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Impact of Initial Public Offerings and Seasoned Equity Offerings on Initial and Aftermarket Price Performance

An Empirical Analysis in the Nordic Markets

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ABSTRACT:
This study examines the initial underpricing and long-term performance of Initial Public Offerings (IPOs) and Seasoned Equity Offerings (SEOs) in the Nordic markets, focusing on Denmark, Finland, and Sweden. It covers IPOs from 2014 to 2021 and SEOs from 2014 to 2018, aiming to identify trends and anomalies unique to these markets and eras. The primary objectives are to compare these equity offerings' initial underpricing and subsequent long-term performance and to evaluate whether these findings align with existing theories, that are predominantly based on the U.S. markets.

The data sample includes 153 IPOs and 157 SEOs. Employing the event study methodology, the study evaluates these offerings' initial underpricing and long-term performance. Event windows analyze immediate (e.g., one day, one week) and extended impacts (e.g., one month, three months) on stock performance. The Fama-French 6-factor model calculates abnormal returns, adjusting for market, size, value, momentum, profitability, and investment factors. Abnormal returns (ARs) are derived by subtracting expected returns from actual returns, with Average Abnormal Returns (AARs) averaged across all events within the event window. Cumulative Abnormal Returns (CARs) are summed over a specified period, and Cumulative Average Abnormal Returns (CAARs) are averaged across all events.

The results reveal distinct performance patterns in the Nordic markets. IPOs do not exhibit significant initial underpricing, contrasting with global trends, but show modest long-term underperformance, indicating initial market over-optimism. SEOs demonstrate minimal initial underpricing but significant long-term underperformance, indicating negative market adjustments over time. CAARs for IPOs over various event windows do not show statistically significant abnormal returns, while SEOs exhibit significant negative returns over longer periods.

KEYWORDS: Initial Public Offerings, IPO, Seasoned Equity Offering, SEO, underpricing, long-term performance, Nordic Markets, Equity Offerings, IPO Puzzle, Financial Markets

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TIIVISTELMÄ:
Tässä tutkimuksessa tarkastellaan listautumisantien (Initial Public Offering, IPO) ja osakeantien (Seasoned Equity Offerings, SEO) alihinnoittelua ja pitkän aikavälin suoriutumista Pohjoismaisilla markkinoilla, keskittyen Tanskaan, Suomeen ja Ruotsiin. Tutkimuksessa käsiteltävät listautumisannit ovat vuosilta 2014–2021 ja osakeannit vuosilta 2014–2018, ja se pyrkii tunnistamaan näille markkinoille ja ajanjaksoille tyypillisiä trendejä ja poikkeamia. Ensisijaisena tavoitteena on vertailla näiden osakeantien alihinnoittelua ja pitkän aikavälin suoriutumiskykyä sekä arvioida, vastaavatko saadut tulokset olemassa olevia teorioita, jotka perustuvat pääasiassa Yhdysvaltojen markkinoihin.

Tutkimuksen aineisto sisältää 153 listautumisantia ja 157 osakeantia, ja näiden antien alihinnoittelua ja suoriutumiskykyä tutkitaan tapahtumatutkimusmetodologiaa (Event Study) hyödyntäen. Tapahtumaikkunat (Event Windows) on asetettu analysoimaan välittömiä (esim. yksi päivä, yksi viikko) ja pitkän aikavälin vaikutuksia (esim. yksi kuukausi, kolme kuukautta). Fama-French 6-faktorimallia käytetään epänormaalien tuottojen laskemiseen, sillä tämä faktorimalli ottaa huomioon markkinariskin, yrityksen koon ja arvon, momentumin, kannattavuuden ja investointitekijät. Epänormaalit tuotot (AR) johdetaan vähentämällä odotetut tuotot todellisista tuotoista, ja keskimääräiset epänormaalit tuotot (AAR) lasketaan keskiarvostamalla kaikkien tapahtumien epänormaalit tuotot valitun tapahtumaikkunan sisällä. Kumulatiiviset epänormaalit tuotot (CAR) lasketaan summaamalla valitun tapahtumaikkunan epänormaalit tuotot, ja keskimääräiset kumulatiiviset epänormaalit tuotot (CAAR) saadaan keskiarvostamalla kumulatiiviset epänormaalit tuotot kaikissa tapahtumissa.

Tutkimuksen tulokset paljastavat, että Pohjoismaissa on selviä eroavaisuuksia muusta markkinasta. Listautumisannit eivät osoita merkittävää alihinnoittelua, mikä poikkeaa aiemmasta kirjallisuudesta. Listautumisannit kuitenkin suoriutuivat pitkällä aikavälillä huonosti, mikä viittaa siihen, että markkinat suhtautuvat ylioptimistisesti listautumisanteihin. Osakeannit puolestaan osoittavat vähäistä alihinnoittelua, mutta niiden pitkän aikavälin alisuoriutuminen on merkittävää. Tämä viittaa siihen, että markkinasuhtautuminen muuttuu negatiivisemmaksi ajan myötä. Listautumisantien keskimääräiset kumulatiiviset epänormaalit tuotot eri aikavälin tapahtumaikkunoissa eivät osoita tilastollisesti merkittäviä epänormaaleja tuottoja, kun taas osakeannit osoittavat merkittäviä negatiivisia tuottoja pitkällä aikavälillä.

AVAINSANAT: listautumisanti, osakeanti, alihinnoittelu, pitkän aikavälin suorituskyky, Pohjoismaiset markkinat, rahoitusmarkkinat, osakeannit

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Abbreviations

IPO Initial Public Offering
SEO Seasoned Equity Offering
AR Abnormal Return
AAR Average Abnormal Return
CAR Cumulative Abnormal Return
CAAR Cumulative Average Abnormal Return
DCF Discounted Cash Flow Model
CAPM Capital Asset Pricing Model
SMB Small Minus Big (size factor)
HML High Minus Low (value factor)
RMW Robust Minus Weak (profitability factor)
CMA Conservative Minus Aggressive (investment factor)
MOM Momentum factor

1 Introduction

The growth stage of a company's lifecycle often sees a significant shortfall in operating capital, which is necessary to pursue ambitious strategies. Companies at this stage need substantial cash for product innovation, capital investments, and marketing efforts, often exceeding the financial capacity of existing shareholders, making access to credit insufficient. One solution for companies to overcome these limitations is to initiate an Initial Public Offering (IPO). This process allows companies to gain new shareholders from the public market, thereby providing the company with much-needed cash. In 2021, IPOs raised over 600 billion dollars globally, highlighting their importance in raising new capital and offering attractive investment opportunities for investors (Bloomberg, 2021).

Seasoned Equity Offerings (SEOs), where companies issue additional shares after their IPO, also play a significant role in financing a company's growth. While IPOs introduce a company to the public markets, SEOs allow already public companies to raise further capital. Both IPOs and SEOs are important financial processes, yet they exhibit differing characteristics and performance outcomes.

A phenomenon associated with IPOs is the '*IPO Puzzle*', which includes the anomalies of initial underpricing and long-term underperformance. Ritter (1991) identified significant initial returns on the first day of trading for IPOs, a trend further confirmed by Loughran and Ritter (2004), who observed changes in underpricing across different market conditions and periods. Additionally, Spiess and Affleck-Graves (1995) found that SEOs, like IPOs, often experience initial underpricing followed by long-term underperformance. Jegadeesh et al. (1993) and Bayless and Chaplinsky (1996) also discovered that market conditions at the time of issue significantly impact SEO underpricing, mirroring the cyclical nature observed in IPOs.

Understanding the performance of IPOs and SEOs in the Nordic markets is particularly relevant given recent global trends. With 2021 being a record year for IPO volumes, analyzing the performance of these offerings can provide interesting insights for both

investors and companies. Investors can gain a better understanding of the risks and returns associated with these equity offerings, while companies can optimize their strategies for raising capital through IPOs and SEOs.

1.1 Purpose of the Study

The primary purpose of this study is to analyze the initial underpricing and long-term underperformance of IPOs and SEOs in the Nordic markets, focusing on *Denmark, Finland,* and *Sweden*. As the prior studies are mainly U.S.-focused, this study aims to bring the theories and findings from previous research into the Nordic context. This is particularly relevant as the Nordic financial markets exhibit distinct characteristics that may influence the behavior and outcomes of IPOs and SEOs differently from the U.S.

