Capital	Kistefos Venture Capital	1999	2010	22.07.2008	26.08.2010	VC	Argentum.no	Argentum.no	
44	Grenland Group	NO	Main List	Norgesinvestor	Norgesinvestor 2 + HitecVision V LP	1998	2006	12.12.2005	20.05.2011	BO	www.norgesinvestor.no	Staaale Myrstad, Norgesinvestor	
45	Hemtex AB	SE	O-list	Priveq				06.10.2005		VC	www.priveq.se	Argentum.no + www.priveq.se	
46	HMS Networks AB	SE	OMX Main	Segulah Advisor AB		2004		19.10.2007		BO	www.segulah.se	www.segulah.se	
47	International Maritime Exchange A	NO	Main List	Incilia Ventures		2001	2007	04.04.2005		VC	www.incilia.com	Argentum.no	
48	Intrum Justitia AB	SE	O-list	IK Investment Partners	IK 1997	1998	2005	07.06.2002		BO	www.ikinvest.com	Argentum.no	
49	InvisoSense ASA	NO	Axess	Viking Venture				2007	06.06.2007	15.12.2009	VC	www.vikingventure.no	www.vikingventure.no
50	KappAhl Holding AB	SE	O-list	Nordic Capital	Nordic Capital Fund V	2004	2006	23.02.2006		BO	Argentum.no + www.nordiccapital.com	Argentum.no	

Continued.

51	Karo Bio AB	SE	O-list	NB Capital + Health cap			03.04.1998		BO	www.nbcapital.net	www.nbcapital.net
52	Kongsberg Automotive Holdings ASA	NO	SMB	FSN Capital	FSN Capital 1	2001	2005	24.06.2005	BO	www.fsncapital.com	Suneel Regulla, FSNCapital
53	Labs2 Group AB	SE	First North	Northzone				15.03.2004	VC	www.northzone.com	http://www.northzone.com/
54	LifeCycle Pharma	DK	Main- DK	-				13.11.2006	VC	Argentum.no	Argentum.no
55	Lindab International AB	SE	-	Ratos		2001	2006	01.12.2006	RBO	www.ratos.se + Argentum.no	Argentum.no
56	Luxo	NO	SMB	Norgesinvestor	Norgesinvestor I	1997	2005	15.05.1998	BO	www.norgesinvestor.no	Argentum.no
57	Mamut ASA	NO	SMB	Northzone				10.05.2004	VC	www.northzone.com	www.northzone.com
58	Mandamus Fastigheter AB	SE	O-list	Accent Equity Partners AB		1997		15.06.1998	BO	www.accentequity.se	SVCA.se
59	Marine Farms	NO	SMB	Marin Forvaltning AS	Marin Vekst 1	2004	2007	12.10.2006	BO	Lisbeth M. Iversen, Menon +	Argentum.no
60	Micronic Laser Systems AB	SE	O-list	Industrifonden				09.03.2000	VC	www.industrifonden.se	www.industrifonden.se
61	Morphic Technologies AB	SE	First North	Volvo Technology Transfer	Volvo Technology Transfer	2003		01.09.2004	VC	Argentum.no	Argentum.no
62	NEAS ASA	NO	-	Reiten & Co	Nordic Capital Partners IV	2000		23.03.2007	VC	Argentum.no + www.reitenco	Argentum.no
63	Nederman Holding AB	SE	OMX Main	EQT	EQT Denmark	1999	2007	16.05.2007	BO	www.eqt.se + Argentum.no	Argentum.no
64	NextGenTel Holding	NO	SMB	Northzone				19.12.2003	VC	www.northzone.com	Argentum.no
65	Nobia AB	SE	O-list	IK Investment Partners	IK 1994	1996	2004	19.06.2002	BO	www.ikinest.com + Argentum	Argentum.no
66	NordiagG ASA	NO	SMB	Sarsiasseed	Sarsia LifeScience Fond, Sarsia Innovation, Convexa III, SakorninVest	2002		14.12.2005	VC	Argentum.no	Jon T Berg, Sarsia Seed Management AS
67	Norwegian Energy Company ASA	NO		Hitec vision	Energivekst	2005	2009	09.11.2007	PE	www.hitecvision.com	Hilde S. Hansen, HitecVision
68	Odin	NO	SMB	Verdane + Norvestor				18.11.2005	CM	Rebecca Farr, Norvestor	Rebecca Farr, Norvestor
69	Odin Hitec ASA	NO	Main	Norsk Vekst		1997	2006	17.06.2001	BO	Norsk Vekst www.norvestor	SVCA.se
70	Opera Software ASA	NO	SMB	Teknoinvest Management AS	Teknoinvest VIII KS	2004	2005	11.03.2004	VC	Argentum.no	Argentum.no
71	Orexo AB	SE	O-list	HealthCap	Scandinavian Life Science Venture + HealthCap III	2005		09.11.2005	VC	www.healthcap.se + Argentum	Argentum.no
72	Oriflame Cosmetics S.A.	SE	O-list	IK Investment Partners	IK 1997	1999	2006	24.03.2004	BO	www.ikinest.com + Argentum	Argentum.no
73	Perlos Oyj	FI	MAIN LIST	EQT	EQT I	1996	1999	28.06.1999	BO	www.eqt.se	SVCA.se
74	Photocure ASA	NO	Main		Bio Fund Ventures I	1999	2000	29.05.2000	VC	Argentum.no	Argentum.no
75	Polimoon	NO	Main List	CVC Capital Partners A/S		1999	2006	26.04.2005	BO	www.cvc.com	SVCA.se
76	Powel	NO	SMB	Viking Venture				24.10.2005	VC	www.vikingventure.no	Argentum.no
77	Precise Biometrics AB	SE	O-list	Centrecourt AB				03.10.2000	VC	www.centrecourt.se	SVCA.se + Argentum.no
78	Proffice AB	SE	O-list	Reiten&co	Nordic Capital Partners I	1996	1999	11.10.1999	VC	www.reitenco.no	www.reitenco.no
79	Pronova BioPharma ASA	NO	Main	Herkules Capital + Birk ventures	Herkules Private Equity Fund I	2004		11.10.2007	VC	Lisbeth M. Iversen, Menon +	www.birkventure.no
80	Q-Med AB	SE	O-list	HealthCap AB				06.12.1999	VC	www.healthcap.se	SVCA.se
81	Readsorf AB	SE	O-list	Priveq				22.06.1999	VC	www.priveq.se	Argentum + www.priveq.se
82	Renewable Energy Corporation ASA	NO	Main	Hafslund Venture AS	Hafslund Venture	1998		09.05.2006	VC	Argentum.no	Argentum.no
83	Revus Energy	NO	SMB	Hitec Vision	Energivekst (HitecVision Private Equity III)	2003	2005	27.05.2005	PE	Hilde S. Hansen, HitecVision	Hilde S. Hansen, HitecVision
84	Salcomp Oyj	FI	MAIN LIST	EQT	EQT 2	1999	2006	17.03.2006	BO	www.eqt.se + Argentum.no	Argentum.no
85	Satama Interactive Oyj	FI	NM LIST	Capman	Finnventure Rahasto III	1998	2000	17.03.2000	VC	Argentum.no	Argentum.no
86	SCAN Geophysical ASA	NO	Axess	Norvestor Equity	Norvestor IV LP	2005	2009	31.05.2007	BO	http://www.norvestor.no	Rebecca Farr, Norvestor
87	Scandinavian Retail Group	NO	SMB	Norsk Vekst				02.04.1998	PE		
88	Scribona	NO	Main	Norvestor				10.05.2001	CM	www.norvestor.no	Rebecca Farr, Norvestor
89	Sense Communications International	NO	Main	Norsk Vekst		2000		22.12.2000	VC	http://www.norvestor.no	Rebecca Farr, Norvestor
90	Stepstone	NO	Main	Northzone Ventures				14.03.2000	VC	Stine Foss, Northzone + www	Argentum.no
91	Synneve Finden Meierier	NO	SMB	Norvestor		1996	2007	06.07.1998	PE	www.norvestor.no	www.norvestor.no
92	Talvivaaran Kalvososakeyhtiö OY	FI	MAIN LIST	Suomen Teollisuussijoltus Oy				11.05.2009	VC		www.industryinvestment.com
93	Tele1 Europe Holding AB	SE	O-list	Reiten	Nordic Capital Partners I	1996	2001	15.03.2000	PE	www.reitenco.no	
94	TeleComputing	NO	Main	Convexa				29.06.2000	VC	www.convexa.no	Argentum.no
95	Teleste Oyj	FI	MAIN LIST	Sponsor Capital Oy		1997	2000	06.04.1999	LBO	www.sponsor.fi	Marit Suominen, Sponsor Capital
96	Ticket Travel Group AB	SE	A-list	Procuritas	Procuritas MBO Investment Consortium (PMIC)	1993	1997	01.07.1999	BO	www.procuritas.se	www.procuritas.se
97	Topotarget A/S	DK	Main- DK	HealthCap				10.06.2005	VC	www.healthcap.se	Argentum.no + www.unquote.com
98	TradeDoubler AB	SE	O-list	Verdane Capital	Verdane Capital V K/S		2006	08.11.2005	VC	www.verdane.com + Argentum	Argentum.no
99	Tripep AB	SE	O-list	HealthCap AB				14.07.2000	VC	www.healthcap.se	SVCA.se
100	Trolltech	NO	SMB	Northzone		2000		05.07.2006	VC	www.northzone.com	Argentum.no
101	Ulfors AB	SE	O-list	Litorina Norsk vekst	Litorina Fund I	1999	2004	11.12.2000	BO	www.litorina.se + Argentum	Argentum.no
102	Via Travel Group	NO	SMB	Norgesinvestor	Norgesinvestor III	2003	2005	09.06.2005	L/M-BO	www.norgesinvestor.no	Ståle Myrstad, Norgesinvestor
103	Vision Park Entertainment AB	SE	O-list	Accent Equity Partners AB		1998		08.06.2000	BO	www.accentequity.se	SVCA.se
104	Webcenter Solutions	NO	SMB	Norvestor		2001		19.06.2000	CM	www.norvestor.no	Rebecca Farr, Norvestor

