Closing the Gap:
Do Exit Announcements Narrow NAV Discounts in Swedish Closed-End Funds?

A study on Exits capability in reducing publicly traded CEFs NAV discount and what characteristics might amplify this

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Abstract

A central study whether portfolio exits can be used to narrow net asset value (NAV) discounts in Swedish publicly traded closed-end funds (CEFs) with predominantly private, illiquid holdings. Using a manually constructed sample of 43 exit announcements from eight Swedish CEFs over 2014–2025, an event baseed study on CAPM abnormal returns, complemented by non-parametric tests, and a multiple linear regression of changes in NAV discounts on exit characteristics and market conditions was conducted. Finding that exit announcements are associated with a statistically and economically significant positive median abnormal return of about 1.6% on the announcement day, implying a short-run reduction in NAV discounts. Over a five-day trading window (one week), cumulative abnormal returns remain positive but are statistically weaker. Regressions show that larger exits (as a share of portfolio value) are systematically linked to greater discount narrowing, while pricing relative to carrying value and the initial NAV discount do not exhibit robust explanatory power. Discount reductions are more pronounced when exits are announced in bear markets, consistent with exits relaxing binding liquidity risk and information-asymmetry constraints in stressed environments. Overall, the results indicate that exits function as a distinct and effective discount-management tool, particularly when economically sizable and executed under adverse market conditions, but they explain only part of the variation in discount dynamics, reflecting the importance of additional, unobserved drivers.

Keywords:

Closed-End Funds, Net Asset Value Discount, Portfolio Exits

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Introduction

Close End Funds and the NAV discount

Closed-end funds (CEFs) are professionally managed investment vehicles that raise a fixed amount of capital at inception and then invest this capital in a portfolio of financial or real assets. Investors who wish to enter or exit the fund do so by buying or selling existing shares on a stock exchange, rather than transacting directly with the fund at net asset value (NAV), but since they have is no obligation for the fund to issue or redeem shares at NAV. The market price of the CEF will often deviate from the value of its underlying portfolio, leading to the characteristic NAV discounts and, more rarely, premia, known as the close end fund discount puzzle.

In this thesis we focus on publicly traded CEFs on the Swedish stock exchange and the disconnect between their stock price and NAV. These investment companies (for example VNV Global or Kinnevik) own diversified portfolios of listed and unlisted holdings, often with significant influence or control in their portfolio firms. Historically for investors, these structures can offer several advantages. First, they provide a way to access illiquid or private, such as late-stage venture capital, private equity or infrastructure. Second, they bundle governance and monitoring into a professionally managed vehicle that can take active roles in portfolio companies. At the same time, because the shares trade in public markets, investors obtain daily liquidity even when the underlying assets are highly illiquid. Within the broad category of listed investment companies, it is useful to distinguish between long-term industrial holding companies and funds with private equity (PE) or venture capital (VC) strategies. Funds with large shares of their portfolio in publicly traded securities, NAV can be computed mechanically, and disagreements between managers and outside investors about asset values are limited. We focus on investment companies that have primarily unlisted illiquid assets. Their NAV is to a large extent model based. It relies on valuation techniques such as discounted cash flow analysis, peer multiples or recent transaction comparables, rather than directly observable market prices. When transaction markets are vibrant and exit activity is high, these valuation models can be anchored in frequent, arm's-length transactions. When transaction markets freeze, however, the link between modelled NAV and possible exit value becomes tenuous. NAV discount may reflect the market's confidence in the credibility and realisable value of assets. When investors become inclined to devalue the CEF the market will demand a larger discount. Understanding how such doubts arise and how attempt to address them is central to this thesis.

The NAV discount

The net asset value (NAV) of a CEF describes the valuation of all underlying assets of a specific company. The NAV discount (or premium) is defined as the precentral difference between reported NAV by the CEF and current market valuation for the same CEF. In practice, discounts of 20–40% are not uncommon, especially for funds with illiquid or opaque portfolios. Discounts may even reach larger percentages of a funds reported NAV over extended periods of time. Concrete for how NAV discount moves over time in CEFs is documented by Malkiel (1977) and subsequent survey work show that CEFs are often launched at or near a premium to NAV but tend to move into discount territory within a year or two after the initial public offering. Discounts then exhibit substantial time-series variation and cross-sectional dispersion.

Findings of Lee, Shleifer and Thaler (1991) show that extreme discounts partly reflect time-varying sentiment or transitory mispricing. They also found in an earlier article, "Anomalies: Closed-end mutual funds" (Lee, Shleifer & Thaler 1990) that when funds are liquidated, merged, or converted into open-

end form, the share price tends to converge to NAV. Shareholders in heavily discounted funds typically realise large abnormal returns around such "termination events", as the corporate action forces the market price to align with underlying asset value. This convergence suggests that a substantial part of the discount is indeed recoverable value, rather than purely an accounting artefact.

Studies focusing on Swedish and Nordic investment companies broadly confirm these patterns. Swedish CEFs display persistent NAV discounts, particularly for funds with higher exposures to illiquid assets and less transparent valuation policies (Svensson & Boström 2015). Recent work on Swedish closed-end funds finds that the discount is systematically related to variables such as dividend yield, leverage, and measures of illiquidity, while also showing sensitivity to market-wide sentiment indicators.

From a shareholder perspective, a large, persistent discount is problematic, it implies that the market attributes a lower value to the claim on the portfolio than the internal NAV suggests. If the fund never liquidates or otherwise realises NAV, investors may never capture the full underlying asset value. For managers, a persistent discount makes share issuance unattractive, as new equity would be sold at a price below portfolio value. Managers of these publicly traded CEFs have dual objectives. First, it is to create value by increasing the NAV, which is the shareholder value creation all firms are seeking. Second, it is to keep the share price in line with the NAV. That suggests that managers should actively do NAV-discount management, where they use certain tools to reduce the NAV discount. This is to ensure that the share price keeps in line with the underlying value of the firm.

Behavioural theories emphasise the role of noise traders and investor sentiment (Chopra, Lee, Shleifer & Thaler 1993). The influential paper by Lee, Shleifer and Thaler (1991) argues that CEFs are held disproportionately by individual investors whose expectations are prone to swings in optimism and pessimism. Because arbitrage against mispricing in CEFs is risky and constrained, sentiment-driven mispricing can persist. Pontiff (1996) argues that discounts in can be interpreted as an aggregate measure of the market's scepticism about both the reported NAV and the portfolio's exit ability.

Overall, the literature suggests that CEF discounts reflect a combination of rational factors (information asymmetry, illiquidity, agency issues) and behavioural forces (sentiment and noise trader risk), with their relative importance varying over time and across fund types.

Research Question

This thesis is concerned with whether, and under what circumstances, exits serve as an effective tool to reduce NAV discounts in publicly traded closed-end funds where there is a substantial amount of private illiquid assets. The empirical analysis focuses on Swedish investment companies with majority of their holdings in private assets.

Main Research Question

Do exits of a portion of the underlying assets of Swedish publicly traded closed-end funds, when these funds trade at a discount to NAV, lead to a decrease in the NAV discount?

Sub Research Questions

1. What is the immediate stock-market reaction to exit announcements, and is it sustained over a short-term event window?

2. Does the effect of exits on the change in NAV discounts depend on the characteristics of the exit, such as the size of the transaction relative to the CEF's NAV or the pricing of the transaction relative to carrying value, the pre-event discount is wider?
3. How does the broader market environment and sentiment shape the relationship between exits and discounts, for instance, are exits more effective in narrowing discounts in normal or bullish markets than during periods of elevated risk aversion and illiquidity?

By addressing these questions, the thesis positions exit as a distinct discount-management tool and compares their effectiveness to the mechanisms emphasised in the existing closed-end fund literature.

Contribution and practical implications of this thesis

We want to contribute on the literature of closed-end funds by examining an instrument to reduce the NAV discount, exits, that has been central in practice but sparsely analysed in empirical work on discounts. Existing research on other tools to reduce the NAV discount, that we could find, has primarily focused on dividend distribution policies, share repurchase programmes and structural reorganisations. By treating portfolio exits as discount-relevant events and studying their stock-market impact, the thesis fills an identifiable gap in the literature on CEF discount dynamics.

We want to provide actionable insights for practitioners, particularly managers and boards of publicly traded CEFs where a large part of the portion of the underlying assets are private. If the empirical results show that exits systematically reduce discounts and reveal how this effect depends on exit size, pricing and market conditions, managers can incorporate these findings into their strategies to reduce NAV discount and timing decisions. Conversely, if exits only weakly or inconsistently affect discounts, the results may caution against using exit for NAV discount closure and instead encourage greater emphasis on other mechanisms. The thesis has implications for shareholders and investors. A better understanding of how exits affect NAV discounts helps investors interpret corporate announcements and evaluate whether discount-narrowing strategies are credible. It may also inform trading strategies that condition on discount levels and anticipated exit activity. Taken together, these contributions are particularly salient at a time when many CEFs with private underlying assets trade at historically wide discounts, largely because markets question both NAV levels and the feasibility of exits. Clarifying the relationship between exits and discounts can therefore enhance decision-making on both sides of the market: managers may design more effective discount-management strategies, and investors may more accurately assess the value implications of those strategies.

Macroeconomic backdrop and Liquidity risk

The relevance of these questions has increased markedly since around 2022. The post-pandemic period has been characterised by a sharp rise in interest rates, quantitative tightening by major central banks, and episodes of heightened risk aversion in financial markets. For illiquid private markets, the combination of higher discount rates, tighter financing conditions, global liquidity decrease and increased uncertainty about exit horizons has led to a pronounced slowdown in deal activity and IPO volume. In such an environment, the ability of a CEF which contains private assets to execute exits at attractive valuations has been decreased substantially. Transaction markets for growth and late-stage venture assets have become more illiquid, and valuation expectations between buyers and sellers have often diverged. This macroeconomic context is directly relevant for Swedish growth-oriented investment companies, many of which hold portfolios of private illiquid assets whose valuations were buoyant in the low-rate, pre-2022 environment but have since come under pressure.

