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Discounts in Closed-End Funds

A Study on the Swedish Market

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Abstract

Title: Discounts in Closed-End Fund – A Study on the Swedish Market

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Key words: Closed-end Fund, Discount, Efficient Market Hypothesis, Premium.

Purpose: The thesis strives to use previous research as a basis to perform an up-to-date and relevant study about the CEF puzzle on the Stockholm stock exchange. Annual data for the whole population of Swedish CEFs will be studied over the time period 2006-2010. A multiple regression analysis will be executed in order to determine the impact of a number of explanatory variables on the CEF discounts.

Theory: Efficient market hypothesis, agency theory, investor sentiment, rational investors.

Methodology: The study is performed using a quantitative, deductive approach. A multiple regression analysis on panel data is executed, as well as a number of tests to ensure the reliability of the results.

Empirical foundation: Annual data from the entire population of closed-end funds listed on the Stockholm stock exchange between 2005 and 2010, analyzed as panel data through a multiple regression model.

Conclusion: The regression performed did show significant impact on the CEF discounts for a number of explanatory variables, dividends, ownership concentration, fund age, and fund diversification. The results can be explained by financial theory in conjunction with the features of the Swedish CEF market. The Swedish population of CEFs is limited, why it could be of interest to incorporate other Nordic markets in future research.

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1. Introduction

Closed-end funds are listed companies in which income derives from investments in a broad array of securities. Supply and demand determines the price of closed-end funds shares, and their market price often differs from their net asset value. This is one of the most immensely researched anomalies in finance; many potential explanatory factors have been put forward, but there is still no clear consensus in the academic research about how it should be interpreted. Closed-end funds play an important role in the Swedish business life, but previous research on the market is scarce.

1.1. Background

On March 15th 2011 the stock of publicly traded Swedish investment company Luxonen soared over 20 percent in a couple of hours trading. The market did not react to new information about high returns, favourable outlooks, or any other positive news one could have anticipated. The stock rocketed on the news that Luxonen was about to get liquidated. (Privata Affärer, 2011). As an investment company, a type of closed-end fund, Luxonen's business model was to invest in other companies and to distribute earnings to its shareholders. The market capitalization of Luxonen should theoretically match the net value of Luxonen's investments, its Net Asset Value (NAV), since anything else would imply that investors has bought something for less, or more, than it is worth. For various reasons, however, the market valued Luxonen at a discount to its NAV, something that were corrected upon the news about the company's coming liquidation.

Closed-end funds traditionally, and with few exceptions, trade at a discount to their NAV, a puzzle that has received significant attention in academic research. In Sweden, roughly 30% of the total public stock market is controlled, either directly or indirectly, by closed-end investment companies. This is significantly higher than in other developed countries, and the reason could partly be found in a Swedish tradition where a few, big owners has been favoured by the political climate, and where investment companies are subject to tax-benefits. In Sweden there is also a system of share-classes with different voting power, which has lead to a concentration of controlling power in companies, much unlike the American system with dispersed ownership. (Hjelström, 2007)

1.1.1. Closed-End Funds

Simply put, an investor has two alternatives once she has decided to enter a stock market. The investor, either individual or institutional, could (1) invest directly in securities on his own, or (2) invest indirectly through a financial intermediary. The financial intermediary could be an

open-end fund (OEF) or a closed-end fund (CEF); both have diversification and portfolio management as their core activities. (Hjelström, 2007).

A CEF is a company that issues a fixed number of shares to finance investments in other companies, whereas the share in an OEF is directly related to the NAV of the fund. Since the CEFs shares are fixed and traded at an exchange, their price is determined by supply and demand, like they are for any other traded company (Chan, Wan Kot, Li, 2007).

1.2 Problem discussion

1.2.1. The Closed-End Fund Puzzle

Closed-end investment companies differ from traditional producing and services companies in a number of ways, and are therefore valuated differently by the market. The market price of CEFs is often substantially lower than the NAV of their holdings, i.e. they are publicly traded at a discount. Theoretically, a CEF should be worth as much as it's combined NAV, but the discount tends to be persistent over time as well as over geographical areas. This means, put simply, that it in this case is possible to buy something for less than it is worth, and is commonly referred to as the CEF puzzle. The anomaly seems to challenge traditional financial theory since two assets, with seemingly equal risk-return distribution, are traded at different prices, which implies a contradiction to the efficient market where arbitrage opportunities should instantly be corrected (Charrón, 2009).

The valuation of CEFs is one of the most immensely researched matters in finance, and although the puzzle has long been observed in the marketplace and received a lot of attention from researchers, no fully satisfying explanation for its existence has been put forward. It is therefore reasonable to believe that the puzzle cannot be studied seen in isolation, but rather as a number of factors that together affect the discount.

1.2.2. The Swedish Closed-End Fund Market

Historically, the tax rate on personal capital gains in Sweden has been high and financial markets have been highly regulated, which has made it costly for minor actors to get direct access to stocks. Before the eighties, when deregulations of the financial markets began, CEFs were an inexpensive way for personal investors to obtain diversification and allowed them to gain the long-term benefits from investing in shares at a low cost. (Hjelström, 2007)

As of today, investors can gain diversification through OEFs, or simply by investing in diverse shares themselves. The practical implication for CEFs is that they actively have to add

value, through expertise or in another way, to economically motivate their own existence. The fact that discounts generally are higher in Sweden than in, for example, Britain (Hjelström, 2007) indicates that Swedish fund managers are failing to do so.

One of the unique features of the Swedish market for CEFs can help motive the existence of the funds, however. Almost all of the publicly traded CEFs in Sweden have extremely concentrated ownership, where the majority owner tends to be a key player in the Swedish business life (Hjelström, 2007). This gives raise to the question if fund managers are determined to obtain highest possible return, or if the main purpose of the fund is to maintain a powerful owner's position in the Swedish business life. Ownership structure is commonly raised as a factor underlying the CEF discount (Barclay, Holderness, Pontiff, 1993), and due to the characteristics of the ownership structure in Sweden, it is reasonable to believe that this is a factor of even greater importance for firms listed on the Stockholm stock exchange.

1.3 Problem formulation

What is aimed to research in this thesis is not as much why CEFs exist, but rather what factors determines the discount that they are traded at. Even though much academic research has been conducted in the past, the results are inconclusive. At least ten different factors have been put forward in various studies as significant explanatory variables for the CEF discount-puzzle. These studies have been conducted on different geographical markets, with different samples, over almost half a decade. An up to date study on the Swedish market is thus justified.

The following questions will be answered:

- Which factors impact the discount that Swedish CEFs tend to be traded at?
- How can financial theory explain the impact of these factors?
- How does the result from the Swedish market differ from results from other markets?
- How can differences be motivated?

1.4 Purpose

The thesis strives to use previous research as a basis to perform an up-to-date and relevant study about the CEF puzzle on the Stockholm stock exchange. Annual data for the whole population of Swedish CEFs will be studied over the time period 2006-2010. A multiple regression analysis will be executed in order to determine the impact of the explanatory variables on the CEF discounts.

1.5. Scope of Research and Contribution

The thesis will study which factors that have impact on the valuation-gap of CEFs. Obtained results will be of interest for CEF managements since it will contribute to a better understanding of the factors affecting the discount; if managers know which factors that have impact on the discount, they will also know which factors to affect in order to minimize the discount. The result could, of course, also be used by investors as a means to facilitate the analysis of whether or not a given discount is justified.

The majority of the research concerning CEFs has been carried out in the US and the UK, why it is considered to be of interest to include the Swedish market and provide a broader perspective. The subject is especially of interest in Sweden, since CEFs constitute a significant part of the Stockholm stock exchange. In Sweden, investment companies are often called "power companies" since they are partly used as a means to gain and maintain the controlling power over companies, and not strictly as a mean to yield highest possible return on investments. It is thus reasonable to believe that ownership concentration is a factor with more impact on the discount in Sweden than it is in countries where similar studies have been conducted in the past.

1.6. Outline

The thesis continues with a practical frame of reference, where CEFs and the reality they operate in are thoroughly investigated and explained. Previous research in the field of CEFs will be explored, and a theoretical framework based on well-known economic theories presented. The methodology used will be explained in detail, since the thesis relies on panel data regression which tends to be a complicated procedure. This will be followed by the empirical section, where results will be presented for the full sample. The results will be analysed thoroughly using relevant theories, and the thesis will end with a conclusion and suggestions for further research.

2. Practical Frame of Reference

Closed-end funds are publicly traded companies like any others, with the exception that their business consists of investing in securities, and managing these investment to achieve abnormal returns. Closed-end funds differ from open-end funds in that their market value is determined by supply and demand for their shares. They are also subject to some tax-advantages, and could be regarded as a way for investors to achieve benefits of scale on their investments. Since 2005, accounting standards require investment companies to disclose their assets at fair market value.

2.1 Closed-End Funds

CEFs are publicly traded companies which operations bear resemblance to other business corporations. They mainly differ in that their business consists of investing funds in securities, and management of these investments to achieve income and profit. CEFs differ from OEFs in a number of ways. In an OEF, investors invest an undetermined amount and receive a share in the fund, where the value of the share is directly correlated to the value of the fund's assets. Closed-end funds are called so because their shares are fixed (closed), implying that supply of the shares are inelastic. The value of the shares is not decided by the NAV of the fund, but rather by supply and demand. This leads to the fact that market value and NAV will most likely not be the same, even though CEFs usually holds other securities that are publicly traded, i.e. have known market values. (Dimson, Minio-Kozerski, 1999)

The CEF shares are traded with either a premium or a discount; where the discount is most commonly observed. This phenomenon is referred to as the closed-end puzzle (Lee, Shleifer, Thaler, 1991) and will be further investigated later in the thesis.

2.1.1 Benefits of Closed-End Funds

A CEF can invest in many different types of assets, which gives individual investors a possibility to get a high degree of diversification at a low transaction cost. Investors can benefit from the fund managers expertise in stock picking, even though this is paid for through management fees. Investment companies also enable investors to benefit from potential economies of scale since they pool money from a broad investor base. Investment companies are subject to some tax-advantages, mainly on dividends, which also is part of the explanation to their existence. (Hjelström, 2007)

2.1.2. Closed-End Fund Categories

Three broad categories of CEFs can be identified: (1) the pure investment company, (2) the mixed investment company, and (3) the operational investment company. The pure

investment company only exercise indirect control over companies it invests in, while the mixed investment company is more direct and active in the control it exercises. The operational investment company is typically a regular, producing, company that has evolved into an asset manager. The line between mixed investment companies and private equity or venture capital companies can be thin, but investment companies are typically more involved in long term investments with lower leverage, and less involved in the actual management of the company in which it invests. (von Essen, 1997)

2.1.3. Closed-End Fund Definition

In the Swedish tax system, the following definition of a closed-end investment company is used:

"An investment company is a Swedish stock corporation or a Swedish incorporated association which exclusively or almost exclusively manages securities or similar personal property, whose main purpose is to offer the shareholders risk diversification through a well-diversified portfolio of securities, and in which a large number of individual investors own shares." (Hjelström, 2007)

2.1.4. The Closed-End Fund Life Cycle

The life cycle of CEFs can be divided into four stages, as described by Lee, Schleifer, and Thaler (1991):

1. When initially listed on a stock exchange, CEFs on average are traded at a premium of 10 percent.
2. After 120 days of trading, the 10 percent premium has turned into an average discount of 10 percent.
3. Discounts are now the norm, but fluctuations can be seen over time. The discounts are mean reverting, and tend to be correlated between funds.
4. In the end of the funds life, when liquidation is approaching, the discounts are diminishing. At final termination, the market value of the fund and its reported NAV are equal, erasing the discount and thus fulfilling the no-arbitrage paradigm.