Excluded samples

	Entity	Region	List	Investor prior to IPO	Fund	Fund invest	Fund exit	Date of IPO	Date of delisting	Classification	Source PE Funding	Source Classification
105	A-COM AB	SE	O-list	CVC Capital Partners A/S		1999	2009	04.11.1999		BO	www.cvc.com	SVCA.se
106	Bavarian Nordic Research Institute	DK	Main- DK	NB Capital				04.11.1998		BO	www.nbcapital.net	www.nbcapital.net
107	Capio AB	SE	O-list	Nordic Capital	Nordic Capital Fund VI	2006		16.10.2000	17.11.2006	BO	Argentum.no	Argentum.no
108	Cash Guard AB	SE	O-list	Accent Equity Partners AB		2003		29.05.2000		BO	www.accentequity.se	SVCA.se
109	Connecta AB	SE		Priveq				15.08.2002		BO	www.priveq.se	Argentum + www.priveq.se
110	Connecta AB	SE	O-list	Priveq				30.05.2005		BO	www.priveq.se	Argentum.no + www.priveq.se
111	Connecta AB (old)	SE	O-list	Priveq				20.09.1999	29.06.2000	BO	www.priveq.se	Argentum.no + www.priveq.se
112	Contex A/S	DK	Main- DK	EQT	EQT Denmark , Ratos	1999	2007	23.02.1999		BO	Argentum.no + www.eqt.se	Argentum.no
113	Drillicon AB	SE	First North	Traction				07.08.2006		x		
114	Duroc AB	SE	O-list	Traction				02.07.1999		x	www.traction.se	
115	EDB	NO	Main	Norvestor		1999		27.06.1997		BO	www.norvestor.no	www.norvestor.no
116	Elcoteq Network OYJ	FI		CAPMAN + Suomen Teollisuussijoitus Oy + MB Funds		1996	2000	26.11.1997		BO	Andreas Rokne, Capman	Andreas Rokne, Capman
117	ElectroMagnetic GeoServices ASA	NO						30.03.2007		x	Lisbeth M. Iversen, Menon	
118	Falck	DK	Main- DK	Nordic capital	Nordic Capital Fund V	2004	2011	20.07.2004	23.02.2005	BO	www.nordiccapital.com	Argentum.no
119	Guide Konsult AB	SE	O-list	Nordic Capital	Nordic Capital Fund IV	2001	2006	27.05.1998	25.02.2000	BO	Argentum.no + www.nordiccapital.com	Argentum.no
120	Gunnebo Industrier AB	SE	O-list	Procuritas	Pre-fund Investments	1988	1990	14.06.2005	01.10.2008	BO	www.procuritas.se	www.procuritas.se
121	ITAB INREDNING AB	SE		Priveq				31.05.2004		x	www.priveq.se	
122	ITAB Shop Concept AB	SE	A-list	Priveq				08.07.2008		x	www.priveq.se	
123	ITAB Shop Concept AB	SE	First North					28.05.2004	08.07.2008	x		
124	Lindab AB	SE	A-list					11.02.1998	03.08.2001	x		
125	M&E Biotech	DK	Main- DK	NB Capital				31.05.2000		BO	www.nbcapital.net	www.nbcapital.net
126	Mogul.com Group com AB	SE	O-list	Affarsstrategerna AB	Affarsstrategerna Fund(s)	1992	1999	11.09.2000	14.10.2003	VC	www.astrateg.se + Argentum.no	Cläes-Göran Fridh, Affarsstrategerna AB
127	Morphic Technologies AB	SE	A-list	Volvo Technology Transfer	Volvo Technology Transfer	2003		04.03.2008		VC	Argentum.no + www.volvo.com/venturetech	Argentum.no
128	PCI Biotech Holding ASA	NO	Axess	Birk Venture	Birk Venture	2010		18.06.2008		x	www.birkventure.no	Hans Ivar Robinson, Birk Venture
129	Pyrosequencing AB	SE	O-list	NB Capital + Health cap				30.06.2000		BO	www.nbcapital.net	www.nbcapital.net
130	SOFTRONIC AB	SE	O-list	Traction				04.12.1998		x	www.traction.se	
131	SWECO AB	SE	O-list	CAPMAN + Finnventure	Finnventure Rahasto V	2000	2004	21.09.1998	29.12.1999	BO	Andreas Rokne, Capman	Andreas Rokne, Capman
132	SwitchCore AB	SE	O-list	Traction				06.12.1999	02.05.2008	x	www.traction.se	
133	Thalamus Networks AB	SE	O-list	Traction				04.09.2000		x		
134	TurnIT AB	SE	O-list	Accent Equity Partners AB		1999		15.04.1998	27.05.2005	BO	www.accentequity.se	SVCA.se + Argentum.no

13.2 First Day Return

13.2.1 The Sample - Sorted by First Day Return given Classification

Entity	Region	Classification	Date of IPO	Offering price	Closing Price	First day return	Source offering price	Source Closing Price
Ballingslov AB	SE	BO	19.06.2002	64,0	21,2	-0,669	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Kongsberg Automotive Holdings ASA	NO	BO	24.06.2005	46,0	33,5	-0,272	www.newsweb.no	oslobors.no/markedsaktivitet
Ability Group ASA	NO	BO	03.07.2006	47,0	34,5	-0,265	www.newsweb.no	oslobors.no/markedsaktivitet
Synnøve Finden Meierier	NO	BO	06.07.1998	45,0	38,9	-0,135	www.oslobors.no , Emisjonsstatistikk	Thomson Financial Datastream
Nobia AB	SE	BO	19.06.2002	78,0	71,0	-0,090	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Via Travel Group	NO	BO	09.06.2005	29,0	28,5	-0,017	www.newsweb.no	Thomson Financial Datastream
Marine Farms	NO	BO	12.10.2006	14,0	13,8	-0,014	www.newsweb.no	Thomson Financial Datastream
Polimoon	NO	BO	26.04.2005	21,5	21,2	-0,014	www.newsweb.no	Thomson Financial Datastream
HMS Networks AB	SE	BO	19.10.2007	74,0	73,0	-0,014	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Qdim Hitec ASA	NO	BO	17.06.2001	40,0	39,5	-0,013	www.oslobors.no , Emisjonsstatistikk	Thomson Financial Datastream
Salcomp Oyj	FI	BO	17.03.2006	3,2	3,2	-0,003	Bloomberg	Thomson Financial Datastream
Bjerge ASA	NO	BO	17.12.2004	7,0	7,0	0,000	thomsonreutersone.com	oslobors.no/markedsaktivitet
Duni AB	SE	BO	14.11.2007	50,0	50,0	0,000	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Cermaq ASA	NO	BO	24.10.2005	44,0	44,1	0,002	www.newsweb.no	oslobors.no/markedsaktivitet
Lindab International AB	SE	BO	01.12.2006	110,0	112,8	0,025	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Teleste Oyj	FI	BO	06.04.1999	8,2	8,4	0,028	Bloomberg	nasdaqomxnordic.com/shares
Revus Energy	NO	BO	27.05.2005	42,0	44,0	0,048	www.oslobors.no , Emisjonsstatistikk	Thomson Financial Datastream
BE Group AB	SE	BO	24.11.2006	62,0	65,0	0,048	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
KappAhl Holding AB	SE	BO	23.02.2006	56,0	58,8	0,049	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Expert Ellag	NO	BO	14.04.2000	55,0	58,0	0,055	www.oslobors.no , Emisjonsstatistikk	oslobors.no/markedsaktivitet
Norwegian Energy Company ASA	NO	BO	09.11.2007	33,0	34,8	0,056	www.newsweb.no	oslobors.no/markedsaktivitet
Intrum Justitia AB	SE	BO	07.06.2002	47,0	50,0	0,064	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Alfa Laval AB	SE	BO	17.05.2002	91,0	98,0	0,077	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Oriflame Cosmetics S.A.	SE	BO	24.03.2004	190,0	208,5	0,097	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Nederman Holding AB	SE	BO	16.05.2007	87,0	95,5	0,098	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Grenland Group	NO	BO	12.12.2005	18,0	21,1	0,173	www.newsweb.no	Thomson Financial Datastream
Gant Company AB	SE	BO	28.03.2006	141,0	193,5	0,372	Uif Persson, OMX Nasdaq Stockholm	Thomson Financial Datastream
TeleComputing	NO	VC	29.06.2000	85,0	58,0	-0,317	www.oslobors.no , Emisjonsstatistikk	Thomson Financial Datastream
C Technologies AB	SE	VC	15.06.2000	125,0	94,1	-0,247	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Sense Communications International	NO	VC	22.12.2000	25,0	19,0	-0,240	Bloomberg	Thomson Financial Datastream
BioInvent International AB	SE	VC	12.06.2001	62,0	52,0	-0,161	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
AKVA GROUP ASA	NO	VC	10.11.2006	35,0	31,4	-0,104	Annual Report 2006	oslobors.no/markedsaktivitet
Genmab	DK	VC	18.10.2000	260,0	233,0	-0,104	newsclient.omxgroup.com	nasdaqomxnordic.com/shares
Funcom	NO	VC	13.12.2005	15,0	13,5	-0,100	www.newsweb.no	oslobors.no/markedsaktivitet
Renewable Energy Corporation ASA	NO	VC	09.05.2006	95,0	85,5	-0,100	www.newsweb.no	oslobors.no/markedsaktivitet
NextGenTel Holding	NO	VC	19.12.2003	25,0	22,7	-0,092	www.oslobors.no , Emisjonsstatistikk	Thomson Financial Datastream
Photocure ASA	NO	VC	29.05.2000	155,0	141,3	-0,088	www.newsweb.no	Thomson Financial Datastream
Algeta ASA	NO	VC	27.03.2007	47,0	43,1	-0,083	www.newsweb.no	oslobors.no/markedsaktivitet
24SEVENOFFICE ASA	NO	VC	22.06.2007	14,0	13,5	-0,036	www.newsweb.no	oslobors.no/markedsaktivitet
NEAS ASA	NO	VC	23.03.2007	33,0	32,0	-0,030	www.newsweb.no	oslobors.no/markedsaktivitet
Mamut ASA	NO	VC	10.05.2004	7,0	6,8	-0,029	www.newsweb.no	Thomson Financial Datastream
Consortie Group	NO	VC	13.06.2001	12,0	11,8	-0,019	www.oslobors.no , Emisjonsstatistikk	oslobors.no/markedsaktivitet
Global IP Solutions	NO	VC	22.07.2008	10,0	9,9	-0,014	www.newsweb.no	Thomson Financial Datastream
InvivoSense ASA	NO	VC	06.06.2007	17,0	17,0	0,000	www.newsweb.no	Thomson Financial Datastream
Orexo AB	SE	VC	09.11.2005	90,0	90,0	0,000	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Powel	NO	VC	24.10.2005	15,0	15,0	0,000	www.newsweb.no	Thomson Financial Datastream
TradeDoubler AB	SE	VC	08.11.2005	110,0	110,0	0,000	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Biotec Pharmacon ASA	NO	VC	04.11.2005	24,5	24,9	0,017	www.newsweb.no	oslobors.no/markedsaktivitet
Clavis Pharma ASA	NO	VC	07.07.2006	45,5	46,5	0,022	www.newsweb.no	oslobors.no/markedsaktivitet
Pronova BioPharma ASA	NO	VC	11.10.2007	23,0	23,8	0,035	www.newsweb.no	oslobors.no/markedsaktivitet
Badger explorer ASA	NO	VC	12.06.2007	32,0	33,9	0,059	www.newsweb.no	oslobors.no/markedsaktivitet
LifeCycle Pharma	DK	VC	13.11.2006	44,0	47,1	0,070	newsclient.omxgroup.com	nasdaqomxnordic.com/shares
Trolltech	NO	VC	05.07.2006	16,0	17,5	0,094	www.oslobors.no , Emisjonsstatistikk	Thomson Financial Datastream
Micronic Laser Systems AB	SE	VC	09.03.2000	105,0	116,7	0,112	Uif Persson, OMX Nasdaq Stockholm	Thomson Financial Datastream
Aerocrine AB	SE	VC	15.06.2007	25,0	28,0	0,120	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Exiqon A/S	DK	VC	29.05.2007	40,0	45,0	0,125	newsclient.omxgroup.com	nasdaqomxnordic.com/shares
Opera Sorftware ASA	NO	VC	11.03.2004	10,0	11,4	0,140	www.newsweb.no	oslobors.no/markedsaktivitet
Topotarget A/S	DK	VC	10.06.2005	22,5	26,3	0,169	newsclient.omxgroup.com	nasdaqomxnordic.com/shares
Hemtex AB	SE	VC	06.10.2005	56,0	66,5	0,188	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Aldata Solution Oyj	FI	VC	27.10.1999	9,3	11,2	0,204	Bloomberg	nasdaqomxnordic.com/shares
Readsorf AB	SE	VC	22.06.1999	25,0	31,0	0,240	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Aresa (Aqualife)	DK	VC	14.02.2006	52,0	66,0	0,269	newsclient.omxgroup.com	nasdaqomxnordic.com/shares
International Maritime Exchange ASA	NO	VC	04.04.2005	81,0	103,0	0,272	www.oslobors.no , Emisjonsstatistikk	oslobors.no/markedsaktivitet
Ellen AB	SE	VC	30.08.2007	2,5	3,2	0,288	Bloomberg	Thomson Financial Datastream
Proffice AB	SE	VC	11.10.1999	84,0	110,5	0,315	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
BioGaia Biologics AB	SE	VC	28.05.1998	24,0	39,5	0,646	Uif Persson, OMX Nasdaq Stockholm	nasdaqomxnordic.com/shares
Nordiag ASA	NO	VC	14.12.2005	10,0	27,2	1,718	www.newsweb.no	oslobors.no/markedsaktivitet

13.2.2 Underpricing mean difference independent two tailed t-test

Group Statistics

Code	N	Mean	Std. Deviation	Std. Error Mean
VCunder 1.00	40	,0838	,31990	,05058
2.00	27	-,0107	,17852	,03436

Independent Samples Test

		Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Interval of the	
									Lower	Upper
VCunder	Equal variances assumed	2,098	,152	1,393	65	,168	,09449	,06782	-,04096	,22994
	Equal variances not assumed			1,545	63,131	,127	,09449	,06115	-,02769	,21667