As exit markets weakened, investors began to question both the accuracy of reported NAVs and the realistic exit values of portfolio assets. The result was a substantial widening of NAV discounts in CEFs who contained private illiquid assets, including Swedish investment companies. Thus, the discount to NAV for CEFs who contains private illiquid assets seems to be related to the overall liquidity and transaction activity on the market.

Cherkes, Sagi & Stanton (2009) and their article "*A Liquidity-Based Theory of Closed-End Funds",* developed a formal rational model explaining why CEFs can trade at persistent discounts or premia to NAV. This article's central insight was that CEFs provide liquidity services to investors by offering tradable claims on portfolios of illiquid assets. Investors value the ability to buy and sell shares in a liquid secondary market rather than transact directly in slow-moving or costly private markets. The article states that CEFs holding more illiquid assets should trade at larger discounts because investors demand compensation for holding a claim on an illiquid portfolio. Also, discounts and premia are not irrational "anomalies" but emerge naturally from equilibrium behaviour once liquidity frictions are incorporated. This article provides a theoretical foundation linking underlying private-asset illiquidity to the CEF discount.

In the article by Impact of liquidity on premia/discounts in closed-end funds by Datar (2001), using market-based liquidity measures, the study examines the relationship between fund-level NAV discounts and the liquidity of both the CEF shares themselves and the underlying assets. The key finding is that higher illiquidity, whether in the fund shares or in the assets held within the portfolio, is associated with larger NAV discounts. What is especially relevant from this article is that funds whose portfolios consist of illiquid or thinly traded assets systematically trade at deeper discounts. The findings in this article directly supports the theoretical claim that liquidity and liquidity risk are central drivers of NAV discount in publicly traded CEFs where a portion of the assets are private non-listed holdings.

In conclusion, there is a systemic liquidity risk which is one explanation to the NAV discount in CEFs holding private illiquid assets. Note that this liquidity risk is only a discount the market applies to the portion of assets which are private. A CEF often but not always contains a mix of private and public underlying assets.

Information Asymmetry and Valuation Uncertainty

In a study by Oh & Ross (1994) they show that information asymmetry is particularly pronounced for funds holding illiquid or private assets. Managers possess detailed information about portfolio companies and valuation assumptions, while outside investors only observe periodic NAV reorts and limited qualitative disclosures. When NAV is heavily model-driven, investors cannot easily verify whether valuations are conservative or aggressive, nor whether assets can be exited at these values. Rationally, they may therefore apply a "haircut" to NAV, producing a discount that compensates for valuation and exit risk. This mechanism is especially relevant for CEFs with a substantial portion of underlying asset being private non-listed, where the link between modelled NAV and realisable value is more fragile (Cherkes, Sagi & Stanton 2009). Besides liquidity risk, this is another relevant explanation for the NAV discount.

Tools to Narrow the NAV Discount

Because NAV discounts destroy shareholder value and constrain external capital raising, managers of CEFs have strong incentives to manage not only portfolio NAV but also the gap between NAV and market price. The literature identifies several corporate actions that can narrow this gap.

Dividend Policy and Signalling

Dividend policy is a visible and credible way to signal management's view of future cash flows and portfolio robustness. Johnson, Lin, & Song, (2006) found in their article, *Dividend policy, signalling, and discounts on closed-end funds*, that closed-end equity funds that commit to minimum dividend yields as policy experience significant reductions in their discounts, trade at smaller discounts than comparable funds, and generate higher excess returns following adoption. Regular dividends, even if partly financed through realised gains or selective exits, can help anchor investor expectations and reduce uncertainty about future liquidity.

Share Repurchases

Open-market share repurchases are another widely used tool to address discounts. In their article, the value of open market repurchases of closed-end fund shares, Porter, Roenfeldt, and Sicherman (1999) outline how when a fund repurchases its own shares at a price below NAV, the transaction is accretive to NAV per share and directly benefits remaining shareholders. Repurchases combine a mechanical effect (NAV accretion) with a signalling effect (confidence in NAV and future performance). In the Swedish setting, many investment companies maintain balance sheet flexibility that allows for buybacks.

Structural Reorganisations

Structural changes that allow shareholders to realise NAV, such as liquidations, mergers, or conversions to open-end form, represent the most powerful mechanisms for eliminating discounts. When such "termination events" occur, the discount typically disappears as the fund commits to returning NAV (or close to it) to investors (Lee, Shleifer, & Thaler 1990). Event study evidence shows substantial abnormal returns around announcements of open-ending or liquidation, particularly for funds that previously traded at large discounts (Brickley, & Schallheim 1985). In Sweden, listed investment companies are rarely liquidated or converted, which limits the relevance of this mechanism for ongoing discount management in PE/VC-like vehicles (Chen, & Tour 2013).

The Role of Exits

Portfolio exits play a central, but empirically under-researched, role in discount management for CEFs. In this context, an exit refers to a partial or full realisation of a portfolio holding, typically via trade sale, secondary sale, or initial public offering (IPO). This thesis will investigate if exits are an effective tool to reduce the NAV discount or not.

Theoretically, exits could theoretically influence NAV discounts in several ways:

1. Exits provides mitigation to liquidity risk, as it means that a lesser portion of the portfolio will be subject to the liquidity risk, as this risk discount is only applied to the private portion of the portfolio and not cash positions. Also, an exit could have an associated signalling value since it provides evidence of a functioning transaction market, which in turn could yield a smaller liquidity risk discount being applied on the NAV.

2. Exits provides unravelling of any potential information asymmetry related to private non-listed assets. It provides the market with a valuation through transaction, and it means that less portion of the portfolio is subject to the information asymmetry, and its associated discount on the NAV, as it is only applied to the private portion of the portfolio and not cash positions. Also, a potential exit close to carrying value, when the confidence in management and its valuation accuracy might be low, could yield a signalling effect to the market that the holdings are correctly valued.

3. Exits makes a portion of the portfolio turn into cash positions, that can be used to do other NAV discount reduction measures, such as deleverage the balance sheet, repurchase shares, or pay dividends, all of which are mechanisms with documented discount-narrowing effects.

Exits help update beliefs about the relationship between reported NAV and realisable value, rather than simply about the realised value of a single asset. Despite these conceptual arguments, the academic literature has largely treated exits as background events and focused instead on dividend policy, repurchases and structural reorganisations. Systematic evidence on the effect of exit announcements on abnormal returns and NAV discounts in listed CEFs, particularly in the Swedish context, is scarce. This gap motivates the research questions of the present thesis.

Methodology and Data

General Assumptions

This thesis assumes the absence of persistent arbitrage opportunities in the Swedish equity market, meaning that publicly traded holdings and cash positions of closed-end funds are valued by the market at or near their fundamental values. The assumption does not imply that CEFs should trade at zero NAV discount. The analysis further assumes a moderate degree of market efficiency; whereby publicly available information is incorporated into prices with limited delay. This thesis does not empirically test the efficiency of the Swedish CEF market. The assumption serves justifies the use of short event windows (1–5 trading days) as a period during which price adjustments to exit announcements are expected to occur.

Data

No existing dataset of exit announcements for Swedish closed-end funds was available, the dataset used in this thesis was manually constructed from primary and secondary public sources. This approach was necessary to ensure that each event was accurately identified and that all variables were defined consistently for the purpose of the event study and the subsequent regression analysis. Manually compiling the dataset allowed for precise control over exit event and CEF inclusion criteria, the timing of announcements, event effect isolation, and the classification of exit characteristics which are essential factors for producing reliable and replicable empirical results.

The data collection period spans from 1st January 2014 to 30th September 2025. Earlier years were not included due to limited availability and reliability of exit-related information prior to 2014. Possibly introducing inconsistencies in event identification and reduced comparability across observations.

CEF Selection: Criteria and Source

Swedish publicly traded closed-end funds relevant for this study, were obtained from IB Index, which provides comprehensive information on Swedish CEFs, portfolio composition, historical NAV and share price data, and trading premia/discounts, all funds return and NAV data related to the CEF stemmed from this source. A set of selection criteria was applied to ensure that the included funds were both comparable and empirically suitable for event-study analysis.

Criteria for selection of CEFs

1. **Minimum Market Capitalization of SEK 100 million**
   This threshold was imposed to reduce the risk of selecting funds that trade inefficiently due to low liquidity. Since the study examines short-term market reactions to exit announcements, market liquidity is essential to ensure that price adjustments reflect information rather than trading frictions.

2. **Listed on the Stockholm Stock Exchange**
   Only CEFs publicly traded in Sweden were included to ensure that all exit events occurred within a consistent regulatory and market environment. This aligns the analysis with the thesis's focus on the Swedish CEF market.

3. **Reported Net Asset Value (NAV)**
   Only funds that regularly report NAV were included. Although NAV can, in principle, be

estimated manually for funds that do not report it, time constraints and the need for consistent measurement across funds made this infeasible. Most CEFs included update their NAV on a quarterly basis.

4. **Historical Trading at a NAV Discount**
   To ensure relevance to the research question, whether exits help close the NAV discount, funds needed to exhibit either, a 10-year average NAV discount, or a 5-year average NAV discount, in which case the observation period was restricted to 2019–2025 (30th of Sep). CEFs that predominantly trade at a NAV premium were excluded, as their discount dynamics do not align with the study's theoretical focus. While individual periods of NAV premium may occur, exit events occurring during premium periods were excluded manually.

5. **Portfolio Composition of at Least 50% Non-Listed (Private) Holdings**
   Since this thesis focuses on exits as possible NAV discount reduction events that reduce information asymmetry and lowers liquidity risk, the analysis targets CEFs with primarily private holdings. Although exits of public holdings could, in theory, affect NAV discounts, emphasising private holdings ensures that the examined exits are more likely to generate informational updates that influence price dynamics.

