UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master's Degree Project in Accounting & Financial Management

Unveiling the Cause of NAV-Discounts of Swedish Closed-End Funds

Eleonor Harrysson

Joel Johansson

Supervisor Taylan Mavruk

Graduate School, Department of Business Administration, Section of Industrial & Financial Management & Logistics

Spring 2022

Abstract

Closed-end funds (CEF) have long been a crucial intermediary in the Swedish financial market by providing relatively inexpensive investment opportunities through their portfolio of public and non-public securities. Interestingly, although CEFs worldwide have been traded at a value below the cumulative value of their underlying portfolio, i.e., at a net asset value discount, this valuation discrepancy has begun to converge for Swedish CEFs while their investments consequently yielded positive returns. There is an incidence of research on why valuation discrepancies occur, but there is yet no theoretical consensus as to what that is. Consequently, this study further delves into the cause of NAV-discounts in a Swedish setting, by emphasizing how multifaceted information on CEFs is interpreted and subsequently valued by investors in terms of NAV-discounts, or premiums. Specifically, derived from linear regression analysis, with the use of panel-corrected standard errors, the study indicates that portfolio concentration, past performance, and dividend yield all have a negative effect on NAV-discount, while increased ownership concentration contrarily is positively associated with NAV-discount - in line with expectations and previous research. Oppositely, the expected negative effect of the proportion of non-public holdings could, conversely, not be detected as the study contrarily indicated its positive effect on NAV-discount. Thus, although the study provides some clarity to the otherwise discorded and US-centric research landscape, it further accentuates its ambiguity.

Keywords: Closed-end funds, NAV-discount, non-public holdings, portfolio concentration, ownership concentration, dividend yield, past performance, PCSE, panel data study.

Table of Contents

1
Introduction

Closed-end funds (henceforth CEF) hold a portfolio of financial securities - predominantly shares in public and private companies. According to Lenkey (2015), CEFs that are publicly listed, usually undergo an initial public offering by offering a fixed number of shares, which are later traded on the secondary market. CEFs differentiate themselves from conventional mutual funds as their shares are non-redeemable. Furthermore, their business model consists of holding a portfolio of financial assets, and their profitability is driven by their underlying portfolio companies. Consequently, CEFs can provide investors with relatively inexpensive diversification opportunities which, in conjunction with the deregulation of the Swedish financial market in the 1980s, made them an essential intermediary for individual and institutional investors (Hjelström, 2007).

One fundamental principle within the field of finance is the law of one price which implies that equivalent financial portfolios with indistinguishable risk exposures, that are expected to generate identical cash flows, must be traded at the same price (Lenkey, 2015). As emphasized by Lenkey (2015), the law of one price stipulates that the valuation of CEFs should equal their Net Asset Value (henceforth NAV), which is the cumulative value of the CEFs portfolio companies - and their associated expected cash flows. However, as concluded by Von Essen (1997), the law of one price is normally violated and CEFs are usually traded at a price below their NAV, i.e., at a NAV-discount. Evidently, between 2004 and 2021 the mean unweighted NAV-discount for the twelve CEFs constituting the foundation for this thesis was 10.26 percent.

The violation of the law of one price becomes especially evident when observing CEFs, such as Industrivärden and Öresund, who exclusively hold public firms, and yet are traded at a substantial discount (Ibindex, n.d.a). In this regard, the valuation mismatch could generate an arbitrage opportunity where a rational investor takes a long position in a CEF currently traded at a discount and short the underlying portfolio (Lee et al., 1991). Additionally, contrary to the efficient market theory which implies that a portfolio and its underlying assets should have equal variance, there is usually a volatility mismatch between CEFs and their net assets (Lenkey, 2015). In a study of US CEFs, Lenkey (2015) found that the return of the CEF is more volatile than the return of its underlying assets. Interestingly, while the excess volatility

of the CEF is consistent with previous research (e.g Pontiff, 1997), the opposite relationship can be observed for the Swedish CEFs included in this study, where the fund return conversely is slightly less volatile than the return of the underlying assets. According to Pontiff (1997), the volatility mismatch is primarily driven by idiosyncratic or firm-specific risk where only a fraction can be explained by systematic market risk or other exogenous risk factors.

Ultimately, although there is an incidence of research on NAV-discount and what causes these seemingly inefficient price disequilibrium, it has remained ambiguous and there is yet no theoretical consensus as to why CEFs are priced differently from their NAV (Lenkey, 2015). Hence, with a basis on previous research, this study further delves into the root cause of NAV-discount by quantitatively analyzing twelve Swedish CEFs. By examining the respective CEFs' portfolio composition, including non-public holdings and portfolio concentration, ownership structure, as well as performance and dividends, the study intends to unravel how this information is interpreted and consequently valued by the market in terms of NAV-discount or premiums - and ultimately discern the explanatory factors behind the price disequilibrium.

1.1 Problem Discussion

While open-end funds more closely instantaneously reflect their net assets, the CEFs are instead valued in terms of future cash flows and the NAV's expected future profits (Boudreaux, 1973). This involves uncertain estimates which are bound to result in valuation differences from which CEFs are more likely to deviate from their NAV. The rationale behind these valuation discrepancies remains unclear and there is an inherent lack of consensus in academia regarding its most important underlying causes. In earlier research, Boudreaux (1973) delineated the most common, albeit ambiguous, explanations, ranging from transaction costs to irrationality and market inefficiency. Albeit, with an inability to reject the efficient market, Boudreaux (1973) implies that both the CEF and its net assets are correctly valued - thus making the aforementioned explanations for valuation differences even more elusive.

Following research has therefore broadened the scope of the explanatory drivers behind NAV-discounts, however without reaching a consensus. For instance, some of the more renowned theories have concluded on portfolio composition, e.g. in terms of diversification (Hjelström, 2007; Lee, Schleifer & Thaler, 1991) or the illiquidity of restricted holdings (Cherkes, Sagi & Stanton, 2009; Carroll, Linsmeier & Petroni, 2003), whilst others detected a

casual relationship with ownership structure (Barclay, Holderness & Pontiff, 1993) and dividend policies of the CEFs (Johnson, Lin & Song, 2006). Although there is some empirical evidence that supports these theories, they remain inconclusive and largely distorted towards US CEFs, from which Swedish CEFs differentiate themselves in three distinctive regards. Firstly, Swedish CEFs have historically been traded at comparably high NAV-discounts relative to foreign equivalents (Hjelström, 2007). Secondly, they have a substantial influence on the Swedish stock market where a scarce number of funds control almost 30 percent of the voting power on the Stockholm Stock Exchange (Hjelström, 2007), while the CEFs subsequently are controlled by a few influential families (Holmén & Högfeldt, 2009; Cronqvist & Nilsson, 2003). Thirdly, while US CEFs' portfolios predominantly constitute public securities, Swedish CEFs more extensively hold a combination of public and non-public securities (Hjelström, 2007).

In recent years, Swedish CEFs have experienced diminished NAV-discounts concurrently as their investment category has repeatedly yielded abnormal returns. Simultaneously, CEFs have risen in popularity as a lucrative investment opportunity and have experienced noticeable traction from capital from small private investors (Sellebråten, 2021). The existing unclarity and elusiveness of NAV-discounts become additionally intricate in a Swedish context. Inevitably, the recent market environment, with historically low interest rates and stimulus of the economy, has led to a unique market situation. Ultimately, the question narrows down to what the cause of this perplexing and seemingly inefficient existence of NAV-discounts of Swedish CEFs is.

1.2 Purpose of the Study

Drawing on the current lack of consensus in research on NAV-discounts, this study aims to add to the theoretical comprehension and the understanding of the possible drivers behind NAV-discounts of Swedish CEFs. By scrutinizing the potential driver of NAV-discounts in particularly a Swedish setting, we aim to broaden this understanding by unraveling the alluring trend portrayed by Swedish CEFs of diminishing NAV-discounts. More specifically, this thesis aims to answer the following research question:

- *How does the portfolio composition through portfolio concentration and non-public holdings in combination with ownership structure, stock performance, and dividend policies affect NAV-discounts?*

1.3 Contributions

The theoretical landscape on NAV-discounts of CEFs can be considered ambiguous as there is an inherent lack of consensus regarding the main drivers behind the valuation discrepancies, with a scarcity of research published in the 21st century. Thus, by investigating the NAV-discounts of Swedish CEFs, this thesis aims to bring clarity to the current lack of consensus in research on the key drivers of NAV-discounts. More specifically, while there is some evidence supporting the effect and significance of the factors mentioned in the research question above, it is almost exclusively assessed independently from other factors. Consequently, examining them jointly could thus yield additional insights and nuance to the currently discorded research landscape. Additionally, research on CEFs is currently weighted towards the US, which differs immensely from the Swedish market in terms of, e.g., ownership concentration, portfolio structure, taxes, regulation, and disclosure requirements (Hjelström, 2007). Thus, regarding the current scarcity of research reaching beyond the US borders, applying said research on the Swedish market could bridge the regional research gap.

Furthermore, this study can bring a contemporary and relevant understanding of the drivers behind the NAV-discount in a Swedish context. This becomes especially pertinent concerning the essential role CEFs have had on the Swedish financial market since the 1980s. An imperative aspect of this is the Swedish CEFs' unique tendency of holding both public and non-public securities. Consequently, an investigation of NAV-discounts can also be contributory from an M&A perspective considering the portfolio of investment firms includes both public and private firms. As a NAV-premium can be used as a proxy for valuation of non-public firms set by the market - this is the closest one gets to a market valuation of unlisted firms. Undoubtedly, the majority of the difficulty in correctly pricing CEFs stems from their investment in non-public firms and the lack of transparent information.

1.4 Disposition

The thesis is structured as follows: Chapter 2 provides a theoretical background on closed-end funds and NAV-discounts along with hypotheses development. Chapter 3 provides an overview of the data constituting the foundation for this study, including sample selection, and descriptive statistics, followed by Chapter 4 which develops the methodological approach. The results of the study are presented in Chapter 5, which is further analyzed in Chapter 6 in the light of the respective hypotheses. Ultimately, the conclusions drawn from the study are presented in Chapter 7 along with suggestions for future research.

2
Theoretical Framework

2.1 Theoretical Overview

The premise of this study relies on the violation of the law of one price which stipulates that financial assets with equivalent cash flows should have the same price (Lenkey, 2015). As asserted in the previous chapter, the law of one price is almost exclusively violated as CEFs are usually traded below their NAV, i.e., at a discount. Previous research has deemed this to be the cause of market inefficiencies (Pontiff, 1997; Gemmill & Thomas, 2002), which has enabled investors to gain abnormal positive returns by investing in high NAV-discount funds, whilst divesting in low discount funds (Cheng, Copeland & O´Hanlon, 1994). However, as presented by Fama (1970), the premise of an efficient market is that prices are fully reflective of all available information. Albeit, considering the ambiguity of the concept "fully reflect", Fama (1970) denotes that a price disequilibrium might arise despite investors having access to the same information, as their perception and ability to evaluate the information often differ.

Another fundamental aspect in the field of finance is portfolio theory which assumes that investors are risk-averse and want to retrieve the highest possible risk-adjusted returns (Markowitz, 1952). According to Bodie, Kane, and Marcus (2005), this is achieved through diversifying the portfolio until all unsystematic risk is eliminated. Specifically, Swedish CEFs commonly diversify their portfolio by holding both public and non-public securities, oftentimes from different segments (Hjelström, 2007). Concurrently, the unique composition of each CEF's portfolio, together with their respective ownership structures, exposes them to different levels of idiosyncratic risk which consequently attracts different types of investors. Hence, due to the implicit investor heterogeneity (Hjelström, 2007) as well as investors' varying perceptions and abilities to evaluate *all available information* (Fama, 1970), valuation differences and price disequilibrium ought to arise. With regards to the heterogeneity of both investors and the CEFs, the premise of this study is thus to examine how this information, in terms of portfolio and ownership structure, past performance, and dividends, is interpreted and consequently valued by the market in terms of NAV-discounts.

2.2 Non-Public Holdings

Swedish CEFs often differentiate themselves from international equivalents by holding a portfolio of both public and non-public securities (Hjelström, 2007). Although the investment

in non-public securities enables investors to access otherwise inaccessible investment opportunities, it simultaneously exposes them to additional risk. Consequently, these two opposing forces have led to a division in research regarding the true effect of non-public holdings on firm value and NAV-discounts - whether they should generate a premium or a discount. According to Cherkes et al. (2009), the price of CEFs consists of the NAV plus an illiquidity premium, less management fees. Thus, the illiquidity premium corresponds to investors willing to pay a premium on CEFs holding otherwise inaccessible and illiquid holdings, whilst the shares of the CEF remain liquid. Ultimately, Cherkes et al. (2009) conclude that this illiquidity mismatch is the cause of the discrepancy between the NAV and the value of the CEF, by detecting a negative relationship between the holding of illiquid securities and the NAV-discount. This is contradicted by Carroll, Linsmeier, and Petroni (2003) who contrarily argue that the illiquidity and innate information asymmetry associated with non-public firms are not fully forgone through the CEF, thus yielding a NAV-discount rather than a premium. This is likewise supported by Damodaran (2005), who emphasizes how the liquidity of an asset determines the feasibility of investment and divestment. Since an illiquid asset is not traded on an open market, the possibility of finding a potential buyer and reaching a price equilibrium becomes cumbersome. Thus, the seller is often forced to offer a discount to account for the illiquidity and the additional risk this entails.

Additionally, the inherent information asymmetry causes difficulties in fairly valuing non-public firms while similarly problematizing the ability to thoroughly audit them (Carroll et al., 2003). In accordance with the lemons theory as presented by Akerlof (1970), inadequate exchange of information hinders investors in accurately assessing the fair value of an asset, subsequently causing market failures. Derived from their significantly lower disclosure requirements, the information asymmetries of non-public firms become more evident which (Carroll et al., 2003), complicates the feasibility of differentiating sound investments from lemons. Essentially, external investors would thus have to entrust the CEF fund managers' abilities and insights in valuing non-public securities as current market conditions, substantial information asymmetries, and illiquidity of non-public firms obstructs direct investments. Thus, concurrent with the efficient market hypothesis, a price disequilibrium might arise from CEFs having superior access to, or superior abilities in evaluating, the information of non-public firms - not necessarily implying that market inefficiencies subsist (Fama, 1970). Consequently, the non-full disclosure of information and the entrustment of the fund managers can cause principal-agent problems (Holmén and

Högfeldt, 2009) as the fund managers may have incentives to either over or underestimate the value of their non-public holdings.

Another contradiction towards the existence of a price disequilibrium between the NAV and the CEF share price is the arbitrage opportunity it creates (Gemmill & Thomas, 2002). If a CEF solely has public holdings and trades at a NAV-premium, a rational investor would short the CEF and buy the underlying companies. Conversely, if a CEF is traded at a NAV-discount, then the investor would buy the CEF and short the underlying portfolio companies. However, these arbitrage opportunities may be aggravated when the CEF holds non-public assets as the ability to short these are problematic to impossible. Gemmill and Thomas (2002) call this the replication risk, which is the inability to perfectly replicate the underlying portfolio, allowing for a large NAV-discount to develop before an actual arbitrage opportunity arises. Additionally, the implausibility of shortening non-public holdings may thus negate the arbitrage contradictions while the occurrence of premiums of CEFs holding exclusively public firms, vitalize the inexplicable phenomenon of a price mismatch which should be impossible in an efficient market (Gemmill & Thomas, 2002).

Relative Multiple Valuation

The holding of non-public assets is also a source of ambiguity as the valuation of non-public firms often becomes cumbersome. The CEFs themself report different valuation methods for their non-public holdings in their financial statements. One common valuation method is to apply different relative multiples retrieved from peers listed on the financial market, for instance the price-to-earnings ratio (P/E) (Adams & Thornton, 2009). Inevitably, if a CEFs investment portfolio consists of a large proportion of non-public, the choice of valuation method will have a mature effect on the reported NAV. The use of either revenue-based or earnings-based multiple methods for their non-public holdings has the advantage as it is a replication of the current market valuation consensus (Schreiner, 2007). Schreiner (2007) discerns the usage of equity multiples as a valuation method and argues that in an efficient market, valuations based on several multiples can be considered as an approximation of the fair market value, which is not necessarily the intrinsic value of an asset. However, this method has several drawbacks, for instance, the choice of peers is subjective, hence the choice of benchmark comparison will affect the applied multiples. The method also neglects other factors that are not reflected in the relative multiples, such as a required risk premium on illiquid assets that would decrease the value of non-public holdings (Schreiner, 2007).

Bonadurer (2003) on the other hand argues that the fundamentals behind the discounted cash flow value are derived based on three factors, cash flows, expected growth, and risk, which is incorporated in the P/E multiple as it is a function of the same independent factors. Conclusively, one theoretically explanatory factor behind the NAV-discount, or the lack of a discount, is the discrepancy in valuation methods used by institutional investors and the CEFs and between the respective CEFs.

Furthermore, there is a time delay in the valuation adjustment of the non-public holdings that may cause a price discrepancy. A reduction in relative multiples on the market will make the investors revalue the non-public holdings of the CEFs immediately. This implies that an increase in the valuation multiples would cause the price to increase, thus reducing the NAV-discount and vice versa. Hence, relative valuation multiples should be negatively correlated to the NAV-discount. Pontiff (1997) and Lenkey (2015) both conclude that the return of CEFs is more volatile compared to the return of the underlying NAV. Evidently, if the CEF price is more volatile than the NAV, then an increase in valuation multiples would cause a larger change in the price, than in the NAV, enlarging the gap between the price and the NAV, thus decreasing the NAV-discount. This predicament also implies that there ought to be a negative correlation between the relative valuation multiples and the NAV-discount.