The research about CEFs life cycle was performed on the US market, but the overlying pattern is the same for the Swedish market, even though discounts tend to be greater, as shown by Hjelström (2007).

2.2. IAS39

In 2005, the IAS39 standards regarding accounting of financial instruments were implemented in EU-countries. The standard stipulates that all listed companies should disclose financial assets and liabilities on their balance sheets at fair market value.

”*Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm’s length transaction*.” (IAS39)

IAS39 is a part of the capital markets oriented framework IFRS, which is developed to make financial reports more useable to investors by increasing transparency. The US do not follow the IFRS, instead the framework US GAAP is used. Inconsistencies in accounting between the Europe and the US as well as within Europe over periods are thus a reality that makes comparisons less precise.

3. Theoretical Frame of Reference

Research concerning closed-end funds is either performed within the rational framework or from the behavioural finance point of view. The closed-end fund puzzle has received significant attention from academic researchers, and a number of potential explanatory variable have been put forward. The most relevant of these explanatory variables are studied in this section.

3.1. The Closed-End Fund Puzzle

The discount in CEFs raises the question of how is it possible to purchase something for less than it is worth. There have been numerous academic attempts to solve the CEF puzzle, where researchers have pointed to different explanation for the persistent difference between NAV and market value in observed in CEFs.

Part of previous research has been concerned with trading implications of the discount. Copeland et al (1994) as well as Brickley and Schallheim (1985) have formulated strategies on how to obtain abnormal returns through inefficiencies in CEF valuation, but formulating trading strategies is beyond the scoop of this thesis. A number of researchers have also turned to behavioural finance to explain the discount when empirical evidence has fallen short. Malkiel (1977), Lee, Schleifer, and Thaler (1991), and Swaminathan (1996) have all offered explanations partly tied to investor sentiment. The majority of previous studies, however, are performed within the rational framework, based on traditional financial theory. The CEF puzzle are here researched through a number of potential explanatory variables, based on fundamentals, and their impact on the discount the average CEF is traded at.

3.2. Traditional finance vs. Behavioural finance

Traditionally, financial theory has been based on two paradigms:

1. Investors are rational and always strive to maximize their utility.
2. Markets are efficient, i.e. share prices reflect all available information.

(Shindler, 2007)

Behavioural finance challenges the traditional paradigms by providing information regarding how markets are inefficient by claiming irrational behaviour of investors (Sewell, 2007). The CEF puzzle has been studied through both perspectives, which has made obtained results even more inconclusive. From the behavioural standpoint, investor sentiment and noise traders are commonly stated as reasons underlying CEF discounts, while representatives of the rational framework have stated a number of potential factors offering rational solutions to the puzzle.

3.3. Efficient Market Hypothesis

The concept of efficient capital markets have for long been one of the dominant theories in financial research. The theory stipulates that in an efficient market, the prices of securities are fully reflecting all available information. Accordingly, abnormal returns cannot be drawn from information advantages, since information advantages simply does not exist (Elton, Gruber, 2003). The market efficiency can be described as strong, semi-strong, or weak (Fama, 1970).

In the weak form of market efficiency, past market prices and data are fully reflected in security prices. This information is easy to interpret, why investors are not able to achieve risk adjusted abnormal returns through trading strategies based on historical information. In the semi-strong market efficiency, all publicly available information is fully reflected in share prices. Fundamental analysis is accordingly performed using information available to all investors, and thus not a valid tool to achieve risk adjusted abnormal returns. In the strong market efficiency, all information is fully reflected in security prices. Security prices even mirrors insider information, making it impossible for investors to beat the market through risk adjusted trading. (Fama, 1970)

The strong form market efficiency is commonly regarded to be unrealistic, since insiders clearly have an information advantage over the average investor. Investors' access to information in the modern financial system is more or less instant, why developed stock markets in reality are generally expected to be semi-strong. Jensen's (1969) findings on mutual fund managers' performance gives support to the efficient market hypothesis. Between 1945 and 1964, he found that the average fund manager was beat by the market by approximately the amount of the funds added expenses. Malkiel (1973) further questioned the performance of the average fund managers by showing that Jensen's result was subject to survivorship-bias, i.e. the true underperformance of the average fund manager were actually even greater.

3.4. Investor Sentiment

The behavioural finance approach offer explanations to the CEF puzzle that centres around the existence of so called noise traders. This group reacts on noise rather than news, causing mispricing in securities and increased volatility by their irrational behaviour (Black, 1986). Instead of decision-making based on fundamentals and models, investors are assumed to be affected by their sentiment, e.g. expectations on the future, returns, and risk. Since it is

assumed to be a greater share of noise traders present in the ownership of CEFs than the funds underlying assets, the discount is justified with the additional risk that are imposed by noise traders (Charrón, 2009).

The first study connecting the CEF puzzle to investor sentiment was written by Martin E. Zweig (1973), concluding that the CEF discounts were a reflection of heterogeneous expectations amongst investors. Since then there have been several studies connecting investor sentiment to the valuation of CEFs. Delong, Shleifer, Summers, and Waldmann presented a model in 1990 in which rational investors interact in financial markets side by side with noise traders. The key component in the proposed model is heterogeneous investor expectations on asset returns, which results in noise traders causing unpredictable fluctuations in share prices. What the studies made are trying to establish is if the discount is a result of irrational behaving investors, noise traders, rather than actual fundamentals. Lee, Schleifer and Thaler (1991) argue that the discount is an effect of investor sentiments; the discount is low when investors are optimistic and high when investors are pessimistic. This conclusion later got criticized by Chen, Kan and Miller (1993), who claimed inaccuracies in the obtained results.

3.5. The Rational Framework

Within the rational framework, the most frequent explanatory factors in earlier studies are agency costs, tax liabilities, and illiquidity effects (Lee, Shleifer, Thaler, 1991), but significant results have been put forward for an additional number of factors as well. Below, these factors will be further scrutinized through studies of previous research.

3.5.1. Agency Costs

The agency costs are the costs connected to the management of the fund and arise since minority investors do not trust that management are trying to maximize shareholder value.

Historically the management fee that a CEF charge has been stable between 0,5 and 2 per cent annually, and if it is seen as an agency cost it can partly explain the discount (Hjelström, 2007). In an efficient market, the CEF should be traded at a discount, since the investor pay extra for something they can potentially get themselves. The fees have been stable over time, while discounts tend to fluctuate, and even though they theoretically can explain a small part of the discount, the average discount is too large to completely be explained by management fees (Brickley, Manaster, Schallheim, 1991).

Agency costs can also be connected to the ownership structure of the CEFs. Hjelström (2007) argues that discounts tend to be larger in CEFs where ownership concentration is larger. He also states that large and stable owners tend to be associated with an increased discount. This is supported by Barclay, Holderness, and Pontiff (1993) and their findings that funds with ownership concentration and large management ownership are traded at a larger discount than funds with dispersed ownership. The rationale behind this is that large owner and management tend to have other priorities than minor investors, who tend to only be interested in highest possible return.

This is not only limited to CEFs, well-established financial theory generally connects ownership concentration in corporations with increased agency costs. The agency costs are further significantly increased if a controlling owner has claims to less than a majority of the cash flow rights from the firm's equity, e.g. through the use of shares with different voting power, adding a dimension to the agency problem (Bebchuk, Kraakman, and Triantis, 1999).

3.5.2. Diversification

Hjelström (2007) finds that CEF portfolio diversification could affect the discount. A diversified portfolio increases the risk that the fund holds stocks not wanted by individual investors. On the other hand, one of the arguments for the existence of CEFs is to facilitate diversification for the minor investor. The explanation could be that only a few stocks can be sufficient in order to diversify away firm-specific risk (Evans, Archer, 1968), but that additional investments make the portfolio less suitable to the majority of stock holders. Miller (1977) argues that rational investors still have heterogeneous expectations about the future, and that they as a result demand different investments.

Overly diversified CEFs cannot please all investors, and should therefore be punished with a discount. Chan, Wan Kot, and Li (2007) find that a high degree of diversification is positively correlated to the discount which Chinese CEFs are traded at. The results applicability on the Swedish market can be questioned, though, since the average number of stocks held by Chinese CEFs are 40-84, significantly higher than in Sweden.

3.5.3. Dividend Payout Ratio

Brickley and Schallheim (1985) showed that due to inefficiencies in the US market, substantial gains could be realized once investors were able to obtain the NAV of a fund. The NAV is obtained when the fund is liquidated, which means that investors in CEFs benefit the most when funds are terminated. This was also discovered by Malkiel (1977), who argued

that capital gain distribution in the form of dividends represents a partial liquidation and that investors therefore benefit from high dividend pay-out ratios. Even though the fund is mispriced, the dividends are not. In equilibrium, CEFs paying large dividends will therefore be mispriced to a lesser degree, implying that the discount will be smaller (Pontiff, 1996).

Dividend paid by a company, CEF or other firm, will be interpreted by the market, causing a signalling effect. If the signalling is interpreted as negative or positive news by investors have been argued in several academic papers, but no clear consensus has been reached since the interpretation is dependent on a number of factors (Ambarish, John, Williams, 1987). It has been argued that dividends should be interpreted by investors as a negative signal, since distribution of cash to shareholders is an effect of absent positive net present value investments (Starks, Yoon, 1995). Other researchers argue that high dividends signal a positive outlook on the future cash-flow, and that direct returns is favoured by investors (Starks, Yoon, 1995).

There is a well-established difference in dividend policies between high-growth companies and mature firms. The Pecking-order theory states that growth firms prefer to fund operations with retained earnings, whereas mature firms pay high dividends and rely extensively on debt to fund operations (Barclay, Smith, Watts, 1995). Operational and mixed investment companies are more often invested in non-listed growth companies, and are thus less likely to receive, and distribute, high level of dividends than pure play investment companies are.

3.5.4. Illiquid and Non-Listed Assets

CEFs holding non-listed assets are valued differently than CEFs only investing in listed securities. The difference is twofold; on the one hand non-listed securities are harder to valuate due to lesser availability of information, which would imply that they are traded with an even greater discount since the market reacts negatively to uncertainty. On the other hand, individual investors cannot invest in non-listed securities on their own, which should drive demand on shares of a CEF holding non-listed securities. (Hjelström, 2007)

Non-listed assets are generally illiquid to a higher extent than listed securities. However, some listed securities can also be categorized as illiquid if the trading volume of the stock is low. Several researchers have found a correlation between illiquid holdings and a high discount among CEFs, but this alone is not enough to solve the puzzle. The effects of illiquid or non-listed assets will be that the true value of the fund will not be estimated accurate, leading to a

NAV that deviate from the market price (Jian, Xia, Wu, 2004). Malkiel (1977) and Lee, Shleifer, and Thaler (1991) showed in their investigations that restricted stock holdings had, although small, effect on the discount.