13.3 Cumulative Abnormal Returns – Calendar time

13.3.1 The time series

Benchmark:	Nordic Index						MSCI Nordic					
	Equally Weighted			Value Weighted			Equally Weighted			Value Weighted		
	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)	BO	VC	(BO - VC)
01.06.1998	-0,074			-0,074			-0,070			-0,070		
01.07.1998	0,000	-0,180		-0,001	-0,180		0,031	-0,149		0,029	-0,149	
01.08.1998	0,002	-0,138		0,022	-0,152		-0,325	-0,465		-0,305	-0,479	
01.09.1998	0,010	-0,038	0,048	0,027	0,039	-0,012	-0,100	-0,148	0,048	-0,083	-0,071	-0,012
01.10.1998	-0,136	-0,178	0,042	-0,171	-0,269	0,098	0,075	0,036	0,039	0,041	-0,054	0,096
01.11.1998	0,040	-0,009	0,050	0,044	-0,035	0,078	0,063	0,038	0,025	0,050	0,013	0,037
01.12.1998	-0,049	0,077	-0,126	-0,043	-0,030	-0,013	0,051	0,177	-0,126	0,057	0,071	-0,013
01.01.1999	-0,009	0,095	-0,104	-0,001	0,099	-0,100	0,116	0,211	-0,096	0,120	0,216	-0,096
01.02.1999	-0,011	-0,058	0,046	0,000	-0,065	0,066	-0,124	-0,170	0,046	-0,112	-0,177	0,065
01.03.1999	-0,064	0,039	-0,104	-0,080	0,054	-0,134	0,040	0,142	-0,101	0,020	0,156	-0,136
01.04.1999	-0,039	-0,122	0,082	-0,073	-0,118	0,045	0,059	-0,015	0,074	0,048	-0,011	0,059
01.05.1999	0,117	0,032	0,085	0,097	0,040	0,057	0,066	-0,025	0,091	0,043	-0,018	0,061
01.06.1999	-0,020	-0,135	0,115	-0,080	-0,113	0,034	0,153	0,038	0,115	0,093	0,060	0,034
01.07.1999	-0,020	-0,031	0,011	-0,022	-0,025	0,003	0,030	0,020	0,010	0,028	0,026	0,002
01.08.1999	-0,022	0,359	-0,381	-0,002	0,451	-0,453	-0,013	0,355	-0,368	0,006	0,438	-0,432
01.09.1999	-0,038	-0,115	0,077	-0,035	-0,150	0,115	0,004	-0,073	0,077	0,007	-0,108	0,115
01.10.1999	-0,097	-0,013	-0,083	0,010	0,070	-0,060	0,095	0,107	-0,012	0,201	0,122	0,079
01.11.1999	-0,115	0,097	-0,212	-0,075	0,082	-0,157	0,150	0,362	-0,212	0,190	0,347	-0,157
01.12.1999	0,078	0,198	-0,120	0,543	0,245	0,298	0,501	0,626	-0,125	0,973	0,667	0,306
01.01.2000	0,054	0,998	-0,944	0,151	0,606	-0,455	0,031	0,976	-0,945	0,129	0,583	-0,455
01.02.2000	0,066	0,136	-0,070	-0,009	0,115	-0,125	0,322	0,392	-0,070	0,247	0,371	-0,124
01.03.2000	-0,006	-0,052	0,046	-0,096	-0,016	-0,081	-0,046	-0,116	0,070	-0,140	-0,067	-0,073
01.04.2000	-0,047	-0,069	0,023	0,029	-0,094	0,123	-0,007	-0,088	0,081	0,055	-0,102	0,157
01.05.2000	0,054	-0,004	0,058	-0,053	-0,064	0,012	-0,096	-0,116	0,020	-0,168	-0,170	0,002
01.06.2000	-0,061	-0,035	-0,026	-0,054	0,041	-0,095	-0,064	-0,033	-0,031	-0,058	0,040	-0,098
01.07.2000	0,036	0,072	-0,036	0,009	0,205	-0,196	-0,104	-0,067	-0,037	-0,132	0,068	-0,200
01.08.2000	0,027	0,129	-0,102	0,046	0,016	0,030	0,054	0,154	-0,100	0,071	0,038	0,033
01.09.2000	0,079	0,079	0,000	-0,049	0,050	-0,098	-0,123	-0,127	0,004	-0,251	-0,162	-0,089
01.10.2000	-0,108	-0,020	-0,088	-0,153	-0,031	-0,122	-0,169	-0,100	-0,069	-0,215	-0,096	-0,118
01.11.2000	-0,024	-0,050	0,027	-0,135	-0,081	-0,054	-0,107	-0,159	0,052	-0,219	-0,168	-0,051
01.12.2000	0,000	-0,097	0,097	-0,017	-0,029	0,012	0,049	-0,041	0,089	0,029	0,028	0,001
01.01.2001	0,062	0,086	-0,024	0,035	0,086	-0,050	0,000	0,021	-0,020	-0,026	0,022	-0,048
01.02.2001	0,077	-0,093	0,170	-0,092	-0,075	-0,018	-0,289	-0,466	0,177	-0,459	-0,447	-0,012
01.03.2001	-0,002	-0,062	0,061	-0,063	-0,059	-0,003	-0,231	-0,295	0,064	-0,294	-0,292	-0,002
01.04.2001	-0,051	-0,180	0,130	0,057	-0,137	0,194	0,341	0,197	0,144	0,446	0,240	0,206
01.05.2001	0,010	0,187	-0,177	-0,010	0,113	-0,123	-0,106	0,019	-0,124	-0,126	-0,029	-0,097
01.06.2001	-0,043	-0,116	0,073	-0,148	-0,104	-0,043	-0,178	-0,257	0,078	-0,296	-0,252	-0,044
01.07.2001	0,000	-0,055	0,055	-0,091	-0,151	0,060	-0,022	-0,089	0,067	-0,116	-0,175	0,058
01.08.2001	-0,063	-0,035	-0,028	-0,115	0,021	-0,137	-0,232	-0,258	0,026	-0,337	-0,202	-0,136
01.09.2001	-0,055	-0,088	0,032	0,016	-0,066	0,082	-0,278	-0,310	0,032	-0,207	-0,288	0,081
01.10.2001	-0,014	0,041	-0,055	0,086	-0,050	0,137	0,257	0,311	-0,054	0,357	0,219	0,138
01.11.2001	0,185	0,422	-0,237	0,089	0,141	-0,052	0,312	0,371	-0,060	0,231	0,267	-0,036
01.12.2001	-0,109	0,124	-0,232	-0,093	0,182	-0,275	-0,033	0,189	-0,222	0,004	0,243	-0,239
01.01.2002	-0,080	0,023	-0,103	-0,114	0,049	-0,163	-0,219	-0,108	-0,111	-0,251	-0,085	-0,166
01.02.2002	-0,178	-0,034	-0,145	-0,116	-0,010	-0,106	-0,181	-0,045	-0,136	-0,118	-0,016	-0,102
01.03.2002	-0,004	-0,041	0,038	0,001	-0,061	0,062	0,074	0,034	0,040	0,080	0,018	0,062
01.04.2002	-0,128	-0,013	-0,115	-0,097	-0,011	-0,085	-0,273	-0,191	-0,082	-0,232	-0,194	-0,037
01.05.2002	0,082	-0,056	0,138	-0,041	-0,027	-0,014	0,035	-0,104	0,139	-0,089	-0,075	-0,014
01.06.2002	-0,069	-0,061	-0,008	-0,063	-0,053	-0,010	-0,073	-0,063	-0,010	-0,065	-0,055	-0,010
01.07.2002	-0,043	-0,002	-0,041	-0,029	-0,039	0,010	-0,281	-0,273	-0,008	-0,262	-0,325	0,063
01.08.2002	-0,213	-0,240	0,027	0,017	-0,219	0,235	-0,159	-0,191	0,033	0,071	-0,172	0,244
01.09.2002	-0,158	-0,156	-0,002	-0,069	-0,310	0,241	-0,378	-0,391	0,013	-0,277	-0,537	0,260
01.10.2002	0,046	0,109	-0,063	-0,263	0,091	-0,354	0,351	0,356	-0,005	-0,023	0,332	-0,355
01.11.2002	0,022	0,110	-0,088	0,183	0,109	0,074	0,290	0,296	-0,006	0,399	0,311	0,088
01.12.2002	0,101	-0,079	0,180	0,099	-0,066	0,165	-0,192	-0,211	0,020	-0,064	-0,220	0,156