1.2 Hypotheses

The hypotheses are based on previous literature examining the initial and aftermarket price performance of IPOs and SEOs. While various theories are trying to explain these phenomena, there is no consensus among researchers.

IPOs often exhibit significant initial underpricing, where shares are offered below their market price, resulting in immediate returns for initial investors. Ritter (1991) documented this phenomenon in the U.S., discovering an average first-day return of 18.8%. Loughran and Ritter (2004) expanded on this, showing changes in underpricing across different market conditions, such as the dot-com bubble. Similar patterns have been observed in the Nordics, as evidenced by Keloharju (1993), indicating that IPO underpricing is a global phenomenon.

In contrast, SEOs, where companies issue additional shares after their IPO, typically show less extreme underpricing. Jegadeesh et al. (1993) compared IPOs and SEOs, finding lower underpricing in SEOs due to the established market presence of these firms.

Bayless and Chaplinsky (1996) observed that market conditions at the time of issue have a significant impact on SEO underpricing, whit 'hot' markets witnessing less underpricing.

Therefore, the first and second hypotheses regarding the initial underpricing are as follows:

$H_{0,a}$: There is no significant difference in the initial underpricing between IPOs and SEOs in the Nordics.
$H_{1,a}$: IPOs exhibit greater underpricing compared to SEOs in the Nordics.

Further, Ritter (1991), and Loughran and Ritter (1995) discovered that IPOs underperform in the long run, usually over a three to five-year period. This underperformance is often due to initial market over-optimism, which fades over time as more information about the company becomes available to the public.

Similarly, SEOs demonstrate long-term underperformance. Spiess and Affleck-Graves (1995) discovered that SEOs underperformed the market significantly over three years, attributed to adverse selection where companies issue equity when overvalued. DeAngelo et al. (2010) observed that companies often time their SEOs to exploit favorable market conditions, leading to later stock price corrections.

Therefore, the third and fourth hypotheses regarding the long-run underperformance are as follows:

$H_{0.b}$: There is no significant difference in the long-run underperformance of IPOs and SEOs in the Nordics.
$H_{1,b}$: SEOs exhibit greater long-run underperformance relative to the market compared to IPOs in the Nordics.

By examining these hypotheses, this study aims to provide a comprehensive analysis of the performance of IPOs and SEOs in the Nordics, contributing to the broader understanding of equity offerings.

1.3 Possible Contribution

This study aims to contribute to the existing body of literature regarding IPOs and SEOs by providing a comprehensive analysis of their initial and long-term performance in the Nordic markets. By comparing the underpricing and aftermarket performance of IPOs and SEOs, the study seeks to uncover patterns and anomalies specific to the Nordic context.

While conducting this study, it became apparent that there is limited previous literature examining Nordic IPOs and SEOs together. Expanding this area of study is important because understanding the combined dynamics of equity offerings in the Nordics can provide insights into market behavior, investor strategies, and economic implications specific to this region. This study aims to address a gap in the literature and offer new perspectives and information.

1.4 Structure of the Study

The structure of the thesis is following. The second chapter presents the fundamentals of IPOs, including their motivations, valuation methods, and the practice of window dressing. Further, the third chapter examines the initial underpricing and long-term underperformance of IPOs, along with the theories that explain these anomalies. The fourth chapter discusses the fundamentals of SEOs and the reasons why companies choose to issue additional shares. In chapter five, the cultural differences between IPOs and SEOs across various countries are discussed, with a focus on the Nordic markets. Chapter six details the data and methodology used for the empirical analysis. The seventh chapter presents the empirical findings, analyzing the initial underpricing and long-term performance of IPOs and SEOs in the Nordic markets. Finally, chapter eight

concludes the study by summarizing the findings, discussing their implications, and suggesting areas for future research.

2 Initial Public Offering (IPO)

2.1 The Fundamentals of Initial Public Offerings

An Initial Public Offering (IPO) is a process a company may undertake to transition from private to public ownership, which is often referred to as ‘going public’. This process allows a company to list its shares on a stock exchange, making them available for public trading for the first time. The shares released to the public during an IPO can be either newly issued by the company (primary shares), existing shares sold by shareholders (secondary shares), or a combination of both (Bodie et al., 2023, p. 63; Espinasse, 2014, p. 1; Geddes, 2003, p. 7). Primary share offerings generate new capital for the firm’s investments and increase the total number of shares outstanding, while secondary share sales benefit insiders without raising new capital for the firm or changing the share count. Mixed offerings include both new shares for capital and existing shares for insider liquidity (Kim & Weisbach, 2008, pp. 282-286).

The IPO process is led by underwriters, typically investment banks, which are appointed by the issuing company. Their responsibilities during the process include the preparation of the prospectus, performing due diligence, marketing the offering, handling the necessary documentation, completing the regulatory filings, and managing the final issue of shares (Geddes, 2003, pp. 55-58). A lead underwriter is often designated to assemble an underwriting syndicate, which is a group of investment banks that work together to share the risk and assist in managing the issuance of the shares (Bodie et al., 2023, p. 63).

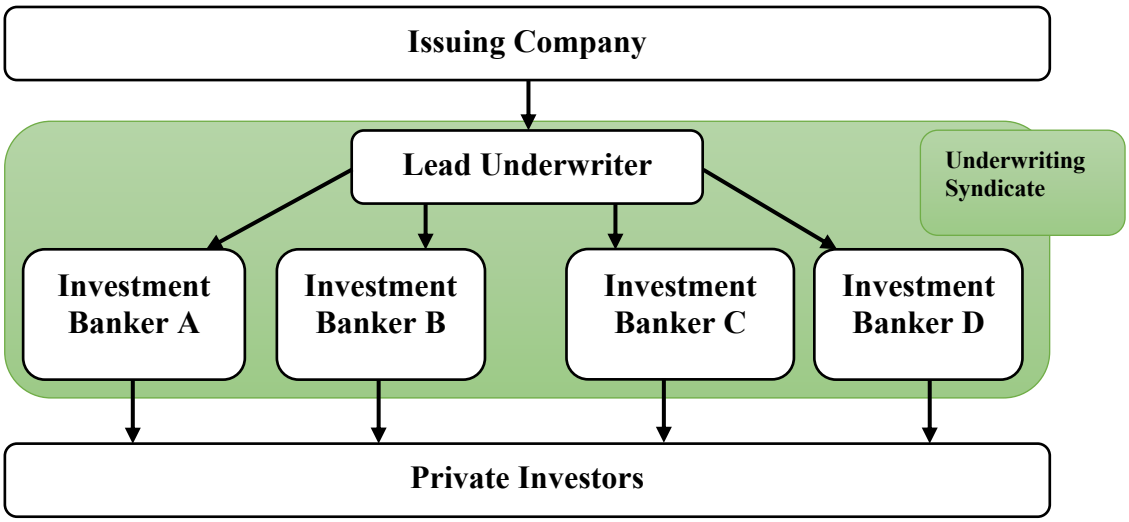

Figure 1. Relationships between the issuing firm, the underwriters, and the public. (Bodie et al., 2023, p. 64)

An underwriting agreement is a contract that outlines the specific details of the arrangement between the issuing company and the underwriter or group of underwriters (Pedersen, 2009, p. 129). This agreement defines the terms under which the underwriters commit to purchasing the shares from the issuer and then offering them for sale to the general public. (Bodie et al., 2023, pp. 63-53; Geddes, 2003, p. 69). The underwriters purchase the shares from the issuer at a discount, a margin known as the spread, which serves as their compensation. This arrangement is referred to as 'firm commitment' because the underwriters assume the risk if they cannot sell the shares at the target offer price. If the shares fail to perform as expected, the underwriters could face losses when selling the shares in the secondary market. Additionally, the underwriters' compensation might also include receiving common stock or alternative securities from the issuer (Bodie et al., 2023, pp. 63-64).