These criteria collectively ensure that the selected CEFs operate within similar market conditions, have comparable reporting standards, and exhibit NAV discount dynamics relevant to the thesis's research questions. In total, the following CEFs were deemed to fulfil all CEF criteria, and were all included, and had exit events extracted from them:

- Sonae, VEF, VNV Global, Karolinska Development, Kinnevik, NAXS, Byggmästare AJA, Traction

Exit Announcement Selection: Criteria and Source

Consistent with the assumption of semi-strong market efficiency, this study uses the announcement date, rather than the date of transaction completion, as the event date. Assuming that the market incorporates the informational content of an exit into prices at the time the exit is publicly disclosed.

For the purpose of this thesis, an exit is defined as the full or partial divestment of a fund's ownership stake in a portfolio company. Exit events were identified through the CEFs' publicly available communication channels, press releases and other similar official publications. To ensure comparability and isolate the price impact of the exit information, several selection criteria were applied:

1. **The exit must be announced in a standalone press release or equivalent disclosure.**
   Exits communicated exclusively through financial reports were excluded. Financial reports typically contain a wide range of information, including NAV updates, portfolio valuations, and interim results, that could confound the isolated effect of the exit announcement on share prices. Restricting the sample to standalone announcements ensures that abnormal returns can be more directly attributed to the exit event.

2. **The CEF must be trading at a NAV discount at the time of the exit announcement.**
   Since the research question concerns whether exits function as a tool to reduce the NAV discount gap, exits occurring when the fund was trading at a NAV premium fall outside the theoretical scope of the study and were therefore omitted.

3. **Exit announcements were not to be double counted.**
   Some CEFs divest a holding in multiple stages. If an announcement specifies that the

divestment will occur in several steps, only the initial announcement was included, as later steps do not constitute new information at the time they occur. However, if each stage is disclosed through separate announcements and each contains new information (e.g., a second-stage sale at a different valuation), these announcements were treated as distinct exit events.

Applying these criteria resulted in 43 exit announcements that were suitable for empirical analysis.

Extraction of Price Data and NAV Discounts Around Exit Announcements

Two event windows were used: a 1-day window and a 5-day window. These windows were selected to capture both the immediate market reaction and the short-term evolution of the reaction. Since the event study follows the assumption of semi-strong market efficiency, the primary event window focuses on the change from the closing price on the trading day before the announcement to the closing price on the announcement day. However, since markets may not always fully incorporate new information instantaneously, a second window extending to five trading days after the announcement was also included to assess whether the effect persists or develops in a different direction over the five first days after exit announcement. For announcements released after market close, the event date was adjusted to the subsequent trading day to ensure that price changes reflect publicly available information.

Market Data and Risk-Free Rate

The OMXSPI index was selected as the benchmark for general market performance. It includes all equities listed on the Stockholm Stock Exchange and provides a broad and representative measure of aggregate market movements. Using this index ensures that abnormal returns are calculated relative to the overall Swedish equity market rather than to a narrower or sector-specific benchmark. Historical OMXSPI data were obtained from S&P Capital IQ.

The three-month Swedish Treasury bill rate is used as the proxy for the risk-free rate. The three-month maturity aligns with standard practice in financial event studies, as it captures short-term market expectations and offers a consistent measure of the opportunity cost of capital for investors.

Exit-Characteristic Data

Two key exit characteristics were extracted:

- Exit Size: Measured as the carrying value % of the exited position relative to the total portfolio value of the CEF at the time of the announcement. This variable captures the economic significance of the divestment for the fund.
- Exit Discount/Premium: Measured as the transaction value relative to the carrying value in % of the sold asset. This variable reflects whether the exit was executed at a valuation above or below the most recently reported fair value.

Due to limitations in the availability of detailed transaction information, complete exit-characteristic data were not obtainable for all 43 identified exit events. Consequently, only 29 exits for which sufficient information was available were included in the regression analysis. The variables were either extracted from the associated press release, or calculated by using the latest (before the exit announcement) financial quarterly report published by the CEF from where the exit stemmed from.

Potential Problems with Data

The primary challenge in this study concerned the construction of the dataset. As no existing database of exit announcements for Swedish CEFs was available, the required information had to be manually collected and compiled. Although this approach ensured accuracy and relevance to the Swedish market context, it is possible that some exit events were not identified or found. Detailed exit-characteristic data

were obtainable for only 29 of the 43 identified exits, which reduces sample size for the regression analysis and may introduce small-sample bias.

Limitations arose from the way CEFs disclose exit information. Many exits were reported exclusively within quarterly or annual financial statements. These reports contain multiple simultaneous disclosures. Exits announced within them were excluded to ensure that the effect measured is attributed specifically to the exit announcement. This exclusion criterion improves internal validity, it radically reduced the number of usable exit events.

Method

The methodological framework of this thesis consists of two complementary components. An event-study approach to assess whether exit announcements generate abnormal returns for closed-end funds and thereby contribute to a reduction in the NAV discount gap. This is done by examining share price reactions in short event windows and evaluating the market response to exits. Thereby determining if announcements are perceived as value-enhancing events.

Building on this we try to analyse the observed changes in NAV discounts and fit a multiple linear regression (MLR) framework to examine whether specific exit-related characteristics, the size of the exit, the pricing of the transaction relative to carrying value, the initial NAV discount level, and market sentiment, help explain or amplify the market reaction. Allowing the study to investigate both the average effect of exit announcements and the circumstances under which this effect is stronger or weaker.

The following sections provide a detailed description of the methods applied in each component, including data construction, event-window definitions, abnormal return calculations, and regression diagnostics.

Abnormal Returns

If exit announcements generate a positive market reaction and thereby function as an effective tool for reducing the NAV discount gap is tested though abnormal returns.

The hypotheses tested are:

$$H_0: \mu_{AR} \leq 0$$
$$H_1: \mu_{AR} > 0$$

$$H_0: \mu_{CAR} \leq 0$$
$$H_1: \mu_{CAR} > 0$$

where μ_{AR} and μ_{CAR} denotes the mean (or median) abnormal return and cumulative abnormal returns respectively across exit announcement events.

Motivation Behind Abnormal Returns

Abnormal returns are used rather than raw changes in the NAV discount to isolate for the CEF's exposure to market movements and systematic risk. Day-to-day fluctuations in its NAV discount can be attributed to general market volatility rather than event-specific information. Without adjusting for expected returns, such movements cannot be attributed to the exit announcement. A statistically significant

positive abnormal return indicates that the exit conveys value-relevant information to investors and contributes to a reduction in the NAV discount gap, independent of broader market dynamics.

Not using changes in the NAV discount as the primary metric also relates to the mechanics of how NAV discounts evolve. The NAV by movements in either the share price or the reported NAV. While share prices adjust continuously in real time, NAV values for Swedish CEFs are updated only in quarterly financial reports. This study excludes exit events announced within financial reports, NAV values remain constant in the 1-day event window, ensuring that any observed change in market valuation is driven solely by share price movements.

In the 5-day event window, quarterly reports may occasionally be released within the window. Such updates change the underlying NAV mechanically, therefore alter the NAV discount independently of the exit announcement. Introducing noise into the measurement and results in raw changes in the NAV discount less reliable as an indicator of market reaction over longer horizons.

To test whether exits generate value-relevant information for investors, two abnormal-return measures were employed:

1. 1-day abnormal return, capturing the immediate price reaction at the close of the announcement day; and
2. 5-day cumulative abnormal return (CAR), capturing the aggregated reaction over the five trading days following the announcement.

Both abnormal-return measures use the closing price on the day before the announcement as the starting point. The cumulative abnormal return extends this window to assess whether the initial reaction persists, strengthens, or reverses. Examining both the immediate abnormal return and its short-term development allows the analysis to determine whether exit announcements lead to a durable reduction in the NAV discount or whether the effect dissipates as prices revert toward pre-announcement levels.

Abnormal Return and Cumulative Abnormal Return (CAR)

Abnormal returns were calculated using the market-model version of the CAPM, which adjusts observed returns for the expected performance of the fund given its systematic risk exposure. Market beta was estimated using the covariance–variance method over a rolling window from t – 120 to t – 20 trading days, excluding the 20 days immediately preceding the announcement to avoid contamination from pre-event price reactions. It is important to note that given this short time frame, this might also include other firm specific or market events that have occurred in the defined time for each exit. Giving them significant impact in the beta calculation which has not been accounted for.

The 1-day abnormal return was computed as the difference between the actual return of the CEF on the announcement day and its expected return:

$$AR_{1d} = r_{\text{actual},0} - r_{\text{expected},0}$$

To evaluate whether the reaction persists or evolves after the initial announcement, a 5-day cumulative abnormal return (CAR) was also calculated. The CAR captures the actual return from the trading day before the announcement to five trading days after the announcement, minus the cumulative expected return over the same interval:

$$CAR_{5d} = r_{\text{actual},+5} - r_{\text{expected},+5}.$$

The cumulative expected return was derived by summing daily expected returns over the five-day period after the exit was announced. This two-window approach allows the analysis to distinguish between

immediate market reactions and short-term adjustments, providing insight into whether the price impact of exit announcements is transient or sustained.

Although abnormal returns can be estimated using multifactor models such as the Fama–French three-factor model, this study employs the single-factor CAPM specification. Multifactor models require additional risk-factor data and impose greater parameter estimation demands, which can be problematic in a relatively small event sample. Since the purpose of this study is to assess whether exit announcements are associated with a market response that reduces the NAV discount, not to provide any evidence for or against the efficient market hypothesis, it is essential to account for systematic risk while avoiding excessive model complexity. The CAPM provides a transparent and widely accepted benchmark for isolating abnormal performance in short-horizon event studies, particularly in markets and datasets where factor premiums may be unstable or difficult to estimate reliably. Prior research on NAV discounts in the article from Brickley and Schallheim (1985), *Lifting the Lid on Closed-End Investment Companies, A Case of Abnormal Returns*" also use a similar approach of CAPM to measure abnormal returns in their event study, studying fund returns after restructuring announcements. This aligns our research approach to previous studies in the same field.