The above-mentioned phenomena, together with the illiquidity premium from non-public holdings, as deduced by Cherkes et al. (2009), and that CEFs holding a large proportion of non-public holdings tend to trade at a premium ended up in the following hypothesis:

> ***H1:*** *There is a negative association between the NAV-discount and the proportion of non-public holdings.*

2.3 Portfolio Concentration

Although Bodie et al. (2005) imply that the highest risk-adjusted return is achieved through diversification, extensive research has found a negative relationship between diversification and firm value premium (Hjelström, 2007). More explicitly, Berger and Ofek (1995) found that firms diversified over multiple segments are traded at a discount between 13 and 15 percent, and the discounts are especially high for cross-industry portfolio diversification. Subsequent research has found similar patterns. For instance, Laeven and Levine (2005) concluded that more diversified banks, and other financial institutions, experienced a significantly higher discount. Thus, although the underlying intention behind diversification is to diminish shareholders' risk exposure, Hjelström (2007) infers that too diversified firms

incite an increased required rate of return, subsequently increasing the very risk exposure that diversification intended to diminish.

Nonetheless, according to Lee et al. (1991), CEFs have a tendency of holding substantial blocks of the underlying securities' shares. Consequently, to account for the discount effect upon the divestment of the underlying security, CEFs often underestimate the NAV of these shares. Thus, in accordance with Hjelström's (2007) inference, the underestimation of NAV from block holdings would imply that more concentrated CEF portfolios would rather incite a premium (Lee et al., 1991), whilst a too diversified portfolio can have a detrimental effect on CEF-value (Hjelström, 2007). Accordingly, to test these findings the following hypothesis has been formulated with portfolio concentration as a proxy for diversification:

H2: *There is a negative association between NAV-discount and portfolio concentration.*

2.4 Ownership Structure

Due to the decoupling of ownership and management there is information asymmetry where the agent, in this case the manager, has the information advantage which subsequently may lead to a misalignment in incentives and suboptimal decision making (Jensen & Meckling, 1976). To circumvent this, owners usually apply supervision or incentivizing measures in order to delineate management from making inadequate choices and to ensure that their incentives are tangent with the owners'. However, such measures are associated with costs commonly denominated as agency costs, and there is a risk that the agency cost may be doubled for CEFs as there will be an agency cost both for the portfolio companies and for the CEF itself (O'Reilly & Main, 2010). Chen, Jiand, Kim, and McInish (2003) highlight that the problem of information asymmetry for CEFs is both external and internal as there may be potent information asymmetry both between the market and the CEF itself and between the CEF and its portfolio companies. This associated uncertainty and the potential doubling of information asymmetry for CEFs have been attributed as one of the key explanations for why CEFs trade at a NAV-discount. Conversely, although influential owners directly or indirectly provide a monitoring dimension that delimits fund managers from acting upon diverging incentives, the existence of influential owners can also expose CEFs to enhanced agency costs.

As asserted by Barclay et al. (1993), a high ownership concentration of a CEF is significantly associated with a higher NAV-discount. Although such an effect could be logically attributed

to the diminished public float caused by large blockholders, the authors also imply some explanatory inference in the private benefits extracted by large, controlling owners. A unique aspect of Swedish CEFs is their pyramidal ownership structure, consisting of a few influential families at the top, CEFs in the middle, and the underlying portfolio companies at the bottom (Holmén & Högfeldt, 2009). While the influential families could ensure a long-term alignment of incentives between shareholders and fund managers, Holmén and Högfeldt (2009) also demonstrated its positive effects on holding company discounts. The detrimental effect of controlling shareholders on firm value has been similarly asserted in previous studies (e.g. Hjelström, 2007; Barclay et al., 1993; Cronqvist & Nilsson, 2003) which emphasize how these shareholders can inflict the CEFs with additional agency costs, by exercising their control to extract pecuniary and non-pecuniary benefits. With non-pecuniary benefits being externally indistinguishable, Hjelström (2007) proposes that a distinction can be made between the controlling and the formal power of majority owners, whereas the former is an indication of the associated owner opportunism. Specifically, Hjelström (2007) argues that extraction of non-pecuniary benefits can be captured by portfolio concentration whereas a high concentration, in combination with a high ownership concentration, indicates *controlling* power - which consequently has a negative value effect. Conversely, a low portfolio concentration contrarily indicates a high *formal,* rather than controlling, power which in comparison has a smaller negative effect on firm value.

While highlighting how this opportunism varies between firms and the characteristics of the controlling owner, Cronqvist and Nilsson (2003) detect a significant relationship between inferior performance and agency costs under the existence of controlling owners. Ultimately, Cronqvist and Nilsson (2003) argue that the agency costs associated with controlling minority shareholders, primarily influential families, subsist between 6 to 25 percent of firm value and are thus concluded to be the main driver of firm value discounts. Logically, the theoretical standpoint is therefore to derive this unique ownership structure portrayed by Swedish CEFs and will therefore be tested accordingly:

H3: *There is a positive association between NAV-discount and ownership concentration.*

2.5 Signaling Effect of Past Performance & Dividend Policies

Although Boudreaux (1973) concluded that the price of a CEF reflects future expected returns, some studies conversely indicate that the value of CEFs retrospectively reflects prior performance (Bleaney & Smith, 2003; 2008; Brickley & Schallheim, 1985) in accordance

with the weak form efficiency as asserted by Fama (1970). Although this research area is more ambivalent, the occurrence of discounts or premiums on CEFs can be seen as a source of abnormal risk-adjusted returns. Hjelström (2007) highlights that CEFs continuously traded at a NAV-discount inherit a positive risk-adjusted return, while Lenkey (2015) emphasizes that CEFs with a contiguous premia yield a negative abnormal risk-adjusted return. In earlier research, Cheng, Copeland, and O´Hanlon (1994) detected a pattern where they in a study of UK CEFs delineated a significant relationship between abnormal returns and NAV-discounts. The authors imply that an investor could expect abnormal positive returns when adopting an investment strategy of buying high NAV-discount funds, whilst divesting in low discount funds. This was, ultimately deemed as a cause of market inefficiency where the market overreacts by appraising NAV-discounts at either extremely low discounts or high premiums.

The association between past performance and NAV-discount is further assessed by Bleaney and Smith (2008). Based on a research of US and UK CEFs, the authors detect a significant, albeit non-persistent, association between historic returns and CEF premiums. Since premiums tend to revert towards the mean, can the same relationship not be assessed for future returns as it is conversely negatively correlated with NAV-premiums. With regards to the non-persistence of the relationship between prior return and CEF-premiums, as well as NAV returns, Bleaney and Smith (2003) emphasize the existence of short-run inertia possibly stemming from CEFs' lagged reporting of NAV and irrationality of investors. Conclusively, although the assessment of NAV-discounts, through past stock performances relies on the often disproved weak form efficiency (Fama, 1970), there are clear indications that such a relationship exists and will consequently be tested through the following hypothesis:

***H4A**: There is a negative association between NAV-discounts and past stock performance.*

Furthermore, Bleaney and Smith (2003) imply that investors interpret realized returns through dividends as a signal of the fund managers' proficiency where current dividends generate increased demand for the fund, consequently appraising its value. The signaling effect of dividends on NAV-discounts is further examined by Johnson, Lin, and Song (2006) who imply that CEFs adopt minimum dividend policies to deliberately, and successfully, reduce their discount. The authors argue that the revaluation made by investors upon dividend policy announcements, which causes the diminished discount, is a rational expectation of increased future performance. In comparison to other factors affecting the NAV-discount, the authors

conclude this to be the most augmented as CEFs adopting a dividend policy experience a 58 percent lower mean discount.

The feasibility of such dividend policies could, however, be diluted as a consequence of the ownership structure of most Swedish CEFs. Specifically, with a presupposition in the principal-agent theory, Holmén and Högfeldt (2009) argue that controlling owners, typically influential families, exploit the separation of ownership and control by exercising their control to invoke reinvestments of realized gains, rather than dividend payments. As such, controlling families with abnormally long positions and a relatively small portion of the shares, are able to prevent excess capital from rendering their control. Holmén and Högfeldt (2009) conclude this to be an inefficient overinvesting strategy that ultimately negatively affects the value of the CEF. Thus, Holmen and Högfeldt (2009) raises the issue of the retention rate and explain that dividends are more valuable for external investors as the reinvested capital would only be worth one less the NAV-discount. Evidently, previous research has emphasized the positive effects of dividends - both in terms of a signaling effect on investors consequently appraising the fund value, and the reinvestment parity (Holmén & Högfeldt, 2009). Conclusively, the ultimate hypothesis to test in regards to NAV-discounts is the effect of realized returns through dividends, accordingly:

***H4B**: There is a negative association between NAV-discounts and dividend yield.*

2.6 Macroeconomic Factors

2.6.1 Interest Rate

One of the most profound macroeconomic variables is the interest rate set by the central banks. In Sweden, the interest rate is set by Riksbanken, the Swedish central bank. As stated by Sveriges Riksbank (2020), by adjusting the interest rate the central bank may influence the overall economy as the interest rate affects the aggregate demand of the economy, and thereby mitigate economic fluctuations. Moreover, the interest rate is also used as a countermeasure to inflation, and the most prominent objective for the central bank has been to keep inflation at its target of two percent. This predominant objective has forced the central banks to continuously decrease the interest rate and in 2015 it became negative for the first time in history, and it stagnated at -0.5 percent until 2020 whereas Sweden consequently has a zero-interest rate (Sveriges Riksbank, n.d.).

There are a plethora of studies scrutinizing the interest rate effect on the stock market and a significant association between the interest rate and the stock market performance has been

proven by for instance Huang, Mollick och Nguyen (2016), Jareño and Navarro (2009) and Papadamoua, Sidiropoulos and Spyromitros (2016). The overall consensus is that there is a negative association between interest rates and the stock market. This is further supported by Sveriges Riksbank's report *Equity market valuation in light of low interest rates* where Ceh, Manfredini, Melander, and Wollert (November 2021) highlight both theoretical and empirical explanations of how the interest rate affects equity valuation. The interest rate is a comprehensive component in most conventional equity valuation models, from discounting cash flows models to the capital asset pricing model and theoretically, an increased interest rate should infer a reduced equity value as it increases the required rate of return. Song and Jain (2021) create a dynamic capital mobility model in order to unveil the rationale behind NAV-discounts with the primary focus on the discounted dividend model. Albeit, their primary focus is to discern the expected dividend yield effect on the NAV discount, Song and Jain (2021) include the 10-year US Treasury rate as a modulating factor and find that the interest rate was weakly negatively associated with the NAV-discount, everything else held constant. Additionally, Swaminathan (1996) investigated the predictive value of NAV-discount on small firms' earnings and future economic performance and concluded that it has a significant forecasting effect on the future inflation rate and that the NAV-discount is a guiding indicator of investors' expectations about future economic performance.

2.6.2 Investor Sentiment

Investors' sentiments effect on the stock market performance have been addressed by a profound number of articles by, for instance, Baker and Wurgler (2007), Brown et al. (2004), Chen et al. (2003), Fletcher (2013), Jitmaneeroj (2017), and Lee et al. (1991), and is a substantiated part of behavioral finance. According to the strict theoretical financial dictum investors sought to be rational and thus capital market prices should equal the future cash flow of the underlying asset. By that, fluctuations in the price should solely be driven by fluctuations in fundamentals (Baker & Wurgler, 2007). However, the financial market regularly observes irregularities in price volatility, which defy the rational framework that permeates the financial market. Hence, subjective parameters such as investors' sentiments and their perception of future cash flow become explicatory for fluctuations in stock price. In addition, investors' sentiment has a greater impact on firms with smaller market capitalization. More specifically, younger, not yet profitable firms that have a highly volatile business performance, usually non-dividend, and firms that predominantly focus on high growth are more susceptible to investors' sentiment. Due to the inherent uncertainties in such

firms, the likelihood of valuation mismatches is more frequent and potent (Baker & Wurgler, 2007). As CEFs hold both public and private firms, of whom many share the characteristics of the abovementioned small-capitalization firms, their NAV ought to be more susceptible to investor sentiment.

For instance, as detected by Lee et al. (1991), the fluctuations in CEFs' discounts can be seen as a reflection of the collective sentiment of individuals. They emphasize the presence of noise traders whose expectations of future returns are not warranted by rational fundamental expectations. Such investors invest on the basis of 'noise' or perhaps devotedly follow a popular trading model and are thus impressionable of changes in the market momentum. Thus, they act in haste and irrational and collectively they cause rapid fluctuations in demand for CEFs shares - which inevitably will be reflected in the NAV-discount (Lee et al. 1991). Similarly, Swaminathan (1996) follows up on the sentiment hypothesis and concludes that individual investors exhibit irrational behavior and misperceive future economic performance. As CEFs are predominantly traded by individual investors, this increases the volatility of both small firms and CEFs, making the CEF more volatile than the underlying assets. Conclusively, Swaminathan's (1996) inference is consistent with Lee et al. (1991), that the NAV-discount can be portrayed as a proxy for investor sentiment and its fluctuation is merely a replication of fluctuations in individual investor's misperception. There is a theoretical consensus that investors' sentiment has a significant influence on the stock market performance, however, it is indefinite what kind of proxies are appropriate to capture the investor sentiment.

Another approximation of the investor sentiment is the P/E ratio. According to Jitmaneeroj (2017), several studies have proven that there is a causal relationship between the P/E ratio and fundamental economic variables such as dividend yield, firm size, growth, interest rate, debt ratio, and inflation. Schreiner (2007) states that the valuation multiples, besides representing the current fair market value, are also a reflection of the mood or the sentiment of the market. This is also proven by Jitmaneeroj (2017), who states that the fluctuations in the P/E ratio are also affected by and driven by investor sentiment to a great extent. Consequently, both the fundamental effect and the sentimental effect are encapsulated within the P/E ratio. This, in summary, infer that if the P/E ratio is a sufficient proxy for the investor sentiment, then it too ought to be negatively correlated to the NAV-discount.

3
Data

3.1 Sample Selection & Overview

The underlying data set consists of 12 CEFs as presented in table 3.1 below, with the selection requirement that the CEFs should be listed on one of the major lists on the Stockholm stock exchange, and report their NAV and its composition, on at least a quarterly basis. Thus, in accordance with said criteria, thirteen listed Swedish CEFs are precluded from the sample as they lacked detailed information about their respective NAV. A potential issue with the chosen sample is that of survivorship bias, meaning that liquidated, merged, or CEF converted to open-end funds are excluded from the study. However, according to Lee et al. (1991), upon liquidation, the NAV-discount of a CEF converges towards zero until complete eradication. Thus, the inclusion of liquidated funds might risk distorting the analysis.

Table 3.1. An overview of the CEF sample per 2021-12-31

Closed-End Fund	Segment	Discount/ Premie	Market Cap (mSEK)	Market Weight	Weighted Discount/ Premium	Non-Public Holdings
Bure Equity	Large Cap	−35,58%	32 491,22	2,58%	−0,92%	10,60%
Creades	Large Cap	−53,28%	13 700,25	1,09%	−0,58%	36,01%
Industrivärden	Large Cap	13,13%	75 213,57	5,98%	0,79%	0,00%
Investor	Large Cap	6,39%	712 423,87	56,64%	3,62%	34,22%
Kinnevik	Large Cap	−25,23%	89 787,18	7,14%	−1,80%	44,76%
Latour	Large Cap	−70,69%	218 345,98	17,36%	−12,27%	34,80%
Lundbergföretagen	Large Cap	4,69%	77 216,00	6,14%	0,29%	14,88%
Öresund	Mid Cap	0,82%	6 627,78	0,53%	0,00%	3,50%
Svolder	Mid Cap	−29,24%	9 488,65	0,75%	−0,22%	0,00%
Traction	Mid Cap	3,15%	3 933,40	0,31%	0,01%	8,10%
VNV Global	Mid Cap	4,67%	12 189,59	0,97%	0,05%	78,35%
VEF	First North	8,47%	6 305,85	0,50%	0,04%	92,03%
		−14,39%	1 257 723,34		−11,00%	29,77%

The sample period is delineated to an 18-year period, 2004 to 2021, thus covering a total of 72 quarters which yielded 769 observations. This also corresponds with previous empirical studies such as Boudreaux (1973) who investigated 13 US equity funds over a ten-year period, Bleaney and Smith (2003) who similarly investigated 23 US funds over a period of

20 years, as well as Holmén and Högfeldt´s (2009) study of 13 Swedish equity funds over a 14-year period.

Furthermore, although the CEFs historically have been traded at a discount on an aggregate basis (Hjelström, 2007), the NAV-discount of the CEFs included in the sample differs substantially. For instance, whilst Industrivärden at year-end 2021 was traded at a 14 percent discount, Latour was in contrast traded at the substantially highest premium of 71 percent. Similarly, their respective portfolio compositions differ greatly whereas the proportion of non-public holdings varies from zero to 87 percent, as seen in table 3.1 above.

3.2 Data Collection

The underlying data consists of both time-series and cross-sectional data, thus having panel data characteristics, with a total of 769 observations distributed over twelve cross-sectional units, *N,* over an average of 64 time periods, *T.* With regards to the varying IPO date of the sample CEFs, the panel is unbalanced since CEFs such as VEF has 26 observations, whilst e.g. Industrivärden has 72.

3.2.1 Accounting Data

The data was extracted from the corresponding CEF's quarterly and annual reports. As such, the preponderance of the raw data consists of reported accounting data. Although accounting and market values normally differ, the CEFs included in the study all report according to the IFRS framework which states that financial assets, in accordance with IFRS 13, should be reported at fair values which commonly corresponds to market values. For public portfolio securities, this coincides with the closing market price at the given report date, but for non-public securities, market prices rarely exist and they are rather valued in terms of discounted cash flows, multiples, or according to the last transaction, i.e., the acquisition price.

The collected data consists of reported NAV per share, the total value of non-public securities, and the reported value of the two largest securities. For measurements such as portfolio concentration and proportion of non-public securities, the total NAV is also required which is calculated from the reported NAV per share times the number of shares outstanding. The number of shares reported by the respective CEF, and consequently used in NAV per share calculations, differed on occasion from what was retrievable from databases such as Bloomberg and CapitalIQ. Thus, to control for potential errors and valuation discrepancies,

the total NAV is tested against the net assets as reported in Bloomberg. The result shows that merely four out of the twelve CEFs experienced discrepancies exceeding ten percent for some of the observations, namely Creades, Industrivärden, Latour, and Lundbergföretagen. For these discrepancies, the NAV retrieved from Bloomberg is applied to the data. Additionally, the data is also controlled and adjusted for differences in reporting currency. Since this study is based on the Swedish market the relevant currency is SEK. Thus, the CEFs VNV Global and VEF, who report in USD, are adjusted accordingly with the closing quarterly USD/SEK exchange rate retrieved from Bloomberg.