Before the prospectus is finalized, the lead underwriter conducts a due diligence investigation of the issuing company to verify its quality. This process involves gathering information to ensure the accuracy and fairness of the prospectus (Geddes, 2003, p. 108). The prospectus is a mandatory document that provides a comprehensive overview of

the issuing company and details the security offering for public sale. This document typically contains externally audited financial statements, and information about the firm, its business, prospects, competitors, products, and its ownership structure. The prospectus serves as a marketing tool for the underwriter during roadshows, aimed at attracting demand (Theo et al., 1998b, pp. 177-178). Approval of the prospectus is obtained from the home country's Financial Supervisory Authority, such as Finanssivalvonta in Finland, Finansinspektionen in Sweden, and Finanstilsynet in Denmark. These regulators ensure that prospectuses comply with the applicable laws and regulations, thereby protecting investors and maintaining the integrity of financial markets.

Once the prospectus has been qualified, the marketing phase begins. To market the offering, the underwriter arranges a roadshow, which involves traveling to meet potential investors. The primary objective of the roadshow is to generate interest among investors and provide detailed information about the shares. Moreover, it serves as a crucial source of information for both the issuing company and the underwriters. These meetings offer insights into the anticipated market price for the shares and evaluate the market's response to the new issue. Institutional investors often contribute valuable perspectives on the market demand for security, as well as the prospects of the company and its competitors (Benveniste and Spindt, 1989, p. 349; Bodie et al., 2023, pp. 64-65; Gao and Ritter, 2010, p. 34).

During the roadshow, the book runner (lead underwriter) collects indications of interest from investors to purchase the IPO shares, compiling them into a 'book' through a process known as book building. Concurrently, the book runner creates an order book based on investor demand. This order book plays a crucial role in setting the initial offering price for the issue, as the underwriter's final decision on the price relies on share demand (Beneveniste & Spindt, 1989; Bodie et al., 2023, pp. 64-65; Gao & Ritter, 2010, p. 34). Once the price is established, the syndicate of underwriters, led by the book runner, proceeds to allocate the shares to investors (Bodie et al., 2023, pp. 64-65; Gao &

Ritter, 2010, p. 34). After the allocation process concludes, the shares are listed and begin trading on the chosen stock exchange. This marks the point at which investors who received allocations of IPO shares can start buying and selling the shares on the market.

2.2 Why to go Public?

The decision for a company to go public is a multifaceted process, informed by both strategic and theoretical considerations, as well as company factors such as ownership structure, size, age, and the legal and institutional context in which it operates (Bancel & Mittoo, 2009, pp. 845-846). The launch of an IPO not only marks a significant event in the company's lifecycle but also opens an important channel of two-way communication, exposing the firm to valuable feedback. However, this primary market feedback, whether positive or negative, comes at a high cost and with significant public exposure (Benveniste et al., 2002, p. 62).

Kim and Weisbach (2008, p. 281-282) identify three potential motives for equity offerings: raising funds for investments, redistributing wealth from new shareholders to existing ones, and enhancing liquidity for the firm and its insiders. Similarly, Espinasse (2014, p. 1) and Geddes (2007, p. 5) highlight that access to equity capital and providing liquidity are primary reasons for equity offerings. Furthermore, an IPO grants a company's entry into the public capital market, which not only can lower the cost of financing but also provide a trading platform for its shares, enabling shareholders to diversify their portfolios and capitalize on the company's growth (Kim & Weisbach, 2008, pp. 281-282; Ljungqvist, 2007, p. 378). Pagano et al. (1998, p. 29) find that companies experience a lower cost of credit and increased turnover in control, suggesting an overall enhancement in financial health and changes in ownership following an IPO.

Baker and Wurgler (2002) suggest that firms may issue equity to capitalize on market conditions, specifically when the shares are overvalued by investors who fail to account for new information from equity issues. Kim and Weisbach (2008, p. 292) note that after an IPO, a significant portion of the capital raised — approximately 49 cents per dollar in

the first year and 38.8 cents over four years — remains as cash holdings. Further, Pagano et al. (1998, p. 29) find that Italian companies seem to time their IPOs to capitalize on high market valuations. The results align with the view of 'market timing', suggesting companies go public when valuations are high to exploit favorable stock prices.

Bancel and Mittoo (2009) discover strong evidence that incentives for pursuing an IPO, such as enhanced credibility, reputation, and financial growth flexibility, are strongly influenced by company size. In their study, larger companies particularly valued the increased scrutiny from external monitoring as a primary benefit. In contrast, smaller and family-owned companies placed value on the possibility of raising capital and improving their standing in negotiations with creditors, all without compromising control.

Pagano et al. (1998, pp. 28-29) illustrate that the likelihood of a company to initiate an IPO is related to its size and the industry's growth potential, measured by the market-to-book ratio. Larger companies, as well as those in industries with high market-to-book ratios, are more likely to go public. However, these companies often pursue an IPO not just to raise money for future investments but to rebalance their financials after a period of high investments and growth.

Most newcomers to the stock market often issue their shares at a discounted price compared to their already-listed peers, to attract more profit-seeking investors. Additionally, the status and recognition gained from being publicly listed can motivate an IPO (Espinasse, 2014, pp. 1-2). Aghamo and Tahkor's (2022) research suggests that a company is more likely to initiate an IPO if a direct competitor does so, a trend that might explain why IPOs often occur in waves, as noted in previous research by Ibbotson and Jaffe (1975) and Ritter (1984).

When a company becomes publicly traded, it takes on new obligations, such as meeting the regulatory, transparency, and disclosure requirements mandated by the stock exchange. This shift also means greater accountability to a broader shareholder group,

leading to a more thorough examination from analysts and media. While this increased exposure can offer benefits, such as raising the company's profile in the eye of the public, it also comes with potential risks. Competitors can leverage the disclosed information, potentially undermining the company's competitive advantage (Bancel & Mittoo, 2009, p. 845: Ljungqvist, 2007, p. 378; Pagano et al., 1998).

Advantages	**Disadvantages**
Access to capital	*Costs and regulatory burden*
Enhanced visibility and credibility	*Loss of control*
Liquidity for existing shareholders	*Disclosure requirements*
	Market Volatility

Table 1. The Advantages and Disadvantages of Going Public

The costs associated with an IPO are substantial contributors to its perceived disadvantages. These expenses, from the initial listing to the ongoing obligations, place significant financial pressure on companies (Espinasse, 2014, pp. 4-5; Sherman, 2005, p. 203). Moreover, transitioning to a public company requires permanent financial commitments such as mandatory quarterly reporting (Ibbotson & Ritter, 1995). Managing investor relations also demands a high level of transparency, demanding major time and resource investments from management to meet market expectations (Espinasse, 2014, pp. 4-5)

Furthermore, once a company goes public, it loses control over who can purchase its shares. The IPO can attract unwanted shareholders, including competitors, potentially resulting in a loss of control over the business for its original shareholders. As the public holds a significant portion of a listed company's capital, it becomes vulnerable to takeover bids, further increasing the risk of extreme outcomes (Espinasse, 2014, pp. 4-5). Brau and Fawcett (2006) found that one of the primary motivations for companies to remain private is to preserve decision-making autonomy and ownership control.

2.3 Valuing IPOs

Determining the appropriate price for an IPO presents a challenge. This arises from the lack of a market price to refer to before the offering and because many companies initiating an IPO have little to no operating history (Geddes, 2003; Ibbotson et al., 1988, p. 66). IPO valuation holds a fundamental role in finance as it constitutes the market's initial assessment of a company's valuation. This process is pivotal for economic efficiency, providing management with early insights into potential growth and influencing broader economic decisions (Aggarwal et al., 2009). Pedersen (2008, p. 114) stated, *''Deciding upon the right multiples and marketing range for an IPO is more of an art than a science''*.

Espinasse (2014) highlights that the valuation techniques for an IPO can vary based on the industry and the size of the offer. For firms active in various industries, employing multiple valuation approaches may be necessary, as a single method might not be sufficient.

One of the primary methods of IPO valuation is the use of multiples. Kim and Ritter (1999) identified price-to-earnings (P/E), market-to-book (M/B), and price-to-sales (P/S) ratios as the most frequently used multiples. They emphasize the importance of adjusting these ratios to reflect the specific characteristics of a company, such as growth prospects and profitability, ensuring a valuation that accurately represents the company's market value. Purnanandam and Swaminathan (2004) also observed that employing industry multiples without company-specific adjustments can lead to inaccurate valuations.