When Jian, Xia, and Wu (2004) investigated the same phenomenon they found a stronger correlation in the relationship between the discount and illiquid assets. Many CEFs holding listed securities only, however, are still traded at a discount to NAV.

3.5.5. Taxes

Taxes are a factor that a number of previous studies (Malkiel, 1977, Brickley, Manaster, Shallheim, 1991, and Kim, 1994) have put forward as part of the answer to the closed-end fund puzzle. Its impact can be discussed, however, since tax laws vary across tax legislations. In the US, dividends from investment companies are taxed on both the corporate and the individual level, something that naturally should result in a discount in the fund market value. In Sweden, the tax argument does not hold since dividends received by investment companies are not taxed if they are directly passed on to the shareholders. (Hjelström, 2007).

3.5.6. Performance and Fund Age

Lee, Schleifer, and Thaler (1990) and Lee, Schleifer, and Thaler (1991) found that funds tend to trade at a premium in the period after their initial listing, but later on fall to a discount. American CEFs are historically traded at a premium of up to 10 percent at issuance, while the British counterparts' premium at issuance is at least 5 percent. Within only a few months, however, the premiums tend to have turned into discounts. (Dimson, Minio-Kozerski, 1999).

It could be argued that a fund constantly beating the market should be traded at a premium. Very few funds, however, manage to consistently beat the market, due to the factors stipulated above. It is therefore reasonable to believe that investors generally expect fund managers to underperform. Thompson (1978) found that funds selling at a premium were bad investments in the US between 1940 and 1975, while large discounts were a predictor of future outperformance. Discounts are thus mean-reverting, and seen over time the average level of discounts is fairly stable. Bodreux showed in his 1972 paper that NAV and CEFs market price only should be expected to be equivalent if the fund is expected to hold the same securities in infinity, while discounts and premiums in reality derive from the market expectation of future portfolio constellations and streams of earnings, which are not expected to be constant.

The practical implication is that new funds are launched with the aim to beat the market, but that few actually do over time.

3.6. The Thesis in Relation to Previous Research

Some studies have been conducted in the past, where small but significant abnormal return has been shown to be possible to realize through trading strategies based on inefficient pricing of CEFs. Our standpoint is that the modern financial markets are efficient enough to correctly, or at least almost correctly, value investment companies. This means that the discount, or premium, to NAV a fund is traded at most likely is justified. If it is justified, it can be explained by a numbers of factors with different impact.

The bulk of previous research is concerned with why CEFs exist, or how an investor can use market inefficiencies to profit from discount based trading strategies. None of these areas are going to be studied in this thesis. The foundation is the efficient market hypothesis, and the belief is that discounts can be explained with the rational investor's scepticism of investment companies in general. There are a number of potential factors that can explain why investment companies are traded at a discount, the aim is to test these factors relevance for the Swedish market. Investor sentiment theory, however, could work as a counter-hypothesis to the thesis. If the discount solely is a consequence of investor sentiment, it would not be possible to produce significant results when testing fundamental-based explanatory variables impact on the discount.

The thesis will to a great extent be based on the 2007 study performed by Chan, Wan Kot, and Li, who examined a number of potential factors impact on CEF discounts in China. The examined factors were all measured using well-established methods, something that this thesis will duplicate in order to enhance the reliability and validity, as well as facilitate comparisons with previous research.

4. Method

The thesis takes a mainly deductive approach; quantitative gathering of data will be the basis for the analysis. Our sample consists of the entire population of closed-end funds listed on the Stockholm stock exchange, and the data will be annual between 2006 and 2010. A multiple regression analysis will be performed at the panel data, to obtain results that subsequent will be further analyzed.

4.1. Conceptual Framework

The positivism and hermeneutics are two starting points of theories of science, which are each other's extremes (Lundahl, Skärvad, 1992). In absolute form, the positivism is based on experiments and quantitative measurements and logical reasoning. A positivist view in strict meaning is based on facts and formal logic that is the result of various measurements (Eriksson, Wiedersheim, 1997).

Positivism believes in scientific rationality, knowledge should be empirically tested in order to be of interest. Judgements and personal opinions are irrelevant and should be replaced by hard facts; explanations should derive from a cause-effect relation. (Patel, Davidsson, 1994). The opposite of positivism is hermeneutics, in which the research object is studied from the researchers own understanding. The scientist uses her own knowledge, thoughts, impressions and feelings in order to understand the research object (Patel, Davidsson, 1994). Hermeneutics, as opposed to positivism, is qualitative and based on interpreting reality through people's thoughts. (Patel, Davidsson, 1994).

A positivistic research method is used, even though some qualitative research might have to be conducted in order to interpret the empirical results. The problem is approached using quantitative data that are tested through a multiple regression analysis. The results are then analyzed in the light of previous research and established theories. The study will be quantitative, different sets of data will be analyzed in order to find statistical correlation. (Holme, Solvang, 1997).

4.2. Methodological Considerations

The purpose of a scientist could be described as to relate theory and reality to each other, which gives rise to the question how this is best carried out. Two alternatives are commonly put forward: deduction and induction (Patel, Davidsson, 1994).

The deductive approach aims at scientists' ability to prove obtained results. Existing theory should be used as a basis to formulate a hypothesis that later can be accepted or discarded through empirical research. Result is reached through logical conclusions. The aim of the inductive approach on the other hand is to formulate a general theory from the results of the researchers own studies. (Patel, Davidsson, 1994).

The thesis uses a deductive approach. First, a number of potential factors influencing investment companies discount to NAV are unbiased mapped down, using existing theory and previous research as a basis. Through empirical testing using a regression analysis conclusions will be drawn. Finally, findings will be compared to already existing theories about CEFs and the valuation of their investments.

4.3. Research Approach

Information underlying the study is mostly found in previous academic research, both specific for the area as well as more general economic theory. This is found in published articles in well-established journals, as well as in research papers. Finally, articles from newspaper and information from text-books will be used to fill gaps of information, and to make the study more up-to-date and to strengthen the quality of the research.

4.4. Research Evaluation

The quality of a study could partly be measured through reliability and validity. High reliability is obtained if the study could be carried out for several points in time and still shows similar results. If what was supposed to be investigated is in accordance with what really is investigated, validity could be said to be high (Patel, Davidson, 1994).

Since the analysis will cover several years of data, the reliability should be satisfying. With that said, due to local characteristics and differences between markets, the result will most probably be slightly different if the study would be duplicated in another country. The validity is always hard to keep at a high level when it comes to regression analysis, why it is extremely important to choose factors to study carefully and to be consistent in the measurements. It is also of importance to keep this in the back of the head when the empirical results are analysed.

4.5. Criticism of sources

Since a lot of the information analysed is gathered from annual reports it is important to consistently be critical and double-check information when possible. Overall, however, information from annual reports should be of high quality since it always is approved by a chartered financial accountant. When gathering information from past research, only well established and reliable journals will be studied.

4.6. Data

4.6.1. Sources

Almost all data regarding the companies in the study will be obtained from annual reports. This is due to the nature of data studied; much of the information is not available from research databases like Datastream or Bloomberg's. These databases are consulted, though, in the cases when annual reports fail to disclose relevant information. Both sources are considered to be highly reliable, and the strength of the data obtained will be enhanced through the procedure of double-checking.

4.6.2. Market

The research is limited to CEFs active on the Swedish market. Familiarity with the market and the language will facilitate the process of data gathering, as well as the analysis of obtained results. The Swedish market for CEF s is also of interest since the discount to NAV that CEFs tend to be traded at is larger and more significant than in the US and the UK, where the bulk of previous research has been performed. Previous research performed on the Swedish market is scarce, which leaves a gap of information to be filled. In Sweden, CEFs have larger impact on the stock market than in most other countries, and are thus interesting to study.

All of the listed CEFs in Sweden will be investigated. Since our sample constitutes the entire population, our results will obtain a high relevance. With that said, the population is small, which will make it harder to show statistically significant results. Seventeen CEFs are traded on the Stockholm stock exchange.

4.6.3. Time Period

The study will investigate the five year time period between 2006 and 2010. The aim is to perform an up-to-date and relevant study based on the results from studies performed as long as 30 years back in time. 2006 is used as the starting point since this is the year the IAS39

regulatory framework was implemented, forcing investment companies to account for financial assets market value on their balance sheets. A high consistency in the findings are crucial, something that could hardly be obtained by mixing data from different accounting standards.

The regression will be executed using data obtained on an annual basis. Many of the CEFs in the study do not update relevant data more frequently, and using more frequent data might therefore distort the study's consistency and aim.

4.7. Multiple Regression Model

The gathered data will be analyzed through a multiple regression:

Equation 1. $$Y = \alpha + \beta * X_1 + \beta * X_2 \ldots . + \beta * X_n$$

α = *intercept*

Y = *dependent variable*

X = *independent variable*

β = *coefficient for the independent variable* (Brooks, 2008)

The method for estimation will be Ordinary Least Squares (OLS), in accordance with previous research (Chan, Wan Kot, and Li, 2007, and Kim, and Song, 2009).

4.7.1. Panel Data

Since data is collected on different CEFs as well as over different time periods, it will be treated as panel data. This will lead to 17 cross-sections (*N*) being used over 5 periods (*T*), resulting in 85 observations. The thesis will, to assure the relevance of the results, take into consideration the errors that may occur when using panel data.

When using panel data it is crucial to avoid autocorrelation, which tend to create non-valid, but significant, results (Brooks, 2008). In this thesis, the cross-sections will be consistent over time periods, since the assumption is made that the explanatory variables within the cross-sections will not change drastically enough over time to avoid autocorrelation between periods. The effect from potential autocorrelation will be tested using the Durbin-Watson test. The test determines if the sample contains autocorrelation, which in that case either is corrected with the random effect model or the fixed effect model (Harris, Sollis, 2003).

The difference between the fixed and the random effect model is that the fixed model assumes that there is a certain quality or characteristic in a cross-section (period) that will have the

same effect on all the periods (cross-sections), whereas the random model assumes there is no such pattern.

The choice between the random effect model and the fixed effect model will be done with the help of a Hausman test, where the null hypothesis is that the preferred model is random effect. The Hausman test determines whether the unique errors (*U*) are correlated with the regressors, the null hypothesis is that they are not. (Harris, Sollis, 2003).

If the null hypothesis is rejected the fixed effect model will instead be applied.