This resulted in 43 individual observations of abnormal returns and 43 corresponding observations of cumulative abnormal returns, which serve as the basis for the hypothesis testing.

Shapiro-Wilk test

Before selecting the appropriate statistical tests to test the main hypothesis in Part 1 of this analysis, it was necessary to examine the distributional properties of the abnormal return data. Assessing normality is important because it determines whether parametric tests are appropriate, or whether a non-parametric alternative is required. To evaluate normality, the Shapiro–Wilk test was employed, used for small to medium sample sizes and provides a sensitive measure of departures from a normal distribution.

The hypotheses for the Shapiro–Wilk test were:

H_0:The abnormal returns are drawn from a normally distributed population
H_1:The abnormal returns are not drawn from a normally distributed population

This normality assessment informed the subsequent choice of statistical method for testing whether exit announcements are associated with significant positive abnormal performance.

Table 1: Abnormal Return Shapiro-Wilk test 1-Day (W = Wilk)

Window	*N*	*W*	*P value*
1 Day	43	0.811	6.1e-6
5 Day	43	0.782	1.5e-6

For the 1-day abnormal returns, the Shapiro–Wilk statistic was

$$W = 0.811, p < 0.05,$$

For the 5-day cumulative abnormal returns, the Shapiro–Wilk statistic was

$$W = 0.782, p < 0.05.$$

In both cases, the null hypothesis of normality was rejected, indicating that the abnormal return data do not follow a normal distribution. Given this violation of the normality and considering the relatively small sample of exit events, a non-parametric testing approach was deemed appropriate.

Wilcoxon Signed-Rank for Main Hypothesis

The Wilcoxon signed-rank test was chosen to assess whether the median abnormal return differs significantly from zero, evaluating the median rather than the mean and providing a representative measure of the typical abnormal return. Where based on the sample size a small number of extreme observations may distort inference. Using a non-parametric approach in this study allows to test make inferences without assuming any underlying distribution.

Robustness Checks

To evaluate the robustness of the Wilcoxon test results, two additional non-parametric diagnostics were used. A sign test was conducted, relying solely on the number of positive and negative abnormal returns. Providing a distribution-free confirmation of whether the median differs from zero and a Winsorized Wilcoxon test was applied to test sensitivity of the result to potential outliers. Additionally, the Hodges–Lehmann estimator and its corresponding non-parametric confidence intervals were computed to provide an interpretable estimate of the median abnormal return (or median shift). This estimator complements the Wilcoxon test by offering a robust and easily interpretable measure of effect size.

Limitations of the Wilcoxon Approach

Although the Wilcoxon signed-rank test offers a robust alternative to parametric methods, it has several limitations in this setting. The test assumes that observations are independent. This assumption is unlikely to hold perfectly here, as several events originate from the same CEF and some event windows overlap in calendar time, diluting the beta calculation and making the observations no longer independent. Abnormal returns for announcements from the same fund are likely correlated due to common management, investor base, and portfolio characteristics, and returns on the same calendar day are affected by shared market-wide shocks. As a consequence, the effective number of independent observations is smaller than the raw event count, and the reported Wilcoxon p-values may understate the true uncertainty.

The test also assumes that the distribution of abnormal returns is symmetric around zero. Substantial skewness or heavy tails can reduce its reliability. Moreover, because the Wilcoxon procedure ranks observations rather than using their raw magnitudes, some information about the size of abnormal returns is lost in the process. The test is also less powerful than parametric alternatives when the normality assumption is approximately satisfied. While non-parametric tests are generally less sensitive to outliers, frequent and/or systematically large extreme values can still influence the test statistic and should be borne in mind when interpreting the findings. Given the small sample size and potential deviations from the symmetry assumption, the Wilcoxon results should be interpreted with caution and viewed alongside other evidence

Multi Linnear Regression

The second part of the analysis examines whether specific exit characteristics help explain the magnitude of the change in the NAV discount following an exit announcement. Because exit events differ substantially in economic significance, valuation, and market context, it is relevant to investigate whether certain features systematically amplify or dampen the NAV-discount response. Understanding these relationships is also valuable from a managerial perspective, as it may indicate under what conditions exits are more likely to generate a meaningful valuation effect.

To assess these relationships, a multiple linear regression (MLR) framework was employed. This approach allows the change in the NAV discount to be modelled as a function of several exit-related characteristics while controlling for broader market conditions. Two separate regressions were estimated, corresponding to the two event windows used in the abnormal-return analysis:

1. 1-day MLR, capturing the immediate effect; and
2. 5-day MLR, capturing the short-term effect five trading days after the announcement.

Regression Specifications

The primary difference between the two MLR models lies in their event-window definitions for the dependent variable. Both models employ the same core set of explanatory variables, with the exception that the 5-day specification includes an additional control variable indicating whether a NAV update occurred within the event window:

MLR 1-day:

- Dependent variable = Change in NAV discount from the day before the announcement to the closing price on the announcement day.
- Independent Variable 1 = NAV discount the trading day before the exit announcement.
- Independent Variable 2 = The Size of Exit in % of the total portfolio as of carrying value.
- Independent Variable 3 = The Discount/Premia of Exit in % as of carrying value.
- Independent Variable 4 = Market conditions (Bull or Bear).

$$\Delta NAV_{i,1d} = \alpha + \beta_1(NAV_{i,-1}) + \beta_2(Size_i) + \beta_3(Prem_i) + \beta_4(Market_i) + \varepsilon_{i,1d}$$

MLR 5-day:

- Dependent variable = Change in NAV discount from the day before the announcement to five trading days after the announcement.
- Independent Variable 1 = NAV discount the trading day before the exit announcement.
- Independent Variable 2 = The Size of Exit in % of the total portfolio as of carrying value.
- Independent Variable 3 = The Discount/Premia of Exit in % as of carrying value.
- Independent Variable 4 = Market conditions (Bull or Bear).
- Independent control variable = Potential changes in NAV.

$$\Delta NAV_{i,5d} = \alpha + \beta_1(NAV_{i,-1}) + \beta_2(Size_i) + \beta_3(Prem_i) + \beta_4(Market_i) + \beta_5(NAVchg_i) + \varepsilon_{i,5d}$$

Use of HC3 Robust Standard Errors

In both regression models, coefficient inference was based on HC3 heteroscedasticity-robust standard errors. The HC3 estimator is a refinement of the conventional heteroscedasticity-robust estimator, suited for small samples. Unlike standard OLS standard errors, which assume constant error variance, the HC3 correction adjusts each observation's contribution based on leverage, reducing the risk that influential data points distort inference.

Since the dataset in this study contains fewer than 40 effective observations after filtering, the use of HC3 is appropriate and improves the reliability of the statistical significance tests. This adjustment does not change the estimated coefficients but makes the inference more robust to heteroscedasticity and small-sample distortions.

Choice of Dependent Variable: Change in NAV Discount

In the regression analysis, the dependent variable is the change in the NAV discount from the trading day before the exit announcement to the end of the respective event window. This measure captures how the valuation gap between the CEF's share price and its reported NAV evolves following an exit. The purpose of the regression is to explain why this adjustment occurs and to identify which exit characteristics influence the degree to which the discount narrows or widens.

Change in NAV discount was chosen as the dependent variable rather than abnormal returns because abnormal returns incorporate a range of market-wide influences that are not directly related to the exit itself. Abnormal returns are adjusted for systematic risk through beta, and therefore their magnitude can be affected by factors such as market model specification, short-term volatility, beta estimation error, and unrelated market movements. These elements introduce noise that complicates interpretation when the goal is to understand the mechanisms by which exit characteristics affect the valuation of the fund. By contrast, the change in NAV discount provides a direct and economically meaningful measure of how the pricing of the CEF moves relative to its underlying asset value. Since the NAV discount is the phenomenon of interest in this thesis, modelling its change allows for a clearer attribution of explanatory power to exit-specific variables. This approach aligns the regression analysis with the broader objective of the study: to determine under what circumstances exit announcements contribute to a reduction in the valuation gap and which characteristics of the exit enhances this effect.

Thus, the independent variables, initial NAV discount, exit size, exit premium or discount, and market conditions, are included to assess how these factors shape the magnitude and direction of the NAV-discount adjustment following an exit announcement.

Independent Variable 1: NAV Discount Prior to the Exit Announcement

This variable measures the fund's NAV discount on the trading day immediately preceding the exit announcement. Including the initial discount level allows the regression to test whether the magnitude of the pre-event discount influences the market's subsequent reaction. Because the dependent variable is expressed in absolute percentage-point changes, the initial discount functions as a baseline from which the post-announcement adjustment occurs. Theoretically, a larger NAV discount may reflect greater information asymmetry and/or higher liquidity risk. Exits may therefore carry stronger informational value for these funds, as they can serve as credible validations of carrying values, management's valuation practices and that transaction markets are functioning. Consequently, funds trading at deeper discounts may experience larger reductions in the discount following an exit announcement.

Independent Variable 2: Exit Size (% of Total Portfolio)

Exit size is measured as the carrying value of the divested holding relative to the fund's total portfolio value. The rationale for including this variable is that larger exits are likely to resolve more information asymmetry by verifying a larger fraction of the portfolio's stated valuations. Additionally, sizeable exits may enhance investor confidence by improving liquidity, reducing perceived insolvency risk, and demonstrating the fund's ability to realize value in private markets. Also, larger exits means that larger portion of the portfolio no longer is subject to liquidity risk and information asymmetry. From a signalling perspective, larger transactions convey stronger evidence about the reliability of the fund's NAV and transaction markets activity. For these reasons, larger exits are expected to be associated with greater narrowing of the NAV discount.