Conclusively, due to the absence of databases that provide the desired parameters, manual extraction of data is currently unavoidable. However, manual extraction of data may distort its quality as the likelihood of errors might be higher in contrast to being retrieved from common databases. Hence, to account for potential errors, the data for each subsequent CEF is examined individually to control for extreme or unreasonable deviations. Additionally, since there currently is a significant scarcity of research on Swedish CEFs, as well as negligible access to the necessary information, the manual data collection can be valuable for future research.

3.2.2 Market Data

The market data retrieved from Bloomberg constitutes share price, the number of shares outstanding, and dividends per share. To coincide with the reported NAV at a given time, the historic values unadjusted for e.g. splits, consolidations, spin-offs, and SEOs are retrieved. Likewise is the ownership structure of the respective CEF retrieved from CapitalIQ. To delineate the relative controlling powers of individual owners the owners of A, B, and C shares are set in relation to their corresponding voting rights reported in each CEFs' respective Article of Association. The different share classes are thus converted so the true voting power of each shareholder is unveiled. Due to the inaccessibility of historic Articles of Associations, the allocation of voting rights per A, B, and C shares are assumed to be consistent during the investigated period.

A potential issue with the retrieval of data could be the time distance between the NAV and the CEF share price. For this thesis, the CEFs quarterly share price is retrieved at the last date of each quarter, while the NAV is retrieved from the quarterly report that is released up to a month later. It subsequently emerged a time discrepancy between the retrieval of the accounting data and the CEFs share price. Therefore, information asymmetry will emerge as

the CEF and its managers will have superior knowledge over the external investors. In contrast, a more accurate way to retrieve the CEF share price would be on the date that the quarterly report is released. The drawback here is that the information asymmetry will be reversed, as the external investors possess superior knowledge about external or internal factors that affect the NAV that is not accounted for in the quarterly report. Nevertheless, judging by earlier research (e.g. Cherkes et al., 2009) this approach to data collection seemed conventional in academia.

3.3 Variable Specification

The following subchapter presents the dependent and independent variables, as well as the macroeconomic control variables which constitute the foundation of this study. Including the variables' definitions, which can be seen in table 3.2 below, as well as how the variables are calculated, and the rationale behind each measurement.

Table 3.2 Variables Acronyms

Acronyms	Definition
NAVD	Net Asset Value Discount
PCON	Portfolio Concentration
PNON	Proportion of Non-Public Holdings
OCON	Ownership Concentration
exc_return_l	Lagged Excess Return
Div	Dividend Yield
rf	Risk-free interest rate
BCI	Business Confidence Index
PE	Price-to-Earnings Ratio

3.3.1 Dependent Variable: NAV-discount

The comprehensive purpose of this thesis is to examine how the presented explanatory variables affect the NAV-discount of Swedish CEFs through a linear regression model. Hence, the main dependent variable is the NAV-discount of each subsequent CEF, which is defined as seen in equation 3.1 below.

$$NAV\ per\ share_{it} = \frac{(Total\ Portfolio\ Value - Net\ Debt_{it})}{Total\ Outstanding\ Shares_{it}} \qquad (3.1)$$

The reported NAV from the subsequent CEF is used as a basis in the calculation above. A potential disadvantage of using reported NAV is the susceptibility to biased reporting and inconsistent accounting measurements (Lee et al., 1991; Carroll et al., 2003). More preferable

would be an external calculated NAV which is provided for some CEFs, albeit only for a limited time period. Having the NAV externally and equally calculated would have generated a more unbiased and comparable data sample. Nonetheless, due to the unavailability of calculated NAV, reported NAV is used. Ultimately, the NAV-discount (denoted as NAVD) variable is calculated in accordance with Lee et al. (1991) as seen in equation 3.2 below.

$$NAVD_{it} = \frac{(NAV_{it} - P_{it})}{NAV_{it}} \qquad (3.2)$$

Specifically, P_{it} denotes the price per share of the CEF *i* at time *t* and NAV_{it} equals the NAV per share. If the NAV exceeds the share price, the quota will be positive which implies that the CEF is traded at a discount. Oppositely, a negative quota logically implies a NAV-premium. For interpretation simplicity, the frame of reference will be NAV-discounts denoted as a positive quota. Thus, to capture the independent variables' effect on NAV-discounts, the dependent variable is set as a percentage that captures the absolute effect, in percentage points, that each independent variable has on the dependent variable.

3.3.2 Proportion of Non-Public Holdings

Previous research is currently heavily focused on the US market and US CEFs, which diverge significantly from their Swedish counterparties. As mentioned, one area in which this is especially apparent is the proportion of non-public holding (Hjelström, 2007). Historically, US CEFs have primarily held public securities, with a minority of restricted holdings constituting municipal, corporate, and foreign bonds (Cherkes et al., 2009). Although these are generally undervalued, which could affect the premia of the CEF, they commonly have a market or an agreed-upon fair value - something which non-public firms seldom have. Subsequently, there is a scarcity of research on non-public holdings in particular. Hjelström (2007) illuminates the possible effect of unquoted holdings, while simultaneously assuming that the valuations made by the CEFs are accurate reflections of market value. This potentially ignores the possible illiquidity benefits (Cherkes et al., 2009), as well as information asymmetries and possible adverse selection effects (Carroll et al., 2003; Akerlof, 1970). Thus, to capture the effect non-public holdings have on the NAV-discount, a measurement subsisting of the proportion of non-public holdings is expressed as follows:

$$PNON_{it} = \frac{RV(non-public\ holdings)_{it}}{RV(total\ net\ asset\ value)_{it}} \qquad (3.3)$$

$PNON$ denotes the proportion of non-public holdings at time t for the respective CEF i, whilst RV refers to the reported value of non-public holdings and total net asset value respectively.

Relative Multiple Valuation

The lack of accurate valuation methods on non-public holdings could be a source for large deviations between the CEFs share price and the reported NAV. Besides, as the aggregated P/E ratio consensus also affects the valuation of the public holdings, the P/E should intuitively be highly correlated with the NAV-discount. As seen in figure 3.1 below, the NAV-discount and the P/E ratio have moved analogously. The most notable deviation between the P/E ratio and the NAV-discount occurs at the inception of the pandemic in 2020. Since then, there has been a notable negative relationship between the P/E ratio and the NAV-discount.

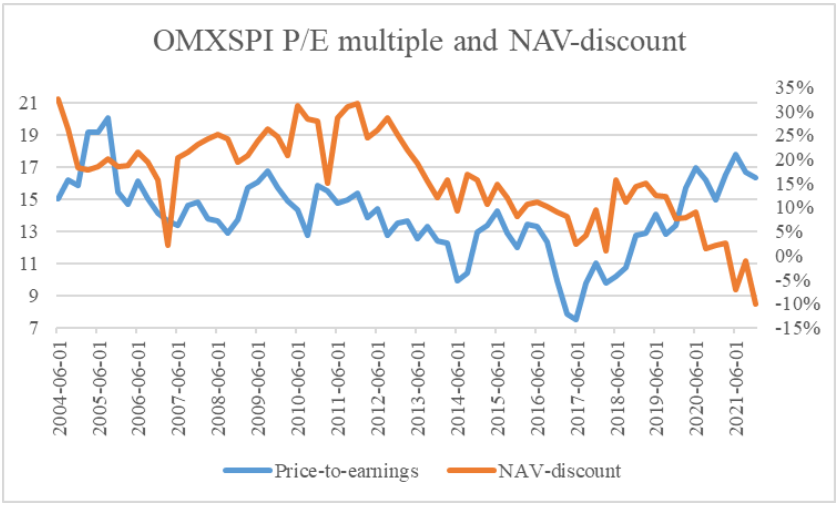


Figure 3.1. Price-to-earnings multiples and the movement of NAV-discount over the sample period.

In order to capture how the relative multiple on the financial market affects the NAV-discount, the aggregated P/E ratio from the OMX Stockholm All Share Index is used as an independent control variable. According to Schreiner (2007), the P/E ratio is the most widely used valuation multiple and several studies have proved that there is an analytical link between the valuation multiples and the discounted cash flow method (Bonadurer, 2003).

Initially, the P/E ratio for OMX Stockholm Small Cap Index was the primary choice but was later excluded due to a lack of historical data[1]. Arguably, the usage of valuation multiples from the small-cap index is assessed to be more relevant as the non-public holdings share many similarities to smaller firms, both in revenue, risk, growth, and fluctuations in earnings (Baker & Wurgler, 2007). Besides, the comovement between the small-cap index and

[1] Price-to-earnings data was only available until 2011 for the OMXS Small Cap Index in Reuters Refinitiv Eikon database.

NAV-discount, and its dependence on investor sentiment would imply that the small-cap index inherits more explanatory power. However, the valuation multiples on both the small-cap list and the all-cap list share many characteristics. When testing their correlation it is affirmed that the two ratios are moderately correlated (0.355) at a five percent significance level. Both the multiple measures have approximately the same mean (14.52 for small-cap and 14.66 for all shares) but the standard deviation is slightly higher for small-cap which is non-surprising as small firms incur more risk. As seen in figure 3.2 the P/E move together with each other but deviate occasionally.

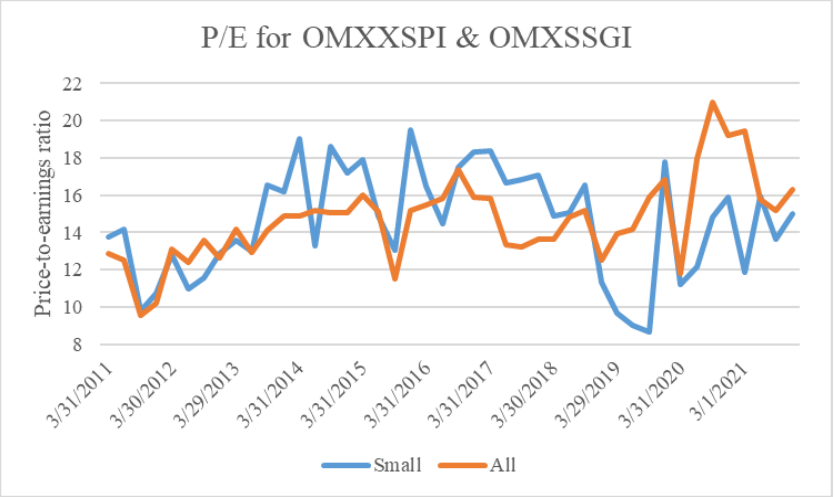


Figure 3.2. The aggregated price-to-earnings ratio from the OMXS All Shares and the OMXS Small Cap 2011 - 2021.

3.3.3 Portfolio Concentration

To capture the effect of portfolio concentration (PCON), a measurement inspired by Hjelström (2007) is utilized as seen in the formula (3.4) below, where the two largest holdings are set in relation to the entire portfolio of the respective CEF. Thus, the measurement reflects how much of the portfolio is reflected in a limited number of firms. By adopting a limit of two firms as the numerator it ought to capture the Swedish CEFs' tendency of being heavily weighted in one security in particular - thus avoiding the measurement from becoming biased to a single holding whilst ignoring the distribution of the remaining holdings. Unlike Hjelström (2007), this measurement includes both public and non-public holdings to better account for the vast majority of the sample CEFs having significant portions of non-public holdings.

$$PCON = \frac{RV(Two\ largest\ holdings)_{it}}{RV(Total\ net\ asset\ value)_{it}} \qquad (3.4)$$

3.3.4 Ownership Structure

A unique feature of Swedish CEFs is that they tend to be controlled by a few influential families, typically with relatively small capital investments (Holmén & Högfeldt, 2009). To capture the controlling powers of these families, individuals, or institutional investors, a measurement inspired by Hjelström (2007) is utilized.

$$OCON_{it} = \frac{Largest\ Vote\ Holder_{it}}{Second\ Largest\ Vote\ Holder_{it}} \quad (3.5)$$

With regards to the pyramidal ownership structure of Swedish CEFs (Holmén & Högfeldt, 2009), formula 3.5 represents the relative control of the owner with the largest number of votes in relation to the second-largest vote holder of the respective CEF *i,* at time *t*. As such, the individual owner's relative power becomes detectable, and thus the potential conflict of interests between owners as well as the potential increase in agency costs (Mavruk, Overland & Sjögren, 2020). Conclusively, the measurement intentionally reveals the existing extraordinary agency costs, through the extraction of private benefits, when controlling power is more concentrated, which according to hypothesis 3 increases the NAV-discount. Testing this against the NAV-discount in the following regression models can therefore determine whether or not such a relationship exists, and what the effect of said relationship could be in terms of NAV-discounts.

3.3.5 Excess Return & Dividend Yield

Although Bleaney and Smith (2008) emphasize the short-run inertia and possible irrationality of investors, there are clear indications that a relationship between past performance NAV-discount subsists. According to Hjelström, (2007), CEFs often assess their performance in comparison to national indices in terms of over or underperformance (Hjelström, 2007), i.e., excess returns. Consequently, the effect of the stock performance is tested through the proxy excess return of the respective CEF. Specifically, the quarterly return of the respective CEF (equation 3.6) is set in relation to the quarterly market return (equation 3.7), encapsulated by the OMX Stockholm All-Share index.

$$Return_{it} = \frac{(Share\ Price_{it} - Share\ Price_{it-1})}{Share\ Price_{it-1}} \quad (3.6)$$

$$OMX\ return_{t} = \frac{(OMX_{t} - OMX_{t-1})}{OMX_{t-1}} \quad (3.7)$$

With quarter as the time unit, both return measurements are calculated as the percentage change in price between time *t* and *t-1.* Consequently, the excess return of the respective CEF

is assessed as the CEF return less the OMX return at time *t.* This approach also corresponds with the performance estimation commonly used by CEFs (Hjelström, 2007). Furthermore, the excess return measurement is further adjusted to account for the time delay between the CEF share price and the revaluation of the NAV. Specifically, external investors are forward-looking, trying to price the future expected cash flows from the CEFs' underlying portfolio, the NAV. Hence, investors at time *t* estimate and price the NAV in time *t+n,* i.e., the future value of the net assets. Hence, the CEF share price in time *t* is a reflection of the future NAV. To capture this timing mismatch, the excess return is lagged one quarter (t-1). This eliminated 12 observations, the first observation for each CEF, while increasing the accuracy of the forthcoming regression models as it better reflects the investor perspective.

Furthermore, to capture the effect of dividends and dividend policies on NAV-discounts, inspiration is drawn from the findings of Johnson et al. (2006). Although their study is conducted in predicatory nature, some inferences can be drawn from this particular study. Thus, the dividend yield is used as a proxy for the proposed effect of dividend policies calculated accordingly:

$$Div_{it} = \frac{Quarterlized\ Dividend\ per\ share_{it}}{Price\ per\ share_{it}} \qquad (3.8)$$

3.3.6 Control Variables: Macroeconomic

Interest rate

Different interest rates have been used in reports scrutinizing the NAV-discounts, from 10 year T-bills to 1 month T-bills, all of which have been conducted on the American market (e.g. by Song & Jain, 2021; Swaminatha, 1996). The objective of including the interest rate is to capture the anomaly of negative interest rates and their potential effect on the NAV-discount. In PwC's (2021) latest risk premia report on the Swedish stock market, they conclude that 68 percent of the respondents[2] use the 10-year Treasury Bond as the risk-free rate in their valuation models. For this thesis, the Swedish 10-year Treasury Bond is used as the risk-free rate which is extracted from Sveriges Riksbank's database. As seen in figure 3.3, the risk-free rate has had a negative trend over the sample period, congruent with the negative trend of NAV-discounts. As the risk-free rate has a longitudinal variance whilst remaining constant cross-sectionally, the inherent negative trend of the dependent variable could be encapsulated with the risk-free rate as a detrending variable.

[2] The respondents were Swedish corporate finance associates, stockbrokers, mutual fund managers, and venture capitalists.

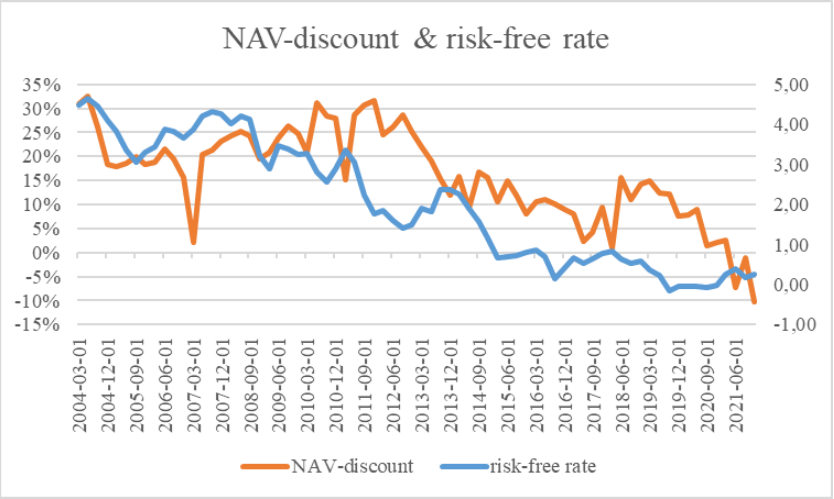


Figure 3.3. The NAV-discount and the development of the 10-year Swedish Treasury Bond over the sample period 2004 to 2021.