Random effect model

Equation 2. $$Y_{it} = \alpha + \beta * X_{it} + u_{it} + \varepsilon_{it}$$

Fixed effect model

Equation 3. $$Y_{it} = \alpha_i + \beta_1 * X_{it} + u_{it}$$

Y = dependent variable
α = intercept
X = independent variable
β = coefficient for the independent variable
u = between-entity errors / error terms
ε = within-entity errors
i = entity, i.e. cross-section
t = period (Harris, Sollis, 2003)

If the Hausman test shows that the fixed effect model is preferred, the determination must be made if fixed effect is over the cross-sections, over the period, or both. The way that the fixed effect model correct the error with autocorrelation between cross-sections (periods) is by using dummy variables and individual intercepts. The dummies are determined with the entity (*N+1*), which is dependent on a coefficient. The dummies correct for what could be assumed from the previous entity. If it would be needed to correct for autocorrelation in both the cross-sections and the periods all that is required is to add dummies in the same way for both entities. (Brooks, 2008)

Fixed effect model with one dummy variable

Equation 4. $$Y_{it} = \alpha_i + \beta_1 * X_{1,it} \ \dots \ \beta_k * X_{k,it} + y_2E_2 \dots y_nE_n + u_{it}$$

Fixed effect model with two dummy variables

Equation 5. $$Y_{it} = \alpha_i + \beta_1 * X_{1,it} \ \dots \ \beta_k * X_{k,it} + y_2E_2 \dots y_nE_n + z_2T_2 \dots z_nT_n + u_{it}$$

Y = dependent variable

α = intercept

X = independent variable

β = coefficient for the independent variable

y = coefficient for entities

E = dummy entities

z = coefficient for secondary entities

T = secondary dummy entities

u = error terms

i = entity, i.e. cross-section

t = period (Harris, Sollis, 2003)

The multiple regression made in the thesis will be tested with one dependent variable and with seven explanatory variables. The dependent variable and the variable that represents diversification will be tested with two respectively three different measurements as shown below.

4.7.2 Dependent Variable – Discount

The discount is calculated as a percentage using annual data obtained from annual reports. NAV per share is explicitly stated in most annual reports, in case it is not it is calculated as the NAV divided by outstanding shares at the end of the year. Since previous researches have used different ways of calculating the discount, the thesis will use two different measurements.

In the first calculation, the discount is defined as NAV per share less share price divided by the NAV per share.

Equation 6. $$Discount\ 1_{\ i,t} = \frac{NAV/share_{i,t} - share\ price_{i,t}}{NAV/share_{i,t}}$$

(Kim, Song, 2009, Gemmil, Thomas, 2009, and Lee, Schleifer, Thaler, 1991)

In the second calculation, the discount is defined as the natural logarithm of NAV per share divided by the share price.

Equation 7. $$Discount\ 2_{i,t} = LN\ \frac{NAV/share_{i,t}}{Share\ price_{i,t}}$$

(Bleaney, Smith, 2009, and Froot, Ramadorai, 2001)

A negative result implies that the fund is traded at a premium.

The discount is the dependent variable in the regression, meaning that a number of explanatory variables impact on the fund discounts are going to be studied.

4.7.3. Explanatory Variables

Previous research has put forward a number of different factors that potentially are affecting the size of the discount (premium) that CEFs are traded at. Since most studies are carried out outside of Sweden, the aim of this study is to test the most commonly stated factors' relevance for the Swedish market.

The following list of variables, suggested in previous studies, to have impact on the CEF discount, and that are considered to be of relevance for the Swedish market. Since diversification is a broad concept, three different measurements of the factor will be used.

a) **Dividend payout ratio** (DIV_PAYOUT) – defined as paid dividend divided by the company's market capitalization (Chan, Wan Kot, Li, 2007, Kim, Song, 2009). Everything else equal, a high dividend payout ratio is expected to be rewarded by the market, and should thus be accompanied by a reduced discount.
b) **Diversification 1**. (NO_STOCKS) – defined as the natural logarithm of the total number of holdings in the CEF portfolio (Chan, Wan Kot, Li, 2007). If investors value fund diversification, a high number of holdings should be related to a lower discount. It is reasonable to believe, however, that overly diversified portfolios are not appreciated by all investors, and thus should be connected with a larger discount.
c) **Diversification 2**. (TOP_STOCKS) – defined as the portfolio weighting of the funds five largest holdings (Chan, Wan Kot, Li, 2007). A high value of TOP_STOCKS implies a low degree of diversification.

d) **Diversification 3**. (HERFI_STOCKS) – defined as the Herfindahl index computed on the weighting of the funds five largest holdings (Chan, Wan Kot, Li, 2007).

Equation 8. $$HERFI\_STOCKS = \sum_{i=1}^{5}\left(\frac{w_{i,t}}{w_{stock\ t}}\right)^2$$

This measurement incorporates information about the weight of the portfolios top stocks. Larger holdings have larger impact. A high value implies a low degree of diversification.

e) **Fund age** (FUND_AGE) – defined as the natural logarithm on the number of days the fund has been listed on the stock exchange (Chan, Wan Kot, Li, 2007, and Gemmil, Thomas, 2009). Since newly listed funds tend to be traded at a premium, or at least at a lower discount, FUND_AGE is anticipated to have a positive impact on the discount. This means that mature funds are expected to be less favoured by the market, i.e. traded at a higher discount.

f) **Ownership structure** (BLOCK_INVESTORS) – defined as the Herfindahl index, computed on the weighting of the three largest investors (Chan, Wan Kot, Li, 2007). The value is obtained by adding the square of the three most powerful shareholders in terms of voting power.

Equation 9. $$BLOCK\_INVESTORS = \sum_{i=1}^{3}\left(\frac{w_{i,t}}{w_{owner\ t}}\right)^2$$

The benefit of weighting ownership using the Herfindahl index is that the most powerful owner has a greater impact on the measurement, corresponding to the concern investors might have regarding a powerful owner.

g) **Stock liquidity** (TURNOVER_SHARES) – defined as the annual turnover of the CEF shares: number of shares traded over a year divided by the average number of issued shares (Chan, Wan Kot, Li, 2007). High turnover indicates high stock liquidity, and is expected to be connected with a lower discount.

h) **Size** (FUND_SIZE) – defined as the natural logarithm of the fund size: NAV per share times number of shares outstanding at the end of the year (Chan, Wan Kot, Li, 2007, Gemmil, Thomas, 2009, Kim, Song, 2009, and Pontiff, 1996). Fund size could both be connected with better liquidity, and thus imply a lower discount, and with fund maturity, and thus imply a higher discount. A large fund might also be argued to enhance the benefits of scale that investment companies can offer to its investors.

i) **Non-listed holdings** (NON_LISTED) – defined as the share of unlisted holdings in the CEF portfolio (Chan, Wan Kot, Li, 2007). A high degree of non-listed holdings could be associated with lower liquidity, and thus lead to a higher discount. We

believe, though, that investors view it as a way to get access to otherwise non-accessible securities, and as a way for the fund to add value. This implies that a high value for NON_LISTED should be negatively correlated to the discount.

Most of abovementioned factors are easy to determine, and some are even explicitly stated in the companies' annual reports.

4.7.4. The Model

Since three different measures of diversification are used, the regression will be performed using three different models. Each model will also be adjusted to account for the different measurements of fund discounts used.

Equation 10.

$$DISCOUNT_{it} = \alpha_i + \beta * TOP5_{STOCKS_{it}} + \beta * DIV_{PAYOUT_{it}} + \beta * FUND_{AGE_{it}} + \beta * BLOCK_{INVESTORS_{it}} + \beta * TURNOVER_{SHARES_{it}} + \beta * FUND_{SIZE_{it}} + \beta * NON_{LISTED_{it}}$$

Equation 11.

$$DISCOUNT_{it} = \alpha_i + \beta * NO_{STOCKS_{it}} + \beta * DIV_{PAYOUT_{it}} + \beta * FUND_{AGE_{it}} + \beta * BLOCK_{INVESTORS_{it}} + \beta * TURNOVER_{SHARES_{it}} + \beta * FUND_{SIZE_{it}} + \beta * NON_{LISTED_{it}}$$

Equation 12.

$$DISCOUNT_{it} = \alpha_i + \beta * HERFI_{STOCKS_{it}} + \beta * DIV_{PAYOUT_{it}} + \beta * FUND_{AGE_{it}} + \beta * BLOCK_{INVESTORS_{it}} + \beta * TURNOVER_{SHARES_{it}} + \beta * FUND_{SIZE_{it}} + \beta * NON_{LISTED_{it}}$$

All tests will also be performed without any diversification variable, to assure that diversification does not distort the results.

4.7.5. Tests

Results from the regression must be tested for relevance. A "good" model that fits the studied data will be prioritized to secure the validity of the thesis. Statistical analysis with hypothesis tests can result in two kinds of errors: Type-I errors and Type-II errors. The Type-I errors is when the null hypothesis is rejected when it should be accepted, and Type-II errors is when a null hypothesis is accepted even though it should be rejected. Type-I errors are the most hazardous, since they could lead to irrelevant results being presented as relevant. (Brooks, 2008). This thesis test and examine results thoroughly to avoid both possible errors.

The panel data is analyzed through multiple regressions, a procedure requiring even more extensive testing of both the data and the obtained results. To show to what extent the

explanatory variables explain the dependent variable, the value R^2 will be used. A R^2 value of 0,8538 means that 85,38 percent of the dependent variable is explained by the explanatory variables. (Brooks, 2008). Only R^2 values over 70 percent will be accepted as relevant.

The Standard Error of the regression will be used to test the correlation between the β for the different explanatory variables. This test is used to make sure that a high correlation between the different β will not cause a Type-I error, i.e. if the different β correlate to much there will be no significant way to determine which one actually affect the dependent variable in which way (Brooks, 2008). A lower value is preferred, the thesis will require that the value stay below 0,2.

The Residual Sum of Squares, RSS, is a way to observe how the value of the dependent variable differs from what the model predicts the value to be, i.e. how well the model used is suited as an explanatory model (Brooks, 2008).

Equation 13. $$RSS = \sum \varepsilon_i^2$$

The value will not be allowed to exceed 1,0, where a lower value indicates a better the fit.

The F-statistics will have two purposes, first it will reassure the fitness of the used model, secondly it will test for homoscedasticity to avoid Type-I errors. The purpose of the F-statistics is similar to that of the Standard Error of the regression, but with the difference that it is affected by degrees of freedom and therefore will establish a probability, a p-value. The null hypothesis in the F-statistics is that the β for all the explanatory values are equal to zero. (Harris, Sollis, 2003)

Equation 14. $$H_0: \beta_1 = \beta_2 = \beta_3 = 0$$
$$H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq 0$$

The null hypothesis must be rejected for the results to be relevant. Since this is a crucial test with great impact on the results, it will be required to be significant to 99 percent, i.e. on a one percent level.

The thesis will include three Standard Information criteria: Akaike, Schwarz and Hannan-Quinn. These are measurements on the fitness of the model based on a number of parameters, for example degrees of freedom and sample size (Harris, Sollis, 2003). They will also be used as a Unit Root Test, which is an examination of the proposal that in an autoregressive

statistical model of a time series, the autoregressive parameter is one (Harris, Sollis, 2003). These will not have a specific framework and will not be discussed as result, they will however be used during the testing as measurements for abnormalities and lack of information.

The Durbin-Watson statistics is of greater importance since, as established earlier, it is reasonable to assume that there will not be great changes within the cross-section units over time. The test will show the autocorrelation between entities, cross-section units or period, and will prevent the occurrence of Type-I errors (Harris, Sollis, 2003). The test is structured so that a regression on panel data with absolutely no autocorrelation will be presented with the value two, where values that deviate from two show some degree of autocorrelation (Harris, Sollis, 2003). Values less than two indicate positive autocorrelation and values over two indicate negative autocorrelation, the first being the most commonly observed. Values between one and three are considered to be good, and will be accepted.