Continued.												
01.01.2003	-0,031	0,089	-0,120	-0,105	0,069	-0,174	-0,087	0,006	-0,093	-0,170	0,014	-0,184
01.02.2003	-0,033	-0,105	0,072	0,151	-0,100	0,252	-0,117	-0,149	0,032	0,085	-0,163	0,248
01.03.2003	0,981	-0,010	0,991	0,030	-0,069	0,099	0,191	-0,013	0,205	-0,015	-0,052	0,038
01.04.2003	0,025	-0,019	0,044	0,021	-0,001	0,022	0,335	0,215	0,120	0,346	0,271	0,074
01.05.2003	-0,069	0,131	-0,200	-0,036	0,076	-0,112	0,023	0,250	-0,227	0,096	0,195	-0,100
01.06.2003	0,044	0,107	-0,064	-0,016	0,149	-0,165	0,007	0,078	-0,071	-0,050	0,124	-0,174
01.07.2003	-0,043	-0,003	-0,040	-0,034	-0,017	-0,017	-0,003	0,014	-0,016	0,004	-0,002	0,005
01.08.2003	-0,060	-0,073	0,013	0,029	-0,056	0,084	0,061	0,050	0,011	0,150	0,068	0,083
01.09.2003	0,025	0,165	-0,140	0,016	0,180	-0,163	0,057	0,198	-0,142	0,050	0,212	-0,162
01.10.2003	-0,094	0,028	-0,122	-0,012	-0,057	0,045	0,051	0,175	-0,123	0,135	0,090	0,045
01.11.2003	0,095	0,090	0,005	0,078	0,029	0,049	0,146	0,147	-0,001	0,162	0,051	0,111
01.12.2003	0,000	-0,067	0,067	0,008	-0,087	0,095	0,096	-0,022	0,118	0,104	-0,034	0,137
01.01.2004	0,069	0,027	0,041	-0,056	0,030	-0,085	0,189	0,147	0,041	0,064	0,150	-0,086
01.02.2004	0,077	0,010	0,067	-0,084	0,015	-0,099	0,168	0,142	0,026	0,043	0,148	-0,105
01.03.2004	-0,015	-0,064	0,049	0,014	-0,051	0,065	-0,064	-0,114	0,050	-0,035	-0,101	0,066
01.04.2004	0,083	-0,014	0,097	0,156	-0,004	0,160	-0,069	-0,188	0,119	0,012	-0,178	0,190
01.05.2004	0,003	0,011	-0,009	0,014	0,049	-0,035	0,010	0,019	-0,009	0,021	0,056	-0,035
01.06.2004	-0,016	-0,057	0,042	-0,013	-0,022	0,009	0,071	0,025	0,046	0,074	0,058	0,016
01.07.2004	-0,001	-0,037	0,036	0,027	-0,058	0,085	-0,110	-0,104	-0,006	-0,081	-0,148	0,067
01.08.2004	-0,088	0,048	-0,136	-0,095	0,058	-0,153	-0,032	0,105	-0,137	-0,039	0,115	-0,153
01.09.2004	-0,089	0,055	-0,144	-0,034	0,078	-0,113	0,098	0,239	-0,141	0,153	0,262	-0,110
01.10.2004	-0,041	0,045	-0,086	-0,043	0,026	-0,070	0,014	0,100	-0,086	0,012	0,081	-0,070
01.11.2004	-0,019	-0,088	0,069	0,035	-0,084	0,119	0,191	0,122	0,068	0,246	0,126	0,120
01.12.2004	0,126	0,220	-0,093	0,026	0,177	-0,150	0,141	0,205	-0,064	0,041	0,144	-0,103
01.01.2005	0,055	0,017	0,038	0,030	0,034	-0,004	-0,010	-0,033	0,023	-0,021	-0,016	-0,005
01.02.2005	0,033	-0,039	0,072	0,053	-0,065	0,117	0,135	0,091	0,044	0,180	0,066	0,114
01.03.2005	0,004	0,107	-0,104	-0,008	0,062	-0,071	-0,039	0,060	-0,099	-0,051	0,011	-0,062
01.04.2005	-0,083	-0,050	-0,032	-0,110	-0,080	-0,030	-0,120	-0,148	0,028	-0,130	-0,155	0,025
01.05.2005	-0,049	-0,007	-0,042	-0,006	0,023	-0,029	0,010	0,047	-0,037	0,048	0,076	-0,028
01.06.2005	0,021	0,158	-0,137	-0,033	0,094	-0,126	0,037	0,169	-0,132	-0,023	0,104	-0,127
01.07.2005	-0,007	0,006	-0,013	-0,002	0,037	-0,039	0,039	0,107	-0,068	0,012	0,144	-0,132
01.08.2005	0,103	0,047	0,056	0,123	0,079	0,044	0,173	0,153	0,021	0,202	0,178	0,024
01.09.2005	-0,017	0,160	-0,178	-0,066	0,148	-0,215	-0,005	0,195	-0,201	-0,054	0,173	-0,227
01.10.2005	-0,024	-0,063	0,039	-0,034	-0,090	0,055	-0,114	-0,155	0,041	-0,124	-0,182	0,058
01.11.2005	-0,089	0,042	-0,131	-0,115	0,001	-0,116	-0,052	0,079	-0,131	-0,074	0,037	-0,111
01.12.2005	0,016	0,014	0,002	0,004	0,029	-0,025	0,132	0,130	0,002	0,120	0,137	-0,017
01.01.2006	0,171	0,006	0,165	0,171	-0,011	0,181	0,301	0,129	0,172	0,303	0,116	0,187
01.02.2006	0,096	0,059	0,037	0,089	0,032	0,057	0,114	0,089	0,025	0,107	0,053	0,054
01.03.2006	-0,004	0,069	-0,072	0,038	0,108	-0,070	0,182	0,264	-0,082	0,224	0,281	-0,057
01.04.2006	0,073	0,040	0,033	0,033	0,051	-0,018	0,160	0,132	0,028	0,120	0,139	-0,019
01.05.2006	0,061	0,004	0,057	0,043	-0,012	0,055	-0,036	-0,096	0,060	-0,049	-0,117	0,068
01.06.2006	-0,043	-0,003	-0,040	-0,036	-0,011	-0,026	-0,080	-0,043	-0,037	-0,073	-0,048	-0,026
01.07.2006	-0,004	-0,025	0,021	-0,003	-0,056	0,054	-0,041	-0,065	0,023	-0,040	-0,095	0,055
01.08.2006	-0,026	0,074	-0,100	-0,074	-0,004	-0,070	0,037	0,150	-0,113	-0,021	0,070	-0,091
01.09.2006	-0,037	0,093	-0,129	-0,031	0,062	-0,093	-0,014	0,053	-0,067	0,000	0,071	-0,071
01.10.2006	0,062	-0,062	0,123	0,058	0,004	0,054	0,198	0,086	0,112	0,194	0,137	0,057
01.11.2006	0,021	-0,010	0,031	0,029	0,073	-0,044	0,120	0,079	0,040	0,129	0,169	-0,040
01.12.2006	-0,016	-0,017	0,001	-0,006	-0,053	0,047	0,106	0,094	0,012	0,122	0,063	0,059
01.01.2007	0,027	0,012	0,015	0,042	0,250	-0,208	0,100	0,072	0,028	0,121	0,317	-0,196
01.02.2007	0,055	-0,014	0,070	0,073	-0,111	0,183	-0,044	-0,082	0,038	-0,015	-0,184	0,170
01.03.2007	0,010	0,047	-0,037	-0,002	0,012	-0,014	0,141	0,125	0,017	0,127	0,149	-0,022
01.04.2007	0,029	-0,001	0,029	0,019	0,157	-0,138	0,182	0,139	0,042	0,173	0,307	-0,134
01.05.2007	0,027	-0,023	0,051	0,009	0,057	-0,048	0,081	0,021	0,059	0,067	0,102	-0,035
01.06.2007	0,021	0,063	-0,042	0,003	0,202	-0,199	0,027	0,055	-0,028	0,012	0,215	-0,203
01.07.2007	-0,006	-0,019	0,012	-0,009	0,001	-0,009	-0,052	-0,088	0,036	-0,053	-0,055	0,003
01.08.2007	-0,015	-0,060	0,044	-0,028	-0,013	-0,016	-0,024	-0,035	0,012	-0,038	0,001	-0,039
01.09.2007	-0,012	-0,018	0,006	-0,013	0,102	-0,115	0,170	0,165	0,005	0,169	0,283	-0,114
01.10.2007	0,019	-0,023	0,042	-0,008	0,097	-0,105	0,019	-0,060	0,079	-0,006	0,083	-0,088
01.11.2007	-0,013	-0,056	0,043	-0,030	-0,037	0,007	-0,109	-0,151	0,042	-0,126	-0,125	-0,001
01.12.2007	0,066	0,025	0,042	0,052	0,068	-0,016	0,014	0,007	0,007	-0,003	0,038	-0,041

Continued.												
01.01.2008	-0,078	0,057	-0,135	-0,102	-0,330	0,228	-0,245	-0,145	-0,100	-0,270	-0,526	0,256
01.02.2008	0,082	0,007	0,075	0,124	-0,099	0,223	0,141	0,071	0,070	0,182	-0,037	0,219
01.03.2008	-0,038	0,002	-0,040	-0,024	0,144	-0,168	0,034	0,015	0,019	0,057	0,181	-0,125
01.04.2008	0,025	0,016	0,009	-0,007	0,146	-0,152	0,024	0,041	-0,017	-0,010	0,160	-0,170
01.05.2008	0,041	-0,021	0,062	0,029	-0,124	0,153	0,078	0,027	0,051	0,089	-0,068	0,157
01.06.2008	0,018	0,024	-0,006	0,002	-0,028	0,030	-0,219	-0,203	-0,015	-0,236	-0,252	0,016
01.07.2008	0,011	-0,014	0,026	0,000	0,113	-0,112	-0,064	-0,085	0,022	-0,081	0,045	-0,127
01.08.2008	-0,056	-0,042	-0,014	-0,059	0,119	-0,179	-0,134	-0,122	-0,012	-0,137	0,037	-0,174
01.09.2008	-0,037	-0,024	-0,013	-0,057	-0,156	0,099	-0,500	-0,435	-0,065	-0,521	-0,597	0,075
01.10.2008	-0,082	-0,100	0,018	-0,089	-0,162	0,073	-0,522	-0,537	0,015	-0,528	-0,605	0,077
01.11.2008	-0,035	0,041	-0,077	-0,068	-0,035	-0,033	-0,357	-0,318	-0,039	-0,368	-0,384	0,017
01.12.2008	-0,131	-0,092	-0,039	-0,076	0,055	-0,132	0,144	0,090	0,054	0,199	0,293	-0,094
01.01.2009	0,034	0,215	-0,181	0,045	0,058	-0,014	-0,187	0,044	-0,232	-0,192	-0,160	-0,032
01.02.2009	-0,048	0,042	-0,090	-0,044	-0,093	0,048	-0,203	-0,215	0,013	-0,198	-0,310	0,112
01.03.2009	0,029	-0,058	0,087	-0,018	-0,029	0,011	0,306	0,275	0,031	0,257	0,326	-0,069
01.04.2009	0,020	-0,042	0,061	0,172	-0,070	0,242	0,380	0,297	0,083	0,541	0,299	0,241
01.05.2009	0,206	0,051	0,155	0,133	0,038	0,095	0,415	0,392	0,023	0,405	0,342	0,063
01.06.2009	-0,092	0,088	-0,179	-0,056	-0,006	-0,050	-0,131	0,012	-0,144	-0,100	-0,018	-0,082
01.07.2009	-0,054	-0,004	-0,050	-0,064	0,055	-0,118	0,127	0,151	-0,024	0,156	0,255	-0,099
01.08.2009	0,052	0,177	-0,125	0,036	0,062	-0,026	0,055	-0,003	0,058	0,039	-0,071	0,110
01.09.2009	-0,002	0,075	-0,077	0,037	0,067	-0,030	0,072	0,179	-0,107	0,110	0,180	-0,070
01.10.2009	0,044	-0,011	0,055	0,046	-0,022	0,069	0,031	0,060	-0,028	0,010	0,048	-0,038
01.11.2009	0,038	0,006	0,032	0,021	-0,061	0,081	0,128	0,044	0,084	0,128	0,047	0,081
01.12.2009	-0,036	0,045	-0,081	-0,022	0,051	-0,073	-0,078	-0,002	-0,076	-0,066	0,003	-0,070
01.01.2010	0,057	0,151	-0,093	0,008	-0,005	0,014	0,053	0,129	-0,076	0,008	-0,007	0,015
01.02.2010	-0,036	-0,008	-0,028	-0,031	0,027	-0,058	-0,061	-0,041	-0,020	-0,056	0,010	-0,066
01.03.2010	0,044	-0,084	0,128	0,022	-0,053	0,075	0,213	0,141	0,071	0,191	0,139	0,051
01.04.2010	-0,003	0,061	-0,064	-0,063	0,014	-0,077	0,001	0,084	-0,083	-0,062	0,030	-0,092
01.05.2010	-0,059	0,022	-0,080	-0,074	0,002	-0,077	-0,319	-0,234	-0,085	-0,333	-0,258	-0,074
01.06.2010	-0,018	-0,007	-0,011	-0,068	-0,187	0,119	-0,056	-0,108	0,052	-0,112	-0,252	0,140
01.07.2010	0,086	0,000	0,086	0,113	0,060	0,052	0,465	0,142	0,324	0,493	0,329	0,164
01.08.2010	0,003	-0,095	0,098	-0,034	-0,170	0,135	-0,092	-0,190	0,098	-0,130	-0,265	0,135
01.09.2010	0,065	-0,060	0,125	0,084	-0,158	0,242	0,297	0,018	0,280	0,316	0,046	0,269
01.10.2010	0,078	-0,102		0,073	-0,102		0,133	-0,047		0,127	-0,047	
01.11.2010	0,014			0,002			-0,026			-0,051		
Mean	0,004	0,017		-0,005	0,008		0,016	0,027		0,014	0,023	
<i>Std. Deviation</i>	<i>0,11</i>	<i>0,12</i>		<i>0,09</i>	<i>0,12</i>		<i>0,18</i>	<i>0,19</i>		<i>0,20</i>	<i>0,21</i>	
Independent T-test:												
Mean Difference		-0,013			-0,013			-0,010			-0,008	
(t-value)		<i>(-0,99)</i>			<i>(-1,09)</i>			<i>(-0,48)</i>			<i>(-0,35)</i>	

13.3.2 Underperformance mean difference independent two tailed t-test

Benchmark: Nordic Index

Weighting: Equally

BO in excess of VC

Group Statistics

Category	N	Mean	Std. Deviation	Std. Error Mean
BO	145	,00	,106	,009
VC	145	,02	,123	,010

Independent Samples Test

	Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Interval of the	
								Lower	Upper
Equal variances assumed	2,351	,126	-.998	288	,319	-.013	,013	-.040	,013
Equal variances not assumed			-.998	281,383	,319	-.013	,013	-.040	,013

Benchmark: Nordic Index

Weighting: Value

BO in excess of VC

Group Statistics

Category	N	Mean	Std. Deviation	Std. Error Mean
BO	145	-,0053	,08555	,00710
VC	145	,0078	,11756	,00976

Independent Samples Test

	Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Interval of the	
								Lower	Upper
Equal variances assumed	8,839	,003	-1,086	288	,279	-,01311	,01207	-,03687	,01066
Equal variances not assumed			-1,086	263,108	,279	-,01311	,01207	-,03688	,01067

Benchmark: MSCI Nordic

Weighting: Equally

BO in excess of VC

Group Statistics

Category	N	Mean	Std. Deviation	Std. Error Mean
BO	145	,0162	,17567	,01459
VC	145	,0266	,19708	,01637

Independent Samples Test

	Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Interval of the	
								Lower	Upper
Equal variances assumed	,672	,413	-,475	288	,635	-,01042	,02192	-,05358	,03273
Equal variances not assumed			-,475	284,273	,635	-,01042	,02192	-,05358	,03273

Benchmark: MSCI Nordic

Weighting: Value

BO in excess of VC

Group Statistics

Category	N	Mean	Std. Deviation	Std. Error Mean
BO	145	,0145	,19969	,01658
VC	145	,0229	,21058	,01749

Independent Samples Test

	Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Interval of the	
								Lower	Upper
Equal variances assumed	,926	,337	-,351	288	,726	-,00845	,02410	-,05588	,03898
Equal variances not assumed			-,351	287,192	,726	-,00845	,02410	-,05588	,03899