The study by Purnanandam and Swaminathan (2004), examines IPOs in the U.S. from 1980 to 1997. The study categorized the sample into three portfolios, each characterized by a distinct multiple, to examine the potential under- or overvaluation of IPOs. They used multiples, such as P/E, P/S, and price-to-EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization) to benchmark IPO valuations against similar, already publicly traded firms within the same industry.

Identifying comparable firms is an essential step in the valuation of IPOs. Investment bankers and analysts often select comparable companies by examining more than just industry classification and considering how similar the companies are in their business operations and market segments, which leads to more refined and detailed comparisons (Kim & Ritter, 1999, pp. 426-427; Pedersen, 2008, pp. 113-114). According to Pedersen (2008, pp. 113-114), finalized earnings models prepared by analysts are essential for establishing IPO valuations, as they inform the calculation of valuation multiples following the market performance of peer companies. The consistency of these models across underwriters, reflecting the issuer's expectations, is crucial for providing investors with reliable data for their valuation judgments.

In addition to multiple-based valuation methods, underwriters frequently use the Discounted Cash Flow Model (DCF) and dividend discount model (DDM). In Roosenboom's (2012) study, it is indicated that bias, accuracy, and explainability are consistent across the three valuation methods. The research further suggests that these methods tend to result in a consistent positive bias, implying an overestimation of the company's value.

In Roosenboom's (2012) study, in 59.2% of the cases, underwriters used the DCF model to estimate the equity value of the IPO. the DCF model calculates the present value of future cash flows generated by the company. If a company offers good long-term visibility with predictable cash flows, the DCF model can be employed. However, it is important to note that the value of the company can vary greatly depending on the assumptions that have been used in the model (Espinasse, 2014, pp. 110-111). While the DCF is widely used to analyze issuing companies, it lacks coverage in academic literature. Kim and Ritter (1999, pp. 410-412) argue that valuing young companies initiating IPOs with the DCF model can be imprecise due to the difficulty in forecasting their future cash flows and determining an appropriate discount rate. Although the DCF model has a solid theoretical foundation, its practical implementation can be

compromised by the difficulty in producing accurate financial forecasts for these emerging companies. Kim and Ritter (1999, p. 410) argue, that valuing young companies during an IPO is challenging due to the unpredictability of their future cash flow. They highlight that accurately projecting these cash flows and estimating suitable discount rates for the DCF model is often a complex task.

The DDM model is commonly used when the issuing company and the industry it operates in are in their mature stages (Roosenboom, 2014). In its basic form, DDM involves estimating the firm's predicted dividends and discounting these cash flows back to present value. DDM model is notable for not requiring a specified utility function to reflect shareholder preferences. Additionally, it is also equipped to account for long-run growth (Lazzati & Menichini, 2015, p. 2). In Roosenboom's (2012) study, also in 59.2% of the cases, underwriters used DDM to estimate the equity value of the IPO, and it was recognized for having the highest explanatory power among the three valuation methods.

Kim and Ritter (1999), Roosenboom (2012), and Purnanandam and Swaminathan (2004) argue that utilizing forecasted earnings tends to result more accurate IPO valuations compared to historical earnings. Specifically, Kim and Ritter (1999) found that forecasted earnings, which aim to capture expected future performance and growth, are more effective for calculating P/E multiples and enhancing the accuracy of IPO valuations. On the other hand, Purnanandam and Swaminathan (2004) caution that placing too much focus on expected growth may misinterpret investor evaluations, possibly overlooking present profitability and resulting in overvalued IPOs.

Kim and Ritter (1999, p. 429) reveals how the age of a company significantly impact the accuracy of its valuation, noting that older, more established companies often have more predictable valuations reflected through capitalized earnings. Younger firms, conversely, with their more uncertain futures, are harder to valuate with precision. Roosenboom (2012, p. 1659) supports this by observing that underwriters typically achieve greater

valuation accuracy with older companies, unless the market volatility enhances uncertainty. Apart from age, underwriter reputation, and market conditions before valuation, there seems to be no other consistent determinant of the variation in valuation accuracy across different companies.

The studies collectively suggest that there is no universally superior valuation method, and the applicability and precision of each can vary depending on the attributes of the company. Therefore, investment bankers typically tailor valuation methods to fit the specific IPO at hand and use their knowledge to process market demand information, which helps in setting more accurate offer prices. Roosenboom (2012, p. 1664) concludes, that it is important to know how underwriters determine initial offer prices to better understand why IPO underpricing exists. IPO underpricing is examined in detail in Chapter 3.

2.4 Window Dressing and Why Companies Do It?

Higher reported earnings can lead to a rise in stock prices and improve a company's public image, which can be particularly beneficial for issuers during equity offerings. However, investors evaluating newly public companies can encounter difficulties due to the information asymmetry between themselves and the issuers. This is compounded by investors' dependence on the financial statements published in the prospectus, which are their primary source of insights into the company's financial health (Lizińska, & Czapiewski, 2019; Roosenboom et al., 2003). This affects investors' possibilities of detecting window dressing activities and evaluating the financial statements as true indicators of the company's projected performance (Sloan, 1996; Teoh et al., 1998b, p 175).

Window dressing is described as an act of manipulating a company's financial statements or operational performance to appear more positive than it is. It can involve a range of activities, such as declaring inflated sales, altering asset and liability valuations, or releasing strategic announcements to influence stock prices (Zaidi et al., 2018). Window

dressing is commonly used to present a company's financial status and growth prospects in a favorable light to potential IPO investors. However, these practices may hide the actual risks and weaknesses of the company, potentially misguiding investors (Lizińska, & Czapiewski, 2019; Roosenboom et al., 2003). According to Zaidi et al. (2018), the term 'window dressing' has been commonly used almost synonymously with creative accounting, earnings management, and accounts manipulation among other terms.

Reported earnings include cash flows and accruals, which adjust these cash flows for accounting purposes. As a company prepares to go public, it is often easier to modify accruals than to change actual cash flows, making these accrual adjustments a likely indicator of earnings manipulation (Lizińska, & Czapiewski, 2019, p. 3; Teoh et al., 1998b, p. 176). Accrual-based earnings management is naturally limited by the requirement for accruals to eventually match cash flows, making long-term earnings exaggeration unsustainable. High accruals in one period are typically offset by lower accruals in another, which means consistent overestimation of earnings is difficult to maintain unnoticed (Lizińska, & Czapiewski, 2019, p. 3; Roosenboom et al., 2003, p. 244; Teoh et al., 1998a, p. 1936).

During the IPO process, companies may be inclined to adjust financial reporting to enhance perceived value. High reported earnings typically result in a higher initial offering price, and companies may be motivated to sustain elevated earnings post-IPO to keep market prices up. However, such adjustments are temporary and inevitably require correction, and that can be especially challenging for companies that don't meet performance expectations (Teoh et al., 1998a). As the information becomes more transparent over time through media coverage, analyst insights, and financial disclosures, investors might realize that earnings do not sustain their initial momentum, leading to a potential decline in investor confidence. A company that aggressively manipulates its earnings around the time of issuing stocks may subsequently experience more substantial corrections in its share price (Lizińska, & Czapiewski, 2019, p. 3; Roosenboom et al., 2003, p. 244; Teoh et al., 1998a). However, Teoh et al. (1998a, p. 1941) argue that

earnings management does not necessarily result in the overvaluation of stock in the aftermarket. Investors incorporate public information regarding earnings management into their valuation, thereby adjusting the stock price to account for these factors. Additionally, regular market processes such as short-selling can help adjust stock prices to align with the company's actual valuation.