5. Empirical Results

5.1. Tests

As expected, the regression made on the data showed low explanatory value, low R^2 value, indicating significant positive autocorrelation, i.e. Durbin-Watson value below one (Appendix 1). A Hausman test determined that the autocorrelation were due to fixed effect between cross-section units. A fixed effect model between cross-section units was therefore used (Appendix 2 and 3).

5.1.1. Test Schedule

The tested variables are coded to facilitate interpretation and comparisons:

X: DISCOUNT 1
Y: DISCOUNT 2
A: TOP5_STOCKS
B: NO_STOCKS
C: HERFI_STOCKS
1: BLOCK_INVESTORS
2: DIV_PAYOUT
3: FUND_AGE
4: NON_LISTED
5: TURNOVER_SHARES
6: FUND_SIZE

The data for each individual variable, arranged by CEF and year, is disclosed in Appendix 4-13. The correlation between the variables has been tested and is disclosed in a correlogram in Appendix 14.

5.1.2. Significance

In the tables the tested variables will be presented along with the p-value for the significant variables. The significance level will be presented with number of stars.

99% accuracy: ***

95% accuracy: **

90% accuracy: *

For all of the tests performed, the tests for fitness are used, however, in the tables only the most crucial is presented. The three tests considered to be of most importance for the thesis is the F-test, the R^2 test and the Durbin-Watson test, since they capture the three possible Type-I errors that may occur in the regression.

The tables also include variables that not reach significant levels, yet are relevant enough to discuss. It is not only tried to find significant results but also to make way for further research by discussing values that are not significant and, more importantly, discuss values that could be significant if using alternate methods of calculation, or if using a larger sample. Variables that are noted are the one with p-values under 0,2, i.e. almost significant.

5.2. Presentation of Results

For the first test, all of the data is used, $N = 17$ and $T = 5$, resulting in 85 observations. The results are presented in Table I.

Table I. Panel regression

Variables			Tests			
Tested variables	Significant variables	p-value	F-test	R^2	Durbin-Watson	p-values<0,2
X:A;1;2;3;4;5;6	2;3	0,0145**;0,0594*	0	0,8712	2,02	
X;B;1;2;3;4;5;6	2;3	0,0091***;0,0597*	0	0,8705	2,08	
X;C;1;2;3;4;5;6	2;3	0,0096***;0,0627*	0	0,8703	2,08	
X;1;2;3;4;5;6	2;3	0,0090***;0,596*	0	0,8703	2,08	
Y;A;1;2;3;4;5;6	2	0,01***	0	0,8768	2,5	A=0,16;1=0,16
Y;B;1;2;3;4;5;6	2	0,005***	0	0,8728	2,63	1=0,14
Y;C;1;2;3;4;5;6	2	0,0053***	0	0,8739	2,56	1=0,15
Y;1;2;3;4;5;6	2	0,0045***	0	0,8728	2,62	1=0,14

What can be stated is that no matter which of the calculated discounts are used there is one highly significant variable: dividend payout ratio. When using the Discount 1, also the fund age variable becomes significant. On the other hand, when using Discount 2, the block investor variable and the top 5 stocks variable becomes consistently more explanatory, though not significant. The tests in the table shows that the model is very much explanatory, explaining over 87 % of the discount for all tests, and the autocorrelation, as indicated by Durbin-Watson, is low enough to be regarded as random.

5.2.1. Adjustments for Extremes

To establish if it is possible to achieve more significant values, a change in the cross-section data was made. The CEF Ratos was removed; the reason for that specific CEF is that it is the only CEF that do not publicly reveal their NAV. The majority of Ratos holdings are also non-listed companies, which can make estimations of the fund's NAV imprecise. Finally, Ratos is operating in the gray-area between being an investment company and being a private equity

company. Since the population of Swedish CEFs is limited, extremes might impact obtained results quite radically. (Appendix 15)

The results from the same test, less Ratos, on $N = 16$ and $T = 5$, giving 80 observations, is presented in Table II.

Table II. Panel regression less Ratos

Variables			Tests			
Tested variables	Significant variables	p-value	F-test	R^2	Durbin-Watson	p-values<0,2
X:A;1;2;3;4;5;6;-R	2;3	0,0099***;0,0238**	0	0,8601	1,92	
X;B;1;2;3;4;5;6;-R	2;3	0,0070***;0,0235**	0	0,856	1,95	
X;C;1;2;3;4;5;6;-R	2;3	0,0072***;0,0255**	0	0,8598	1,97	
X;1;2;3;4;5;6;-R	2;3	0,0068***;0,0229**	0	0,8598	1,95	
Y;A;1;2;3;4;5;6;-R	2	0,0135**	0	0,8431	2,54	
Y;B;1;2;3;4;5;6;-R	2	0,0074***	0	0,8393	2,66	1=0,17
Y;C;1;2;3;4;5;6;-R	2	0,0077***	0	0,8404	2,59	1=0,18
Y;1;2;3;4;5;6;-R	2	0,0066***	0	0,8392	2,65	1=0,17

What the test shows is that a miscalculation, if there was one, regarding Ratos did not have great enough impact on the results to be considered a source of Type-II errors.

Another CEF that may have caused irregularities in the first tests, Table I, is Hakon Invest. Over 70% of Hakon Invests NAV consists of one non-listed stock, the ICA group. The ICA group is a retail group that delivers to, and owns, the franchise ICA, the largest grocery store chain in Sweden. This might have effect on investors, and thus the discount, since investors most likely does not see an investment in Hakon Invest as an investment in a well-diversified CEF, but rather as an investment in the ICA group. (Appendix 15)

The results from the test less Hakon Invest on $N = 16$ and $T = 5$, giving 80 observations, is presented in Table III.

Table III. Panel regression less Hakon Invest

Variables			Tests			
Tested variables	Significant variables	p-value	F-test	R^2	Durbin-Watson	p-values<0,2
X:A;1;2;3;4;5;6;-H	A;2	0,0944*;0,0167**	0	0,8689	2,41	1=0,17
X;B;1;2;3;4;5;6;-H	2	0,0073***	0	0,8622	2,53	1=0,15
X;C;1;2;3;4;5;6;-H	2	0,0083***	0	0,865	2,46	1=0,15
X;1;2;3;4;5;6;-H	2	0,0066***	0	0,8623	2,53	1=0,15
Y;A;1;2;3;4;5;6;-H	A;2	0,0547*;0,0177**	0	0,8475	2,71	1=0,15;6=0,18
Y;B;1;2;3;4;5;6;-H	1;2	0,1000*;0,0074***	0	0,8373	2,86	
Y;C;1;2;3;4;5;6;-H	1;2	0,0986*;0,0082***	0	0,8422	2,74	C=0,18DR
Y;1;2;3;4;5;6;-H	1;2	0,0990*;0,0065***	0	0,8372	2,84	

When adjusting for the extreme Hakon Invest, the diversification variable Top 5 stock becomes significant for both ways of calculating the discount. The variable block investor is significant for Discount 2, and is noticeable for Discount 1.

The last sample tested is excluding both Ratos and Hakon Invest. The risk of the test is the loss of the degrees of freedom, which might cause Type-II errors. The results from the same test, less Ratos and Hakon Invest, on $N = 15$ and $T = 5$, giving 75 observations, is presented in Table IV.

Table IV. Panel regression less Ratos & Hakon Invest

Variables			Tests			
Tested variables	Significant variables	p-value	F-test	R^2	Durbin-Watson	p-values<0,2
X:A;1;2;3;4;5;6;-R-H	A;2	0,0598*;0,0027***	0	0,7583	2,75	1=0,12;5=0,17;6=0,18
X;B;1;2;3;4;5;6;-R-H	1;2	0,0996*;0,0011***	0	0,7418	2,93	
X;C;1;2;3;4;5;6;-R-H	1;2	0,0990*;0,0011***	0	0,7516	2,76	C=0,14DR
X;1;2;3;4;5;6;-R-H	1;2	0,0979*;0,0009***	0	0,7414	2,9	
Y;A;1;2;3;4;5;6;-R-H	A;2;6	0,0752*;0,0239**;0,0963*	0	0,7098	2,82	1=0,14
Y;B;1;2;3;4;5;6;-R-H	2	0,0109**	0	0,6926	2,97	1=0,12
Y;C;1;2;3;4;5;6;-R-H	2	0,0117**	0	0,7024	2,83	C=0,18DR;1=0,12;6=0,14DR
Y;1;2;3;4;5;6;-R-H	2	0,0093***	0	0,6918	2,94	1=0,12

The table show that more significant results are established but at a cost of a lowered R^2value and a higher Durbin Watson. They are still acceptable, and were anticipated as a result of the decrease in degrees of freedom. The fund size variable becomes significant when testing Discount 2, but at a low level of significance.

6. Analysis

In this section the results are interpreted and analyzed using relevant theories and previous research. Comparisons are made, and both significant and non-significant results are discussed. The obtained results are discussed both from the rational framework as well as from the behavioural finance point of view.

The explanatory variables clearly have impact on the dependent variable, the discount. The R^2 values are consistent between 0,69 and 0,87, which is considered to be more than satisfying, and are interpreted as a sign of the explanatory variables relevance. Roughly half of the explanatory variables do not show a statistically significant impact on the discount, but due to the small population of CEFs in Sweden and the markets unique characteristics, all results are well worth discussing.

Above all, dividends, fund size, block investors, and diversification are the variables with the most significant impact on the CEF discounts observed at the Swedish market between 2006 and 2010. The results are generally in line with previous research and established theories, though the dividend variable was found to have impact opposite from what was expected. The results are below interpreted in the light of financial theory, previous research, research method used, and the characteristics of the Swedish market.

6.1. Dividends

In all regressions executed, the dividend payout variable was found to have a statistically significant impact on the level of CEF discount. Consistently, the t-value was positive, indicating a positive correlation with the dependent variable, i.e. the higher the dividend payout ratio, the higher the discount. The result contradicts the expected outcome, which is based on previous research (Chan, Wan Kot, Li, 2007).

Pontiff (1966), among others, argues that dividends represent a partial liquidation of the fund, and thus should be favoured by investors. The practical implications of CEF dividends are in reality, however, not equivalent to a partial liquidation. A liquidation of a CEF could be beneficial for its investors, since they will receive the difference between the CEF market value and its NAV, less liquidation costs. Liquidation is thus directly connected to the NAV, while dividends only are indirectly connected in that the ratio is calculated as a percentage of the market capitalization. An intuitive response to the partial liquidation view is that investors would not invest in CEFs if they thought that management were incapable of actively adding value. A high dividend payout ratio might instead indicate a lack of profitable investment

opportunities (Berk, DeMarzo, 2007), something that is alarming since the main idea behind investment companies is to find profitable investment opportunities.