13.4 Single and Three Factor Regression

13.4.1 Risk Free Rate

Input from DataStream										
Name:	DENMARK BENCHMARK BOND 10 YR (DS) - RED. YIELD	FINLAND BENCHMARK BOND 10 YR (DS) - RED. YIELD	NORWAY BENCHMARK 10 YEAR - RED. YIELD	SWEDEN GOV.BND.10Y (SE E TRSD10T)- RED. YIELD	Weights on Market Value acc. by country of total Nordic Index:				Estimated Nordic Risk Free Rate	
Data type:	-	-	-	-	Denmark	Finland	Norway	Sweden	Yearly	Monthly
Currency:	-	-	-	-						
Code:	DKBRYLD	FNBRYLD	NW10BND	SDBND10						
Start:	01.01.1998	01.01.1998	01.01.1998	01.01.1998						
End:	01.01.2012	01.01.2012	01.01.2012	01.01.2012						
Frequency:	M	M	M	M						
Date:										
01.01.1998	5,63	5,52	5,49		0,35	0,30	0,35		0,0555	0,0045
01.02.1998	5,41	5,20	5,32		0,35	0,34	0,31		0,0531	0,0043
01.03.1998	5,23	5,07	5,28		0,34	0,37	0,29		0,0518	0,0042
01.04.1998	5,14	5,02	5,30		0,35	0,36	0,29		0,0514	0,0042
01.05.1998	5,21	5,14	5,46		0,32	0,39	0,29		0,0526	0,0043
01.06.1998	5,07	4,95	5,53		0,34	0,39	0,27		0,0515	0,0042
01.07.1998	4,96	4,94	5,57		0,34	0,41	0,25		0,0511	0,0042
01.08.1998	4,91	4,79	5,33		0,33	0,43	0,24		0,0496	0,0040
01.09.1998	4,76	4,62	5,72		0,40	0,38	0,23		0,0492	0,0040
01.10.1998	4,51	4,21	5,22		0,39	0,39	0,23		0,0455	0,0037
01.11.1998	4,70	4,51	5,54		0,37	0,39	0,23		0,0482	0,0039
01.12.1998	4,33	4,33	5,31		0,36	0,42	0,21		0,0454	0,0037
01.01.1999	4,23	4,04	5,32		0,34	0,49	0,18		0,0433	0,0035
01.02.1999	4,05	3,87	4,69	3,99	0,15	0,24	0,09	0,52	0,0403	0,0033
01.03.1999	4,44	4,27	4,99	4,56	0,14	0,25	0,09	0,52	0,0451	0,0037
01.04.1999	4,37	4,22	4,84	4,37	0,13	0,26	0,09	0,51	0,0437	0,0036
01.05.1999	4,27	4,11	4,74	4,24	0,13	0,28	0,09	0,50	0,0425	0,0035
01.06.1999	4,63	4,42	5,17	4,71	0,13	0,30	0,10	0,46	0,0466	0,0038
01.07.1999	4,91	4,77	5,67	5,13	0,12	0,32	0,10	0,46	0,0504	0,0041
01.08.1999	5,36	5,18	6,05	5,43	0,13	0,31	0,09	0,46	0,0540	0,0044
01.09.1999	5,46	5,21	5,91	5,61	0,14	0,32	0,10	0,45	0,0549	0,0045
01.10.1999	5,61	5,42	6,20	5,82	0,13	0,33	0,10	0,44	0,0569	0,0046
01.11.1999	5,59	5,39	6,14	5,73	0,12	0,35	0,08	0,44	0,0562	0,0046
01.12.1999	5,49	5,35	6,06	5,59	0,11	0,38	0,08	0,43	0,0552	0,0045
01.01.2000	5,71	5,65	6,25	5,86	0,10	0,41	0,07	0,42	0,0579	0,0047
01.02.2000	5,86	5,70	6,30	5,91	0,10	0,39	0,07	0,44	0,0585	0,0047
01.03.2000	5,80	5,67	6,30	5,81	0,09	0,38	0,07	0,47	0,0579	0,0047
01.04.2000	5,54	5,32	6,07	5,37	0,10	0,39	0,07	0,45	0,0541	0,0044
01.05.2000	5,65	5,48	6,18	5,46	0,09	0,40	0,06	0,45	0,0553	0,0045
01.06.2000	5,72	5,44	6,20	5,18	0,10	0,38	0,07	0,46	0,0540	0,0044
01.07.2000	5,76	5,48	6,21	5,31	0,10	0,38	0,07	0,45	0,0548	0,0045
01.08.2000	5,66	5,36	6,15	5,29	0,11	0,34	0,07	0,48	0,0541	0,0044
01.09.2000	5,63	5,44	6,23	5,25	0,11	0,35	0,08	0,47	0,0543	0,0044
01.10.2000	5,62	5,44	6,33	5,23	0,12	0,33	0,08	0,46	0,0544	0,0044
01.11.2000	5,52	5,44	6,33	5,16	0,12	0,35	0,08	0,45	0,0540	0,0044
01.12.2000	5,31	5,22	6,06	5,06	0,13	0,37	0,08	0,43	0,0523	0,0043
01.01.2001	5,16	5,06	5,97	4,86	0,13	0,37	0,08	0,42	0,0506	0,0041
01.02.2001	5,07	5,01	5,93	4,81	0,14	0,31	0,09	0,46	0,0501	0,0041
01.03.2001	5,05	4,98	5,95	4,83	0,16	0,28	0,10	0,47	0,0502	0,0041
01.04.2001	5,00	4,96	6,06	4,71	0,16	0,31	0,11	0,43	0,0498	0,0041
01.05.2001	5,31	5,29	6,35	5,14	0,13	0,35	0,10	0,42	0,0533	0,0043
01.06.2001	5,40	5,30	6,69	5,34	0,15	0,33	0,10	0,42	0,0547	0,0045
01.07.2001	5,37	5,33	6,70	5,49	0,15	0,30	0,11	0,44	0,0555	0,0045
01.08.2001	5,19	5,13	6,50	5,27	0,15	0,28	0,14	0,43	0,0538	0,0044
01.09.2001	5,07	5,00	6,41	5,12	0,16	0,26	0,14	0,44	0,0527	0,0043

Continued.										
01.10.2001	5,03	4,99	6,30	5,31	0,16	0,28	0,14	0,42	0,0531	0,0043
01.11.2001	4,56	4,50	5,75	4,80	0,15	0,31	0,13	0,41	0,0480	0,0039
01.12.2001	4,71	4,75	5,92	5,03	0,14	0,31	0,13	0,42	0,0501	0,0041
01.01.2002	5,15	5,12	6,32	5,35	0,13	0,32	0,13	0,42	0,0537	0,0044
01.02.2002	5,14	5,05	6,28	5,37	0,15	0,32	0,13	0,40	0,0535	0,0044
01.03.2002	5,21	5,17	6,41	5,46	0,15	0,31	0,13	0,41	0,0546	0,0044
01.04.2002	5,44	5,40	6,67	5,63	0,15	0,30	0,14	0,41	0,0568	0,0046
01.05.2002	5,37	5,26	6,69	5,65	0,16	0,28	0,15	0,41	0,0566	0,0046
01.06.2002	5,42	5,29	6,89	5,68	0,17	0,27	0,16	0,41	0,0572	0,0046
01.07.2002	5,22	5,09	6,66	5,48	0,17	0,27	0,15	0,40	0,0551	0,0045
01.08.2002	4,98	4,79	6,41	5,23	0,17	0,27	0,16	0,40	0,0526	0,0043
01.09.2002	4,79	4,58	6,14	5,10	0,17	0,28	0,16	0,39	0,0506	0,0041
01.10.2002	4,53	4,35	6,01	4,92	0,17	0,30	0,15	0,38	0,0485	0,0040
01.11.2002	4,70	4,54	6,17	5,05	0,16	0,31	0,15	0,38	0,0500	0,0041
01.12.2002	4,71	4,47	6,18	5,07	0,14	0,32	0,14	0,39	0,0498	0,0041
01.01.2003	4,33	4,08	5,80	4,71	0,16	0,30	0,15	0,39	0,0462	0,0038
01.02.2003	4,20	4,17	5,46	4,59	0,16	0,29	0,15	0,40	0,0453	0,0037
01.03.2003	4,15	3,95	5,24	4,46	0,16	0,29	0,14	0,41	0,0437	0,0036
01.04.2003	4,29	4,11	5,24	4,59	0,17	0,29	0,14	0,40	0,0449	0,0037
01.05.2003	4,29	4,15	5,28	4,70	0,17	0,28	0,14	0,42	0,0456	0,0037
01.06.2003	3,97	3,80	4,73	4,26	0,17	0,28	0,14	0,41	0,0415	0,0034
01.07.2003	3,98	3,85	4,66	4,36	0,19	0,26	0,14	0,41	0,0419	0,0034
01.08.2003	4,39	4,20	5,13	4,69	0,18	0,25	0,15	0,42	0,0458	0,0037
01.09.2003	4,40	4,22	4,96	4,72	0,18	0,26	0,14	0,42	0,0456	0,0037
01.10.2003	4,19	3,98	4,72	4,55	0,19	0,25	0,14	0,42	0,0436	0,0036
01.11.2003	4,53	4,38	4,96	4,98	0,19	0,25	0,14	0,42	0,0474	0,0039
01.12.2003	4,65	4,48	5,01	5,05	0,18	0,26	0,14	0,42	0,0483	0,0039
01.01.2004	4,46	4,27	4,61	4,78	0,18	0,24	0,15	0,43	0,0458	0,0037
01.02.2004	4,40	4,20	4,52	4,71	0,18	0,25	0,14	0,42	0,0450	0,0037
01.03.2004	4,21	4,03	4,02	4,48	0,18	0,25	0,15	0,42	0,0425	0,0035
01.04.2004	4,10	3,93	4,28	4,27	0,17	0,25	0,15	0,43	0,0416	0,0034
01.05.2004	4,34	4,13	4,89	4,56	0,18	0,22	0,16	0,45	0,0448	0,0037
01.06.2004	4,53	4,30	4,83	4,74	0,18	0,21	0,16	0,44	0,0462	0,0038
01.07.2004	4,47	4,25	4,54	4,67	0,18	0,21	0,16	0,44	0,0452	0,0037
01.08.2004	4,34	4,12	4,36	4,53	0,19	0,20	0,17	0,44	0,0438	0,0036
01.09.2004	4,16	3,96	4,24	4,38	0,18	0,20	0,17	0,45	0,0423	0,0035
01.10.2004	4,12	3,93	4,27	4,35	0,18	0,20	0,18	0,44	0,0421	0,0034
01.11.2004	3,94	3,77	4,08	4,20	0,18	0,21	0,17	0,44	0,0404	0,0033
01.12.2004	3,99	3,63	3,97	4,04	0,17	0,21	0,18	0,44	0,0393	0,0032
01.01.2005	3,82	3,48	3,99	3,95	0,18	0,20	0,18	0,44	0,0384	0,0031
01.02.2005	3,63	3,38	3,77	3,74	0,18	0,20	0,18	0,44	0,0365	0,0030
01.03.2005	3,80	3,72	3,95	3,89	0,18	0,20	0,18	0,43	0,0385	0,0032
01.04.2005	3,71	3,61	3,95	3,71	0,18	0,20	0,18	0,43	0,0373	0,0031
01.05.2005	3,45	3,40	3,77	3,38	0,19	0,20	0,18	0,43	0,0347	0,0028
01.06.2005	3,26	3,19	3,62	3,21	0,19	0,21	0,18	0,42	0,0329	0,0027
01.07.2005	3,09	3,10	3,47	2,97	0,18	0,21	0,20	0,41	0,0312	0,0026
01.08.2005	3,27	3,25	3,65	3,15	0,18	0,20	0,20	0,42	0,0329	0,0027
01.09.2005	3,04	3,01	3,52	2,96	0,18	0,20	0,22	0,41	0,0310	0,0026
01.10.2005	3,14	3,14	3,60	3,12	0,17	0,20	0,21	0,41	0,0323	0,0026
01.11.2005	3,37	3,36	3,86	3,30	0,18	0,21	0,20	0,41	0,0344	0,0028
01.12.2005	3,38	3,32	3,94	3,35	0,18	0,20	0,20	0,41	0,0347	0,0028
01.01.2006	3,33	3,27	3,67	3,37	0,18	0,20	0,20	0,41	0,0340	0,0028
01.02.2006	3,44	3,47	3,79	3,49	0,17	0,20	0,21	0,41	0,0354	0,0029
01.03.2006	3,53	3,47	3,70	3,43	0,17	0,21	0,21	0,41	0,0351	0,0029
01.04.2006	3,87	3,79	4,01	3,77	0,16	0,21	0,22	0,41	0,0384	0,0031
01.05.2006	4,01	3,93	4,12	3,92	0,16	0,20	0,23	0,41	0,0398	0,0033
01.06.2006	4,05	3,93	4,25	3,94	0,16	0,20	0,23	0,41	0,0402	0,0033
01.07.2006	4,12	4,03	4,35	4,04	0,16	0,20	0,23	0,40	0,0412	0,0034
01.08.2006	3,97	3,87	4,27	3,87	0,16	0,20	0,24	0,40	0,0398	0,0033
01.09.2006	3,79	3,69	4,10	3,70	0,17	0,20	0,23	0,40	0,0380	0,0031
01.10.2006	3,74	3,63	4,08	3,68	0,17	0,20	0,21	0,42	0,0376	0,0031
01.11.2006	3,74	3,67	4,19	3,63	0,17	0,19	0,22	0,42	0,0378	0,0031