Investor sentiment

NAV-discount has commonly been used as a proxy for investor sentiment (e.g. Lee et al., 1991; Swaminathan, 1996; Baker & Wurgler, 2007), hence the causal relationship between investor sentiment and the fluctuation in NAV-discount has already been affirmed. There is no definitive proxy for capturing the fluctuations in investor sentiment. Baker and Wurgler (2007) present several proposed proxies, all of which are admittedly imperfect approximations. One proxy is investor surveys, although these are predominantly conducted in the Anglo-Saxon market. Baker and Wurgler (2007) highlight that previous studies have used the Consumer Confidence Index (CCI), which has been proven to be highly correlated with the investor survey. Besides, Lemmon and Portniaguina (2006) proved that the CCI was highly correlated with small-capitalization stock returns, which are predominantly held by individual investors and thus susceptible to fluctuations in investor sentiment. CCI has the advantage that it is available for a majority of countries (Sweden included) and is provided by the OECD (2022b). The CCI, gives an indication of the future development of private households' consumption and savings. A score exceeding 100 implies that consumers are optimistic about the future (next 12 months), while a score below 100 implies that consumers are pessimistic.[3] Thus, CCI is a sufficient indicator of the aggregated demand in society. Similarly, another index provided by the OECD (2022a) is the business confidence index (BCI) which shares many similarities to the CCI but is directly related to the industry sector. This index encapsulates the future development based on product development, order quantity, and stocks of finished goods within the industry.[4] Similarly, a score exceeding 100

[3] For a full definition of the Consumer confidence index (CCI) from OECD, see appendix 2.
[4] For a full definition of the Business confidence index (BCI) from OECD, see appendix 3.

indicates increased confidence in future business performance while a score below 100 indicates the opposite.

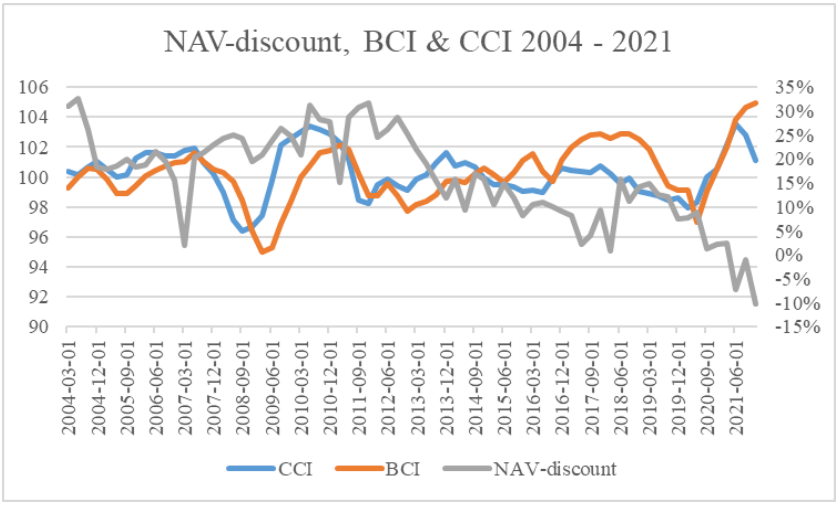


Figure 3.4 Business Confidence Index, Consumer Confidence Index, and NAV-discount over the sample period.

As seen in figure 3.4 above, the CCI and BCI are highly correlated, although deviations occur occasionally. The correlation between the two confidence indices is 0.4365 and significant. Besides, both indices are significantly correlated with the dependent variable, CCI at -0.1248 and BCI at -0.1589. As the BCI correlates most with the dependent variable, CCI is excluded to avoid high multicollinearity. The BCI consists of industry-specific components, the same components which are also subject to scrutiny when investors assess the business momentum and the future market prospective. Thus, due to the joint component structure, BCI is considered a sufficient indicator of investor sentiment. As Lemmon and Portniaguina (2006) proved that the CCI was highly correlated with the investor surveys available, the assumption is made that also the BCI is correlated with investor sentiment, based on the moderately high correlation between CCI and BCI.

The final notation is the usage of the P/E ratio as an investor sentiment proxy. As argued under section 2.5.2, the P/E ratio is not only affected by changes in fundamentals, it is also a reflection of the investor sentiment. As seen in figure 3.5 below, the comovement of the business confidence index and the P/E ratio is noticeable. As will be depicted in the correlation matrix later in table 3.6, the correlation coefficient between the business confidence index and the P/E ratio are approximately 0.25. Consequently, the interpretation of the P/E ratio is twofold in the analysis as both its affection for the value of non-public holdings is regarded as well as its more subjective influence on the presence of NAV-discount.

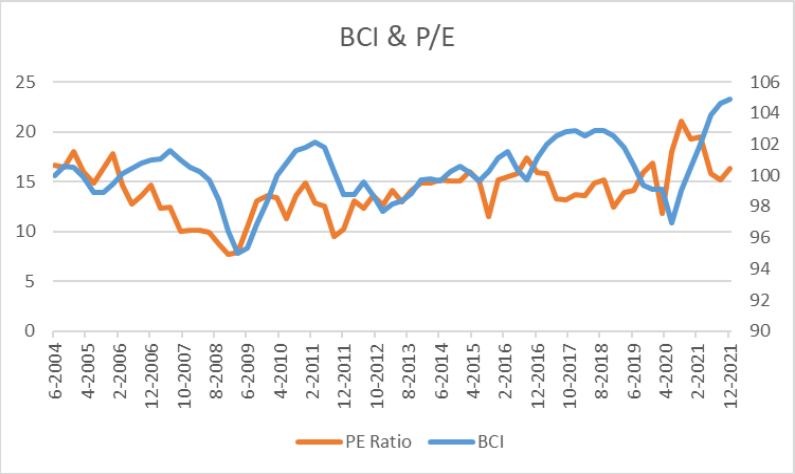


Figure 3.5 Business Confidence Index & the price-to-earnings ratio between 2004 - 2021.

3.4 Descriptive Statistics

3.4.1 Dependent Variable

Under the sample period, 2004 to 2021, the NAV-discount fluctuated substantially, as depicted in figure 3.6 below. The graph depicts the aggregated weight-adjusted[5] historical NAV-discount of the twelve CEFs and indicates that the CEFs have on an aggregate level been traded at a NAV-discount, which is consistent with prior research (Hjelström, 2007). It is not until now that the Swedish CEFs have on an aggregate basis been traded at a NAV-premium. This underlines another observation, that the NAV-discount on average has diminished between 2004 and 2021. The trend of diminishing NAV-discount is congruent with prior findings (Sellebråten, 2021). Several extraordinary and market diluting events, such as the financial crisis and a global pandemic, have occurred during the sample period which has caused severe market fluctuations.

[5] Weight adjusted for market capitalization.

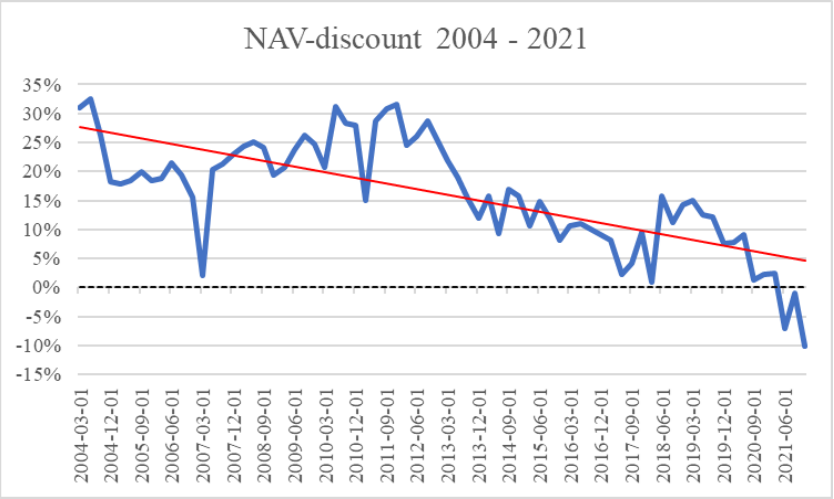


Figure 3.6 NAV-discount development

Furthermore, the unweighted NAV-discount has on aggregate a mean of 10.26 percent and a standard deviation of 18.86 percent, as seen in table 3.3 below. This indicates that the CEFs included in the sample, on average, are traded at a NAV-discount. The largest standard deviations can be observed within the respective panel, indicating that the NAV-discounts have varied more over time than it has between CEFs.

Table 3.3. Net Asset Value Overview

CEF	Mean	Std. Dev	Min	Max	Obs
Bure	7.83%	28.32%	−45.02%	74.23%	72
Creades	−1.90%	21.80%	−58.93%	18.56%	40
Industrivärden	12.38%	6.90%	−7.01%	26.88%	72
Investor	23.76%	8.07%	6.39%	38.40%	72
Kinnevik	16.96%	17.44%	−28.89%	62.97%	71
Latour	4.78%	19.78%	−70.69%	26.93%	72
Lundbergföretagen	9.11%	17.59%	−96.71%	34.57%	72
Öresund	0.04%	10.35%	−22.98%	18.97%	72
Svolder	6.63%	12.64%	−29.24%	50.05%	72
Traction	16.31%	10.25%	−8.72%	41.88%	69
VEF	18.68%	14.53%	−21.98%	52.78%	26
VNV Global	8.55%	29.08%	−139.05%	66.92%	59
Overall	**10.26%**	**18.86%**	**−139.06%**	**74.23%**	N = **769**
Between		7.64%	−1.90%	23.76%	n = 12
Within		17.49%	−137.35%	75.94%	T-bar = 64.08

This variance is also detectable when observing the vast differences between minimum and maximum observations of the respective CEF, where Bure has been traded at the highest discount of 74.23 percent, whilst VNV Global has been traded at the highest premium of 139.05 percent. Thus, although the sample CEFs on average are traded at a discount there are some extreme observations of premiums, more specifically Latour, Lundbergföretagen, and VNV. Interestingly, while the CEFs exceedingly have been traded at both a NAV-discount and

a premium during the investigation period, Investor stands out as the sole CEF exclusively traded at a discount. Congruent with previous research, the majority of the CEFs included in the sample were on average traded at a discount, with Creades constituting the sole exception with the largest premium average of 1.90 percent.

Furthermore, there seems to be a cross-sectional dependency between CEFs when observing the significant correlation between the NAV-discount of the respective CEF (see table 3.4 below). This would coincide with the interchangeability of the CEFs where an investor may perceive CEFs as comparable substitutes. With generally low transaction costs of substitution, this implies that the Swedish CEFs included in the sample cannot be considered independent from each other. What is notable in table 3.4 is that there prevails an exceptionally high significant correlation between some of the CEF. For instance, Bure and Creades have a correlation coefficient of 0.846, and Investor and Industrivärden have a correlation coefficient of 0.758. Arguably, this is not surprising as several of the CEFs own the same firms, and sometimes even overlapping ownership of the CEFs subsist. For instance, the second-largest holding in Lundbergföretagens portfolio is another CEF, Industrivärden which constitutes 17.7 percent of the portfolio. Hence, cross-sectional dependence is expected.

Table 3.4. Pearson Correlation Matrix of the NAV-discount between CEFs

	BURE	CRED	INDU	INVE	KINV	LATO	LUND	ORES	SVOL	TRAC	VEFAB	VNV
BURE	1.000											
CRED	0.846*	1.000										
INDU	0.055	0.242	1.000									
INVE	0.115	0.324*	0.758*	1.000								
KINV	-0.082	0.309	0.393	0.545*	1.000							
LATO	0.247	0.835*	0.518	0.613*	0.491*	1.000						
LUND	-0.056	0.361*	0.471*	0.492	0.216	0.460	1.000					
ORES	-0.172	0.052	0.254	0.429*	0.243*	0.286*	0.271*	1.000				
SVOL	0.029	0.503*	0.206	0.352*	0.455*	0.502*	0.136	0.282*	1.000			
TRAC	0.120	0.588*	0.353*	0.521*	0.161	0.632*	0.438	0.376*	0.330*	1.000		
VEFAB	0.484*	0.246	0.282	0.461*	0.603*	0.416	-0.009	0.152	0.303	0.060	1.000	
VNV	-0.173	-0.241	0.049	0.060	0.381*	-0.099	-0.153	-0.014	0.163	-0.191	0.514*	1.000

** Indicates significance level at 0.05.*

Conclusively, while previous research (e.g. Pontiff, 1997; Lenkey 2015) indicates that there is excess volatility in the return of the CEF relative to the return of the NAV, this study indicates the opposite. Specifically, the return of the CEFs´ share price has a volatility of 14.92 percent in comparison to the return of the net assets of 15.24 percent.

3.4.2 Independent Variables & Macroeconomic Control Variables

As seen in table 3.5, while the NAV-discounts have greater variation within the respective panels, the independent variables predominantly vary more between the panels, with excess stock returns denoted as a lagged excess return and the dividend yield, as the exceptions. Comparable to NAV-discount, the larger within variation of excess return is also expected as the distribution and change in stock prices are reflected in both measurements, intuitively causing them to portray similar patterns. On average, the CEFs had a quarterly excess return of 1.72 percent which varied greatly from -52.56 to 58.11 percent. A deviation which, as mentioned, stems from within the respective panels, indicating that the cross-sectional fluctuations in return are small relative to the fluctuations over time.

In terms of portfolio composition, the CEFs portray a rather dispersed pattern where portfolio concentration for the two largest holdings varies between 7.92 and 117.7 percent, whilst the proportion of non-public holdings varies significantly from zero to over one hundred percent. Intuitively, a value larger than one for the two measurements should not be possible. This is not necessarily the case since the total NAV constitutes the entire portfolio less net debt. Thus, a value larger than one for the two measurements indicates a larger proportion of debt in the underlying portfolio. Nonetheless, the extensive variance between the minimum and maximum observations for the proportion of non-public holdings indicates that while some CEFs entirely lack non-public holdings in their investment portfolio entirely, or at least some point in time, others are heavily or exclusively weighted in non-public holdings.

Table 3.5 Overview of the Independent Variables

Variables		Mean	Std. Dev	Min	Max	Obs.
Proportion of non-public holdings	Overall	22.92%	24.48%	0.00%	106.25%	N = 769
	Between		23.35%	0.00%	80.62%	n = 12
	Within		15.60%	-53.12%	87.29%	T-bar = 64.08
Portfolio Concentration	Overall	42.50%	17.80%	7.92%	117.70%	N = 769
	Between		13.61%	17.66%	68.56%	n = 12
	Within		11.56%	4.48%	105.71%	T-bar = 64.08
Ownership Concentration	Overall	7.10	12.53	1.00	88.71	N = 769
	Between		9.86	1.51	36.35	n = 12
	Within		7.78	-22.92	59.46	T-bar = 64.08
Lagged excess return	Overall	1.72%	11.97%	-52.56%	58.11%	N = 757
	Between		1.85%	-0.51%	5.89%	n = 12
	Within		11.87%	-53.15%	56.57%	T-bar = 64.08
Dividend yield	Overall	0.37%	1.32%	0.00%	27.30%	N = 769
	Between		0.27%	0.00%	0.80%	n = 12
	Within		1.30%	-0.43%	26.97%	T-bar = 64.08

Furthermore, as indicated by Holmén and Högfeldt (2009), Swedish CEFs have a generally high ownership concentration relative to other markets. This is neither confirmed nor disproved by the CEFs included in this study. Although there is a maximum notation in ownership concentration of 88.71, there is also a bottom notation of 1, meaning that the largest and second largest vote holders have the same number of votes. Nonetheless, with an overall average of 7.1 can the ownership concentration roughly be seen as high. Albeit, since the largest standard deviation lies between rather than within the panels at 9.86, it is indicated that a high ownership concentration does not necessarily hold for all CEFs. This also coincides with the cross-sectional differences in ownership concentration as seen in appendix 5, where the arguably high ownership concentration is primarily driven by two CEFs, namely Creades and Lundbergföretagen with an ownership concentration average of 13.76 respectively 36.35. Nonetheless, as seen in table 3.5 above, the dividend yield has an overall mean of 0.37 percent. Intuitively, this stems from the generally small or non-existent dividends in the sample, derived from the minimum observation of zero and low standard deviation of 1.32 percent. This also coincides with CEFs such as VNV and VEF who both have a zero-dividend policy until 2023.

Conclusively, as seen in table 3.6, the highest significant correlation coefficient is between the variable price-earnings ratio (P/E) and the risk-free rate (-0.4338). This affirms the theoretical correlation between the risk-free rate pinpointed by Riksbanken's equity report by Ceh et al. (2021). Additionally, the BCI is significantly negatively correlated with the dependent variable, affirming the expected negative association between the investor sentiment and the NAV-discount. Similarly, the P/E ratio is also significantly negatively correlated to the NAV-discount, in line with expectations. Besides, the BCI and the P/E are complementary to each other as they both work as a proxy for investor sentiment, hence this assumption is strengthened by the moderately high significant correlation between the two variables.

In regards to the independent variables, most of the correlations are below +/- 0.25. Consequently, the conclusion is that the data does not suffer from severe multicollinearity. Only, the proportion of non-public holdings and lagged excess return have a significant correlation with the dependent variable, which unexpectedly is positive for the former, and negative for the latter. Portfolio concentration has a notably low and insignificant correlation with the dependent variable while being strongly and significantly correlated with the proportion of non-public holdings. Ownership concentration is likewise insignificantly and positively correlated with the dependent variable, thus coinciding with the initial expectations

in hypothesis 3. The dividend yield shows a very weak negative correlation toward the NAV-discount, also not significant. The negative correlation of the excess return, on the other hand, is in line with expectations. Another unexpected correlation is between the risk-free rate which is significantly positively correlated with the NAV-discount, contradicting the expected association derived from Song and Jain's (2021) earlier findings.

Table 3.6. Pearson Correlation Matrix of the Dependent & Independent Variables

	NAVD	PNON	PCON	OCON	exc_return	Div	BCI	rf	PE
NAVD	1.0000								
PNON	0.0731*	1.0000							
PCON	0.0012	0.2532*	1.0000						
OCON	0.0468	0.0103	0.0683	1.0000					
exc_return_1	-0.1706*	0.0370	0.0641	-0.0202	1.0000				
Div	-0.0620	-0.0611	0.0304	-0.0417	-0.0150	1.0000			
BCI	-0.1961*	0.0295	-0.0141	-0.0787*	0.0128	-0.0666	1.0000		
rf	0.2604*	-0.1173*	-0.0335	0.1300*	-0.0378	0.0250	-0.2937*	1.0000	
PE	-0.2453*	0.0751*	0.0858*	-0.0487	0.0486	-0.0509	0.2464*	-0.4338*	1.0000

** indicates a significant correlation at 0.05.*

4
Methodology

4.1 Methodological Overview

Table 4.1 provides a summarization of the testable hypotheses as presented in chapter 2, including its main explanatory variable and its expected association with the dependent variable, NAV-discount.