The study by Ho et al. (2010) indicates that issuers frequently broadcast optimistic strategy and policy news before IPOs to improve the public's perception of the company but decrease such reporting afterward, reflecting a strategic use of information. Moreover, issuers are prone to announce positive expectations for the future and typically report negative outcomes only after the event has already occurred. The study also shows that insiders exploit the information asymmetry between themselves and investors. Companies where existing shareholders sell a significant amount of IPO shares, or insiders increase their sales after the IPO, are more likely to participate in 'window dressing' practices, and eventually experience poorer aftermarket performance Teoh et al. (1998b) note that IPO firms commonly offer stock rights and options for management to motivate them to stay with the company after it becomes publicly traded. These compensations come with restrictions on when the stock can be sold or when the options can be exercised, which can extend from a few months to several years post-IPO. In line with the findings of Ho et al. (2010), Teoh et al. (1998b) observe that such compensation strategies could potentially create an additional incentive for managers to engage in 'window dressing' to sustain stock prices until the selling restrictions expire.

Empirical studies indicate that companies engaging in both conservative and aggressive earnings manipulation experience a decline in market value over time. Lizińska and Czapiewski (2019) examine Polish IPOs and observe that IPOs with more aggressive accrual manipulation exhibit worse long-term performance, with annualized abnormal returns varying from -12.1% to -20.5%. whereas the range is -8.2% to -13.7% for more conservative IPO companies. Furthermore, Theo et al. (1998a, p. 1964) report that companies in the highest quartile for aggressive earnings management during their IPO

have been found to underperform by an average of 15% to 30% over three years following their earnings announcements relative to companies in the most conservative quartile. Additionally, issuers that are more conservative with their earnings manipulation tend to re-enter the capital market for a seasoned equity offering (SEO) about 20% more often within five years than their more aggressive counterparts, suggesting that there may be long-term benefits to a more measured approach to earnings management during the IPO process.

Roosenboom et al. (2003) examined the Dutch IPO market and found that, on average, IPO firms engage in accruals-based earnings management during their first year as a public company, rather than the years before the IPO. Furthermore, as noted by Teoh et al. (1998a, p. 1936), firms encounter heightened legal and potentially reputational scrutiny in the aftermath of an IPO. The immediate reversal of accounting practices may expose earnings management activities, potentially leading to lawsuits against the firm and its management. Consequently, companies that actively manage their earnings before the IPO are likely to manage their first post-IPO earnings.

3 The IPO 'Puzzles'

As companies embark on public trading via IPOs, the shares issued often exhibit two notable anomalies: an initial underpricing and a propensity for long-run underperformance. The tendency to underprice can be interpreted as a tactical measure, offering outside investors a form of compensation for the risks associated with information asymmetry, as explored by Ritter (1984) and Rock (1986), or as a method to communicate the issuing company's inherent value, as noted by Allen and Faulhaber (1989) and Welch (1989). The persistent underperformance seen in IPO stocks is often associated with investor sentiment, particularly tendencies towards over-optimism, as observed by Aggarwal and Rivoli (1990), and reflection of market sentiment, as studied by Ljungqvist et al. (2006).

Existing research has not yet agreed on how the initial underpricing relates to long-term underperformance, and the relationship between the two remains unestablished. Ritter (1991) reported a negative correlation between underpricing and long-term underperformance, while Krigman et al. (1999) observed a positive correlation between the two. Ljungqvist et al. (2006) proposed that several common IPO anomalies, such as underpricing, hot issue markets, and long-run underperformance, can all be attributed to the actions of overly optimistic investors.

3.1 Short-Term Underpricing

When the initial offering price of shares in an IPO is set below the market's valuation, it results in underpricing. This condition is evidenced when the shares end their first trading day with a closing price that is higher than the offering price, which classifies the shares as underpriced (Loughran & Ritter, 2010). Typically, underpricing is calculated as the percentage difference between the initial offer price of the share and the closing price on the first trading day, as expressed in equation (1) (Ljungqvist, 2007, p. 381; Loughran & Ritter, 2004).

$$Underpricing = \left(\frac{Closing\ Price - Initial\ Offer\ Price}{Initial\ Offer\ Price}\right)\ x\ 100 \qquad (1)$$

As an alternative to calculating underpricing as above, it can be also measured by examining the dollar amount of *'money left on the table'*, expressed as in equation (2). This calculation assumes that shares sold at the initial offer price could have been sold at the aftermarket trading price, leaving money on the table (Ljungqvist, 2007, p. 381; Ritter, 2023). Benveniste and Spindt (1989) suggested that underpricing compensates investors who provide valuable information before the issue price is finalized, effectively minimizing the money left on the table.

$$\begin{aligned} &Money\ Left\ on\ the\ Table \\ &\quad = (Aftermarket\ Trading\ Price \\ &\quad - Initial\ Offer\ Price)\ x\ IPOs\ Number\ of\ Shared\ Sold. \end{aligned} \qquad (2)$$

Companies often underprice the equity offered in an IPO, leading to a significant surge in price on the first day of trading. In well-developed capital markets, underpricing tends to disappear relatively quickly. Therefore, researchers predominantly rely on the first-day closing price for computing initial underpricing returns (Ljungqvist, 2007, p. 381). Furthermore, as highlighted by Ritter (1991, p. 3), the extent of underpricing follows a cyclical pattern, with certain periods lasting for multiple months, wherein the average initial return displays a notable increase.

Documented since the 1970s, IPOs are often introduced to the market at prices below their actual value. Ibbotson's (1975) study was pioneering in identifying the phenomenon of underpricing, revealing an average initial return of 11.4% on the first offerings of U.S. common stocks. This regularity in underpricing suggests a systematic deviation from the expected market behavior and poses a challenge to traditional economic theories (Ibbotson, 1975; Judge et al., 2015). This trend of underpricing has been observed globally and through various periods, its level varying over time (Ritter & Welch, 2002; Ritter, 2003; Loughran et al., 1995). A study by Loughran and Ritter (2004)

identified significant variances in the U.S. IPO underpricing rates across various periods, such as an average of 65% during the Dot-com bubble (1999-2000), in contrast to 5% in the 1980s and an increase to 15% in the years 1990-1998. During the post-bubble era from 2001 to 2003, the underpricing decreased to 12%.

3.2 Long-Term Underperformance

IPO underperformance refers to the phenomenon where a company's stock price after its IPO falls short of anticipated returns compared to benchmarks or the industry average over a certain timeframe following the IPO (Aggarwal & Rivoli, 1990; Loughran & Ritter 1995; Ritter, 1991). The argument presented is that shares issued during an IPO are commonly initially overvalued, and then experience a temporary surge in the aftermarket before they eventually adjust to accurately reflect their true value in the long run (Purnanandam & Swaminathan, 2004). Conversely, proponents of efficient markets, especially Fama (1998), dispute this anomaly. Fama (1998) argues that abnormal returns often disappear with suitable adjustments in methodology, suggesting these should not be classified as anomalies.

Ritter's (1991) study found that IPOs do not sustain their initial excess returns beyond their first day on the market. His research, which examined 1,526 U.S. IPOs between 1975 and 1984, revealed that these companies underperformed significantly relative to similarly sized peers in their respective industries over the subsequent three years. The average three-year return for these IPOs was -17%. Furthermore, the underperformance was particularly pronounced among younger firms, suggesting that over-optimism regarding these companies' future growth prospects might contribute to their initial overvaluation. Ritter's (1991) findings are further complemented by Jain and Kini (1994) and Mikkelson et al. (1997), who report a notable decrease in the operating performance of companies from the year before their IPOs up to the first three years following the offerings.

To evaluate the performance, Ritter (1991) calculated the difference between the stock's monthly raw return and the corresponding monthly benchmark return over each 21-trading-day interval. These benchmark-adjusted returns were then cumulatively summed to estimate the total performance across the three years post-IPO, excluding the initial return period.

In his study of Finnish IPOs from 1984 to 1989, Keloharju (1993) employed a methodology that closely resembled Ritter's approach, and his results aligned strongly with Ritter's (1991). The study's findings supported the existence of a long-term IPO underperformance anomaly in Finland, suggesting that this pattern of underperformance is not limited to particular industries and tends to be more pronounced in smaller companies. Keloharju's (1993) study found that an investment in IPOs from their first trading day if held for three years, generated only a 79-cent return on every dollar when measured against the OMXH (formerly the Helsinki Stock Exchange, HSE) value-weighted index. The performance was even more unfavorable when compared to the HSE equally weighted index. Keloharju (1993) highlighted that the Finnish IPO market was extraordinarily active during the study period, indicating that the results may represent a temporary over-optimism among investors, which subsequently declined as they became more acquainted with the long-term prospects of the IPO companies.