Continued.										
01.12.2006	3,65	3,62	4,12	3,56	0,17	0,19	0,22	0,42	0,0371	0,0030
01.01.2007	3,89	3,97	4,33	3,81	0,17	0,19	0,22	0,43	0,0397	0,0032
01.02.2007	4,03	4,06	4,51	4,03	0,17	0,19	0,22	0,42	0,0414	0,0034
01.03.2007	3,92	3,94	4,42	3,78	0,17	0,20	0,22	0,41	0,0397	0,0033
01.04.2007	4,01	4,06	4,57	3,92	0,17	0,19	0,22	0,42	0,0410	0,0034
01.05.2007	4,14	4,15	4,78	4,09	0,16	0,19	0,22	0,42	0,0426	0,0035
01.06.2007	4,45	4,46	5,06	4,30	0,17	0,20	0,22	0,41	0,0452	0,0037
01.07.2007	4,55	4,51	5,14	4,45	0,17	0,20	0,24	0,40	0,0464	0,0038
01.08.2007	4,35	4,40	4,97	4,29	0,17	0,20	0,23	0,40	0,0448	0,0037
01.09.2007	4,35	4,35	4,81	4,21	0,17	0,21	0,23	0,39	0,0440	0,0036
01.10.2007	4,45	4,40	4,94	4,32	0,17	0,21	0,24	0,38	0,0450	0,0037
01.11.2007	4,33	4,30	4,85	4,26	0,17	0,22	0,24	0,37	0,0442	0,0036
01.12.2007	4,19	4,19	4,64	4,17	0,17	0,22	0,24	0,37	0,0429	0,0035
01.01.2008	4,46	4,40	4,68	4,35	0,17	0,22	0,25	0,36	0,0446	0,0036
01.02.2008	4,07	4,01	4,35	3,97	0,17	0,24	0,23	0,37	0,0408	0,0033
01.03.2008	3,97	3,95	4,30	4,02	0,17	0,22	0,24	0,37	0,0406	0,0033
01.04.2008	4,19	4,12	4,40	4,01	0,17	0,22	0,23	0,37	0,0416	0,0034
01.05.2008	4,42	4,28	4,54	4,08	0,17	0,21	0,26	0,37	0,0430	0,0035
01.06.2008	4,67	4,50	4,69	4,34	0,18	0,20	0,26	0,36	0,0452	0,0037
01.07.2008	4,81	4,79	5,03	4,49	0,18	0,20	0,27	0,34	0,0476	0,0039
01.08.2008	4,65	4,53	4,87	4,19	0,19	0,20	0,26	0,35	0,0452	0,0037
01.09.2008	4,38	4,31	4,62	4,03	0,19	0,20	0,26	0,35	0,0430	0,0035
01.10.2008	4,32	4,25	4,27	3,78	0,19	0,20	0,23	0,37	0,0410	0,0034
01.11.2008	4,43	4,23	4,28	3,55	0,19	0,22	0,22	0,37	0,0403	0,0033
01.12.2008	3,84	3,52	3,80	2,83	0,20	0,22	0,21	0,37	0,0339	0,0028
01.01.2009	3,32	3,48	3,81	2,43	0,19	0,22	0,20	0,38	0,0312	0,0026
01.02.2009	3,68	3,76	3,65	3,08	0,20	0,21	0,22	0,37	0,0347	0,0028
01.03.2009	3,71	3,82	3,76	2,80	0,20	0,19	0,22	0,38	0,0340	0,0028
01.04.2009	3,59	3,68	3,74	3,05	0,18	0,19	0,22	0,41	0,0342	0,0028
01.05.2009	3,63	3,74	3,94	3,26	0,18	0,20	0,21	0,41	0,0356	0,0029
01.06.2009	3,93	4,09	4,26	3,82	0,18	0,20	0,22	0,41	0,0399	0,0033
01.07.2009	3,82	3,83	4,11	3,51	0,18	0,19	0,22	0,41	0,0376	0,0031
01.08.2009	3,58	3,65	4,03	3,41	0,18	0,18	0,21	0,43	0,0362	0,0030
01.09.2009	3,62	3,58	4,12	3,35	0,19	0,18	0,21	0,42	0,0360	0,0030
01.10.2009	3,53	3,53	4,16	3,31	0,18	0,18	0,22	0,42	0,0358	0,0029
01.11.2009	3,61	3,51	4,05	3,23	0,18	0,17	0,23	0,43	0,0353	0,0029
01.12.2009	3,50	3,40	3,87	3,22	0,17	0,17	0,23	0,42	0,0345	0,0028
01.01.2010	3,64	3,55	4,15	3,30	0,17	0,18	0,24	0,41	0,0360	0,0030
01.02.2010	3,51	3,41	3,99	3,30	0,18	0,18	0,23	0,42	0,0351	0,0029
01.03.2010	3,39	3,23	3,72	3,14	0,18	0,17	0,23	0,42	0,0333	0,0027
01.04.2010	3,40	3,21	3,83	3,21	0,17	0,18	0,22	0,43	0,0338	0,0028
01.05.2010	3,19	3,27	3,72	3,04	0,18	0,16	0,23	0,43	0,0326	0,0027
01.06.2010	2,68	2,88	3,38	2,64	0,18	0,17	0,21	0,43	0,0285	0,0023
01.07.2010	2,66	2,81	3,37	2,63	0,19	0,16	0,21	0,44	0,0282	0,0023
01.08.2010	2,79	2,92	3,26	2,79	0,18	0,16	0,21	0,44	0,0291	0,0024
01.09.2010	2,29	2,43	3,04	2,36	0,18	0,16	0,21	0,44	0,0250	0,0021
01.10.2010	2,39	2,54	3,23	2,57	0,18	0,17	0,21	0,45	0,0267	0,0022
01.11.2010	2,59	2,71	3,16	2,81	0,18	0,17	0,21	0,44	0,0283	0,0023
01.12.2010	2,90	3,04	3,43	3,02	0,18	0,16	0,21	0,45	0,0309	0,0025
01.01.2011	3,00	3,12	3,67	3,28	0,18	0,16	0,22	0,44	0,0329	0,0027
01.02.2011	3,25	3,39	3,79	3,43	0,18	0,16	0,23	0,44	0,0347	0,0028
01.03.2011	3,43	3,50	3,73	3,36	0,18	0,15	0,23	0,43	0,0348	0,0029
01.04.2011	3,62	3,70	3,84	3,38	0,18	0,15	0,24	0,43	0,0358	0,0029
01.05.2011	3,44	3,53	3,67	3,22	0,18	0,15	0,23	0,44	0,0341	0,0028
01.06.2011	3,21	3,30	3,35	2,94	0,18	0,15	0,23	0,44	0,0313	0,0026
01.07.2011	3,25	3,34	3,41	2,93	0,17	0,15	0,23	0,44	0,0316	0,0026
01.08.2011	2,74	2,90	2,83	2,47	0,18	0,14	0,24	0,44	0,0267	0,0022
01.09.2011	2,41	2,63	2,78	2,11	0,17	0,15	0,25	0,43	0,0240	0,0020
01.10.2011	2,02	2,28	2,38	1,69	0,11	0,17	0,30	0,43	0,0203	0,0017
01.11.2011	2,01	2,26	2,53	1,69	0,10	0,17	0,30	0,43	0,0207	0,0017
01.12.2011	1,90	2,75	2,57	1,80	0,10	0,17	0,30	0,42	0,0220	0,0018
01.01.2012	1,74	2,38	2,47	1,80	0,10	0,17	0,31	0,42	0,0210	0,0017

13.4.2 Input Regression

Input from DataStream										
Name:	MSCI NORDIC		Nordic Index		Estimated Risk Free Rate (Monthly)					
			1931 entities actively traded on Nordic Indexes							
Data type:	TOT RETURN IND		Market Value							
Currency:	US Dollar		US Dollar							
Code:	MSNORD\$(MSRI)~U\$									
Start:	01.01.1998		01.01.1998		01.01.1998					
End:	01.01.2012		01.01.2012		01.01.2012					
Frecuency:	M	Estimated Returns	M	Estimated Returns	M	Fama-French Factors (2012)		Active entities in sample Portfolio		
Date:						SMB	HML	BO	VC	
01.01.1998	5 546,1	0,019	491 820,2	-0,050	0,0045					
01.02.1998	5 650,0	0,088	467 394,6	0,086	0,0043	-0,006	-0,023			
01.03.1998	6 148,3	0,076	507 659,3	0,057	0,0042	-0,047	-0,066			
01.04.1998	6 618,2	0,054	536 754,3	0,063	0,0042	0,018	0,017			
01.05.1998	6 973,9	0,011	570 371,7	-0,003	0,0043	-0,017	-0,012			
01.06.1998	7 047,7	-0,000	568 415,3	0,005	0,0042	-0,051	-0,060	1		
01.07.1998	7 047,1	0,025	571 479,9	0,009	0,0042	0,027	0,025	3	1	
01.08.1998	7 221,6	-0,166	576 877,5	-0,187	0,0040	0,116	0,113	4	2	
01.09.1998	6 022,4	-0,048	469 282,3	-0,071	0,0040	0,071	0,041	6	2	
01.10.1998	5 731,3	0,087	436 107,3	0,129	0,0037	-0,138	-0,164	6	2	
01.11.1998	6 232,1	0,050	492 186,6	-0,003	0,0039	-0,016	-0,043	6	2	
01.12.1998	6 543,5	0,050	490 726,5	0,080	0,0037	-0,083	-0,110	7	2	
01.01.1999	6 868,0	0,060	529 983,2	0,063	0,0035	0,027	0,043	7	2	
01.02.1999	7 279,4	-0,048	563 371,0	-0,071	0,0033	0,011	0,011	7	2	
01.03.1999	6 933,6	0,054	523 291,5	0,047	0,0037	-0,037	-0,037	7	2	
01.04.1999	7 307,0	0,040	547 964,8	0,066	0,0036	0,165	0,207	7	2	
01.05.1999	7 600,9	-0,035	584 252,1	-0,081	0,0035	0,045	0,061	8	2	
01.06.1999	7 331,8	0,095	537 130,3	0,077	0,0038	0,064	0,110	8	2	
01.07.1999	8 029,0	0,037	578 493,9	0,017	0,0041	0,016	0,025	8	2	
01.08.1999	8 322,8	-0,010	588 441,3	-0,012	0,0044	0,098	0,167	9	3	
01.09.1999	8 239,7	0,024	581 459,3	0,014	0,0045	0,104	0,121	9	3	
01.10.1999	8 436,0	0,115	589 393,1	0,071	0,0046	-0,014	-0,031	9	3	
01.11.1999	9 410,3	0,130	631 012,0	0,134	0,0046	-0,054	-0,048	9	3	
01.12.1999	10 638,1	0,212	715 521,6	0,222	0,0045	0,308	0,452	9	5	
01.01.2000	12 895,0	-0,007	874 605,7	0,000	0,0047	0,489	0,620	9	5	
01.02.2000	12 801,9	0,133	874 650,0	0,122	0,0047	0,058	0,061	9	7	
01.03.2000	14 509,6	0,000	981 363,6	-0,046	0,0047	0,079	0,093	9	7	
01.04.2000	14 510,0	-0,004	936 607,5	0,012	0,0044	-0,016	-0,009	9	7	
01.05.2000	14 459,1	-0,051	948 229,0	-0,049	0,0045	0,018	0,044	10	10	
01.06.2000	13 724,6	-0,011	901 847,4	0,008	0,0044	0,052	0,038	12	10	
01.07.2000	13 577,3	-0,064	909 243,8	-0,048	0,0045	0,161	0,143	12	11	
01.08.2000	12 702,4	-0,005	865 733,8	0,031	0,0044	-0,028	-0,046	12	14	
01.09.2000	12 636,2	-0,095	892 284,6	-0,109	0,0044	0,059	0,006	12	14	
01.10.2000	11 439,0	-0,039	795 425,6	-0,022	0,0044	0,017	0,063	12	14	
01.11.2000	10 995,8	-0,045	778 313,0	-0,038	0,0044	0,042	0,045	12	14	
01.12.2000	10 499,7	0,048	749 098,0	0,022	0,0043	-0,173	-0,217	12	15	
01.01.2001	11 000,9	-0,036	765 689,8	-0,009	0,0041	0,353	0,427	12	15	
01.02.2001	10 599,5	-0,195	758 983,1	-0,174	0,0041	0,016	0,003	12	16	
01.03.2001	8 537,1	-0,115	627 063,5	-0,118	0,0041	0,091	0,094	12	16	
01.04.2001	7 551,6	0,206	553 152,7	0,165	0,0041	-0,062	-0,104	12	16	
01.05.2001	9 104,6	-0,076	644 354,5	-0,067	0,0043	-0,022	-0,037	12	16	
01.06.2001	8 411,4	-0,080	601 471,7	-0,070	0,0045	0,022	0,055	10	16	
01.07.2001	7 742,2	-0,010	559 427,6	0,015	0,0045	0,054	0,066	9	15	
01.08.2001	7 661,2	-0,119	567 808,6	-0,108	0,0044	0,033	0,036	8	15	
01.09.2001	6 752,3	-0,113	506 394,5	-0,113	0,0043	0,003	0,002	7	15	