Table 4.1 Hypotheses Overview

	Hypothesis 1	**Hypothesis 2**	**Hypothesis 3**	**Hypothesis 4a**	**Hypothesis 4b**
Dependent variable:	NAV-discount	NAV-discount	NAV-discount	NAV-discount	NAV-discount
Independent variable:	Proportion of non-public holdings	Portfolio concentration	Ownership concentration	Lagged excess return	Dividend yield
Association:	**Negative**	**Negative**	**Positive**	**Negative**	**Negative**

Consequently, the hypotheses are primarily tested through five different multivariate linear regression models which jointly capture the longitudinal and cross-sectional variance of the underlying data. The equation expression for each model version is displayed accordingly:

$$NAVD_{it} = a + \beta_1 PNON + \beta_2 PCON + \beta_3 OCON + \beta_4 Div + \beta_5 exc\_return\_l + \mathcal{E} \quad (A)$$

$$NAVD_{it} = a + \beta_1 PNON + \beta_2 PCON + \beta_3 OCON + \beta_4 Div + \beta_5 exc\_return\_l + \delta quarter + \mathcal{E} \quad (B)$$

$$NAVD_{it} = a + \beta_1 PNON + \beta_2 PCON + \beta_3 OCON + \beta_4 Div + \beta_5 exc\_return\_l + \beta_6 rf + \beta_7 BCI + \beta_8 PE + \mathcal{E} \quad (C)$$

$$NAVD_{it} = a + \beta_1 PNON + \beta_2 PCON + \beta_3 OCON + \beta_4 Div + \beta_5 exc\_return\_l + \beta_6 rf + \beta_7 BCI + \beta_8 PE + \delta CEF + \mathcal{E} \quad (D)$$

$$NAVD_{it} = a + \beta_1 PNON + \beta_2 PCON + \beta_3 OCON + \beta_4 Div + \beta_5 exc\_return\_l + \delta_1 CEF + \delta_2 Year + \mathcal{E} \quad (E)$$

As demonstrated in the equations above, α describes the regression intercept, while β_j reflects the coefficient of the respective independent variables *j*, followed by the error term Ɛ. Additionally, *δquarter, δyear, and δCEF* reflect the longitudinal, respectively the cross-sectional variances which will be further developed in the subsequent chapter. The definition of the dependent and independent variables can be seen in table 3.2.

Model Development

Since the underlying data have both heteroscedastic and autocorrelated error terms, as well as cross-sectional dependence, the best linear unbiased estimator assumptions of an OLS do not hold (see chapter 4.2). This implies that the utilization of an OLS regression model would yield biased and incorrect standard errors and estimates. Thus, the regression models are performed with panel-corrected standard errors (denoted as PCSE), which accounts for these issues. The PCSE model produces OLS estimates, however with standard errors corrected for the contemporaneous correlation of errors across panels (Beck & Katz, 1995). Thus, by accounting for serial correlation of the errors in the data, the PCSE produces Prais-Winsten error estimates through circular or iterated, estimates of the coefficients as well as the error autocorrelation in the model, until achieving sufficiently converged autocorrelated coefficients. Hence, all models used the panel-specific first-order autocorrelation option to account for the autoregressive behavior of the data and autocorrelation within the panels. Additionally, the model also incorporated the option for panel-level heteroskedastic disturbances to account for the dependence across panels. The justification for these choices will be further discussed in the subsequent chapter 4.2.

As indicated in figure 3.1, the dependent variable NAV-discount portrays a considerable negative trend over the sample period of this study. Thus, to capture this non-stationary trend and the aforementioned heterogeneity of the sample CEFs, five different approaches are applied. The first approach (A) only includes the five primary independent variables: Proportion of non-public holdings; Portfolio concentration; Ownership concentration; Dividend yield; Lagged excess return. Secondly, to capture the diminishing trend of NAV-discounts on the Swedish market, two separate approaches are utilized to capture the non-stationary trend - approach (B) includes a quarterly-fixed effect variable, denoted as $\delta quarter,$ and (C) includes macroeconomic control variables. The control variables BCI, rf, and P/E, which all vary over time, but do not vary cross-sectionally, enable the model to capture the time trend variance of the data. The two final approaches, (D) and (E), include a CEF fixed-effect variable, denoted as $\delta CEF,$ to capture the cross-sectional variance between the individual CEFs. Model (E) is an extension of the model (D) and includes a year fixed-effect variable, denoted as $\delta year,$ to capture the year-specific variance and longitudinal negative trend along the sample period. Thus, model (E) both addresses the cross-sectional variance and any prevailing year-specific trend in the data.

Consequently, by utilizing five different approaches for each model, the robustness of each model can be reassured and the results validated. Hence, by iterating each model with different equational expressions and tackling the regressive involution with different methods, through different detrending approaches and combinations of control variables, the result can then be compared to see if the results are consistent, thus unveiling the true association between the NAV-discount and the independent variables.

4.2 Model Validation

4.2.1 Best Linear Unbiased Estimator

As mentioned, the OLS assumptions for unbiased estimates do not hold. Specifically, the Wooldridge test for autocorrelation in panel data, applied to all five models, comprehensively indicated that serial correlation subsists. These results were also expected as the short-term change in firm-specific variables, such as portfolio composition and ownership structure, tend to be stagnant for the respective CEF. This was, thus, accounted for in the PCSE-model by utilizing panel-specific first-order autocorrelation, where the autocorrelation coefficient is assumed to be specific to each panel. Furthermore, with regards to the heterogeneity of the sample, as indicated by the descriptive statistics in chapter 3.4, there are heteroscedastic indications. This is likewise supported by the Modified Wald test for groupwise heteroskedasticity in panel data, which indicated that none of the five models portrayed equal variance in the distribution of residuals. Implicitly, this indicates that heteroscedasticity of the error terms subsists which further substantiates the use of the PCSE-model as it accounts for heteroscedastic distribution and contemporaneous correlation across the panels.

Ultimately, the data is also tested for cross-sectional dependence between the CEFs, as indicated in the descriptive statistics chapter. Based on a Breusch-Pagan LM test for cross-sectional correlation, the null hypothesis of no cross-sectional dependence is rejected, implying that the panels, more specifically the CEFs, cannot be considered independent from each other. A potential solution to some of the above mentioned issues related to the panel heterogeneity is to cluster the standard errors by the respective CEF. However, since the underlying data solely subsist of twelve CEFs such an approach is deemed inadequate as the regression model could yield low statistical power and optimistic results (Özler, 2012). Aggregately, this ultimately reaffirms the suitability of the PCSE model as it accounts for the correlation and dependencies across panels.

4.2.2 Model Accuracy & Residual Distribution

As stated, the underlying panel data have indicated non-stationary behaviors through its prominently negative trend in NAV-discount, as seen in figure 3.1, as well as the comprehensively larger within variances of the independent variables, as emphasized in chapter 3.4. The indicative non-stationarity of the panel data was, furthermore, confirmed in an Inn-Pesaran-Shin unit root test of the CEF share price and NAV. The two components of the dependent variable NAVD both portray significantly non-stationary behaviors with cyclical trends. Ultimately, this is accounted for by the utilization of the five different regression models as previously presented, which capture the longitudinal variance and/or the variance across panels. Consequently, the following subsection tests the respective models' accuracy in capturing the variance of the dependent variable.

The underlying data suffers from panel-level heteroskedasticity, which becomes further evident when observing the distribution of the predicted values produced by the five models' in appendix 6. Preferably, in order to have an unbiased model, an even distribution of the residuals around the dependent variable is desirable. Although the residuals in model A are seemingly evenly distributed, while portraying a slightly positive trend, they diverged significantly from the dependent variable, NAV-discount - indicating the model's failure to replicate its inherent trend. Conversely, after the inclusion of the quarterly fixed-effect variable in model B, the residual distribution conversely depicts the cyclical non-stationary trend, becoming highly similar to the cyclical trend of the NAV-discount. This is similarly depicted by model C. Prevalent for the two models is, nonetheless their comparatively more concentrated distribution. Simultaneously, models E and, especially, D are significantly more dispersed, however, while still partially capturing the non-stationary negative trend of NAV-discounts although to a varying degree.

The respective models' accuracy is ultimately assessed in terms of the normality in the models' residual distribution. As depicted in figure 4.1 below, all models are to some extent distorted from normality, while displaying a continuously positive skewness. Expectedly, this is also affirmed by the Shapiro-Wilk test where the null hypothesis of normal distribution is significantly rejected for all five models. Conclusively, the underlying data appears to suffer from great variances, or nuisance, which none of the model versions exclusively succeeds to capture as they all inherit different capabilities to oblige the longitudinal non-stationary trend.

Thus, all models will henceforth be compared and analyzed in the subsequent chapter to validate the regression results and seek a robust explanation behind the Swedish NAV-discounts. Ultimately, by including the CEF-fixed effects, models E and D better encapsulate the significant differences between CEFs, while simultaneously accounting for the longitudinal trend - arguably emphasizing their relative superiority in capturing the variance of the dependent variable.

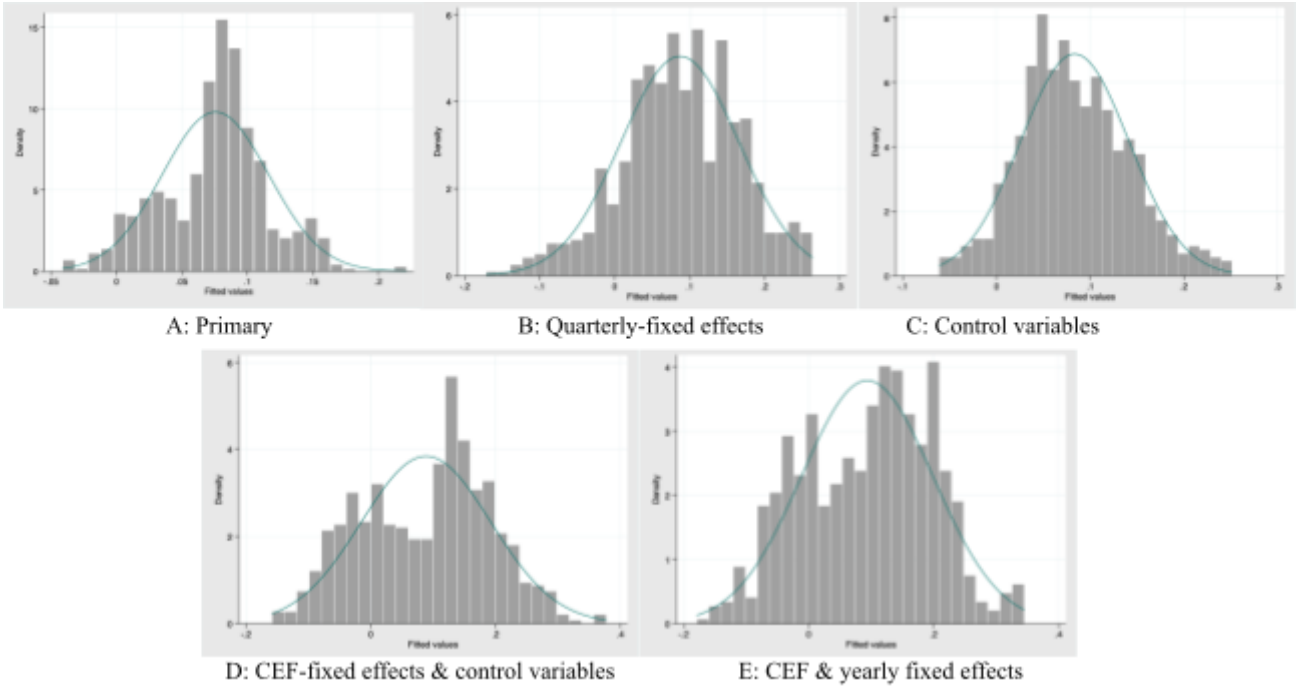


Figure 4.1 Normal Distribution of Residuals from the main regression model 1, versions A to E

4.3 Model Criticism

Although the PCSE model has significant traction within research on time-series, cross-sectional studies, it simultaneously has received criticism against its alleged superiority over the Feasible Generalized Least Squares (FGLS) model as argued by Beck and Katz (1995). The authors argue that although the application of Feasible Generalized Least Squares is considered similarly applicable in panel data studies, it tends to produce more optimistic standard errors, making it a less reliable option (Beck & Katz, 1995). Thus, in a review of the PCSE properties and accuracy, Reed and Webb (2010) argue that although the PCSE produces adequate estimates, the FGLS better resembles empirical research situations. By replicating the study of Beck and Katz (1995), the authors argue that the FGLS is comparatively more efficient than the PCSE under three distinct conditions. Firstly, when the independent variables have substantial persistence; secondly, when the error term is serially correlated;

and, thirdly, when the time dimension, *T,* is relatively short. Consequently, as shown in the previous chapter, the underlying data of this study primarily meets the second condition of serial correlation, as the independent variables display significant longitudinal variance (see chapter 3.4.2) and the time dimension is contrarily long. Specifically, as stated by Beck and Katz (1995), the relative efficiency advantage of PCSE against FGLS is especially evident when *T* is at least twice as large as the cross-sectional dimension, *N* - which is the case for this particular study.

5
Results

The following subchapter presents the results of the main regression model where the hypothesis, as presented in the previous chapters, is jointly presented and individually assessed in terms of the direction of the coefficients as well as their respective significance. As previously mentioned, the regression model consists of five different versions (A to E), where model B and C captures longitudinal variance by the inclusion of a time-fixed effect variable or control variables, whilst D and E additionally reflect the cross-sectional variance with the inclusion of CEF-fixed effects.

Table 5.1. Results of the Regression Models

Net Asset Value Discount	A: Primary	B: Quarterly fixed effects	C: Control variables	D: Fund fixed effects with control variables	E: Fund & year fixed effects
Proportion of non-public holdings	0.100**	0.106**	0.097**	0.020	0.063
Portfolio concentration	-0.170**	-0.134**	-0.122**	-0.195***	-0.220***
Ownership concentration	0.002**	0.001	0.001*	0.003***	0.003***
Lagged excess return	-0.044	-0.039	-0.051	-0.064*	-0.065*
Dividend yield	-0.506*	-0.522*	-0.478*	-0.486*	-0.4262
Business confidence index			-0.012***	-0.012***	
Risk-free rate			1.217*	0.834	
Price-to-earnings ratio			-0.009***	-0.011***	
Constant	0.115***	0.183***	1.378***	1.498***	0.182**
Observations	757	757	757	757	757
R-squared	0.0676	0.1924	0.1099	0.2215	0.2550
Wald-chi2	19.30	141.08	50.49	248.37	315.99

Note: * = 10 percent significance. ** = 5 percent significance. *** = 1 percent significance

When comparing the five regression models, A to E, the coefficient of the proportion of non-public holding is slightly deviating among the different models, although indicating the same positive direction. Models D and E show no significance for the proportion of the non-public holding coefficient, hence the null hypothesis cannot be rejected in these models. Contrarily, models A, B, and C all show a moderate significance, i.e., at five percent, hence the null hypothesis is rejected. Collectively, all coefficients are positive, which contradicts the expected negative association in hypothesis 1. The ambivalent significance in the coefficients in the different models questions its robustness, hence the interpretability is limited. As models D and E both capture the longitudinal and cross-sectional variances and yield the

highest R-square, these models have inherent explanatory advantages which arguably make them more reliable. Thus, the insignificance in the coefficient for the proportion of the non-public in models D and E impair its explanatory power on the NAV-discount.

The utmost significant and robust coefficient is that for the portfolio concentration that is negatively associated and moderately to strongly significant for all models. This is in line with the expected association in hypothesis 2. Furthermore, the ownership concentration coefficient depicts a slightly positive and significant association and is especially strong in models D and E with a significance level of one percent. The positive coefficient, as seen in table 5.1 above, is likewise in line with expectations as formulated by hypothesis 3. Although, with regard to its arguably small coefficient, its associated effect on NAV-discount can be assumed to be limited. Regarding the lagged excess return variable, the result is more arbitrary. The variable similarly depicts a negative coefficient in all models, while being merely weekly significant in models D and E. Although this negative association is congruent with the expected association as expressed in hypothesis 4A, the result does not support hypothesis 4A as the null hypothesis for the lagged excess return coefficient cannot be significantly rejected in models A to C. Still, the null hypothesis can be rejected in models D and E which, as mentioned, conclusively inherit superior explanatory power. Hence, this indicates that the lagged excess return may have some causal effect on the NAV-discount. Furthermore, the dividend yield is indicatively negatively associated with the dependent variable, with a coefficient that is weakly significant in all models except model E. This is an indication that dividend yield is robustly negatively associated with the NAV-discount, supporting hypothesis 4B.

Turning to models C and D which included the control variables to capture the longitudinal variance. The utmost significant coefficient is that for the Business confidence index which is strongly significant and negatively associated with the NAV-discount for both models. Evidently, this is in support of the expected association from section 2.5.2 that the investor sentiment ought to be negatively associated with the NAV-discount. It should nonetheless be remarked that the coefficient is fairly small. Continuing, the risk-free rate had the largest coefficient, which, albeit is only weakly significant in model C. Similar to the business confidence index, the P/E ratio is also negatively associated with the NAV-discount through a negative coefficient, significant at one percent for both models, hence the null hypothesis can be rejected in both models. Noteworthy is that the coefficients are small in both models. The expected association between the P/E ratio and the NAV-discount is twofold, one aspect being

its proximation for investor sentiment, the other being its financial effect on the valuation of the NAV, indifferently the association is presumed to be negative between the P/E ratio and the NAV-discount. Thus, this association is supported by the result from models C and D.

Evidently, the determination of coefficients, R-squared, deviated substantially between the different models, ranging from 0.0676 to 0.2550. This indicates that the respective models successfully capture 6.8 to 25.5 percent of the variance in the dependent variable. Demonstrably, by including time- and/or fund-fixed effects, as done in models B to E, the respective model's efficiency in capturing the variance of the dependent variable, NAV-discount, increases substantially. This further emphasizes the aforementioned heterogeneity of the underlying data, both within and across panels. Specifically, the highest coefficient of determination can be observed in model E, where both the yearly-fixed effect and the fund-fixed effect are included, followed by model D which also includes fund-fixed effects and macroeconomic variables as the longitudinal detrend variables. Thus, the inclusion of the fund-fixed effect can be presumed as the best approach to capture the heterogeneous variance of the dependent variables across the panels. In comparison to previous studies, the coefficients of determination are similar to prior research. For instance, the regression model in the study of Johnson et al. (2006), yielded an R-squared between 0.18 to 0.19. Similarly, the corresponding regression model of Swedish CEFs as conducted by Hjelström (2007), varied between 0.068 to 0.255, thus almost exactly corresponding to the results of this study. Ultimately, the last interpretation is of the observed Wald-Chi Square, which varied substantially between the models. The Chi-square is significant for all models, hence it is significantly precluded that there is a relationship between the independent variables and the dependent variable.