The nature of dividend payments also differs substantially within the Swedish population of CEFs. Operational and mixed investment companies are more often invested in young, mostly unlisted, companies, while pure play investment companies are more prone to hold mature, listed securities. This is of importance since young companies generally reinvest earnings to finance growth, while mature companies generally have few positive net present value investment opportunities (Berk, DeMarzo, 2007), and therefore tend to distribute their earnings to their shareholders through dividends. As a consequence, the dividend payout ratio tends to be higher for pure investment companies than it is for operational and mixed investment companies. In the Swedish population of CEFs between 2006 and 2010, operational and mixed investment companies have outperformed pure investment companies and are generally traded at a lower discount. Since the Swedish population of CEFs is so small, the relatively large operational investment companies have a larger impact than they have on larger markets, e.g. the US and the UK. For the population investigated, it is therefore not as surprising to find that high dividend payout ratios are closely correlated to high discounts as one might think at first glance.

A flawed measurement, finally, could be part of the explanation to the unusual findings regarding dividends as an explanatory variable. Dividend payout ratio is defined as a percentage of the fund market capitalization; everything else equal, a low market capitalization will lead to a high dividend payout ratio. Dividends could thus be positively correlated to discounts as implications of poor fund performance.

6.2. Fund Age

The impact of the fund age variable is not consistent trough all tests performed, but significant for testing Discount 1, and for Discount 1 when excluding the extreme Ratos. Fund age is positively related to CEF discounts: the older the fund, the higher the discount it is traded at. The result is in line with the CEF life-cycle (Lee, Schleifer, Thaler, 1991) as well as expectations drawn from previous research, which more or less unanimously states that older funds tend to be traded at higher discounts (Thomson, 1978, and Chan, Wan Kot, Li, 2007).

The likely cause for this is that investors believe that management will underperform, which is the most probable outcome since few investors, professional or non-professional, consistently manage to beat the market return.

6.3. Ownership Structure

The impact of the block investors variable is statistically significant, or at least noted with a p-value below 0,2, for all of the tests performed. This is consistent with the argumentation of Hjelström (2007) and Barclay, Holderness, and Pontiff (1993); discounts tend to be higher in CEFs with high ownership concentration. It is also consistent with the results obtained by Chan, Wan Kot, Lee (2007) for the Chinese CEF market. The underlying logic is that majority owners might have other preferences than minor investor, which potentially creates agency problems. Since the ownership in Swedish CEFs by tradition consists of one, in a few cases two, dominant owners, the results from the regression analysis are highly interesting, and are in line with both financial theory as well as previous research on the CEF puzzle.

Swedish CEFs tend to be controlled by the country's most well known and successful business men/women. On the one hand, this group has clearly shown superior skills in doing business and investing their money, why it could be attractive for investors to follow their moves on the financial market. On the other hand, this group clearly has all the money they need, why their investment activities might not always be motivated by an urge to gain the highest possible rate of return. Instead, motives can be found in a wish for controlling power over prestigious companies and influence in the business world.

Additionally, the Swedish system with different share classes often leads to differences between an owner's voting power and his share of invested capital. This implies that the controlling owner of a company exercises unproportionate control over other investors money, and thus are joining the managers as agent in the classical principal-agent relationship. It is harder for minor investors to monitor the behaviour of majority owners than it is for owners to monitor managers, why an extra dimension of uncertainty is connected to investments in a corporation where the controlling owner holds claims to less than a majority of the firms' future cash flows. Applied on the market for Swedish CEFs, this should mean that a difference between the majority owners controlling power and his equity claims are "punished" by investors, and therefore connected with a higher discount.

6.4. Diversification

Three different measurements are used in the study in order to capture the impact of fund diversification on the dependent variable, fund discount. This have resulted in the three diversification variables Top 5 stocks, Number of stocks, and Herfindahl indexed stocks.

When adjusting the sample for the extremes Hakon Invest and Ratos, both and respectively, Top 5 stocks was found to have a statistically significant impact on the discount. The variable presents a positive t-value, indicating that the market regards high concentration of a funds five largest holdings as something negative; a low degree of diversification is connected to a high discount. This result is only partly in line with previous research, why a thorough analysis is needed.

One of the main explanations for the existence of CEFs is to offer diversification to investors at low transaction costs. This is also regarded as the main reason underlying the Top 5 stocks variable's positive relationship with the discount Swedish CEFs are traded at. The higher the diversification, the more reason to invest in the CEF rather than simply replicating its portfolio. This will considerably reduce transaction costs, since the investor only has to buy one stock instead of a large number. A more diversified portfolio also requires more attention and active management than one containing only a few securities, why it is logical that investors are willing to pay a professional fund manager a premium to get access to a well managed, diversified portfolio.

The drawback of this explanation is that it is only valid if investors have homogeneous expectations on the future, and thus are interested in the same securities. A well diversified portfolio is in reality not likely to satisfy all investors' preferences, why this has generally been associated with larger CEF discounts. Chan, Wan Kot, and Li (2007) found that a high degree of diversification is positively correlated to the discount which Chinese CEFs are traded at. The average number of holdings in Chinese CEFs, however, is 40-84, many enough to raise the question if fund management could possibly have time to properly manage all of them. For the population researched in this study, the average number of holdings is between 10 and fifteen, and rarely exceeds twenty. The results from the Chinese market are thus of limited applicability for the Swedish market, and the conclusion is drawn that CEF diversification to a certain extent is in fact favoured by investors.

The severe financial crisis covered by the studied time period might also offer some guidance in how to interpret the obtained results regarding fund diversification. To reduce risk, basic portfolio theory suggests that an investor should hold a diversified portfolio (Berk, DeMarzo, 2007). Risk reduction is favoured by investors in times of financial instability, whereas it is of subordinated concern in bull markets. Adding these facts together, the logical conclusion is that diversification is in greater demand when markets are unstable and uncertainty is high.

The studied time period in this thesis is dominated by the financial crisis, which could have led to a bias towards diversification demand.

6.5. Non-Significant Variables

Even though the regression model used explained a high degree of the observed CEF discounts, as explained by the high R^2 values, the impact of roughly half of the explanatory variables examined could not be statistically verified. This might be due to irrelevant variables, flawed measurements, or a too small sample.

All of the studied variables have in previous research been proven to be relevant as part of the explanation to the CEF puzzle. This does not mean, however, that they are relevant for the setting in which this study has been executed. The Swedish market is different from the US and the UK markets where the bulk of previous research has been performed, and it is definitely different from the emerging Chinese market studied by Chan, Wan Kot, and Li (2007). It is therefore possible that the measurement of the variables should have been adjusted to better fit and capture the characteristics of CEFs in Sweden. When no clear consensus about how a measurement should be calculated could be found in previous research, different methods have been used in the tests. It is therefore believed that the measurements are solid, but that some variables are irrelevant for the Swedish market and that others would be statistically significant if the population examined were larger.

Below, the results, or lack of results, from the explanatory variables not found to have a significant impact on the discount are analyzed.

6.5.1. Fund Size

The variable Fund size is found to be significant in one of the tests and show a p-value under 0,2 in most of them. Although not statistically significant, the relationship to the CEF discounts is positive; large funds trade at larger discounts. There are considerable benefits from economies of scale to be drawn from CEF investments, but a large fund is harder to manage efficiently. It is also reasonable to believe that much of the variables explanatory power is derived from its correlation with the fund age variable; an old fund is more likely to be large, and is generally traded at a higher discount.

6.5.2. Non-Listed Holdings

The variable for non-listed holdings did not show the results that were expected. Overviewing the sample, the two CEFs with the highest part of non-listed holdings, Hakon Invest and Ratos, are the two presented with the highest premium. This could indicate that investors are

willing to pay a premium to get access to otherwise inaccessible securities. It is not a goal in itself, however, to invest in non-listed securities, and therefore this variable lack explanatory power if it is not connected to performance.

6.5.3. Stock Liquidity

The stock liquidity variable did not show any significant results when tested for its impact on CEF discounts. Share turnover in Swedish CEFs have been at a consistent high level, and in the cases when it is not low, the fund often guarantees that liquidity will be maintained. This measurement thus has limited explanatory power. A more suitable measurement would probably be liquidity of CEF holdings, since CEFs often are partly invested in extremely illiquid non-listed companies.

6.6. Performance

If there was a precise measurement of fund performance, this would be a variable with potentially great explanatory power. The bottom line is clear: a fund that consistently outperforms the market, and is expected to keep on doing this in the future, deserve to be traded at a premium, since its management clearly are actively adding value. Unfortunately, no precise way of measuring CEF performance and linking it to specific periods has been identified. Instead, a number of variables that are more or less connected to future fund performance are studied, and the discount is in fact thus indirectly explained through expectations of future performance.

6.7. Investor Sentiment

As discussed earlier, the results obtained from the regression analysis can to a high degree explain the discount that Swedish CEFs tend to be traded at. Why not all, or at least an even higher degree, of the discount is explained is hard to state accurately.

It could be explained through behavioural finance; that financial markets are claimed to be dominated by irrational investors and thus not efficient. This is probably true to some extent, markets are rarely expected to show the strong form efficiency described by Fama (1970), and the Stockholm stock exchange is no exception. Surely, the existence of noise traders and investors sentiment explains some of the degree of CEF discounts, but this is not captured by the thesis. Instead, a number of explanatory variables have been shown to have statistically significant impact on the CEF discounts, which means that the rational framework is applicable on the Swedish market. Behavioural finance can in this case be used as a

complement to the rational framework, but is far from sufficient to alone solve the CEF puzzle.

6.8. Comparability

The thesis has to a large extent been performed with the Chan, Kot and Li (2007) study as a basis. The same variables are measured and analyzed, but for different markets. The sample used by Chan et al. is gathered on the larger Chinese CEF market, which has enabled them to produce more significant results. The comparability between the thesis and the study is still considered to be high, however.

The fact that both studies show significant results for a number of variables implies that the method is solid and can be applied to different markets. It can also be used on already researched markets and perfected to achieve more significant results.

7. Conclusion

A number of conclusions can be drawn from the analysis of the obtained results. Even though the thesis does not solve the CEF puzzle, it offers explanations to some of its parts. The Swedish market is clearly different from markets where previous research has been performed, as shown by the results. The section ends with suggestions for further research.

The aim of the study has been to examine a number of explanatory variables impact on the discount to NAV that CEFs tend to be traded at. The sample consisted of CEFs listed on the Stockholm stock exchange during the time period 2006 to 2010.

The examined variables could to a high extent explain the dependent variable, the CEF discounts. The results also showed that significant differences exists between the Swedish market and markets where previous research have been performed, mainly the UK, the US, and China. Roughly half of the examined variables were found to have statistically significant impact on the level of CEF discounts, and an additional few had p-values below 0,2.

The variable for dividend payouts was statistically significant at a high level for all constellations of the regression, and was thus shown to be positively related to the discount. This finding contradicts the results from some of the previous research performed on the field, which could be explained by the Swedish markets special features and characteristic. During the examined time period, mixed and operational investment companies, paying low dividends, have outperformed traditional investment companies, paying high dividends. The result could also be explained with an investor view on excessive dividends as a sign of absent positive net present value investment for the fund management.