Research by Ibbotson (1975) and Jenkinson and Ljungqvist (2001) on U.S. common stock offerings indicates market efficiency in aftermarket price performance, without deviation from expected returns. Their findings did not disprove the assumption that abnormal long-term returns average out to zero. They note a pattern where IPOs tend to underperform by about 1% monthly across four years, starting with strong performance in the first year, declining in the following three, and showing a positive trend in the fifth year.

Contrasting results come from Thomadakis et al. (2012), who studied the Greek IPO market, analyzing 254 offerings. They found what they termed the 'Greek exception,' where IPOs in Greece did not follow the typical underperformance trend but rather saw overperformance, particularly during the market boom and Greece's transition to the Eurozone, which was not a permanent state but rather period-specific, suggesting market timing played a crucial role.

3.3 The Theories Behind the Puzzles

3.3.1 Asymmetric Information

Another issue related to the underpricing of IPOs is the amount of uncertainty concerning the true value of the company involved. Asymmetric information theory suggests a discrepancy in the knowledge held by participants in transactions such as IPOs, with some having more information than others. This discrepancy is commonly implicated in the tendency to initially price IPOs below what might be their true market value (Ljungqvist, 2007; Rock, 1986; Welch, 1989). Issuers and underwriters naturally have more insights into the details of the offering than external investors. Consequently, rational investors are concerned about the lemons problem and the winner’s curse, leading them to be cautious about investing in IPOs if they do not have enough information (Ritter & Welch, 2002). Therefore, underpricing IPOs in the primary market is essential for attracting uninformed investors, assuming that the demand from informed investors is not sufficient to cover the offering (Rock, 1986).

The poor long-run aftermarket price performance of IPO shares can, in part, be attributed to asymmetric information, as documented by Leland and Pyle (1977), Allen and Faulhaber (1989), Welch (1989), and Houge et al. (2001). The asymmetry can prevent the accurate pricing of an IPO. If investors are too optimistic, they may push a company’s value higher than it should be, which might result in the company’s stock not performing well over time. Setting an IPO’s offering price is a challenging task since the issuer or the underwriter cannot determine with complete certainty how the market is

going to value the stock (Rock, 1986). Lowry et al. (2010) suggest that companies with greater information asymmetry, which makes their valuation more challenging, experience higher volatility in returns and are often underpriced when issued. Investments with uncertain futures are challenging to value accurately, and as a result, setting a lower initial price can be an effective way to address the complexities of valuation that investors encounter.

Further, Benveniste and Spindt (1989, p. 344) identify challenges in IPO pricing arising from information asymmetries. One issue arises when the issuing company is often well-informed about and understands its operational circumstances. This asymmetry can affect pricing as companies might be tempted to present themselves in a more favorable light to attract investors. Moreover, Ho et al. (2010, p. 188) suggest that information asymmetry can create conditions where the issuing company might engage in opportunistic strategies because of the high and costly information barrier.

The results of Purnanandam and Swaminathan (2004) are inconsistent with the asymmetric information model. Their portfolio tests show that overvalued IPOs yield higher initial-day returns of 5% to 7% compared to undervalued IPOs. However, they also exhibit lower long-term risk-adjusted returns of 20% to 30%. The asymmetric information theories would predict that the most undervalued IPOs should generate the highest initial-day returns as an efficient market corrects prices to fair value (Purnanandam and Swaminathan, 2004, p. 845).

3.3.1.1 Winner's Curse

One of the well-established asymmetric theories regarding IPOs is Rock's (1986) 'Winner's Curse', which describes the dynamics of the new issue market. In this theory, some investors possess better information, allowing them to avoid participating in overvalued IPOs. Therefore, uninformed investors frequently win bids for overpriced new issues, as informed investors overshadow them in underpriced offerings. To mitigate the 'winner's curse' faced by uninformed investors, deliberate underpricing is necessary.

Without new issues generally being underpriced, uninformed investors would experience negative returns and likely withdraw from the new issue market. To avoid this, investment bankers underprice new issues to ensure uninformed investors achieve normal results.

Rock's (1986) concept of the Winner's Curse can be seen as an extension of Akerlof's (1970) Lemons Problem. In the Lemons Problem, the challenge occurs when there is uncertainty about the quality of the item, and buyers are unable to reliably tell apart higher-quality items from low-quality items (lemons). This can lead to a situation known as adverse selection, in which the presence of lower-quality items can lower the average quality of items in the market, decrease the size of the market, and potentially even lead to the failure of the market itself.

An explanatory factor derived from the *winner's curse* is the size of the issue. Larger offerings are typically managed more professionally and have more information about their actual value, reducing the information asymmetry between investors. Consequently, larger IPOs often have less need to underprice their offering and are expected to show less initial outperformance (Rock, 1986). Keloharju (1993) examined the Winner's Curse in OMXH (HSE), confirming its existence, showing that when average returns are corrected for allocation bias, they are lower than returns calculated without this adjustment. Average unadjusted initial excess returns were 8.7%, while allocation-weighted returns varied between 5.3% to 5.1%. Particularly, investors who place smaller orders receive larger proportional allocations relative to their order size than those with larger orders. This leads to a trend where tiny orders generate insignificant positive returns after adjusting for share allocation, while large orders often result in significant negative returns.

In their research, Brounen and Eichholtz (2002) found a 2.55% initial excess return for 54 European real estate IPOs, with a slight decline after one year. Supporting Rock's (1984) winner's curse hypothesis, they observed that larger, professionally managed

IPOs were less underpriced and had lesser abnormal long-term underperformance. Furthermore, they discovered that IPOs with higher volatility after listing, suggesting greater initial uncertainty, faded more substantial underpricing yet delivered greater long-run returns.

However, Welch (1989) and Ritter (1987) argue that the winner's curse as a reason for IPO underpricing is avoidable. They propose that underwriters could address the problem of adverse selection by grouping IPOs by offering to withdraw the issue or compensation if informed investors do not show any interest. Alternatively, venture capitalists have the resources and expertise to potentially reduce IPO underpricing. Despite this, Barry et al. (1988) and Lee and Wahal (2004) find that IPOs with venture capital involvement tend to be even more underpriced.

3.3.1.2 Model of Cascades

Welch (1992) introduced a cascade model that describes investor behavior dynamics in the context of IPOs. This model suggests that investors' decisions are influenced not only by their personal information but also by the actions and interests of other investors. This phenomenon is notable during pre-IPO events such as road shows, where influential investors gather. In Welch's (1992) theory, a small group of influential investors showing interest in an IPO can create a domino effect, leading to increased investor participation. This surge in interest can drive up the demand for the IPO shares, potentially resulting in a higher initial offering price. Furthermore, Welch (1992) proposes that issuers might strategically underprice their IPO shares to attract early investments from influential investors.

The model of cascades further explains how later investors often base their investment decisions on the actions of previous investors, leading to this '*cascade effect'*. In IPOs where the shares are sold sequentially, the initial sales can serve as an indicator of the offering's success, influencing the later investors' decisions. This sequential decision-making process highlights the importance of initial investors' perceptions. If they view

the IPO as overvalued, it could negatively impact the offering's success, whereas if they perceive it as undervalued, it could lead to overwhelming demand (Welch, 1992).

The model of cascades offers an alternative perspective for IPO underpricing that does not rely on the winner's curse. According to this model, the fate of an IPO is often determined before it becomes available to a wider range of investors. Moreover, this model highlights the role of the underwriters in managing the information flow among segmented investor markets, thereby minimizing informational disadvantages for the issuer when determining the IPO price.

3.3.2 IPO Cycles, Windows of Opportunity, and '*Hot Issue Markets*'

The concept of '*hot IPO markets*' is recognized as a reflection of the financial market's cyclical reaction to new stock issues. Research by Ibbotson and Jaffe, and further work by Ibbotson et al. (1994) and Ibbotson and Ritter (1995), reveals a pattern where the volume of new issues and the initial returns show distinct cycles. These are often driven by bullish market conditions that lead to a surge in IPOs. This leads to fluctuating returns – initial spikes followed by declines – as the market conditions evolve.