Conclusively, the results indicate that portfolio concentration, past performance, and dividend yield comprehensively have a negative effect on NAV-discount, while increased ownership concentration contrarily is positively associated with NAV-discount - in line with expectations and previous research. Oppositely, the expected negative association of proportion of non-public holdings is not supported as the study contrarily indicated a positive effect on NAV-discount. The most robust result is the portfolio concentration which is significant in all models. Similarly, the coefficient of ownership concentration is statistically significant in all models except model B, similarly the dividend yield coefficient is statistically significant in all models except model E. Ultimately, the coefficient of the lagged excess return is only significant twice, namely model D and E.

6
Analysis & Discussion

6.1 Non-Public Holdings

6.1.1 Illiquidity Premium or Discount?

One proposed explanation behind the discrepancy between NAV and CEFs share prices is the illiquidity mismatch, where the CEF price is assumed to consist of the NAV, plus an illiquidity premium, less management fees (Cherkes et al., 2009). The implication is that investors are willing to pay a premium on CEFs holding non-public securities that otherwise would be inaccessible on the financial market. Arguably, if the non-public holdings are assumed to be relatively immature firms in a high-growth stage, investors will find it lucrative to gain access to a potentially favorable growth and exit opportunity (i.e., through an IPO). However, there is a risk dilemma in holding non-public securities. As highlighted by Carroll et al. (2003), holding illiquid assets is associated with substantial risk as the divestment opportunity is aggravated. This, together with the innate information asymmetry should instead incite investors to require a NAV-discount, to account for the peculiarity of illiquid assets.

Undoubtedly, earlier research portrays an ambiguous picture of the effect of non-public holdings. Although, the expected association was that non-public holdings have a negative association with the NAV-discount as investors tend to be willing to pay a premium on CEFs holding non-public firms. Recall hypothesis 1 where a negative association is expected. As evident from the results, the proportion of non-public holdings had an ambiguous but slightly positive and partially significant association with the NAV-discount - thus contradicting hypothesis 1. Hence, this finding is more in support of the higher risk premium requirement as proposed by Carrol et al. (2003). Although what should be noted is the moderate significance of the proportion of non-public holdings in the different models. The coefficient is moderately significant in model A to C, which potentially can question its robustness. What is strengthened is that for all instances in which the coefficient is significant, the same positive association is observed. Undeniably, models D and E have both the highest R-square, hence explaining the large proportion of variance in the NAV-discount. The fact that the proportion of non-public holdings becomes insignificant in these models makes the coefficient dubious.

Characteristics & Replicability of the Underlying Portfolio

Looking at the overarching table 3.1 of the individual CEFs, there is a diverse picture regarding the conjunction between the proportion of non-public holdings and NAV-discount, where some CEFs having a high proportion of non-public holdings had high premiums (i.e., Latour and Creades) while some had large discounts (i.e., VNV Global and VEF). Judging by the result, it indicates that the larger proportion of non-public holdings, the larger NAV-discount, although the result is not convincing. One possible explanation behind the inexplicit association between non-public holdings and the larger NAV-discount is the vast difference in the characteristics of the underlying non-public holdings. For instance, Latour's and Lundbergföretagen's non-public holdings are overall well-established businesses with robust cash flows that external investors are able to assess. Conversely, VEF and VNV Global have more scattered non-public holdings with obscure profitability located in emerging markets - making them much harder to analyze for external investors. Additionally, these firms have high inherent risk, both firm-specific and market-specific, thus the discount requirement as proposed by Carroll et al. (2003) may be applicable. Additionally, these firms may also have high growth potential, thus compensating for the higher risk and potentially conversely incentivizing investors to pay a NAV-premium for gaining access to this otherwise inaccessible growth opportunity. This raises another aspect, the replicability of the portfolio. Arguably, some of the CEFs underlying portfolio holdings are inaccessible for conventional investors, thus the portfolio is in practice impossible to replicate. Hence, given the implausibility to replicate the underlying portfolio due to either legal or mechanical impediments such as judicial restrictions or high transaction costs, the only accessible option left is to invest in the CEF. This fact gives reason for a compensating premium for this opportunity, equaling the hypothetical incurred cost to short the portfolio.

Furthermore in a similar aspect, investing abroad in emerging markets may be associated with substantially high transaction costs. Hence, the cheapest and most efficient way for investors to invest in firms in emerging markets is perhaps through an indirect investment in the CEF. Although this implies a premium on CEFs that hold a large proportion of non-public holdings, which is contradictory to the positive coefficient seen in the results. VNV Global and VEF have the largest proportion of foreign holdings. Applying the transaction argument would infer that these CEFs would trade at a premium, equaling the transaction cost of foreign direct investment, nevertheless both CEFs trade at a NAV-discount, contradicting this argument. One potential explanation behind the positive association between the proportion of

non-public holdings and the NAV-discount is that investors who strive to invest in one or a couple of the non-public firms are not able to deselect the rest of the portfolio firms. Hence, this inability to opt out of undesirable firms may incur external investors to require a NAV-discount to compensate for the reluctant indirect investment in undesirable firms.

The issue of implausible replication is also raised by Gemmill and Thomas (2002) who argue that there is an inherent replication risk associated with shortening the underlying portfolio. The infeasibility of replication allows for a relatively large NAV-discount to develop before an arbitrage opportunity emerges, even in an efficient market. In the sample, one CEF, Svolder, was traded at a premium although its portfolio consisted of 100 percent public companies which should not be possible in an efficient market. Remember, in the case of a CEF that is trading at a premium and only has public firms, a rational investor can buy the underlying portfolio and short the CEF, and by that create a perfectly hedged portfolio that may yield risk-free arbitrage return. Here, the argumentation by Gemmill and Thomas (2002) is weakened. Evidently, when a CEFs holds 100 percent public firms and are traded at a premium, this portfolio is easily replicable and the argument of replication risk fails. The fact that premiums on CEFs with 100 percent public portfolio holdings remain obscure. Inevitably, the vast difference in the characteristics of the non-public holdings combined with the relatively scarce number of included CEFs may distort the true effect that the proportion of non-public holdings has on NAV-discounts.

Information Asymmetry

One potential explanation for the positive association may be derived from the inherent information asymmetry that exists between investors and the CEF, and their non-public holdings. Carroll et al. (2003) highlight that information asymmetries may both cause valuation and auditing difficulties that result in price discrepancies in the market. As the CEFs managers have incentives to undervalue non-public securities in order to account for the required discount upon divestment. The positive coefficients in the results are an indication of the opposite, i.e., that investors consider the non-public securities to be overvalued by the CEFs. Considering the availability of information for the respective sides, the managers in the CEF ought to have an information advantage and, thus, be able to more accurately value their non-public holdings. Notwithstanding, this actualizes the lemon theory (Akerlof, 1970) discussed in section 2.2.1. As the investors have an information deficit, they may

consequently apply a conservative valuation approach by assuming that all non-public holdings are lemons, hence undervaluing the non-public holdings.

Another influential factor may be the suboptimal double agency cost as presented by O'Reilly and Main (2010). This potentially doubled agency cost may cause external investors to require a discount on the NAV and an even greater discount on the larger proportion of non-public holdings as the information asymmetry increases. This reasoning would imply a positive association between the proportion of non-public holdings and the NAV-discount, as the agency cost increases in conjunction with the proportion of non-public holdings. Arguably, the existence of agency cost may thus explain why NAV-discount occurs in an efficient market, as similarly concluded by Chen et al. (2003).

As mentioned in the theoretical section, the efficient market hypothesis and the law-of-one-price is raised as theories contradicting the occurrence of NAV-discounts as equivalent portfolios with equal cash flows should be priced equally. On the other hand, one could argue that in an efficient market, an investor may be willing to pay a premium that equals the cost that would be required to make the replication of the portfolio possible, i.e., the transaction costs. Recall that according to Cherkes (2009), the CEF price equals the NAV plus an illiquidity premium, less management fees. In the case of investments that are associated with a high transaction cost, the expression could be extended by adding the transaction cost. Conclusively, taking into account the infeasibility to replicate the portfolio and all its associated transactions cost, a premium may be motivated on CEFs that hold otherwise inaccessible firms. This holds as long as the transaction cost exceeds or equals the premium.

6.1.2 Relative Multiple Valuation

Closely related to the proportion of non-public holdings is the relative multiples used for valuing the portfolio holdings. The proxy variable, the P/E ratio, is tested in two out of five models. The variable was found to be strongly negatively associated with the NAV-discount, however, in both models, the coefficient is small. Remember, Bonadurer (2003) argued that the P/E ratio inherited the same three fundamental factors in a discounted cash flow valuation; free cash flows, expected growth, and risk. Schreiner (2007) on the other hand argued that the P/E ratios inherited disadvantages when utilized to value non-public holdings, as it neglects important factors such as the required risk premium on illiquid assets. Derived from the earlier discussion by Bonadurer (2003) and Schreiner (2007), the P/E ratio is expected to be

negatively correlated with the NAV-discount. This association is supported by the result, but the small coefficient obstructs the interpretation value to some degree.

Considering the time delay as brought forward by Bleaney and Smith (2003), a decrease in the relative valuation multiples would lead to an instant decrease in the price of the CEF, as investors immediately revalue the non-public holdings. Hence, a discrepancy between the NAV and the CEF price will emerge. Take into account that the quarterly reports are released after the current quarter while the price of the CEF is retrieved from the last date of the quarter. Thus, there is a time gap between the price and the reported NAV where it prevails information asymmetry between the investors and the CEF's fundamentals, preventing the price and the NAV to converge. Theoretically, the prices should converge at the last date of the quarter, according to the law of one price, as the price and the NAV should represent the same underlying cash flows. Nonetheless, this is not the case as the same information about the cash flows is not accessible to all market participants. On the other hand, one could argue that the price at the date of the release of the quarterly report should converge to the reported NAV, as this information now becomes available. Only in this case, the information asymmetry is reversed as the investor now has more updated information regarding valuation multiples that was not included or included in the quarterly report. Hence, the timing inaccuracy thus makes it implausible for the share price and the NAV to converge.

The result for the P/E ratio indicates that, as expected, the relative multiples on the market are negatively associated with the NAV-discount. However, the coefficient is small which indicates that the effect is fairly weak, and the P/E ratio actual causality with NAV-discount can be questioned. Remember, the P/E ratio does not only affect the valuation of non-public companies, it also directly affects the valuation of public holdings. Hence, informed investors may directly act on changes in the multiples and revalue the CEF price accordingly. Hence, the comovement of the CEF price and the relative multiples are expected to be highly linear, thus there will be a quick adjustment of the CEF price, especially when the CEFs have a large proportion of public holdings. Hence, this quick price adjustment may increase the correspondence between the CEF price and the NAV, potentially explaining why the relative multiples have a negligible effect on the NAV-discount.

6.2 Portfolio Concentration

As shown in the previous chapter, portfolio concentration appears to have a robust and significant negative association with the NAV-discount, in all models which consequently

affirms hypothesis 2. Logically, this would imply that CEFs with more concentrated portfolios have a lower NAV-discount, and are possibly traded at a premium, in contrast to CEFs with more dispersed portfolios. The underlying cause of which could, nonetheless, be assessed in two regards; whether a CEF with a concentrated portfolio experiences higher share prices in relation to their net assets, or whether a concentrated portfolio causes undervaluation of the underlying portfolio.

Remember, the business model of a CEF is centered around holding a portfolio of financial assets and since their profitability is almost exclusively dependent on the performance of the underlying security companies, portfolio management, and composition become the utmost important profitability contributors (Lenkey, 2015). Although a fundamental principle within finance is that the highest risk-adjusted return is achieved through diversification (Bodie et al., 2005), Hjelström (2007) argues that too diversified firms often incite an increased required rate of return. Thus, although diversification enables the CEF to diminish shareholders' risk exposure, it simultaneously causes an increased return expectation from investors, subsequently diminishing the value of the CEF through an increased discount rate. Conversely, with a basis on the negative association between portfolio concentration and NAV-discount, as indicated in the previous chapter, a higher portfolio concentration would thus imply a relatively lower required rate of return which consequently increases the value of the CEF. This is also supported by the volatility mismatch between the CEFs and their net assets whereas the return of the CEF, in contrast to previous research (e.g. Pontiff, 1997; Lenkey, 2015), is less volatile than the return of their NAV (see appendix 4). Hence, with lower volatility of the CEF share price, investors would require a lower rate of return which decreases the NAV-discount, given the comparably higher volatility of the net assets. This is, however, not to say that portfolio diversification per se is detrimental to the value of the CEF; it merely accentuates the ambiguity of optimal diversification in order to achieve the highest risk-adjusted return. In this light, the diversification benefits become nonlinear as the marginal effect of portfolio diversification is diminishing.

While portfolio concentration appears to have a positive effect on CEF value, it can conversely have a negative effect on the value of the underlying portfolio. Lee et al. (1991) argue that CEFs usually hold substantial blocks of the underlying securities' shares, which often forces them to underestimate its value to account for the discount effect upon divestment. This is likewise evident through the high portfolio concentration of the sample CEFs and the variable coefficient's significantly negative association with NAV-discounts in

all five models. However, the magnitude of the discount of blockholding could be potentially questionable as Swedish CEFs have an abnormally long investment horizon (Hjelström, 2007), whereas only Traction is explicitly open to exit proposals (see appendix 1). Thus, with regards to the arguably more stagnant portfolio structure of Swedish CEFs, undervaluation estimates that account for the discount effect of block holding divestments would potentially become redundant. In this retrospective, the negative association between portfolio concentration and NAV-discount would rather be incited by the diminishing effect on the CEF share price as previously discussed.

6.3 Ownership Concentration

One aspect where Swedish CEFs are differentiated from their international equivalents is their generally high ownership concentration (Hjelström, 2007; Cronqvist & Nilsson, 2003), and their unique pyramidal ownership structure where a few influential owners, typically families, have a significant power of the Swedish financial market (Holmén & Högfeldt, 2009). Accordingly, as established in previous research, a high ownership concentration often has a detrimental effect on fund value - either in terms of diminished liquidity of the CEF shares (Barclay et al., 1993) or through increased agency costs incited by the controlling owners (Hjelström, 2007; Cronqvist & Nilson, 2003). Thus, as formulated in hypothesis 3, the negative effect of high ownership concentration on firm value is expected to be exhibited through an increased NAV-discount. Evidently, as presented in the previous chapter, the aforementioned positive association between ownership concentration and NAV-discount could be significantly validated in all models except model B, thus supporting hypothesis 3. Although it should be noted that the coefficient is immensely small.

Implicitly, a benefit of influential owners is their ability, and especially willingness, to ensure the alignment of managers' incentives with shareholders', thus assuring optimal decision making. What is conversely indicated by the results of this study, is that the opposite relationship implicitly subsists. As presented in the theoretical framework, large controlling owners tend to exercise their control to extract monetary and non-monetary benefits (Hjelström, 2007; Cronqvist & Nilson, 2003). Thus, although influential owners directly or indirectly provide a monitoring dimension that delimits fund managers from acting upon diverging incentives, they themselves can expose CEFs to enhanced agency costs. The likelihood of which is arguably inflated as the controlling owners of Swedish CEFs tend to control a large portion of votes through comparatively small and abnormally long capital

investments - emphasizing their characteristics as controlling *minority* shareholders (Cronqvist & Nilsson, 2003). Thus, the potential conflict of interest between owners becomes encapsulated in the ownership concentration measurement which reflects the relative voting power of the largest owner in relation to the second largest owner. Theoretically, when the relative control of the largest owner is high, the plausibility of opportunistic behavior increases. In this light, the positive association between NAV-discount and ownership concentration can be seen as a result of the typical *who guards the guardian* dilemma.

Albeit, the extent to which ownership concentration influences NAV-discount is debatable as the corresponding coefficient is relatively small in all models. This could imply that the extent to which these controlling minority shareholders exercise their control for their own benefit, is limited - making the potential conflict of interest between majority and minority shareholders neglectable. However, before assuming this to be true, it is important to emphasize that potential conflict of interest does not solely subsist between minority and majority shareholders, but is also often present between fund managers and shareholders. As mentioned, the latter becomes especially eminent in the context of a CEF as principal-agent problems tend to arise between shareholders and the CEFs, as well as between CEFs and their underlying portfolio companies (O'Reilly & Main, 2010), making information asymmetries both internal and external (Chen et al., 2003). Consequently, there is an indication that controlling owners enable a monitoring dimension which consequently ensures the alignment of incentives between shareholders and managers of the CEF. Thus, the doubled information asymmetry, as detected by O'Reilly and Main (2010), is indicatively reduced in the existence of controlling owners. Accordingly, this would imply that the influence of controlling owners assures the alignment of fund managers' incentives (O'Reilly & Main, 2010), while the existence of influential owners also exposes CEFs to enhanced agency costs.

6.4 Past Performance & Dividend Yield

6.4.1 Past Performance

Although past performance, measured as the lagged excess return, depicted a negative association with NAV-discount, the result does not support hypothesis 4A as the coefficient is only significant in models D and E. The result is perhaps unsurprising as it is congruent with the extensive critique on the explanatory power and inference of past performance on firm value, i.e., weak form efficiency (Fama, 1970). The negative, albeit insignificant, association

with NAV-discount can nonetheless provide some interesting insights. Specifically, although an investment strategy based on past performance, according to Bleaney and Smith (2008), is driven by short-run inertia and potentially an irrationality of investors, it has arguably a signaling effect on the market regarding the financial potential of the CEF which consequently is manifested by the diminishing effect on NAV-discount.