Independent Variable 3: Exit Discount/Premium (% Relative to Carrying Value)

These variable captures whether the exit was executed at a discount or premium relative to the most recently reported carrying value. The economic intuition is that the pricing of the exit conveys direct information about the accuracy of the fund's private asset valuations. Exits conducted at a premium provide positive validation of the fund's valuation methodology and may increase market confidence in the reported NAV, thereby contributing to a reduction in the NAV discount. In contrast, an exit at a material discount may reinforce market concerns regarding overvaluation of private holdings, potentially limiting or reversing any narrowing of the discount.

Independent Variable 4: Market Conditions (Bull/Bear)

To test for broader market sentiment, a variable representing prevailing market conditions was included. Market conditions were classified using a 60-day rolling sum of daily returns on the OMXSPI index. If the cumulative return over this period was positive, the market was coded as Bull = 1; otherwise, it was coded as Bear = 0. This classification captures short-term momentum and provides a proxy for general investor sentiment. Including this variable enables the regression to distinguish fund-specific valuation effects from movements driven by the wider market. Still, the Bull/Bear dummy variable provides only a coarse representation of market sentiment and does not capture short-term volatility shocks or sector-specific dynamics, so the estimated market-condition effects should also be interpreted with appropriate caution.

Control Variable: Potential changes in NAV

Because the NAV discount can change either through daily share-price movements or through NAV revisions released with quarterly reports, it is necessary to account for NAV updates in the 5-day regression. NAV does not change in the 1-day window, as all exits announced through financial reports were excluded, but in the 5-day window NAV revisions occurred in 4 of 43 cases. Since such updates mechanically affect the NAV discount independently of the exit event, a dummy variable was introduced. This control ensures that observed changes in the NAV discount reflect market reactions to exit announcements rather than routine NAV adjustments.

MLR Diagnostics

To assess whether the MLR models provide reliable inference, a set of diagnostic tests were conducted to aligned with the empirical specification. Testing for multicollinearity among the explanatory variables was evaluated using Variance Inflation Factors (VIFs), which indicate whether predictors are excessively correlated in ways that inflate standard errors and obscure the effects of individual regressors. Heteroscedasticity was tested for using the Breusch-Pagan test, which assesses whether the residual variance is constant across fitted values. To guard against potential heteroscedasticity, the regression models were estimated using HC3 heteroscedasticity-robust standard errors, so that coefficient inference remains valid even if the variance of the errors is not perfectly constant. Influential observations were examined using Cook's distance to detect cases with unusually large leverage on the regression results. No observations exceeded the conventional threshold of $D \geq 1$ for severe influence, so no cases were removed from the analysis. Overall, these diagnostics suggest that multicollinearity, heteroscedasticity, and influential observations are unlikely to materially distort our regression estimates.

MLR: Potential Problems and Limitations

Despite the usefulness of the MLR approach in explaining changes in NAV discounts, limitations must be acknowledged. The analysis is based on a small sample size, limiting statistical power and raises the risk of overfitting relative to the number of regressors. The regression houses to many variables in relation to the sample size but all deemed necessary in relation to the research questions. Still omitted variable bias cannot be ruled out and an argument can be made that other determinants may have been better fitting. Such as governance quality, manager reputation, and macroeconomic developments and more.

Results

Abnormal Returns

Table 3: Abnormal and Cumulative Abnormal Return

WINDOW	N	MEDIAN
AR: 1 DAY	43	0.0156
CAR: 5 DAY	43	0.0302

Table 3 reports the median 1-day abnormal return and 5-day CAR for the 43 exit announcements in the sample. The median abnormal return on the announcement day is 1.56%, and the median 5-day CAR is 3.02%. Since the subsequent Wilcoxon signed-rank tests are formulated in terms of the median, the fact that both medians are positive is directly relevant for the hypothesis that exits tend to be followed by positive abnormal performance.

Figure 1: Abnormal vs. Cumulative abnormal return distribution

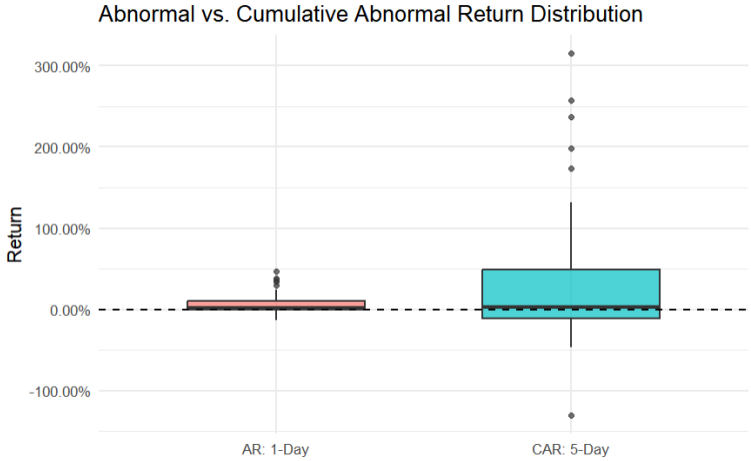


Figure 1 illustrates the distribution of 1-day abnormal returns and 5-day CARs. In both cases, the mean exceeds the median by a margin, indicating a strongly skewed distribution driven by a small number of very large positive observations. For the 1-day window, most abnormal returns lie in a band around zero, with few small outliers. Dispersion is therefore limited for the bulk of the sample. For the 5-day CARs, dispersion is much greater: although the interquartile range remains close to zero, several exits are associated with extremely high positive CARs, alongside a few sizeable negative outcomes. This heavy-tailed and asymmetric pattern is consistent with the normality diagnostics discussed earlier and motivates the focus on non-parametric tests. At the same time, it suggests that exit announcements are usually accompanied by modest short-horizon valuation effects, while a small subset of events coincides with very large revaluations of the CEF's equity.

Results from hypothesis testing of abnormal returns

To assess whether exit announcements are systematically followed by positive abnormal performance, the Wilcoxon signed-rank test is applied under the null hypothesis that the median abnormal return is less than or equal to zero and the alternative that it is strictly positive.

Table 4: Wilcoxon Signed- Rank Test Results

WINDOW	WILCOXON V	WILCOXON P	HL CI LOWER 95%
AR: 1-DAY	734	0.0008	0.0138
CAR: 5-DAY	601	0.0618	-0.0062

For the 1-day window, with a p-value of 0.0008 rejects the null hypothesis of a non-positive median abnormal return at the 5% significance level. Combined with the positive median abnormal return of 1.56% reported in Table 3, this indicates that exit announcements are typically followed by a positive price reaction on the announcement day. The Hodges–Lehmann 95% lower confidence bound of 1.38% for the median abnormal return suggests that, in this sample, the announcement-day effect is statistically detectable.

For the 5-day cumulative window, the median CAR of 3.02% remains economically sizeable, but the Wilcoxon p-value of 0.0618 does not meet the 5% threshold, only indicating marginal significance at the 10% level. The Hodges–Lehmann 95% lower confidence bound for the median CAR is slightly negative −0.0062, which reflects the higher variability in 5-day outcomes and implies that the hypothesis of a non-positive median CAR cannot be rejected at the 5% level, even though the point estimate of the median is positive.

Taken together, this points to a statistically and economically significant positive abnormal return concentrated on the announcement day itself, with only weaker and less robust indications of continued abnormal performance over the subsequent four trading days.

MLR Results and related visuals:

Table 5: Estimated Coefficients from the ΔNAV Regression Models

TERM	ΔNAV 1 DAY	ΔNAV 5 DAY
INTERCEPT	-0.0281** (0.0131)	-0.0381** (0.0161)
NAV DISCOUNT (-1)	0.0305 (0.0231)	-0.0104 (0.0286)
EXIT SIZE (% OF PORTFOLIO)	-0.0988*** (0.0302)	-0.0718* (0.0380)
EXIT DISCOUNT / PREMIUM	-0.0064 (0.0041)	-0.0057 (0.0050)
MARKET (BULL = 1)	0.0159 (0.0098)	0.0358*** (0.0122
NAV CHANGED IN 5 DAY WINDOW	NA	-0.0209 (0.0161)

Table 5 reports the estimated coefficients from the multiple linear regressions explaining the 1-day and 5-day changes in NAV discount following an exit announcement, both MLR models assume HC3-robust standard errors.

For the ΔNAV 1-Day model, exit size is statistically significant at the 1% level with a coefficient of -0,0988 indicating a negative association between exit size and 1-day change in NAV discount. None of the remaining regressors are statistically significant.

For the ΔNAV 5-Day model, the market dummy is significant at 1% level, with a positive coefficient of 0,0358 and exit size is significant at the 10% level with a negative coefficient of -0,0718. None of the remaining regressors are statistically significant.

This is evidence that the larger the exit announcement is, the more it tends to decrease the NAV discount gap. However, this size effect is especially visible in the 1-day model, meanwhile the evidence is not as clear in the 5-day model. Furthermore, there is strong evidence that Exit announcements reduces the NAV discount gap after 5 days more in bear markets than in bull markets.

Table 6: ΔNAV Regression Models Fit Statistics

MODEL	NOBS	R^2	ADJ R^2	STATISTIC	P VALUE
ΔNAV 1-DAY	29	0.4373	0.3435	4.6633	0.0063
ΔNAV 5-DAY	29	0.4514	0.3321	3.7843	0.0120

The regression model fit statistics show that the explanatory power of both models is low, with an adjusted R^2 of 0,3435 for the ΔNAV 1-Day model, and an adjusted R^2 of 0,3321 for the ΔNAV 5-Day model. However, both models are significant, as indicated by the F-statistic, with corresponding p-values below significance levels. These statistics confirm that the regressions still explain a meaningful share of the variation in NAV-discount changes within the sample.