Fund age is, in accordance with previous research, found to have a positive impact on the fund discounts. This relationship seems to be consistent both over time and over geographical areas, and is commonly described through the CEF life-cycle. In the period after listing, funds tend to trade at a premium to NAV, but this soon falls to a discount that generally is persistent until the fund is liquidated. It has been established in numerous articles that the average fund manager will never beat the market over time, which is mirrored in the fund age variable.

The ownership concentration was also shown to statistically significantly impact the fund discounts. This is in line with previous research, and supported by the agency theory. The Swedish CEF population is dominated by extremely concentrated ownership, which clearly is a concern for investors.

Diversification, finally, were also found to significantly impact the fund discounts. A low concentration among the funds top five shares is related to a low discount. This finding is supported by traditional portfolio theory, as well as the commonly raised argument that CEFs to a great extent exist to offer investors a way of obtaining diversification at low transaction costs.

The thesis might not have solved the CEF puzzle once and for all, but it definitely located some of the pieces. The thesis has contributed an enhanced understanding of the Swedish CEF market, and could be used as a basis for further research. Although investors might seem to act irrational, the thesis has shown that rational behaviour can explain a large part of the CEF puzzle.

7.1. Suggestions for Future Research

Since the population of active Swedish CEFs is limited, it would be of interest to broaden the sample in order to obtain more accurate results. One way of doing this could be to extend the study to cover other Nordic markets similar to the Swedish. Another way could be to extend the examined period, and to include CEFs that are no longer listed. The variables examined could also be adjusted to better fit the Swedish, or other, markets.

Finally, future research could be more focused on ways for fund management to reduce the discounts, for example buy more closely examine the variables relationship to fund performance.

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Appendix

Appendix 1. Regression without Fixed-Effect Model

Dependent Variable: DISCOUNT
Method: Panel Least Squares
Sample: 2006 2010
Periods included: 5
Cross-sections included: 17
Total panel (balanced) observations: 85

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP5_STOCKS	0.395125	0.156385	2.526614	0.0135
BLOCK_INVESTORS	0.735384	0.178736	4.114362	0.0001
DIV_PAYOUT	0.165112	0.715820	0.230661	0.8182
FUND_AGE	0.179382	0.036508	4.913452	0.0000
NON_LISTED	-1.126454	0.119539	-9.423294	0.0000
TURNOVER_SHARES	0.693305	0.127184	5.451184	0.0000
FUND_SIZE	-0.090876	0.017597	-5.164237	0.0000

R-squared	0.604319	Mean dependent var	0.015145
Adjusted R-squared	0.573882	S.D. dependent var	0.474135
S.E. of regression	0.309505	Akaike info criterion	0.571077
Sum squared resid	7.471868	Schwarz criterion	0.772236
Log likelihood	-17.27076	Hannan-Quinn criter.	0.651989
Durbin-Watson stat	0.944369		

Appendix 2. Regression Discount 1. Fixed-Effect Model

Dependent Variable: DISCOUNT
Method: Panel Least Squares
Sample: 2006 2010
Periods included: 5
Cross-sections included: 17
Total panel (balanced) observations: 85

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.052245	2.544926	-1.199345	0.2350
TOP5_STOCKS	-0.218721	0.321053	-0.681262	0.4983
BLOCK_INVESTORS	1.771440	1.816940	0.974958	0.3334
DIV_PAYOUT	1.679202	0.667510	2.515619	0.0145
FUND_AGE	0.172642	0.089876	1.920883	0.0594
NON_LISTED	0.040438	0.432971	0.093396	0.9259
TURNOVER_SHARES	0.186188	0.171861	1.083365	0.2829
FUND_SIZE	0.044614	0.101227	0.440734	0.6610

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.871236	Mean dependent var	0.015145
Adjusted R-squared	0.822686	S.D. dependent var	0.474135
S.E. of regression	0.199652	Akaike info criterion	-0.151552
Sum squared resid	2.431520	Schwarz criterion	0.538138
Log likelihood	30.44095	Hannan-Quinn criter.	0.125861
F-statistic	17.94503	Durbin-Watson stat	2.023960
Prob(F-statistic)	0.000000		

Appendix 3. Regression Discount 2. Fixed-Effect Model

Dependent Variable: DISCOUNT
Method: Panel Least Squares
Sample: 2006 2010
Periods included: 5
Cross-sections included: 17
Total panel (balanced) observations: 85

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.263358	1.917205	0.137366	0.8912
TOP5_STOCKS	-0.341019	0.241863	-1.409966	0.1636
BLOCK_INVESTORS	1.936914	1.368781	1.415064	0.1621
DIV_PAYOUT	1.336306	0.502865	2.657384	0.0100
FUND_AGE	0.069848	0.067708	1.031616	0.3063
NON_LISTED	-0.093320	0.326176	-0.286104	0.7758
TURNOVER_SHARES	0.158898	0.129471	1.227288	0.2244
FUND_SIZE	-0.056946	0.076259	-0.746743	0.4581

Effects Specification			
Cross-section fixed (dummy variables)			
R-squared	0.876846	Mean dependent var	0.093239
Adjusted R-squared	0.830411	S.D. dependent var	0.365231
S.E. of regression	0.150407	Akaike info criterion	-0.718018
Sum squared resid	1.379954	Schwarz criterion	-0.028328
Log likelihood	54.51577	Hannan-Quinn criter.	-0.440606
F-statistic	18.88323	Durbin-Watson stat	2.502111
Prob(F-statistic)	0.000000		

Appendix 4. Discount (Premium) by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	-27,00%	-35,26%	15,24%	-35,15%	-17,56%
HAKON	-192,09%	-117,50%	-50,73%	-78,97%	-113,43%
HAVSFRUN	25,00%	40,00%	46,00%	38,00%	42,00%
INDUSTRIVARLDEN	11,95%	22,04%	11,29%	22,16%	19,93%
INVESTOR	19,62%	28,44%	23,22%	29,17%	35,76%
KINNEVIK	22,30%	29,33%	32,26%	33,95%	34,13%
LATOUR	13,16%	10,04%	45,94%	-25,63%	20,64%
LUNDSBERGS	17,01%	24,90%	14,61%	20,16%	16,67%
LUXONEN	20,34%	21,25%	26,54%	28,72%	31,63%
MELKER	-13,96%	0,83%	6,00%	1,10%	0,29%
NOVESTRA	10,34%	29,10%	42,84%	26,43%	23,84%
RATOS	-136,50%	-134,29%	-34,73%	-91,77%	-162,74%
SVOLDER	1,49%	13,27%	17,13%	8,43%	7,76%
SAKI	10,31%	17,72%	22,73%	17,14%	22,11%
TRACTION	2,56%	17,07%	22,86%	20,00%	23,16%
VOSTOK NAFTA	0,00%	25,45%	53,99%	9,14%	11,44%
ÖRESUND	-20,47%	5,13%	16,70%	-1,38%	12,69%
Average	**-13,88%**	**-0,15%**	**18,35%**	**1,27%**	**0,49%**
Average less Hakon & Ratos	**6,18%**	**16,62%**	**26,49%**	**12,82%**	**18,97%**

Appendix 5. Share of Top 5 Stocks by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	50,70%	35,68%	22,62%	55,79%	59,03%
HAKON	68,88%	71,57%	76,71%	76,54%	77,02%
HAVSFRUN	27,00%	37,40%	36,40%	34,50%	28,10%
INDUSTRIVARLDEN	90,23%	97,49%	115,40%	99,47%	98,54%
INVESTOR	69,01%	64,57%	58,03%	64,51%	66,15%
KINNEVIK	97,32%	94,89%	94,39%	93,23%	94,11%
LATOUR	95,01%	76,68%	53,14%	76,24%	48,10%
LUNDSBERGS	94,19%	92,32%	99,24%	90,04%	90,82%
LUXONEN	85,59%	70,55%	96,72%	78,81%	79,77%
MELKER	94,83%	91,72%	94,72%	92,45%	94,90%
NOVESTRA	93,33%	89,11%	88,44%	94,22%	92,79%
RATOS	34,95%	39,73%	31,32%	40,94%	42,61%
SVOLDER	53,25%	59,08%	61,65%	64,43%	70,29%
SAKI	89,85%	78,85%	79,84%	83,63%	90,01%
TRACTION	26,04%	22,50%	22,00%	27,72%	34,08%
VOSTOK NAFTA	0,00%	61,21%	62,08%	48,81%	55,96%
ÖRESUND	52,44%	47,86%	39,16%	48,32%	59,64%
Average	**66,04%**	**66,54%**	**66,58%**	**68,80%**	**69,53%**
Average less Hakon & Ratos	**67,92%**	**67,99%**	**68,26%**	**70,15%**	**70,82%**

Appendix 6. Number of Stocks by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	2,83	2,56	2,30	1,79	2,56
HAKON	1,95	1,95	1,95	1,61	1,61
HAVSFRUN	3,69	3,69	3,00	3,18	3,18
INDUSTRIVARLDEN	2,40	2,40	2,40	2,30	2,20
INVESTOR	2,89	2,94	2,89	2,94	2,89
KINNEVIK	2,30	2,64	2,77	2,83	2,77
LATOUR	2,64	2,64	2,71	2,64	2,48
LUNDSBERGS	2,30	2,40	2,40	2,40	2,40
LUXONEN	2,40	2,40	2,64	2,83	3,09
MELKER	2,08	1,95	2,08	2,08	2,08
NOVESTRA	1,61	1,79	1,79	1,95	1,95
RATOS	2,94	2,94	2,94	3,00	3,00
SVOLDER	2,94	3,09	2,89	2,64	2,71
SAKI	1,95	1,95	1,95	1,95	1,95
TRACTION	2,83	2,48	3,00	2,94	2,71
VOSTOK NAFTA	0,00	3,56	3,66	3,71	3,53
ÖRESUND	3,40	3,58	3,43	3,76	3,22
Average	**2,42**	**2,64**	**2,64**	**2,62**	**2,61**
Average less Hakon & Ratos	**2,42**	**2,67**	**2,66**	**2,66**	**2,65**

Appendix 7. Herfindal Index of Top 5 Stock Weight by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	5,79%	3,20%	2,37%	12,47%	9,91%
HAKON	43,04%	42,63%	49,41%	50,44%	50,48%
HAVSFRUN	1,46%	2,90%	2,67%	2,62%	1,58%
INDUSTRIVARLDEN	17,34%	21,06%	29,09%	22,49%	22,25%
INVESTOR	9,66%	9,11%	7,31%	8,77%	9,80%
KINNEVIK	28,46%	32,54%	36,72%	29,56%	30,18%
LATOUR	21,31%	12,54%	6,19%	17,31%	7,54%
LUNDSBERGS	19,52%	19,82%	25,99%	19,57%	18,27%
LUXONEN	20,97%	16,37%	31,66%	23,17%	20,03%
MELKER	26,65%	24,94%	24,32%	31,87%	39,95%
NOVESTRA	25,56%	19,72%	21,90%	21,64%	19,31%
RATOS	2,67%	3,40%	2,09%	3,63%	3,97%
SVOLDER	6,03%	7,56%	9,42%	10,41%	12,00%
SAKI	21,05%	15,65%	18,16%	19,21%	23,54%
TRACTION	2,21%	1,09%	0,99%	1,61%	2,43%
VOSTOK NAFTA	0,00%	10,21%	11,03%	6,30%	7,28%
ÖRESUND	5,96%	4,65%	3,19%	5,06%	8,21%
Average	**15,16%**	**14,55%**	**16,62%**	**16,83%**	**16,87%**
Average less Hakon & Ratos	**14,13%**	**13,42%**	**15,40%**	**15,47%**	**15,49%**