Accordingly, since Swedish CEFs long have had an imperative role as financial intermediaries for small private capital investors in particular (Sellebråten, 2021; Hjelström, 2007), trading on past performance can logically be seen as an attractive and comparatively unambiguous investment strategy for the comparatively lesser informed investors. This is further supported by Chen et al. (1994) who emphasize that an investor could expect abnormal positive returns when investing in funds with high discounts. As mentioned, Bleaney and Smith (2008) emphasize that such an investment strategy would be myopically driven as a stock continuously yielding abnormal returns would experience increased demand, subsequently appraising its value which consequently reduces the fund's discount. Such an occurrence is also evident in the Swedish market and the CEFs included in the sample. More explicitly, Swedish CEFs have in recent years yielded high positive returns and have thus gained significant traction from capital investors (Sellebråten, 2021) which subsequently have diminished the weighted NAV-discount as seen in figure 3.1. Ultimately, the expected negative association with NAV-discount can somewhat be seen as reflected in the regression model, however, while emphasizing the non-persistence and short-sightedness of performance-based investment strategies as suggested by Bleaney and Smith (2008).

6.4.2 Dividend Yield

Furthermore, while performance-based valuations, in accordance with the weak form efficiency, have received extensive criticism, valuations and revaluations based on dividends are contrarily seen as rationally driven (Johnson et al., 2006). According to Johnson et al. (2006), CEFs who adopt a minimum dividend policy experience a significantly lower mean discount, which also coincides with the results of this study. Although only weakly significant in all models except model E, dividend yield depicts a negative association with NAV-discount, which is congruent with the expected results as formulated in hypothesis 4B.

As discussed in the theoretical section, past performance and dividends both have a signaling effect on the market where investors often interpret these forms of returns as an indication of the fund's financial potential and the fund managers' proficiency (Bleaney & Smith, 2008;

Johnson et al., 2006). This likewise coincides with the findings of Holmén & Högfeldt (2009), who emphasize a high retention rate as an inefficient overinvestment strategy that negatively affects the value of the CEF as dividend payments are more valuable to the external investor. The authors further argue that the inefficiently high retention rate is a common repercussion of controlling minority shareholders. Indicatively, since Swedish CEFs often have a comparatively high ownership concentration (Hjelström, 2007), which is further supported by the descriptive statistics in chapter 3.4.2, a high retention rate could be expected. Although a small negative correlation is detected between ownership concentration and dividend yield, it could not be significantly supported, as seen in table 3.6.

A potential rationale behind the negative association between the dividend yield and the NAV-discounts, is the implication of the retention rate argument presented by Holmén & Högfeldt (2009). For rational investors, the accessibility of capital from dividends is more lucrative than the reinvestment of it, as the reinvested capital has a discounted value under the management of the CEF. Arguably, external investors may want to relocate the capital from the dividend, in order to optimize their portfolio composition. Thus, the option to relocate capital investments, through dividend payments, might be endorsed by the external investors, consequently causing an appraisal of the CEF value which reduces the NAV-discount.

Another conjunction between the dividend yield and the NAV-discount is the portfolio composition and the characteristics of the underlying holdings. For instance, VNV Global and VEF, which both have a zero-dividend policy, hold relatively immature, high-growth firms in emerging markets that seldom pay any dividends. Such firms, if profitable, reinvest their realized profits in order to grow more rapidly and the CEF realizes their return by divesting the holdings. Ultimately, as concluded under section 6.1, on the proportion of non-public holdings, CEFs holding small firms, for instance VNV Global and VEF, receive a discount. Hence, it is perhaps not the dividend yield that inhibits the explanatory power of the NAV-discount, instead it is the underlying characteristics of the holdings that incur a NAV-discount. These characteristics then happen to coincide with the presence of a dividend payout policy, which creates the negative association depicted in the result.

6.5 Macroeconomic Factors

Turning to the control variable and the proxy for investor sentiment, the business confidence index is significant and negative in all included models, hence the aforementioned negative association between the investor sentiment and NAV-discount is supported by the result. The

result can be asserted as robust as the coefficient is strongly significant in both models. The NAV-discount is evidently highly susceptible to fluctuations in investor sentiment, supporting earlier findings by Baker and Wurgler (2007) and conformity of the expected association. Remember also that the interpretation of the inclusion of the P/E ratio is twofold, both to capture the valuation impact and also its approximation as a proxy for investor sentiment, as proposed by Schreiner (2007) and Jitmaneeroj (2017). Evidently, the coefficient for the P/E ratio is negative and strongly significant in both models, hence the negative association between the investor sentiment and the NAV-discount is strengthened.

As discussed in section 2.5.2, small-capitalization firms are more susceptible to investor sentiment, which correspondingly is the overrepresented asset category in CEFs portfolios. The high causality between investor sentiment and NAV-discount is thus not surprising. Nevertheless, one remark is how investor sentiment also affects the CEFs share price. A reduction in investor sentiment may also have a negative effect on the CEF share price as the demand for the share decreases. Hence the CEF share price and the NAV may decline simultaneously. However, an increase in investor sentiment can lead to an overly optimistic financial environment, leading to an increased demand for CEFs' shares which inevitably decreases the NAV-discount.

Finally, the last included control variable is the risk-free rate that, judging by the result, had an ambivalent although slightly positive association with the NAV-discount. This result is contradicting the findings by Song and Jain (2021) who found that the interest rate was weakly negative associated with the NAV-discount. Nonetheless, the positive association in this thesis should not be over-exaggerated, particularly as the coefficient is only significant in one out of two models, and the found significance in model C is fairly weak. What is surprising is the notable high coefficient on the risk-free rate which infer that an increase in the risk-free rate would lead to an immense increase in the NAV-discount. Given the negative trend depicted in both the risk-free rate and the NAV-discount depicted in figure 3.3, a positive association can be motivated. Although this study only includes data until last December 2021, both the interest rate and the NAV-discount have increased immensely during the first half-year of 2022. Consequently, although the inferences from this study's result are limited, the positive association between the interest rate and the NAV-discount has to some degree been affirmed by the development during the spring of 2022.

7
Conclusions

The premise of this study arguably relies on the efficient market hypothesis and how prices are reflective of all available information. In this light, the origin behind the NAV-discount can be seen as a reflection of how multifaceted information on CEFs and their respective NAV, is interpreted and subsequently valued by investors - without necessarily implying that price disequilibrium is due to market inefficiencies.

By quantitatively analyzing twelve different CEFs on the Swedish market over a time period of 18 years, this study increases the comprehensibility of some of the explanatory factors behind the NAV-discount. The result indicates, congruent with prior research, that portfolio concentration, past stock performance, and dividend yield have a negative effect on the NAV-discount. However, in contradiction to earlier research, this study finds support that the proportion of non-public holdings is positively associated with the NAV-discount. One potential explanation behind this rather unintuitive finding is the diversity in the underlying non-public holdings, where some CEFs have firms with more dependable cash flows while others have more immature firms located in emerging markets. Additionally, this result also gives support to the illiquidity premium required by investors on illiquid holdings, i.e., non-public firms. The result further supports that the impracticability of replicating the underlying portfolio, and the associated risk it entails, allows for a NAV-discount to persist, without violating the efficient market hypothesis. Arguably, utilizing the theoretical arbitrage opportunity that the NAV-discount enables is associated with a high transaction cost, hence the market is as efficient as it can be, under the current premises.

Conclusively, CEFs have long been, and continue to be, a crucial financial intermediary for private and institutional capital investors. Thus, the inferences made from this thesis may be utilized by these investors to increase the comprehension behind the value of CEFs and their respective NAV-discount. Hopefully, this can encourage investors to more closely scrutinize the CEFs and their portfolio, and thereby look beyond the inefficient and misleading investment strategy based on past performance.

Suggestions for Future Research

Although the study provides some clarity to the otherwise ambiguous research on NAV-discount, some questions remain and have perhaps been exacerbated by events occurring after the end period of this study. During the finalization of this thesis, the stock market has decreased by approximately 20 percent which has negatively affected all CEFs substantially. As the investor sentiment has decreased, the prices of CEFs have simultaneously decreased. Hence, the CEFs share price has gradually converged towards their respective NAV and eliminated the aggregated NAV-premium seen on the market at the end of 2021. This raises the question of whether this is due to the proximity of a financial recession, or if the previous discounts (premiums) is the result of a period with unfeasibly high valuations. Nonetheless, the preceding market environment, with historically low interest rates and stimulus of the economy, has created a unique market situation whose denouement in the spring of 2022 is not captured in this study. Thus, a suggestion for future research is to broaden the investigated time period to also include these events and the events following its culmination.

Furthermore, although the study indicated a positive association between NAV-discounts and the non-public holdings, there is arguably more to discover. For instance, this thesis illuminates that one potential factor behind the positive association is the characteristics of non-public holdings. The inclusion of CEF type and the characteristics of the underlying non-public holdings could yield an additional comprehension. Lastly, during the initial stage of this thesis, an ambitious endeavor to retrieve the EBIT and Net Income for the non-public holdings was initiated but abandoned due to time constraints and incomplete data. To further scrutinize the effect of non-public holdings, future research could be focused on the financial performance of the non-public holdings and their corresponding valuation in comparison to more extensive multiples, e.g EV/EBIT and P/S, and potentially discern any deviations.

Conclusively, research on NAV-discount remains scarce in the Swedish market which indicates that there is still much to unravel. Consequently, for this purpose, as well as for replicability purposes, the raw data compiled for this study can be made available upon request.

Appendix

Appendix 1. Closed-End Fund Overview & Investment Strategy

BURE

Bure Equity incipiently originated from discontinued employee funds and has since its IPO on Stockholm Nasdaq in 1993 actively invested in a diversified portfolio of companies with varying maturity phases. Through a high presence and commitment, Bure Equity has as principal owners contributed to successful development in many of the portfolio companies where they continually reevaluate the kind of leadership their portfolio companies need. With a long presence on the market, Bure Equity has built its expertise to create long-term value and financial strength for its investments and its shareholders. (Bure, nd.)

CREADES

Relative to other CEFs, Creades has a relatively short history where they, after the split of Investment AB Öresund, became listed on the Stockholm Nasdaq in 2013. Their portfolio strategy primarily consists of investments in small and medium-sized public and non-public Nordic companies, currently distributed over 70 to 75 percent public and 25 to 30 percent non-public holdings, e.g. the publicly listed Avanza and the non-public company Pricerunner. With a long-term commitment and active ownership, Creades provides its shareholders with a competitive risk-adjusted return in companies with potential for revaluation and increased value creation. (Creades, n.d.)

INDUSTRI VÄRDEN

Since they were founded by the Svenska Handelsbanken[6] in 1944, Industrivärden became an active investor in publicly listed Swedish companies where they enabled long-term development and value creation of their holdings. Industrivärden differentiates itself by holding a relatively concentrated portfolio of, primarily, companies with a strong market position, e.g. AB Volvo and Sandvik. Thus, with an extensive background in investment positions of strong influence, Industrivärden provides deep industrial knowledge and experience, financial strength, and a vast network. (Industrivärden, n.d.)

[6] Svenska Handelsbanken is one of the major banks in Sweden

Investor was founded by the renowned Wallenberg family in 1916 and is, thus, one of the oldest CEFs in Sweden. By holding a portfolio of global, high-quality companies, Investor strives toward generating an attractive return for their shareholders through a strategy with an emphasis on net asset value growth, steady and increasing dividends, and ESG deliverance. Their investment portfolio primarily consists of listed companies, including Atlas Copco and ABB, wholly-owned subsidiaries with growth potential, e.g. Mölnlycke, and investments in EQT. (Investor, n.d.)

Kinnevik was founded in 1936 and has since strived towards becoming the leading listed growth investor in Europe. Their strategy consists of active investments in bold and digitally transformative Nordic and US companies, such as Tele2 and Budbee, to enable long-term and sustainable growth for their investments and their shareholders. (Kinnevik, n.d.)

After their IPO in 1985, Latour has been a significant CEF on the Swedish market by providing investors with a portfolio characterized by long-term investments in companies with unique products and brands, and a large growth potential supported by global trends and internationalization prospects. The portfolio is currently divided into two fractions, fully owned industrial operations, including Hultafors Group, and publicly listed companies, including companies such as Assa Abloy and Securitas. (Latour, n.d.)

Lundbergföretagen was founded in 1944 by Lars Erik Lundberg, whose family has remained the principal shareholders, currently holding approximately 70 percent of the votes. The fund later underwent an IPO in 1983 and has since offered a portfolio of primarily publicly listed companies, including Holmen and Industrivärden, as well as non-public and fully owned subsidiary Lundbergs Fastigheter. Thus, through active investments in the portfolio companies, with a strong financial position, Lundbergföretagen provides its shareholders with

a return corresponding to the required market return, through dividends and NAV growth. (Lundbergföretagen, n.d.)

Öresund has its origin as a Maritime Insurance Ltd founded in 1890 and was later introduced as a closed-end fund to Stockholm Nasdaq, formerly known as Stockholms Fondbörs, in 1962. With a strategy of being actively involved in the portfolio companies' operative, financial and strategic positions, Öresund offers investors a long-term risk-adjusted return through opportunistic investments in Nordic companies, including Swedish Bilia and Finish Musti Group. (Öresund, n.d.)

Svolder's investment strategy mainly consists of a concentrated portfolio of small and mid-cap publicly listed Swedish companies, with an emphasis on shareholder responsibility, growth, and dividends. Since its IPO on Stockholm Nasdaq in 1993, they have had the overarching goal of being the leading CEF with long-term dividend growth and a return exceeding the Swedish small-cap index[7]. (Svolder, n.d)

Traction was founded in 1974 and was later listed on Stockholm Nasdaq in 1997. Like many of the Swedish CEFs, Traction is majority held by a family, namely the Stillström family currently holding approximately 68 percent of the votes. With an active investment approach in smaller and middle-sized public and non-public companies, Traction engages in close collaboration with its portfolio companies to generate and enable organizational and financial development. Unlike other CEFs, Traction invests in a broad range of industries and organizations to facilitate a return and dividend development exceeding the market. Furthermore, although Traction works towards a long-term horizon, they disclose an exit or divestment willingness for all their investments. (Traction, n.d.)

[7] Carnegie Small Cap Index (CSRX)

VEF

VEF differentiates itself by investing in non-public fintech companies in emerging markets, such as Brazil and Mexico, primarily in a growth phase. Although VEF strives towards minority investments, they consistently uphold board representation in all portfolio companies. VEF was founded in 2015 through a split from VNV Global and is thus one of the younger funds on the market. (VEF, n.d.)

VNV GLOBAL

VNV Global was founded in 2005 and has since enacted an investment strategy with a focus on high growth, specifically in industries with high entry barriers with long-term return prospects, e.g. mobility, marketplaces, and digital health. Their portfolio is globally dispersed with investments in both developed and emerging markets, primarily in non-public companies within the technology sector. Notwithstanding, to counteract corporate governance risks, VNV Global, like the other CEFs, enacts an active investment approach, especially in emerging markets through, e.g., board representation. (VNV Global, n.d.)

Appendix 2. Definition of Consumer confidence index (CCI) from OECD (2022b)

"This consumer confidence indicator provides an indication of future developments of households' consumption and saving, based upon answers regarding their expected financial situation, their sentiment about the general economic situation, unemployment and capability of savings. An indicator above 100 signals a boost in the consumers' confidence towards the future economic situation, as a consequence of which they are less prone to save, and more inclined to spend money on major purchases in the next 12 months. Values below 100 indicate a pessimistic attitude towards future developments in the economy, possibly resulting in a tendency to save more and consume less."

Appendix 3. Definition of Business confidence index (BCI) from OECD (2022a)

"This business confidence indicator provides information on future developments, based upon opinion surveys on developments in production, orders and stocks of finished goods in the industry sector. It can be used to monitor output growth and to anticipate turning points in economic activity. Numbers above 100 suggest an increased confidence in near future business performance, and numbers below 100 indicate pessimism towards future performance."

Appendix 4. Volatility Comparison

Volatility Comparison

CEF		Mean	Std. Dev	Obs
Bure	price	6.35%	18.35%	72
	NAV	3.46%	13.88%	
Creades	price	7.29%	15.89%	40
	NAV	2.83%	16.94%	
Industrivärden	price	1.97%	12.90%	72
	NAV	1.83%	12.99%	
Investor	price	3.95%	9.15%	72
	NAV	2.15%	11.47%	
Kinnevik	price	3.46%	16.59%	71
	NAV	3.39%	15.67%	
Latour	price	5.57%	12.24%	72
	NAV	2.31%	15.26%	
Lundbergföretagen	price	3.57%	9.94%	72
	NAV	1.82%	12.83%	
Öresund	price	2.19%	15.28%	72
	NAV	0.14%	14.89%	
Svolder	price	5.30%	15.65%	72
	NAV	3.49%	13.42%	
Traction	price	3.44%	10.10%	69
	NAV	2.00%	12.37%	
VEF	price	8.61%	18.83%	26
	NAV	5.69%	15.55%	
VNV Global	price	5.03%	23.00%	59
	NAV	3.17%	26.54%	
Total	**price**	4.39%	14.93%	**769**
	NAV	1.50%	15.25%	

Comparison between the return of the CEF & its respective NAV.