In their research, Ibbotson et al. (1994, p. 66) identify fluctuating volumes of new issues and the size of initial returns as the third anomaly associated with IPOs, besides the initial underpricing and long-term underperformance. They propose a connection between these anomalies: occasional over-optimism among investors establishes '*windows of opportunity*' that lead to a wave of companies swiftly initiating their public offerings. This often leads to returns that fall short of long-term investors' expectations when the performance of issuers does not align with the initial over-optimism. The results by Ibbotson et al. (1994) confirm the existence of a cyclical pattern in both the volume and the average initial returns of IPOs. '*Hot issue markets*' are characterized by periods with substantially higher average initial returns. The cyclical nature of underpricing enables accurate predictions of the average returns for the upcoming month, and therefore investors may be able to centralize their purchases in months

when initial returns are anticipated to be exceptionally high. Additionally, month-to-month issue volumes display a higher degree of regularity than the patterns of underpricing (Ibbotson & Jaffe, 1975, pp. 1027-1041; Ibbotson et al., 1994).

Bayless and Chaplinsky (1996, pp. 253-255) define the windows of opportunity as periods when companies can raise capital under favorable terms due to decreased information costs. They suggest that if these information costs significantly influence a company's decision to issue equity, then it would be expected to see an increase in the volume of equity issues during these periods when information costs are lower. This perspective is in line with Myers' (1984) observation that the costs associated with asymmetric information are significant enough to impact companies' financing decisions, leading them to prioritize other methods over equity issuance.

Further, Lowry and Schwert (2002) found a notable autocorrelation between IPO activity and initial returns, suggesting that firms strategically choose to go public during periods that typically offer higher initial returns. Although these periods are associated with increased public listings, they do not reliably predict the extent of underpricing. Instead, it appears that the decision-making process during the IPO registration, informed by prevailing market trends, is what primarily drives the timing and volume of filings.

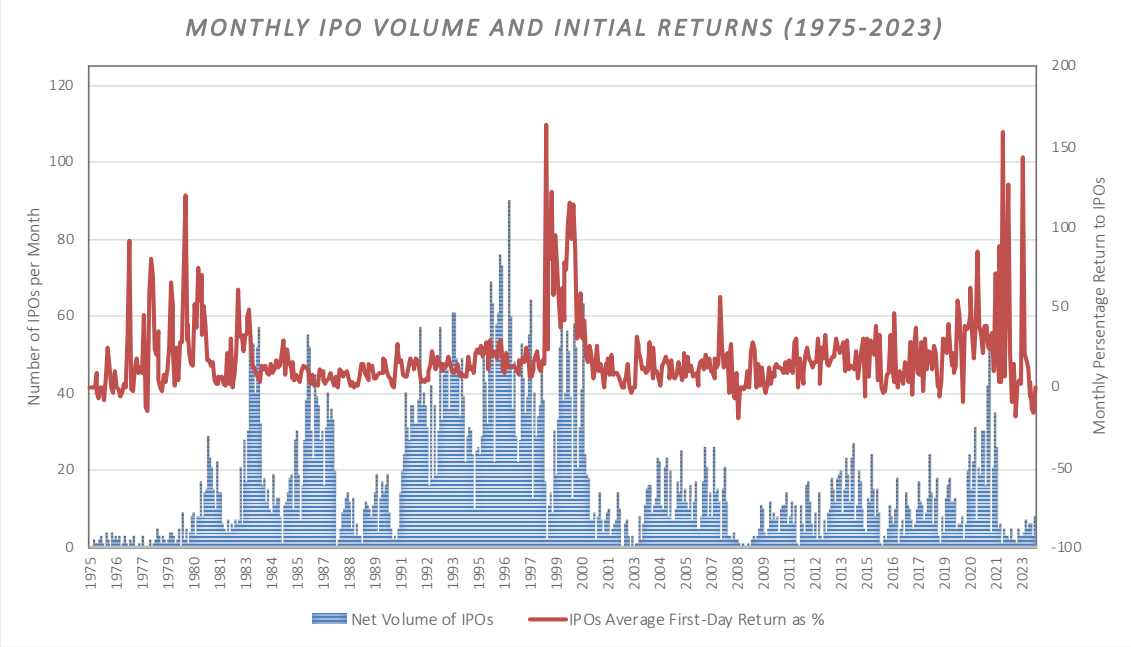

Figure 2. Monthly Data on Aggregate U.S. IPOs per Month and Average Initial Returns to IPO Investors. (Ibbotson et al., 1994). Updated on 03/04/2024 from Jay Ritter's Website [https://site.warrington.ufl.edu/ritter/ipo-data/] to Cover the Period January 1975 - December 2023.

Building on the data used by Ibbotson et al. (1994) and Lowry and Schwert (2002), my analysis in Figure 2 extends the timeframe to December 2023. The IPO volume exhibits cyclical behavior, consistent with the findings of previous research regarding the trends in company listings. Furthermore, the relationship between the IPO volume and the initial first-day returns suggests, that higher initial returns typically come before a rise in IPO frequency, aligning with the concept of hot markets. According to Ibbotson et al. (1994) and as illustrated in Figure 2, high-volume IPO activity months usually resulted in more high-volume months, with expectations linked to significant market downturns, as those that occurred during the dot-com bubble in 2000 and the beginning of the financial crisis. As seen in Figure 2, despite the expected efficiency of financial markets, there are noticeable occasions when the market reacts more favorably to new listings, which may be attributed to windows of opportunity.

Ritter (1991) suggests that when investor sentiment is particularly bullish, resulting in an increased valuation of a company, there is an opportunity for IPO issuers to set higher initial prices for their shares. The timing of an IPO plays a crucial role in its success. Launching the offering during windows of opportunity can result in substantial initial underpricing, leading to significant first-day trading returns for investors. However, this approach may also contribute to the stocks' long-term underperformance (Cai et al., 2007; Kumar et al, 2018, p. 2; Loughran et al., 1994; Ritter, 1991).

Contrastingly and expanding on Ritter's (1991), research, Loughran and Ritter (1995) argue that IPOs tend to be overpriced rather than underpriced during windows of opportunity, leading to long-term underperformance. This trend remains evident beyond the impacts of standard risk factors such as company size and book-to-market ratios, indicating that additional factors, such as timing and conditions of the IPO window, may contribute to this phenomenon.

Research by Cho, and Lee (2013), Loughran et al., (1994), and Lowry and Schwert (2002) discovered a positive correlation between the volume of IPOs and average initial returns, suggesting that companies 'time offerings during hot issue periods to capitalize on windows of opportunity. Loughran et al. (1994) observed that the increased initial returns seen in hot-issue periods could be attributed to the increased risks associated with the new offerings, alongside the increased overall market risk. Additionally, Aggarwal and Rivoli (1990) discovered that trading volumes for IPO shares generally decrease after the trading starts, with a significant drop observed in Finland, which could confirm the perceived negative long-run performance of IPOs.

Cai and Wei (1997) examined the long-term stock returns and operational performance of 180 IPOs on the Tokyo Stock Exchange from 1971 to 1992 and revealed a significant post-listing decline, a trend that was distinct compared to various benchmarks and contrary to patterns observed in the U.S. markets. Such declines in performance were not linked to changes in managerial ownership, supporting Loughran and Ritter's (1995)

'windows of opportunity' theory, which suggests that managers might choose to issue shares at times when market optimism is highest (hot-issue periods), instead of basing such decisions on the company's consistent performance.

4 Seasoned Equity Offering (SEO)

4.1 The Fundamentals of Seasoned Equity Offerings

Following the IPO and the first issuance of shares, companies can later sell additional shares to the market through '*seasoned equity offerings*' (SEOs). SEOs, also known as follow-on offerings, offer a technique used by companies on the stock exchange to secure more equity capital by distributing extra shares to the public (Gao & Ritter, 2010, p. 33; Kumar et al., 2018, p. 2).