Continued.									
01.10.2001	5 987,6	0,147	449 363,2	0,115	0,0043	0,115	0,141	7	15
01.11.2001	6 866,3	0,078	500 933,7	0,069	0,0039	0,071	0,125	7	15
01.12.2001	7 398,8	0,061	535 620,9	0,056	0,0041	-0,027	-0,013	6	15
01.01.2002	7 847,1	-0,073	565 771,3	-0,046	0,0044	0,085	0,100	6	15
01.02.2002	7 271,5	-0,008	539 798,7	0,002	0,0044	0,284	0,431	6	15
01.03.2002	7 214,9	0,039	541 001,0	0,040	0,0044	0,064	0,100	6	15
01.04.2002	7 497,2	-0,105	562 567,4	-0,083	0,0046	0,062	0,104	6	15
01.05.2002	6 708,8	-0,032	515 846,3	-0,016	0,0046	0,030	0,043	5	15
01.06.2002	6 493,7	-0,002	507 794,3	-0,000	0,0046	-0,002	-0,018	5	15
01.07.2002	6 478,9	-0,156	507 755,3	-0,130	0,0045	0,116	0,139	7	15
01.08.2002	5 471,4	0,030	441 494,7	0,018	0,0043	-0,013	-0,003	9	14
01.09.2002	5 637,5	-0,102	449 269,8	-0,107	0,0041	-0,009	-0,021	9	14
01.10.2002	5 060,4	0,133	401 251,7	0,106	0,0040	0,142	0,129	9	14
01.11.2002	5 731,4	0,141	443 759,3	0,124	0,0041	0,271	0,365	9	14
01.12.2002	6 541,4	-0,105	498 699,8	-0,052	0,0041	-0,014	0,000	9	12
01.01.2003	5 852,6	-0,042	472 611,4	-0,033	0,0038	0,245	0,162	9	12
01.02.2003	5 605,9	-0,037	456 796,6	-0,031	0,0037	0,133	0,158	9	10
01.03.2003	5 401,0	0,019	442 757,3	0,000	0,0036	0,181	0,311	9	10
01.04.2003	5 506,0	0,187	442 570,2	0,130	0,0037	1,369	2,077	9	10
01.05.2003	6 534,5	0,057	499 941,4	0,054	0,0037	0,580	0,526	8	7
01.06.2003	6 909,7	-0,037	527 029,0	0,003	0,0034	0,030	0,052	6	7
01.07.2003	6 656,9	0,018	528 359,8	0,006	0,0034	0,438	0,627	6	6
01.08.2003	6 776,6	0,066	531 590,1	0,055	0,0037	-0,000	-0,000	6	3
01.09.2003	7 224,6	0,007	560 722,7	0,027	0,0037	0,726	1,031	6	3
01.10.2003	7 274,1	0,077	575 736,4	0,069	0,0036	0,048	0,091	6	3
01.11.2003	7 836,9	0,041	615 296,9	0,044	0,0039	0,919	1,331	6	3
01.12.2003	8 155,2	0,038	642 596,8	0,058	0,0039	0,047	0,055	5	2
01.01.2004	8 466,6	0,068	679 868,6	0,046	0,0037	1,080	1,538	5	2
01.02.2004	9 038,9	0,071	711 155,9	0,058	0,0037	0,065	0,098	5	3
01.03.2004	9 683,6	-0,015	752 651,5	-0,036	0,0035	0,001	0,015	5	3
01.04.2004	9 533,7	-0,093	725 225,3	-0,076	0,0034	0,078	0,052	5	3
01.05.2004	8 643,6	0,002	670 063,2	0,005	0,0037	-0,002	-0,011	5	4
01.06.2004	8 659,4	0,049	673 361,4	0,039	0,0038	0,008	0,050	5	4
01.07.2004	9 082,6	-0,066	699 352,6	-0,041	0,0037	-0,022	-0,030	5	5
01.08.2004	8 482,1	0,030	670 343,4	0,020	0,0036	0,000	0,016	6	3
01.09.2004	8 734,2	0,097	684 037,0	0,090	0,0035	0,101	0,075	6	3
01.10.2004	9 582,8	0,026	745 357,4	0,029	0,0034	0,025	0,039	6	4
01.11.2004	9 833,2	0,102	766 869,9	0,108	0,0033	-0,030	-0,091	6	4
01.12.2004	10 838,2	0,002	849 502,1	0,012	0,0032	0,086	0,038	6	4
01.01.2005	10 862,7	-0,028	859 622,8	-0,020	0,0031	0,074	0,071	6	4
01.02.2005	10 558,3	0,062	842 381,8	0,067	0,0030	0,003	0,008	7	4
01.03.2005	11 209,0	-0,018	898 972,0	-0,026	0,0032	0,111	0,161	7	4
01.04.2005	11 009,0	-0,018	875 348,3	-0,050	0,0031	0,053	0,050	7	4
01.05.2005	10 807,6	0,036	831 710,9	0,022	0,0028	0,043	0,003	7	4
01.06.2005	11 197,1	0,003	850 291,6	0,013	0,0027	0,063	0,100	8	5
01.07.2005	11 233,2	0,048	861 732,2	0,060	0,0026	-0,010	-0,033	7	5
01.08.2005	11 773,2	0,038	913 058,8	0,047	0,0027	0,042	0,066	6	6
01.09.2005	12 214,9	0,011	955 959,9	0,001	0,0026	0,029	0,052	5	6
01.10.2005	12 352,6	-0,043	957 079,4	-0,045	0,0026	0,016	0,038	5	6
01.11.2005	11 822,2	0,022	913 625,4	0,028	0,0028	1,445	2,122	5	6
01.12.2005	12 087,0	0,054	939 041,3	0,063	0,0028	0,038	0,040	5	8
01.01.2006	12 744,3	0,061	997 750,7	0,077	0,0028	0,153	0,110	6	11
01.02.2006	13 523,0	0,010	1 074 885,7	0,008	0,0029	-0,001	0,001	7	13
01.03.2006	13 658,0	0,100	1 083 520,0	0,087	0,0029	0,033	0,074	7	13
01.04.2006	15 019,9	0,051	1 178 218,3	0,037	0,0031	0,044	0,036	8	13
01.05.2006	15 782,4	-0,051	1 222 182,5	-0,053	0,0033	0,310	0,470	10	13
01.06.2006	14 973,6	-0,017	1 156 974,0	-0,025	0,0033	0,020	0,060	10	13
01.07.2006	14 725,4	-0,022	1 127 626,3	-0,013	0,0034	0,020	0,086	10	13
01.08.2006	14 401,8	0,043	1 113 361,7	0,025	0,0033	0,194	0,311	10	14
01.09.2006	15 020,6	0,007	1 141 744,5	0,002	0,0031	0,074	0,018	10	16
01.10.2006	15 131,6	0,065	1 144 535,7	0,070	0,0031	-0,050	0,081	10	16
01.11.2006	16 121,3	0,042	1 224 450,3	0,058	0,0031	0,056	0,066	10	16