Appendix 5. Independent Variables Overview

Proportion of Non-Public Holdings

CEF	Obs	Mean	Std. Dev	Min	Max
BURE	72	30,25%	27,32%	5,96%	94,62%
CRED	40	24,27%	7,85%	11,49%	57,59%
INDU	72	0,11%	0,28%	0,00%	1,14%
INVE	72	25,89%	6,74%	12,80%	37,29%
KINV	71	19,47%	10,94%	4,96%	49,43%
LATO	72	34,19%	8,39%	17,72%	50,13%
LUND	72	24,58%	7,16%	14,88%	44,74%
ORES	72	8,01%	10,65%	0,00%	68,18%
SVOL	72	0,00%	0,00%	0,00%	0,00%
TRAC	69	12,80%	6,63%	2,93%	25,02%
VEFAB	26	80,62%	23,38%	4,58%	100,68%
VNV	59	58,24%	38,62%	0,00%	106,25%
Overall	**769**	**22,92%**	**24,48%**	**0,00%**	**106,25%**
Between	12		23,35%	0,00%	80,62%
Within	64,08		15,60%	−53,12%	87,29%

Portfolio Concentration

CEF	Obs	Mean	Std. Dev	Min	Max
BURE	72	53,44%	17,26%	18,31%	78,54%
CRED	40	59,40%	7,77%	44,13%	78,04%
INDU	72	70,96%	8,42%	58,26%	98,57%
INVE	72	45,70%	4,67%	36,75%	60,28%
KINV	71	82,26%	15,38%	45,65%	128,19%
LATO	72	58,35%	9,39%	45,64%	86,82%
LUND	72	63,23%	9,20%	46,37%	95,02%
ORES	72	39,44%	8,19%	23,08%	90,71%
SVOL	72	37,70%	11,71%	21,43%	99,50%
TRAC	69	23,12%	8,19%	11,79%	54,38%
VEFAB	26	53,41%	14,54%	8,00%	75,19%
VNV	59	60,88%	19,50%	32,73%	87,61%
Overall	**769**	**53,77%**	**19,74%**	**8,00%**	**128,19%**
Between	12		15,86%	23,12%	82,26%
Within	64,08		11,71%	8,37%	115,57%

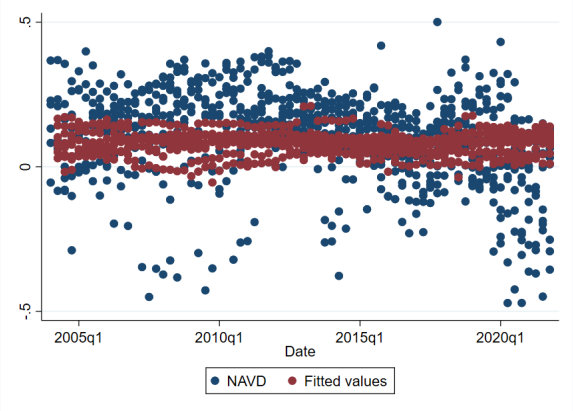
Ownership Concentration

CEF	Obs	Mean	Std. Dev	Min	Max
BURE	72	1,51	1,19	1,01	11,15
CRED	40	13,76	4,53	1,43	20,03
INDU	72	1,67	0,52	1,06	2,55
INVE	72	5,06	2,76	1,00	9,76
KINV	71	2,84	0,86	1,38	4,74
LATO	72	3,22	1,52	1,02	5,91
LUND	72	36,35	23,69	6,33	88,71
ORES	72	3,35	2,66	1,07	9,28
SVOL	72	7,70	4,91	1,06	13,38
TRAC	69	3,75	6,24	1,03	24,25
VEFAB	26	1,71	0,50	1,01	3,05
VNV	59	2,86	1,32	1,16	6,27
Overall	**769**	**7,10**	**12,53**	**1,00**	**88,71**
Between	12		9,86	1,51	36,39
Within	64,08		7,78	−22,92	59,46

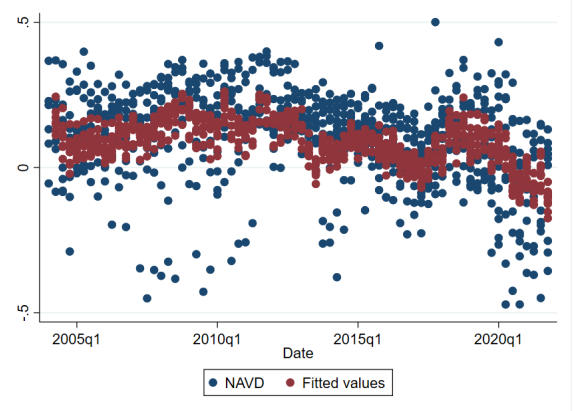
Dividend Yield

CEF	Obs	Mean	Std. Dev	Min	Max
BURE	72	0,69%	3,28%	0%	27,30%
CRED	40	0,56%	1,14%	0%	3,92%
INDU	72	0,78%	1,57%	0%	7,66%
INVE	72	0,19%	0,34%	0%	1,03%
KINV	71	0,59%	1,17%	0%	4,11%
LATO	72	0,24%	0,49%	0%	2,32%
LUND	72	0,16%	0,29%	0%	1,09%
ORES	72	0,49%	1,22%	0%	5,56%
SVOL	72	0,12%	0,28%	0%	1,73%
TRAC	69	0,44%	0,97%	0%	3,57%
VEFAB	26	0%	0%	0%	0%
VNV	59	0%	0%	0%	0%
Overall	**769**	**0,37%**	**13,22%**	**0,00%**	**27,30%**
Between	12		0,27%	0,00%	0,78%
Within	64,08		1,30%	−0,41%	26,98%

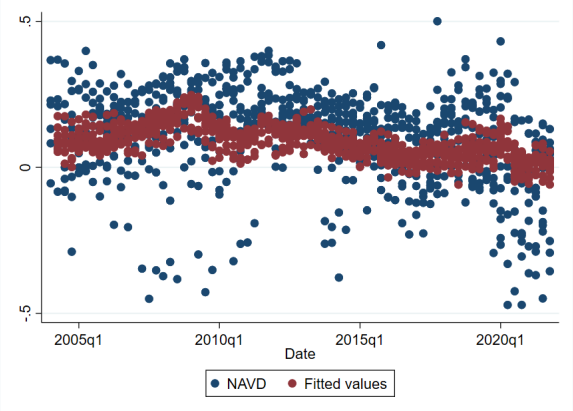
Appendix 6: Residual plot for the five different models (A to E)



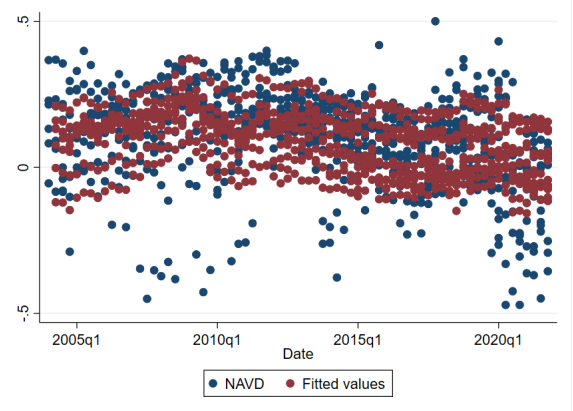
Model A: Primary



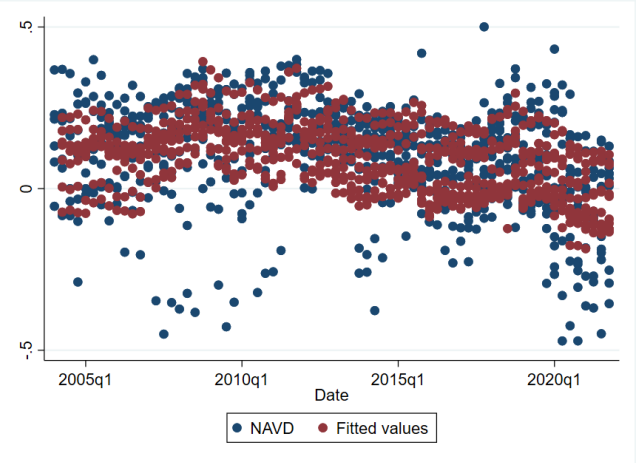
Model B: With quarterly fixed effects



Model C: With macroeconomic control variable



Model D: With CEF-fixed effects & macroeconomic control variables



Model E: With CEF & yearly-fixed effects

References

Adams, M., & Thornton, B. (2009). A comparison of alternative approaches to equity valuation of privately held entrepreneurial firms. Journal of Finance and accountancy, 1, 2.

Akerlof, G. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, 84(3), 488-500.

Baker, M., & Wurgler, J. (2007). Investor Sentiment in the Stock Market. The Journal of Economic Perspectives, 21(2), 129-151.

Barclay, M. J., Holderness, C. G., & Pontiff, J. (1993). Private benefits from block ownership and discounts on closed-end funds. *Journal of Financial Economics*, Vol. 33(3), ss. 263-291.

Beck, N., & Katz, J. (1995). What To Do (and Not to Do) with Time-Series Cross-Section Data. The American Political Science Review, 89(3), 634-647.

Bleaney, M. & Smith, R.T. (2003). Prior Performance and Closed-End Fund Discounts. *Discussion Papers in Economics*, University of Nottingham, DP03/16, September 2003, p.36

Bleaney, M. & Smith, R.T. (2008). Is Prior Performance Priced Through Closed-End Fund Discounts. *International Journal of Finance and Economics*, in press, DOI: 10.1002/ijfe.387

Bodie, Z., Kane, A. & Marcus, A. (2011). *Investments and Portfolio Management.* 9 uppl. New York: McGraw Hill.

Bonadurer, W. (2003). Valuation by Multiples. (Doctorate), University of St. Gallen (HSG), Scottsdale.

Boudreaux, K.J. (1973); "Discounts and Premiums on Closed-End Mutual Funds: a Study in Valuation"; *The Journal of Finance*; pp. 515-523.

Brooks, C., (2015). Introductory Econometrics for Finance, Third Edition, *Cambridge University Press*, UK.

Brown, Gregory W., and Michael T. Cliff. 2004, "Investor Sentiment and the Near-Term Stock Market." Journal of Empirical Finance, 11(1): 1

Bure Equity (n.d.). *Om Bure.* Retrieved at 2022-05-10 from https://www.bure.se/ombure/ombure

Carroll, T. J., Linsmeier, T. J. & Petroni, K. R. (2003). The reliability of fair value versus historical cost information: Evidence from closed-end mutual funds. *Journal of Accounting, Auditing & Finance*, Vol. 18(1), pp. 1-24.

Ceh, A., Manfredini, J., Melander, O. & Wollert, S. (November, 2021). Equity market valuation in light of low interest rates. *Sveriges Riksbank*.

Chen, J., Jiang, C., Kim, J., & McInish, T. (2003). Bid-Ask Spreads, Information Asymmetry, and Abnormal Investor Sentiment: Evidence from Closed-End Funds. *Review of Quantitative Finance and Accounting*, 21(4), 303-321.

Chen, X. (2021) The Impact of Monetary and Fiscal Policy on Stock Market Performance: Evidence from Multiple Countries. *Advances in Economics, Business and Management Research*, Vol 203, pp 779 -783.

Cheng, A., Copeland, L., & O'Hanlon, J. (1994). Investment Trust Discounts And Abnormal Returns: Uk Evidence. *Journal of Business Finance & Accounting*, 21(6), 813-831.

Cherkes, M., Sagi, J. & Stanton, R. (2009). A liquidity-based theory of closed-end funds. *The Review of Financial Studies*, Vol. 22, 257-297.

Chordia, T., Huh, S., & Subrahmanyam, A. (2009). Theory-Based Illiquidity and Asset Pricing. *The Review of Financial Studies*, 22(9), 3629-3668.

Creades (n.d.). *Om Creades*. Retrieved at 2022-05-10 at https://www.creades.se/om-creades/

Cronqvist, H., & Nilsson, M. (2003). Agency Costs of Controlling Minority Shareholders. *Journal of Financial and Quantitative Analysis*, 38(4), 695-719.

Damodaran, A. (2005). Marketability and Value: Measuring the Illiquidity Discount. *Stern School of Business*.

Drukker, D. (2003). Testing for serial correlation in linear panel-data models. The Stata Journal, 3(2), 168-177.

Fama, E. (1970). Efficient Capital Markets: A Review Of Theory And Empirical Work. *The Journal of Finance* (New York), 25(2), 383-417.

Fletcher, M. (2013). Uk Closed-end Country Funds: Illiquidity, Sentiment and Segmentation.

Gemmill, G., & Thomas, D. (2002). Noise Trading, Costly Arbitrage, and Asset Prices: Evidence from Closed-end Funds. *The Journal of Finance* (New York), 57(6), 2571-2594.

Hjelström, T., & Ekonomiska forskningsinstitutet vid Handelshögskolan i Stockholm. (2007). *The closed-end investment company premium puzzle : Model development and empirical tests on Swedish and British data.* Stockholm: Economic Research Institute, Stockholm School of Economics [Ekonomiska forskningsinstitutet vid Handelshögskolan i Stockholm] (EFI).

Holmén, M., & Högfeldt, P. (2009). Pyramidal Discounts: Tunneling or Overinvestment? *International Review of Finance*, 9(1-2), 133-175.

Huang, W., Mollick, A. & Nguyen, K. (2016). U.S. stock markets and the role of real interest rates. *The Quarterly Review of Economics and Finance*. Vol. 59, ss. 231–242.

Ibindex, (n.d.a). *Ibindex.* Retrieved January 27th, 2022, at: https://ibindex.se/ibi/#/index

Ibindex, (n.d.b). *Investmentbolagen.* Retrieved February 1st, 2022 at: https://ibindex.se/ibi/#/companies

Industrivärden (n.d.). *Industrivärden i korthet.* Retrieved 2022-05-11 from https://www.industrivarden.se/sv-se/verksamheten/industrivarden-i-korthet/

Investor (n.d.d). *About Investor.* Retrieved at 2022-05-11 at: https://www.investorab.com/about-investor/

Jareño, F. & Navarro, E. (2009). Stock interest rate risk and inflation shocks. *European Journal of Operational Research*. Vol. 201, ss. 337–348.

Jensen, M., & Meckling, W. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305-360.

Jitmaneeroj, B. (2017). Does investor sentiment affect price-earnings ratios? Studies in Economics and Finance (Charlotte, N.C.), 34(2), 183-193.

Johnson, S.A., Lin, J. & Song, K.R. (2006) Dividend policy, signaling, and discounts on closed-end funds. *Journal of Financial Economics*, Vol 81(3), ss. 539-562.

Kinnevik (n.d.). *About us.* Retrieved 2022-05-11 at: https://www.kinnevik.com/about-us

Laeven, L., & Levine, R. (2007). Is there a diversification discount in financial conglomerates? *Journal of Financial Economics*, 85(2), 331-367.

Latour, (n.d.). *About us.* Retrieved 2022-05-11 at: https://www.kinnevik.com/about-us

Lee, C.M., Shleifer, A. & Thaler, R.H. (1991). Investor sentiment and the closed-end fund puzzle. *The Journal of Finance,* Vol. 46, ss. 75–109.

Lemmon, Michael, and Evgenia Portniaguina. 2006. "Consumer Confidence and Asset Prices: Some Empirical Evidence." Review of Financial Studies, 19(4): 1499-15

Lenkey, S. (2015). The closed-end fund puzzle: Management fees and private information. *Journal of Financial Intermediation,* Vol. 24 (1), ss. 112-129.

Lundbergföretagen, (n.d.). Om Lundbergföretagen. Retrieved 2022-05-11 at: https://www.lundbergforetagen.se/sv

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance* (New York), 7(1), 77.

Mavruk, T., Overland, C., & Sjögren, S. (2020). Keeping it real or keeping it simple? Ownership concentration measures compared. *European Financial Management*, 2020, Vol. 26, Iss. 4, Pp. 938-.957, 26(4), 938-957.

OECD (2022a), Business confidence index (BCI) (indicator). doi: 10.1787/3092dc4f-en (Accessed on 20 April 2022)

OECD (2022b), Consumer confidence index (CCI) (indicator). doi: 10.1787/46434d78-en (Accessed on 20 April 2022)

Papadamou, S., Sidiropoulos, M., & Spyromitros, E. (2017). Interest rate dynamic effect on stock returns and central bank transparency: Evidence from emerging markets. *Research in International Business and Finance*, 39, 951-962.

Pontiff, J. (1997). Excess Volatility and Closed-End Funds. *The American Economic Review,* 87(1), 155-169.

Price Water Cooper (May 2021). Riskpremien på den svenska aktiemarknaden. https://www.pwc.se/sv/pdf-reports/corporate-finance/riskpremiestudien-2021.pdf

Reed, R., & Webb, R., (2010). The Pcse Estimator Is Good, Just Not As Good As You Think. *Journal of Time Series Econometrics*, https://doi.org/10.2202/1941-1928.1032

Schreiner, A. (2007). Equity Valuation Using Multiples (1. Aufl. ed., Schriften Zum Europaischen Management). Wiesbaden: Gabler Verlag.

Sellebråten, M. (2021). *Frida Bratt: "Investmentbolagen är de nya folkaktierna".* Realtid. https://www.realtid.se/frida-bratt-investmentbolagen-ar-de-nya-folkaktierna

Sias, R. (1997). Price Pressure And The Role Of Institutional Investors In Closed‐end Funds. *The Journal of Financial Research*, 20(2), 211-229.

Song, G., & Jain, A. (2021). REVISIT CLOSED-END FUND PUZZLES VIA DYNAMIC CAPITAL MOBILITY. International Journal of Economics and Financial Issues, 11(4), 1-10.

Sveriges Riksbank, (2020). Redogörelse för penningpolitiken. *Sveriges Riksbank.*

Sveriges Riksbank, (n.d). *Reporäntan, in och utlåning.* Retrieved 2022-03-21 from: https://www.riksbank.se/sv/statistik/sok-rantor--valutakurser/reporanta-in--och-utlaningsranta/

Svolder, (n.d.). *Om Svolder*. Retrieved 2022-05-11 at https://svolder.se/om-svolder/

Swaminathan, B. (1996). Time-Varying Expected Small Firm Returns and Closed-End Fund Discounts. *The Review of Financial Studies*, 9(3), 845-887.

Traction, (n.d.). *Om Traction.* Retrieved 2022-05-11 at https://www.traction.se/sv/om-traction/

VEF, (n.d.). *About.* Retrieved 2022-05-11 at https://vef.vc/about-us/

Von Essen, R., & Sveriges aktiesparares riksförbund. (1997). Investmentbolag med eller utan existensberättigande. Stockholm]: [Sveriges aktiesparares riksförb.].

VNV Global, (n.d.). *About*. REtrieved 2022-05-11 at https://sv.vnv.global/about/

Öresund, (n.d.). *Om Öresund.* Retrieved 2022-05-11 at https://www.oresund.se/om-oresund/affarsid%C3%A9/

Özler, B., (2012). Beware of Studies with a small number of clusters. *Development Impact, Worldbank.* Retrieved at https://blogs.worldbank.org/impactevaluations/beware-of-studies-with-a-small-number-of-clusters