Appendix 8. Percentage of Non-Listed Holdings by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	56,70%	35,26%	24,21%	56,71%	29,02%
HAKON	68,93%	71,63%	76,79%	76,54%	77,02%
HAVSFRUN	0,00%	0,00%	0,00%	0,00%	0,00%
INDUSTRIVARLDEN	0,00%	0,00%	0,00%	0,00%	0,00%
INVESTOR	15,15%	20,62%	28,61%	22,76%	21,85%
KINNEVIK	30,87%	24,53%	37,75%	25,67%	23,97%
LATOUR	28,14%	39,59%	32,52%	69,56%	48,41%
LUNDSBERGS	25,63%	30,58%	40,90%	32,73%	28,73%
LUXONEN	0,77%	0,53%	0,25%	0,25%	0,51%
MELKER	0,00%	0,00%	0,00%	0,00%	0,00%
NOVESTRA	56,00%	92,00%	90,00%	84,00%	83,00%
RATOS	95,52%	94,40%	95,25%	95,59%	97,95%
SVOLDER	0,00%	0,00%	0,00%	0,00%	0,00%
SAKI	0,11%	2,14%	3,60%	4,86%	5,13%
TRACTION	18,60%	18,18%	14,66%	17,17%	16,91%
VOSTOK NAFTA	0,00%	5,00%	14,78%	8,25%	10,24%
ÖRESUND	1,50%	2,60%	5,00%	2,80%	20,20%
Average	**23,41%**	**25,71%**	**27,31%**	**29,23%**	**27,23%**
Average less Hakon & Ratos	**15,56%**	**18,07%**	**19,49%**	**21,65%**	**19,20%**

Appendix 9. Dividend Payout Ratio by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	0,00%	2,60%	34,60%	0,90%	29,90%
HAKON	3,50%	4,50%	5,60%	5,40%	5,10%
HAVSFRUN	4,10%	5,90%	9,00%	8,00%	8,70%
INDUSTRIVARLDEN	3,30%	4,40%	7,90%	3,40%	3,30%
INVESTOR	2,70%	3,20%	3,20%	3,00%	3,50%
KINNEVIK	1,50%	1,40%	3,20%	2,80%	3,30%
LATOUR	3,00%	3,40%	6,00%	2,80%	3,00%
LUNDSBERGS	1,90%	2,40%	2,00%	1,80%	1,50%
LUXONEN	0,00%	0,00%	0,00%	0,00%	0,00%
MELKER	0,80%	0,90%	1,20%	0,90%	0,72%
NOVESTRA	0,00%	0,00%	0,00%	0,00%	0,00%
RATOS	3,40%	5,10%	6,70%	5,10%	4,20%
SVOLDER	5,20%	5,20%	9,90%	6,70%	5,60%
SAKI	2,64%	4,77%	10,29%	4,31%	4,05%
TRACTION	1,40%	2,70%	4,60%	2,70%	2,50%
VOSTOK NAFTA	0,00%	0,00%	0,00%	0,00%	0,00%
ÖRESUND	2,80%	5,20%	13,10%	4,80%	3,90%
Average	**2,13%**	**3,04%**	**6,90%**	**3,09%**	**4,66%**
Average less Hakon & Ratos	**1,96%**	**2,80%**	**7,00%**	**2,81%**	**4,66%**

Appendix 10. Fund Size by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	21,80	21,68	21,62	20,98	21,61
HAKON	22,88	23,01	22,98	23,03	22,90
HAVSFRUN	20,21	20,25	19,78	19,77	19,70
INDUSTRIVARLDEN	24,79	24,73	23,90	24,48	24,78
INVESTOR	23,49	23,47	23,17	23,39	23,57
KINNEVIK	22,09	22,43	21,61	22,23	22,48
LATOUR	23,37	23,45	23,45	23,07	23,75
LUNDSBERGS	24,23	24,14	23,82	24,06	24,34
LUXONEN	21,02	21,12	20,65	20,79	20,91
MELKER	23,30	23,37	22,49	23,32	23,73
NOVESTRA	20,33	19,93	19,77	19,86	19,88
RATOS	23,11	23,20	23,48	23,45	23,44
SVOLDER	20,66	20,90	20,64	20,44	20,62
SAKI	22,30	22,10	21,51	21,98	22,28
TRACTION	20,98	21,02	20,86	21,02	21,12
VOSTOK NAFTA	0,00	22,37	21,39	21,97	22,17
ÖRESUND	23,18	22,91	22,28	22,68	22,76
Average	**21,04**	**22,36**	**21,96**	**22,15**	**22,35**
Average less Hakon & Ratos	**20,78**	**22,26**	**21,80**	**22,00**	**22,25**

Appendix 11. Share Turnover by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	187,00%	68,00%	48,00%	65,77%	65,00%
HAKON	13,35%	10,85%	7,97%	9,94%	10,76%
HAVSFRUN	6,30%	6,90%	6,80%	13,80%	19,30%
INDUSTRIVARLDEN	24,53%	30,40%	40,94%	46,95%	45,11%
INVESTOR	53,70%	61,71%	36,86%	43,18%	37,04%
KINNEVIK	90,82%	79,31%	100,45%	70,17%	80,83%
LATOUR	5,93%	5,57%	3,13%	6,26%	3,97%
LUNDSBERGS	18,00%	19,00%	21,00%	25,00%	20,00%
LUXONEN	9,00%	4,00%	6,00%	4,00%	5,00%
MELKER	7,57%	3,07%	1,70%	2,00%	3,13%
NOVESTRA	100,00%	98,00%	92,00%	90,00%	89,00%
RATOS	42,89%	45,14%	61,94%	52,24%	69,03%
SVOLDER	41,00%	49,00%	58,00%	26,00%	28,00%
SAKI	1,56%	1,30%	1,18%	1,12%	1,10%
TRACTION	7,30%	5,83%	4,15%	8,81%	3,42%
VOSTOK NAFTA	0,00%	112,38%	103,11%	124,69%	71,56%
ÖRESUND	12,78%	14,66%	27,91%	23,02%	37,92%
Average	**36,57%**	**36,18%**	**36,54%**	**36,06%**	**34,72%**
Average less Hakon & Ratos	**37,70%**	**37,28%**	**36,75%**	**36,72%**	**34,03%**

Appendix 12. Percentage of Top 3 Owners by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	3,69%	5,43%	5,43%	4,43%	2,52%
HAKON	45,41%	45,47%	45,39%	45,38%	45,45%
HAVSFRUN	25,79%	25,38%	25,38%	25,55%	26,65%
INDUSTRIVARLDEN	3,78%	4,19%	4,19%	4,34%	5,02%
INVESTOR	22,20%	23,15%	23,47%	23,47%	23,47%
KINNEVIK	24,21%	24,23%	24,12%	24,11%	24,18%
LATOUR	64,37%	64,06%	63,90%	64,23%	64,46%
LUNDSBERGS	79,80%	77,50%	77,50%	80,16%	80,16%
LUXONEN	15,10%	15,10%	15,10%	15,10%	9,67%
MELKER	72,18%	72,18%	73,20%	74,05%	74,40%
NOVESTRA	8,14%	8,29%	14,96%	15,01%	15,95%
RATOS	22,86%	25,03%	25,40%	25,33%	25,33%
SVOLDER	74,34%	76,95%	76,76%	79,04%	76,48%
SAKI	0,00%	9,62%	9,87%	8,51%	8,58%
TRACTION	5,97%	5,93%	5,37%	5,21%	5,10%
VOSTOK NAFTA	31,19%	32,17%	32,67%	32,93%	32,49%
ÖRESUND	30,74%	31,69%	32,25%	32,55%	32,05%
Average	**3,69%**	**5,43%**	**5,43%**	**4,43%**	**2,52%**
Average less Hakon & Ratos	**45,41%**	**45,47%**	**45,39%**	**45,38%**	**45,45%**

Appendix 13. Fund Size by CEF and Year

CEF/YEAR	*2006*	*2007*	*2008*	*2009*	*2010*
BURE	8,48	8,56	8,62	8,69	8,75
HAKON	5,96	6,62	7,02	7,30	7,52
HAVSFRUN	8,79	8,84	8,90	8,94	8,99
INDUSTRIVARLDEN	10,03	10,04	10,06	10,07	10,09
INVESTOR	10,39	10,40	10,41	10,42	10,43
KINNEVIK	8,48	8,55	8,62	8,68	8,74
LATOUR	8,94	8,99	9,04	9,08	9,12
LUNDSBERGS	9,04	9,08	9,12	9,16	9,20
LUXONEN	8,70	8,76	8,82	8,87	8,92
MELKER	7,85	7,98	8,10	8,20	8,30
NOVESTRA	7,78	7,92	8,04	8,15	8,25
RATOS	9,86	9,88	9,90	9,92	9,93
SVOLDER	8,48	8,55	8,62	8,68	8,74
SAKI	8,16	8,26	8,35	8,44	8,51
TRACTION	7,76	7,85	8,03	8,14	8,24
VOSTOK NAFTA		5,19	6,30	6,81	7,15
ÖRESUND	9,70	9,72	9,74	9,76	9,78
Average	**8,65**	**8,54**	**8,69**	**8,78**	**8,86**
Average less Hakon & Ratos	**8,76**	**8,58**	**8,72**	**8,81**	**8,88**

Appendix 14. Correlogram

	DISCOUNT	BLOCK_INVESTORS	DIV_PAYOUT	FUND_AGE	FUND_SIZE	HERFI_STOCKS	NO_STOCKS	NON_LISTED	SOLIDITY	TOP5_STOCKS
DISCOUNT										
BLOCK_INVESTORS	*-0,03*									
DIV_PAYOUT	*-0,06*	*-0,17*								
FUND_AGE	*0,09*	*-0,15*	*0,17*							
FUND_SIZE	*-0,27*	*0,26*	*-0,07*	*0,34*						
HERFI_STOCKS	*-0,21*	*0,20*	*-0,22*	*-0,31*	*0,24*					
NO_STOCKS	*0,18*	*-0,36*	*0,04*	*0,13*	*-0,10*	*-0,66*				
NON_LISTED	*-0,62*	*0,01*	*-0,05*	*-0,04*	*0,07*	*0,17*	*-0,31*			
SOLIDITY	*0,29*	*-0,19*	*-0,03*	*-0,33*	*-0,30*	*0,11*	*0,11*	*-0,45*		
TOP5_STOCKS	*0,18*	*0,11*	*-0,33*	*-0,01*	*0,33*	*0,76*	*-0,58*	*-0,06*	*-0,02*	
TURNOVER_SHARES	*0,03*	*-0,57*	*-0,10*	*-0,19*	*-0,15*	*-0,10*	*0,18*	*0,31*	*-0,12*	*0,03*

Appendix 15. Residuals