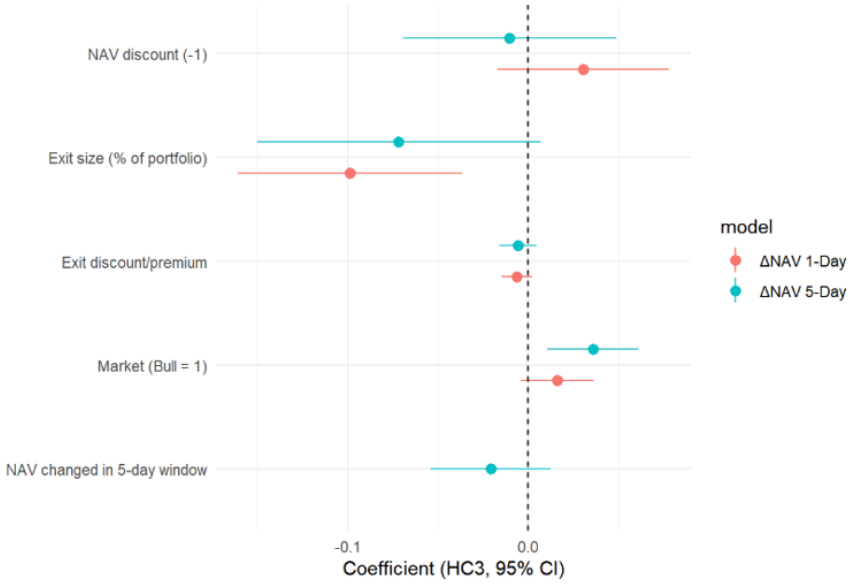
Table 7: Sample Overview: Cook's Distance Screening, Market Regimes, and NAV-Change Frequency

SECTION	METRIC	COUNT
COOK'S DISTANCE (ΔNAV 1-DAY)	Total observations	29
COOK'S DISTANCE (ΔNAV 1-DAY)	Trimmed out (Cook's D ≥ 1)	0
COOK'S DISTANCE (ΔNAV 5-DAY)	Total observations	29
COOK'S DISTANCE (ΔNAV 5-DAY)	Trimmed out (Cook's D ≥ 1)	0
MARKET REGIM	Bear (market = 0)	12
MARKET REGIME	Bull (market = 1)	31
NAV CHANGED (5-DAY WINDOW)	No NAV change (dummy = 0)	39
NAV CHANGED (5-DAY WINDOW)	NAV changed (dummy = 1)	4

Table 7 reports an overview of the sample characteristics.

The Cook's Distance screening shows that no observations exceeded the threshold of $D \geq 1$in either the 1-day or 5-day regression, meaning that no data points had to be removed due to excessive influence. The market-sentiment variable is split between 12 Bear-market observations and 31 Bull-market observations, indicating that most exits announcements occurred during periods of positive 60-day market momentum. For the 5-day window, NAV revisions occurred in 4 of the 43 events, while 39 cases showed no NAV update. This variable is included as a control in the 5-day model to isolate price-driven discount adjustments from mechanically induced changes due to NAV reporting.

Figure 2: Estimated coefficients from the 1-day and 5-day MLR models (HC3 robust intervals)



The plot of the visual estimated coefficients from the 1-day and 5-day MLR models shows that coefficients whose confidence intervals cross zero appear visually consistent with statistical insignificance, whereas intervals striving away to one side indicates a more precisely estimated effect.

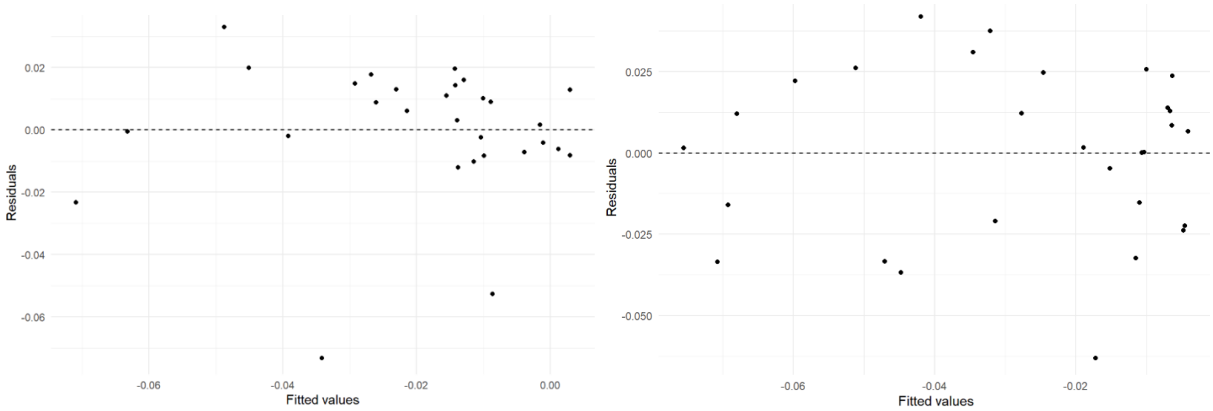
Across both models, exit size exhibits a negative estimate, and its confidence interval does not include zero in the 1-day event window, and barely in the 5-day. This visual pattern reflects the regression results, where exit size is statistically significant in both specifications. The negative sign indicates that larger exits are associated with larger reductions in the NAV discount.

The market sentiment coefficient is positive in both models, and the 5-day confidence interval lies entirely above zero, visually indicating significance for the 5-day model. This suggests that NAV-discount reductions tend to be larger in bear markets, a pattern consistent with the regression estimates.

While both exit size and market sentiment show effects in the expected directions, the width of the confidence intervals differs: the interval for exit size is wider in both specifications, indicating greater sampling variability. In contrast, the market-sentiment coefficient is estimated with somewhat greater precision, especially in the 5-day window. This should not be interpreted as one variable being "more predictive," but rather that the sampling uncertainty surrounding the exit-size effect is larger than that of market sentiment in this dataset. Overall, Figure 2 visually reinforces the regression findings: exit size and market conditions are the only variables that exhibit consistent directional effects across both models, with market sentiment estimated more precisely and exit size displaying stronger but more variable effects.

MLR Diagnostics and Related Visuals

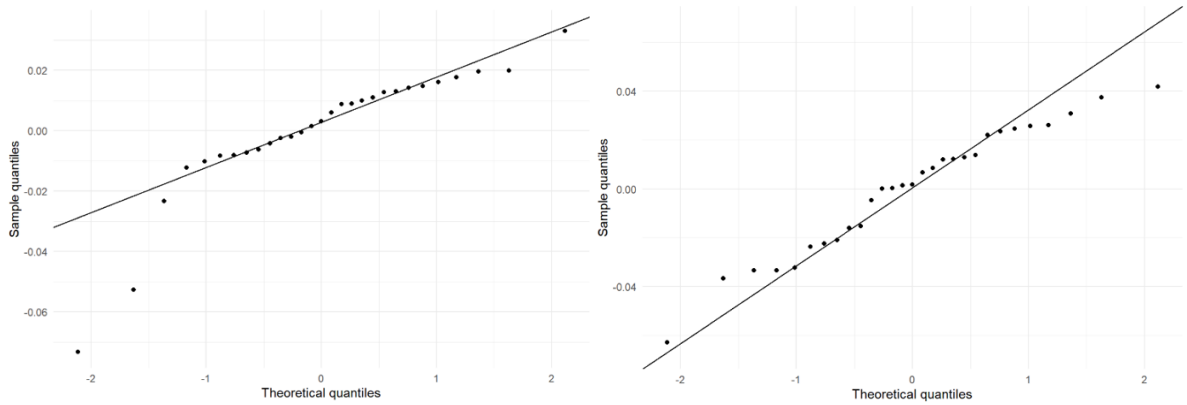
Figure 3: Residuals vs Fitted Plot for the ΔNAV 1-Day MLR (Left) and ΔNAV 5-Day MLR (Right)



The residuals-versus-fitted plot for the 1-day regression shows no strong curvature or systematic pattern, indicating that the linearity assumption is reasonably satisfied. The spread of residuals appears roughly constant across the fitted range, providing no clear visual evidence of heteroskedasticity. A few observations display relatively large residuals, but none appear extreme in terms of fitted values or residual magnitude.

The residuals-versus-fitted plot for the 5-day regression similarly shows no apparent nonlinear, the residuals are scattered without forming a curve. The residual variance is somewhat wider near the centre of the fitted range, but this pattern is mild and does not provide strong visual evidence of heteroscedasticity. In both models, the plots do not highlight any observations that clearly stand out as jointly high-leverage and high-residual outliers.

Figure 4: Normal Q–Q Plot for the ΔNAV 1-Day MLR (Left) and ΔNAV 5-Day MLR (Right)



The normal Q–Q plot for the 1-day model shows that residuals track the theoretical normal quantiles closely over most of the distribution, with modest deviations confined to the extreme tails. This is typical in small samples and does not suggest a substantial departure from normality. The Q–Q plot for the 5-day model shows a similar pattern: most points lie on or near the reference line, with larger deviations only in the tails. Overall, the residuals do not exhibit strong non-normality in either specification, which is reassuring, although inference relies primarily on HC3-robust standard errors rather than exact normality.

Table 8: Variance Inflation Factors for the ΔNAV 1-Day MLR and ΔNAV 5-Day MLR

VARIABLE	VIF ΔNAV 1-DAY MLR	VIF ΔNAV 5-DAY MLR
NAV M1	1.139	1.159
SIZE	1.041	1.095
DISC PREM	1.141	1.143
MARKET	1.042	1.072
NAV CHANGED	NA	1.108

The variance inflation factors (VIFs) for the 1-day model range from 1.04 to 1.14, and for the 5-day model from 1.07 to 1.16. These values are close to 1, indicating that none of the regressors can be well explained as a linear combination of the others. There is no indication of problematic multicollinearity in either specification, so the coefficient estimates are not unduly inflated by linear dependence among the explanatory variables.