Continued.									
01.12.2006	16 799,3	0,061	1 295 199,7	0,058	0,0030	-0,004	0,030	11	17
01.01.2007	17 816,1	0,034	1 370 018,5	0,036	0,0032	0,116	0,063	13	18
01.02.2007	18 416,1	-0,035	1 419 023,0	-0,038	0,0034	0,063	0,001	12	18
01.03.2007	17 765,5	0,078	1 365 480,9	0,067	0,0033	0,224	-0,210	12	18
01.04.2007	19 146,9	0,086	1 456 980,0	0,067	0,0034	1,385	2,113	12	18
01.05.2007	20 796,8	0,029	1 554 360,1	0,014	0,0035	-0,031	-0,013	12	19
01.06.2007	21 400,3	0,007	1 576 679,2	0,014	0,0037	0,064	0,105	12	20
01.07.2007	21 559,1	-0,029	1 599 243,6	-0,024	0,0038	0,164	0,198	15	20
01.08.2007	20 932,3	0,014	1 561 259,4	-0,006	0,0037	-0,034	0,044	15	25
01.09.2007	21 225,4	0,095	1 552 457,6	0,081	0,0036	-0,004	0,066	15	25
01.10.2007	23 251,1	-0,009	1 678 068,8	-0,004	0,0037	0,004	0,010	15	26
01.11.2007	23 038,9	-0,039	1 671 080,7	-0,044	0,0036	-0,014	0,026	15	25
01.12.2007	22 137,5	-0,016	1 598 031,4	-0,015	0,0035	-0,034	0,038	16	26
01.01.2008	21 774,9	-0,095	1 574 824,3	-0,094	0,0036	0,196	0,144	18	26
01.02.2008	19 714,7	0,027	1 426 778,3	0,036	0,0033	0,040	0,033	17	26
01.03.2008	20 253,6	0,027	1 477 532,4	0,017	0,0033	-0,025	0,007	17	26
01.04.2008	20 807,7	0,010	1 502 712,7	0,001	0,0034	0,073	0,005	17	26
01.05.2008	21 019,7	0,031	1 504 304,3	0,023	0,0035	-0,059	-0,010	15	26
01.06.2008	21 669,3	-0,119	1 538 778,9	-0,108	0,0037	0,248	0,278	15	25
01.07.2008	19 083,8	-0,027	1 373 081,8	-0,044	0,0039	0,076	0,079	15	25
01.08.2008	18 561,4	-0,039	1 312 712,2	-0,043	0,0037	-0,005	0,045	14	23
01.09.2008	17 830,3	-0,219	1 256 628,4	-0,228	0,0035	0,222	0,247	14	24
01.10.2008	13 930,6	-0,217	970 114,1	-0,226	0,0034	0,026	-0,055	14	24
01.11.2008	10 908,7	-0,174	750 835,7	-0,184	0,0033	0,132	0,058	14	24
01.12.2008	9 006,9	0,136	613 014,3	0,117	0,0028	-0,166	0,098	13	22
01.01.2009	10 231,5	-0,122	684 728,2	-0,101	0,0026	0,276	0,059	12	19
01.02.2009	8 979,7	-0,115	615 842,7	-0,101	0,0028	0,040	0,011	11	16
01.03.2009	7 948,5	0,187	553 810,7	0,166	0,0028	0,121	0,318	11	17
01.04.2009	9 437,2	0,199	645 947,5	0,171	0,0028	0,085	0,374	10	17
01.05.2009	11 317,5	0,148	756 128,0	0,149	0,0029	0,110	0,129	9	17
01.06.2009	12 998,0	-0,025	868 715,6	-0,023	0,0033	1,165	1,706	9	17
01.07.2009	12 672,4	0,114	848 484,7	0,118	0,0031	0,092	0,256	9	16
01.08.2009	14 115,6	-0,002	948 743,4	0,004	0,0030	0,090	0,224	7	15
01.09.2009	14 092,7	0,030	952 563,9	0,040	0,0030	0,053	0,063	7	14
01.10.2009	14 517,9	0,027	990 999,4	0,034	0,0029	0,016	0,022	7	14
01.11.2009	14 912,8	0,050	1 025 121,6	0,060	0,0029	0,052	0,181	7	14
01.12.2009	15 658,9	-0,029	1 086 862,4	-0,020	0,0028	-0,009	0,030	6	13
01.01.2010	15 197,2	0,001	1 065 224,0	0,001	0,0030	0,093	0,076	5	12
01.02.2010	15 206,5	-0,011	1 065 918,4	-0,014	0,0029	0,044	-0,074	4	11
01.03.2010	15 042,0	0,094	1 050 663,0	0,075	0,0027	0,218	0,387	4	11
01.04.2010	16 452,5	0,003	1 129 591,3	-0,001	0,0028	0,167	0,242	4	11
01.05.2010	16 494,2	-0,127	1 127 981,7	-0,144	0,0027	0,150	0,184	4	9
01.06.2010	14 396,6	-0,021	965 014,5	-0,029	0,0023	0,118	0,131	4	9
01.07.2010	14 093,5	0,190	937 404,0	0,195	0,0023	0,071	0,318	3	8
01.08.2010	16 767,6	-0,047	1 119 890,8	-0,056	0,0024	-0,016	0,029	3	3
01.09.2010	15 973,3	0,114	1 057 656,7	0,118	0,0021	0,069	0,073	3	3
01.10.2010	17 793,3	0,025	1 182 269,9	0,030	0,0022	0,023	0,188	3	1
01.11.2010	18 230,2	-0,029	1 217 755,8	-0,024	0,0023	0,004	-0,037	3	1
01.12.2010	17 695,5	0,101	1 188 496,4	0,112	0,0025	0,170	0,420	2	
01.01.2011	19 490,6	0,025	1 321 050,0	0,037	0,0027	0,166	0,056		
01.02.2011	19 974,4	-0,012	1 370 129,8	-0,006	0,0028	0,034	0,104		
01.03.2011	19 739,2	0,035	1 362 073,3	0,030	0,0029	0,004	-0,057		
01.04.2011	20 420,3	0,078	1 403 009,4	0,059	0,0029	0,122	0,190		
01.05.2011	22 016,8	-0,051	1 485 415,0	-0,066	0,0028	0,103	0,045		
01.06.2011	20 901,2	-0,044	1 386 807,5	-0,048	0,0026	0,087	-0,101		
01.07.2011	19 980,2	-0,084	1 320 923,1	-0,080	0,0026	0,082	0,006		
01.08.2011	18 310,5	-0,072	1 214 630,4	-0,077	0,0022	0,226	0,149		
01.09.2011	16 999,4	-0,143	1 120 600,2		0,0020				
01.10.2011	14 573,2	0,091			0,0017				
01.11.2011	15 894,1	0,010			0,0017				
01.12.2011	16 060,2	0,004			0,0018				
01.01.2012	16 127,2				0,0017				

13.4.3 Robust Regression output

MSCI Nordic Index: Single Factor Regression - CAPM											
Buyout CAPM EW MSCI					Buyout CAPM VW MSCI						
Number of obs 145					145 Number of obs						
F(1, 143) 206,15					F(1, 143) 84,69						
Prob > F 0					Prob > F 0						
R-squared 0,6027					R-squared 0,5833						
Root MSE 0,0675					Root MSE 0,0852						
Robust											
borfew					borfvw						
Coef.	Std.Err.	t	P>t	[95% Conf. Interval]	Coef.	Std.Err.	t	P>t	[95% Conf. Interval]		
rmrfmsci	1,005564	0,0700359	14,36	0	0,867125	1,219387	0,1324992	9,2	0	0,957	1,481297
_cons	-0,0053352	0,0055658	-0,96	0,339	-0,01634	-0,0086228	0,0066672	-1,29	0,198	-0,02	0,004556
VC CAPM EW MSCI					VC CAPM VW MSCI						
Number of obs 145					Number of obs 145						
F(1, 143) 65,79					F(1, 143) 97,66						
Prob > F 0					Prob > F 0						
R-squared 0,2597					R-squared 0,3858						
Root MSE 0,1245					Root MSE 0,1187						
Robust											
vcrfew					borfvw						
Coef.	Std.Err.	t	P>t	[95% Conf. Interval]	Coef.	Std.Err.	t	P>t	[95% Conf. Interval]		
rmrfmsci	0,8920296	0,1099752	8,11	0	0,674642	1,137815	0,1151338	9,88	0	0,91	1,365399
_cons	0,0071973	0,010394	0,69	0,49	-0,01335	0,0009431	0,0099661	0,09	0,925	-0,02	0,020643
Buyout in excess of VC CAPM EW MSCI					Buyout in excess of VC VW MSCI						
Number of obs 145					Number of obs 145						
F(1, 143) 0,66					F(1, 143) 0,3						
Prob > F 0,4169					Prob > F 0,5829						
R-squared 0,0024					R-squared 0,0025						
Root MSE 0,1495					Root MSE 0,1283						
Robust											
bovcw					bovcvw						
Coef.	Std.Err.	t	P>t	[95% Conf. Interval]	Coef.	Std.Err.	t	P>t	[95% Conf. Interval]		
rmrfmsci	0,0878123	0,1078491	0,81	0,417	-0,12537	0,0774954	0,1408112	0,55	0,583	-0,2	0,355836
_cons	-0,012817	0,0124043	-1,03	0,303	-0,03734	-0,0131869	0,0105439	-1,25	0,213	-0,03	0,007655

Ad-Hoc Nordic Index: Single Factor Regression - CAPM											
Buyout CAPM EW Nordic					Buyout CAPM VW Nordic						
Linear regression					Linear regression						
Number of obs 145					Number of obs 145						
F(1, 143) 191,49					F(1, 143) 90,22						
Prob > F 0					Prob > F 0						
R-squared 0,3864					R-squared 0,6197						
Root MSE 0,10608					Root MSE 0,08209						
Robust											
niewbo					niewwbo						
Coef.	Std.Err.	t	P>t	[95% Conf. Interval]	Coef.	Std.Err.	t	P>t	[95% Conf. Interval]		
nirmrf	1,075798	.0777428	13,84	0	0,9221247	1,338944	.1409657	9,50	0	1,060298	1,61759
_cons	.0039705	.0088217	0,45	0,653	-0,0134673	-.006796	.0064259	-1,06	0,292	-0,019498	0,0059059
VC CAPM EW Nordic					VC CAPM VW Nordic						
Linear regression					Linear regression						
Number of obs 145					Number of obs 145						
F(1, 143) 86,79					F(1, 143) 113,19						
Prob > F 0					Prob > F 0						
R-squared 0,2941					R-squared 0,4178						
Root MSE 0,12467					Root MSE 0,11618						
Robust											
niewvc					niewwvc						
Coef.	Std.Err.	t	P>t	[95% Conf. Interval]	Coef.	Std.Err.	t	P>t	[95% Conf. Interval]		
nirmrf	1,028257	.1103711	9,32	0	0,8100879	1,257646	.1182089	10,64	0	1,023983	1,491308
_cons	.0163865	.0103219	1,59	0,115	-0,0040167	.0062725	.0096752	0,65	0,518	-0,0128523	0,0253973
Buyout in excess of VC CAPM EW Nordic					Buyout in excess of VC CAPM VW Nordic						
Linear regression					Linear regression						
Number of obs 145					Number of obs 145						
F(1, 143) 0,18					F(1, 143) 0,3						
Prob > F 0,673					Prob > F 0,5835						
R-squared 0,0006					R-squared 0,0025						
Root MSE 0,14956					Root MSE 0,12832						
Robust											
niewbovc					niewwbovc						
Coef.	Std.Err.	t	P>t	[95% Conf. Interval]	Coef.	Std.Err.	t	P>t	[95% Conf. Interval]		
nirmrf	.0474385	.1121732	0,42	0,673	-0,1742935	.081405	.1481456	0,55	0,584	-0,2114333	0,3742433
_cons	-.0124912	.0124285	-1,01	0,317	-0,0370586	-.013145	.0105416	-1,25	0,214	-0,0339826	0,0076925

Ad-Hoc Nordic Index: Three Factor Regression - Fama-French 2012

BO Fama French EW Nordic					FAMA EW BO NI					BO Fama French VW Nordic					FAMA VW NI BO				
Linear regression					Number of obs	145				Linear regression					Number of obs	145			
					F(3, 141)	64,54									F(3, 141)	33,9			
					Prob > F	0									Prob > F	0			
					R-squared	0,3875									R-squared	0,6231			
					Root MSE	0,10674									Root MSE	0,0823			
Robust										Robust									
niewbo	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]				nivwbo	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]			
nirmrf	1.087429	.0859609	12.65		0	0,9174905 1,257368				nirmrf	1.358986	.1510885	8.99		0	1,060294 1,657678			
smb	.047616	.1275552	0.37		0,709	-0,2045519 0,299784				smb	.0980559	.1190815	0.82		0,412	-0,13736 0,3334719			
hml	-.0317879	.0850463	-0.37		0,709	-0,1999187 0,136343				hml	-.0653042	.0793879	-0.82		0,412	-0,2222486 0,0916401			
_cons	.0030446	.0098157	0.31		0,757	-0,0163604 0,02245				_cons	-.0072899	.0063287	-1.15		0,251	-0,0198014 0,0052216			
VC Fama French EW Nordic					FAMA EW NI BO-VC					VC Fama French VW Nordic					FAMA VW NI VC				
Linear regression					Number of obs	145				Linear regression					Number of obs	145			
					F(3, 141)	38,05									F(3, 141)	39,94			
					Prob > F	0									Prob > F	0			
					R-squared	0,3505									R-squared	0,4303			
					Root MSE	0,12042									Root MSE	0,11574			
Robust										Robust									
niewwvc	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]				nivwvc	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]			
nirmrf	1.162358	.1120922	10.37		0	0,9407594 1,383956				nirmrf	1.319062	.1218314	10.83		0	1,07821 1,559915			
smb	.5985005	.2068106	2.89		0,004	0,1896502 1,007351				smb	.2670066	.1523296	1.75		0,082	-0,0341387 0,5681519			
hml	-.3990674	.1378704	-2.89		0,004	-0,6716277 -0,12651				hml	-.1780981	.101552	-1.75		0,082	-0,3788595 0,0226632			
_cons	.0091181	.0092465	0.99		0,326	-0,0091615 0,027398				_cons	.002455	.0094705	0.26		0,796	-0,0162675 0,0211775			
Buyout in excess of VC Fama French EW Nordic					Fama EW NI BO-VC					Buyout in excess of VC Fama French VW Nordic					FAMA VW NI BO-VC				
Linear regression					Number of obs	145				Linear regression					Number of obs	145			
					F(3, 141)	2,09									F(3, 141)	1,13			
					Prob > F	0,1043									Prob > F	0,3409			
					R-squared	0,0469									R-squared	0,0172			
					Root MSE	0,14709									Root MSE	0,12827			
Robust										Robust									
niewwovc	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]				nivwovc	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]			
nirmrf	-.0749982	.1201858	-0.62		0,534	-0,3125972 0,162601				nirmrf	.0401067	.1557857	0.26		0,797	-0,2678709 0,3480843			
smb	-.5507492	.2274313	-2.42		0,017	-1,000365 -0,101113				smb	-.1686193	.1756216	-0.96		0,339	-0,5158112 0,1785725			
hml	.3671891	.1516231	2.42		0,017	0,0674406 0,666938				hml	.1125729	.1170821	0.96		0,338	-0,1188903 0,3440361			
_cons	-.0061514	.0123157	-0.50		0,618	-0,0304986 0,018196				_cons	-.0098262	.0105651	-0.93		0,354	-0,0307127 0,0110604			