Table 9: Breusch–Pagan Test for Heteroscedasticity for ΔNAV 1-Day MLR and ΔNAV 5-Day MLR

TEST	STATISTC	DF	P VALUE
ΔNAV 1-DAY MLR	3.9886	4	0.4076
ΔNAV 5-DAY MLR	3.2064	5	0.6682

The Breusch–Pagan statistic for the 1-day model is 3.99 with a p-value of 0.4076. For the 5-day regression is 3.21 with a p-value of 0.6682. Residual variance does not show significant heteroscedasticity. In both cases, the null hypothesis of homoscedastic residuals cannot be rejected at conventional significance levels. Taken together with the residuals-versus-fitted plots, these results provide no evidence of strong heteroscedasticity, though the small sample size limits the power of these tests.

Diagnostics conclusion and implications

Across the available diagnostic checks, both the 1-day and 5-day MLR models do not exhibit strong departures from the key assumptions of linear regression. The residuals-versus-fitted plots show no clear systematic curvature and only modest variation in residual spread, which is consistent with the Breusch–Pagan tests that fail to reject the null of homoscedasticity at conventional significance levels. The normal Q–Q plots likewise do not reveal major deviations from the theoretical normal distribution, aside from some tail discrepancies that are typical in small samples, suggesting no pronounced non-normality of residuals.

Multicollinearity also does not appear to be a serious concern: all VIF values are close to 1, indicating no strong linear dependence among the explanatory variables and suggesting that the coefficient estimates are not severely inflated by collinearity. Influence diagnostics do not indicate any individual observations with clearly undue influence on the estimated relationships, although the small sample size limits the power to detect moderate problems.

Taken together, these diagnostics provide no evidence of major violations of the standard linear regression assumptions for either horizon, within the limitations imposed by the sample size. The coefficients can therefore be interpreted as reasonably well identified, with HC3-robust standard errors helping to mitigate moderate deviations from ideal conditions. The relatively low adjusted R^2 values are thus more plausibly interpreted as reflecting the inherently noisy nature of short-horizon ΔNAV data and

the limited sample, rather than as direct evidence of a severe misspecification of the linear models, although some degree of omitted-variable or functional-form uncertainty cannot be ruled out.

Discussion

Abnormal Returns and Cumulative Abnormal Returns

The Wilcoxon signed-rank test applied to the 1-day abnormal returns provides evidence that exit announcements generate statistically significant positive median abnormal returns at the 5% level. For the 5-day cumulative abnormal returns (CAR), the Wilcoxon test shows weaker, but still suggestive, evidence of a positive median effect, statistically significant at the 10% level but not at the 5% threshold. The distributional patterns of the two measures differ noticeably: the abnormal returns exhibit a narrow range of values, whereas the CARs display substantially wider dispersion, including both large negative and large positive observations, reflecting greater variability in post-announcement price adjustments over the extended window. These results indicate that exit announcements are associated with reductions in the median NAV discount, as both the AR and CAR capture price increases beyond expected returns. However, the statistical evidence for AR is stronger due to the lower dispersion and significance level, in comparison to the CAR.

From a conceptual standpoint, the empirical results align with what would reasonably be expected. In the context of private and illiquid assets, value is only realised upon exit, and the event therefore represents the crystallisation of value creation, making it plausible that investors respond positively. The logic behind the abnormal returns associated with exit announcements, which leads to the reduction in NAV discount, could theoretically be explained by three mechanisms.

The first relates to the cash inflow, and what the fund can do with the capital realised from the exit. For funds facing financial distress, the liquidity generated may help sustain operations or reduce insolvency risk, which the market may reward. Alternatively, in periods characterised by extensive investment opportunities, the proceeds may allow the fund to invest in new assets or allow them to make other NAV discount reduction measures such as share repurchases. In either case, the market may price in the enhanced flexibility and improved capital-allocation potential following an exit. This mechanism is applicable to both private and public assets being exited.

The second and third mechanism concerns the applicability and possible signalling of information asymmetry and liquidity risk described in the introduction, and these mechanisms is only applicable to the private portion of the portfolio. The main difference between the two mechanisms is that the applicability mechanism only explains the portion of the NAV discount which applies to the exited holding, meanwhile the signalling mechanism applies to the entire portfolio.

An exit yields a pure cash value, and investors does not have to trust relative and intrinsic valuation models. Rather the value is realised through the exit, and no information asymmetry discount exists for this portion of the portfolio. The exit effectively provides information about the valuation of a certain asset and could potentially also create a signalling effect that the portfolio as a whole is valuable, making investors trust the valuation of other underlying assets more.

Furthermore, an exit converts an illiquid position into a fully liquid one and because liquidity risk just like information asymmetry only applies to non-listed assets and not to cash, the exited portion of the portfolio is no longer subject to a liquidity discount, thereby reducing the overall NAV discount. An exit could also serve as a credible signal that the portfolio's private assets are indeed marketable under

current market conditions, and provide evidence that transaction markets are functioning, which encourages investors to apply a lower liquidity-risk discount to the NAV.

The potential signalling effect may be particularly important in the Swedish CEF context, where private valuations are updated infrequently and investor scepticism regarding the value and ability to exit of illiquid assets is common. The consistently positive and low-dispersion 1-day abnormal returns could suggest that that the market responds not only to the realised valuation of the exited asset (the applicability effect) but also to a broader signalling effect concerning the credibility of NAV valuations and the functioning of the transaction market. The greater dispersion observed in the 5-day CAR relative to the 1-day abnormal return is logically consistent with their respective event windows: the 1-day window captures the isolated, immediate market reaction, whereas the 5-day window incorporates firm-specific developments, macroeconomic movements, and market noise.

These findings also have managerial implications. Because CEF managers aim both to grow NAV and to narrow the NAV discount, the evidence confirms that exit announcements reliably contribute to discount reduction by generating positive abnormal returns. Exits thus serve not only as value-realising events but also as effective tools for signalling credibility to the market. Moreover, because the effect is concentrated within the first trading day, managers wishing to reinforce the discount-reducing impact may benefit from coordinating other credibility-enhancing actions, such as share repurchases, debt reduction, or corporate governance improvements, shortly after the exit announcement, to maximise the NAV discount reduction.

Multi Linnear Regressions Discussion

The regression results identify two exit-related characteristics that influence short-term changes in the NAV discount. In the 1-day model, exit size (carrying value as a percentage of the total portfolio) is the only statistically significant predictor, with a negative coefficient at the 1% level. This indicates that larger exits are associated with larger reductions in the NAV discount on the announcement day. No other variable exhibits a significant effect in the 1-day window. In the 5-day model, two variables significantly influence NAV-discount changes: exit size negative and at the 10% significance level and market sentiment at the 1% significance level. The positive coefficient on the bull-market indicator implies that exits announced during bull markets lead to smaller discount reductions, whereas those announced during bear markets lead to larger reductions. Although both variables are significant, the confidence interval for exit size is wider, suggesting greater variability in that effect. Overall, NAV-discount reductions are more pronounced for larger exits and for exits announced under bear-market conditions.

The finding that larger exits have a stronger effect is intuitive. Larger exit size potentially amplifies all three key mechanisms as described in the abnormal-return discussion section, firm cash-inflow and the applicability and signalling effects of liquidity risk, resulting in a larger reduction in NAV discount.

Diving deeper into this, larger exits generate more liquidity, enabling more substantial capital-allocation actions such as larger share repurchases and larger debt reduction. Moreover, larger exits also means that a larger portion of the portfolio no longer is subject to the information asymmetry, nor the liquidity risk, since it has become cash, putting less of a tool on the NAV discount. Additionally, a larger exit signals a stronger, more active transaction market, thus lower liquidity risk, because it provides a clearer indication than a small exit that sizable assets can be successfully sold.

The effect of market sentiment is likewise consistent with these NAV discount reduction mechanisms. In bear markets, there is often a larger (but not always) need for more capital, as firms face higher financial costs, more financial distress. In these situations, the liquidity yielded from the exit is well

needed and should result in a lower NAV discount as the firm becomes more financially healthy. Furthermore, in bear market, there is less transactional activity, which leads to more of the underlying assets being valued through relative and intrinsic valuation methods rather than precedent transactions. This in combination with general bearish market sentiment leads to a low confidence towards NAV and its accuracy and ability to exit. These factors make the information asymmetry and liquidity risk especially prevalent and puts a larger pressure on the NAV discount. Since these factors have a substantial effect on the NAV discount, an exit which results in private non-listed assets becoming cash, results in less of a portion of the total portfolio being subject to these factors. Thus, resulting in a smaller overall NAV discount. However, most likely, the applicability mechanism is likely limited in this case, since the market sentiment effect only is visible on the 5-day model. The explanation to their only being a significance in the 5-day MLR, is the third mechanism of there being a signalling effect. During bear market conditions, an exit would signal that the portfolio is valuable, and transaction markets are functioning. These signals could result in an overall smaller information asymmetry and liquidity risk discount being applied on the total portfolio.

More surprising is the absence of a significant effect for exit discount/premium. Intuitively, one might expect that exits executed at higher premia relative to carrying value would lead to larger reductions in the NAV discount, as they signal that managers value assets conservatively. However, the empirical results does not support this initial theory. A plausible and theoretical explanation is that what matters is not whether the exit occurs above or below carrying value, but whether it occurs above the prevailing NAV discount, which is typically much larger. For example, an exit at a 20% discount to carrying value may still yield an abnormal return if the fund trades at a 50% NAV discount. Since the exit discount/premium does not affect the reduction in the NAV discount, this may indicate an absence of signalling; if such a signalling effect existed, one would expect a significantly negative coefficient, as exiting an asset near or above NAV would reduce valuation uncertainty and demonstrate management's credibility.

The lack of a significant effect for the initial NAV discount is also noteworthy. One might expect that funds trading at deeper discounts would experience larger reductions following an exit because the need for signalling credibility and value in these cases is larger. Theoretically, a possible explanation to this, is that funds with larger NAV discount also have larger portions of their portfolio being private non-listed assets, resulting in larger information asymmetry and liquidity risk. This means that the CEF will still be subject to these risks, causing a persistent NAV discount even after the exit.

Taken together, the results imply clear managerial implications. CEF managers seeking to maximise the NAV-discount-reducing effect of an exit should, where feasible, prioritise larger exits and consider announcing them in bear-market conditions, where the signalling value and liquidity benefits are most powerful. Whether the exit occurs at a modest discount or premium to carrying value is less important. Of course, managers must balance these strategic considerations against factors such as the desirability of timing exits for higher NAV realisations, the availability of buyers during market downturns, and their broader investment and capital-allocation plans. While larger exits amplify the effect, even small exits contribute to reducing the NAV discount, as supported by the consistent positive median abnormal returns documented in Part 1. The evidence therefore suggests that, from the perspective of discount management, executing an exit is generally superior to taking no action at all.

Addressing the Low adjusted R^2

The explanatory power of the regression models is low but economically meaningful. The adjusted R^2 values of 0.3435 (1-day) and 0.3321 (5-day) indicate that roughly one-third of the variation in short-term NAV-discount changes is explained by exit characteristics and market conditions. Both models are

statistically significant overall, as reflected by the F-statistics and p-values, suggesting that the regressions capture systematic patterns despite the inherent noise in short-horizon event data.

Three factors likely contributing to the low adjusted R^2.

Firstly, it is the small sample size (29 observations). It makes it more difficult for additional regressors to raise adjusted R^2 because each variable consumes relatively more degrees of freedom; as a result, the penalty for including predictors is more binding in small samples. Limited sample size also reduces statistical power and increases estimation uncertainty, so economically meaningful effects may not be fully detected. Nevertheless, the significant F-statistics indicate that the models possess explanatory value despite these constraints. Residual diagnostics show no clear evidence of heteroscedasticity, suggesting that variance irregularities are unlikely to undermine the validity of the regression results.

Secondly, omitted idiosyncratic or macroeconomic developments could contribute to unexplained variation. Or in other words, if something else besides the exit announcement occurred within the event window which could have affected the result. However, this influence is likely limited: the event windows, especially the 1-day window are tightly defined to isolate exit effects, and financial-report events are removed or controlled for. Thus, external confounding effects are probably not the dominant reason for the low adjusted R^2.

The third, explanation for the low adjusted R^2 is the presence of an omitted variable. This could for example be related to the signalling mechanism as detailed before. Although, this requires more research with larger data sets to make an absolute conclusion, it is still meaningful to discuss whether or not signalling effect exists. NAV discounts are not driven solely by valuation fundamentals but also by the degree of confidence investors place in reported NAVs and the ability to exit private underlying assets. As discussed earlier, an exit reduces both information asymmetry and liquidity risk for the portion of the portfolio that is realised into cash. However, if exits also generate a broader signalling effect, one that improves investors' confidence in the entire portfolio rather than only the exited asset, then this latent may be a missing explanatory variable in the regression models.

Several aspects of the empirical results are consistent with the signalling mechanism. The very tight clustering of the 1-day abnormal returns suggests a highly uniform immediate response across funds. Such low dispersion could imply that markets interpret exit announcements in a similarly favourable way despite characteristics and circumstances, is difficult to explain solely through the applicability mechanism (i.e., reduced discount only for the exited asset). A signalling channel that reassures investors about private-asset valuations and ability to exit more generally provides a plausible explanation for this consistent pattern. Moreover, the amplified effect of exits during bear markets aligns closely with the signalling effect interpretation. In bear market environments, an exit announcement sends a stronger-than-usual signal that assets remain marketable and that transaction markets function better than feared. This interpretation is reinforced by the fact that market sentiment is significant only in the 5-day model, which is consistent with signalling effects being more diffuse and slower to materialise than the immediate cash-inflow mechanism.

The absence of significance for exit discount/premium and initial NAV discount limits the extent to which any signalling effect can be assumed to operate universally across NAV-discount components, suggesting instead that signalling may work mainly through the liquidity-risk channel and become most relevant during periods of market stress, when confidence in private-asset valuations is weakest. However, several aspects of the results and data sample suggest caution of over-interpreting the signalling mechanism.

Only exit size and market sentiment are significant predictors, whereas exit discount/premium and initial NAV discount are not. An unexpected pattern if reductions in information asymmetry were the primary signalling mechanism, since higher exit premia should, in theory, demonstrate valuation conservatism and reduce uncertainty about the full NAV. Moreover, the bear-market effect could theoretically reflect a cash-inflow mechanism rather than signalling, although this would likely produce an immediate (1-day) rather than a 5-day response. Additionally, the small sample size of the MLR could have played a massive role for the variables coefficient results. Also, another problem could be the Abnormal return and change in NAV discount comparison.

Problems with Methodology and Data

While the results are broadly consistent with exit announcements contributing to a temporary reduction in NAV discounts, several features of the design and data constraints limit the numerical validity of this study. Many of have already been outlined in previous sections.

A central limit to the method is how the sample was constructed. Only exits announced in stand-alone press releases are included, whereas exits disclosed solely in periodic reports are excluded. Giving both bias to larger exits that are noteworthy for the fund to communicate. In addition, multiple events originate from the same CEF and some event windows overlap in calendar time. Abnormal returns are therefore unlikely to be independent. Events around similar dates are exposed to the same market shocks as well as each other. In both the non-parametric tests and the regressions treat observations as independent, which means the reported p-values most likely understate the true degree of uncertainty.

Our event-study framework introduces further fragility. Abnormal returns are derived from a CAPM model estimated over a relatively short window. Raising concerns about non-trading bias and noisy beta estimates, especially when the estimation window may itself contain other corporate events. The sensitivity of the results to the choice of expected-return model remains unknown. The resulting statistics are better viewed as descriptive evidence of patterns in the data than as precise hypothesis tests.

The observed association between bear-market regimes, larger exits and subsequent narrowing of discounts may therefore reflect a mixture of signalling, liquidity, timing choices, and broader macro effects. The small number of observations relative to the number of regressors, and the absence of clustering by fund in the regression standard errors, further limit the strength of inference.

Conclusion

Over the past few years, CEFs with a lot of private non-listed assets have traded at substantial NAV discounts. This can be attributed, among many other reasons, to information asymmetry about the value of the underlying assets, and liquidity risk due to smaller transactional activity leading to smaller ability to exit. Because of this, exits have become a useful tool for CEF managers to use, when aiming for NAV discount reductions. However, there is little research on the topic of exits, and whether it actually works as intended or not. Therefore, this study aimed to answer the question on if exits does actually reduce the NAV discount, and what exit characteristics is this dependent on and/or could amplify this effect.

Using calculated abnormal return and cumulative abnormal returns (CAR) applied with the Wilcoxon signed rank test. This thesis provides strong evidence that exits does create significantly (5% level) positive median abnormal returns with low dispersion, and slightly significant (10% level) CAR with larger dispersion. This suggests that exit announcements do lead to a reduction in NAV discount through abnormal returns. Moreover, using multi linear regression, this thesis found that larger exits, and exits made under bear market conditions amplifies this NAV discount reduction effect.

Furthermore, the reasoning behind these results can theoretically be attributed to three main mechanisms. Firstly, exits produces a cash inflow, which can be used to make new investments, reduce insolvency risk or make other NAV discount reduction measures. Secondly, exits of private non-listed assets reduces the portion of the portfolio being subject to information asymmetry and liquidity risk. Thirdly, the exit of private non-listed assets could theoretically create signalling effects which reduces the discount on the total portfolio, not only affecting the single exited asset. However, this third mechanism is more uncertain, and potentially, it is only liquidity risk which has this signalling effect attached to it, and potentially only under bear market conditions with diminishing effect with continuously improving transaction markets.

The result from this thesis brings several practical implications to Swedish CEF managers, where equal or more than 50% of the portfolio consist of private underlying assets. When the CEFs trade at a NAV discount, Exits are an effective tool to reduce this discount, among others, which they can utilise for this purpose. If CEF managers wants to maximise the exit NAV discount reduction effect, they should do larger exits during bear market conditions.

However, to this result, there are a few potential limitations a problems. In regard to the Wilcoxon test, it assumes that data observations are independent of each other, however, this assumption is violated since there are exits in this research which stems from the same CEF, during the same event window. This makes the results of the tests less of a clear-cut evidence. Furthermore, another limitation is the sample size of the MLR, where only 29 observations were found. This sample size is too small to make any definitive conclusions, and the results should be thought more of as an indication.

Although there are certain limitations to this thesis, it does build a solid ground for future research around exit as a tool to close the NAV discount for CEFs. This thesis brings two suggestions towards future research.

Future work using larger and less selective datasets, more granular NAV information, and regressions directly on abnormal returns with clustered or panel-data methods would be required to more convincingly distinguish signalling from alternative mechanisms such as liquidity needs, managerial timing, or contemporaneous macro shocks. Also, as there exist other literature providing evidence for other NAV discount reduction tools, future research should find what tool is the most effective, and in what situations. This would enable CEF managers to know what NAV discount reduction tool to use under what circumstances, which would result in shareholders more efficiently and effectively receiving greater shareholder value.

In conclusion, this thesis provides empirical evidence that exit announcements systematically reduce the NAV discount of Swedish CEFs, primarily through positive abnormal returns and mechanisms related to liquidity risk and information asymmetry. These findings offer both theoretical insight and practical guidance for CEF managers seeking to close the NAV-discount gap and enhance shareholder value.

Sources and AI policy

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Use of AI

In this paper, AI has been used for reformulation of certain sentences and used as an assistant in certain part of the coding in R Studio.