Valuing shares for SEOs can be generally more straightforward and less expensive than for IPOs, as SEOs can be priced based on existing market prices for the shares. Therefore, the extensive book-building process may not be necessary for companies issuing additional equity after their initial IPOs (Bortolotti et al., 2006, p. 36). SEOs can be classified into three primary types based on their methods of offering: fully marketed offers, accelerated offers, and rights offers (Gao and Ritter, 2010, p. 33).

4.1.1 Fully Marketed Offers

The process for issuing fully marketed SEOs is very similar to book-built IPOs, involving collaboration between the issuing company and investment banks to market and price the shares. The primary shares are issued by the company and existing shareholders have the opportunity to sell their shares as secondary shares. The lead underwriter or underwriters conduct the due diligence investigation to verify the company's quality and then the prospectus is published. Just like in IPOs, there is a roadshow to market the offering and to develop interest among investors, where the book-runner assesses the investors' demand and builds an order book that is used to determine the initial offer price. Then, a syndicate of underwriters, led by the book runner, distributes the shares (Espinasse, 2014, p. 220; Gao & Ritter, 2010, pp. 3-4).

4.1.2 Accelerated Offers

Accelerated offers, including both bought deals and accelerated bookbuild offers, present a very rapid execution strategy for follow-on offerings (Bortolotti et al., 2006, p. 36; Espinasse 2014, p. 223; Gao & Ritter, 2010, p. 4).

In bought deals, the company looking to sell its shares announces the share amount available, and investment banks leave bids for these shares, typically submitting them after the stock market has closed for the day. The bank with the highest bid wins the deal, and then resells the shares, primarily to institutional investors. Bought deals are also known as overnight deals because the winning bank typically resells the shares within 24 hours (Bortolotti et al., 2006, p. 36; Gao & Ritter, 2010, p. 4).

In accelerated bookbuild offerings, banks submit proposals, commonly specifying a gross spread instead of an initial offer price, for the right to act as an underwriter in the equity offering. After being selected, the winning bank usually puts together a small underwriting syndicate and begins the marketing of the shares to institutional investors. After this, the issuing company and the bank negotiate the price of the offer. The book-building process is therefore '*accelerated*' since no road-shows are conducted, and the underwriting process is typically completed within 48 hours (Bortolotti et al., 2006, p. 36; Gao & Ritter, 2010, p. 4).

4.1.3 Rights Offers

In a rights issue (or rights offering), existing shareholders are granted rights to subscribe to new company shares issued at a prespecified price, relative to their current holdings. For example, they may acquire one new share for every three old shares. This allows the shareholders to maintain or increase their ownership in the company by acquiring additional shares before they are offered to other investors. The right of first refusal serves as a protective measure, ensuring that current shareholders can safeguard their position against potential dilution. The shareholders have the option to either exercise

their pre-emption rights by subscribing to the new issue or selling their rights on the stock exchange. Despite potential dilution for those selling rights, there is no actual loss in value (Espinasse, 2014, pp. 220-221; Gao & Ritter, 2010, p. 33; Massari et al., 2016, p. 432). Rights offers are usually not as heavily marketed as fully marketed offerings. In this sense, they are similar to accelerated offers (Bakshi & Ritter, 2010, p. 33).

Rights issues typically involve full underwriting by a bank or syndicate of banks, ensuring issuers receive full proceeds. The underwriters are committed to purchasing any unsubscribed shares at the subscription price. In contrast, during a non-underwritten rights issue, under certain market conditions, some new shares can remain unsubscribed (Espinasse, 2014, p. 220; Massari et al., 2016, p. 432).

The subscription price for new shares is predetermined by the issuer at a significant discount, and preemptive rights can be exercised within a limited time frame known as the subscription period. During this period, these rights are detached from the shares and are traded separately on the stock exchange. Unexercised rights are traded separately as '*nil paid*' during the subscription period and at the end of the period, they are auctioned in a coordinated market placement known as a rump placement (Espinasse, 2014, pp. 220-221; Massari et al., 2016, p. 432).

Shares in a rights issue are commonly offered at a notable discount, often around 20 percent or more, aiming to motivate shareholders to exercise their rights. However, the extended timelines of rights issues, compared to other follow-on transactions, may occasionally contribute to a temporary dip in the share price, sometimes leading it to fall below the rights issue price. The trading price of shares after the announcement but before the rights issue launch is termed the 'cum' price. The theoretical price at which shares should trade post-launch, with both shares and rights trading separately, is referred to as the 'theoretical ex-rights price' (TERP) (Espinasse, 2014, p. 220-221). TERP is calculated as follows in equation 3 (Massari et al., 2016, pp. 433-434).

$$TERP = \frac{(n\ x\ p) + (N\ x\ p)}{n + N} = \frac{(n\ x\ p) + S}{n + N} \quad (3)$$

Where n represents the number of shares outstanding before the announcement and N is the number of newly issued shares. The reference share price before the announcement (cum-right price), is denoted as p and P is the subscription price. S represents the rights issue size (N x P). Therefore, TERP should be equal to the market capitalization of the issuer at the announcement, adding the expected proceeds of the rights issue and then dividing the result by the total number of shares outstanding after the issuance of new shares. The discount applied to the subscription price is usually expressed as a percentage of TERP (Espinasse, 2014, pp. 220-221; Massari et al., 2016, pp. 433-434).

The determination of the discount price and the subscription price involves significant consideration. The discount should ensure that the ex-right price remains higher than the subscription price until the end of the subscription period, making the rights offer advantageous for the shareholders. However, if the market perceives the discount as overly generous, it could be interpreted as a negative signal regarding the expected future share price of the issuer (Massari et al., 2016, p. 433). Choosing a higher discount on the TERP is a strategic move that encourages shareholder participation while minimizing speculative behavior, reducing the likelihood of the share price falling below the rights issue. Conversely, selecting a lower discount to the TERP may result in shorting the stock (Espinasse, 2014, p. 222).

4.2 Why to go Public Again?

Similar to IPOs, companies issue secondary equity for various reasons. The previous literature suggests that these include *increasing market liquidity, managing the composition of ownership, securing capital for expansion and investment, and responding to favorable market conditions*. Market conditions are covered in detail in Chapter 4.2.1.

When new shares are issued through a public offering and acquired by new investors, it typically improves the liquidity of the shares on the secondary market. Both Kothare (1997) and Ginglinger et al. (2013) have observed that the expected impact on stock liquidity might influence the company's choice of issuance method. Ginglinger et al. (2013) discovered that uninsured rights issues have the least positive impact on a stock's liquidity, while pure public offerings have the most favorable effect. Further results by Ginglinger et al. (2013) indicate that companies operating in highly liquid markets tend to choose standby rights offerings or, in cases where large influential shareholders opt out of subscription, select pure public offerings. On the other hand, Kothare (1997) discovers that companies with concentrated ownership tend to prefer rights offerings, possibly influenced by their investors' focus on long-term returns over immediate trading costs. In contrast, larger firms with a dispersed shareholder base might avoid rights offerings, considering the critical influence of liquidity on stock trading volume and price. She documents that bid-ask spreads widen after rights issues and narrow after public offerings, attributing these effects to ownership becoming more diffuse after public offerings and more concentrated after rights issues. Furthermore, Kothare (1997) emphasizes that even small changes in trading costs can significantly impact a company's market valuation over time, urging firms to ensure the liquidity of their publicly traded equity. However, Ginglinger et al. (2013) argue that Kothare's (1997) findings may be driven by the large proportion of financially distressed firms in her sample.

Zhang (2005) found that insider participation and equity dilution at the time of an IPO correlate positively with the issuance and the size of seasoned equity. Further, companies that release seasoned equity within three years of their IPO tend to have lower abnormal returns compared to companies that go public for over the three years before their SEO, as well as those conducting their second or third SEO. The observed difference is -0.8% and is both statistically and economically significant.

Walker et al. (2016) analyzed companies that have conducted several SEOs from 1995 to 2012 to examine whether a company's commitment to its stated use of proceeds from past offerings influences investor trust in future offerings. Their findings indicate that companies that are transparent regarding their investment plans, and even those that do not announce but proceed with investments, tend to experience more favorable returns upon subsequent SEO announcements. This suggests that the market, mindful of equity's potential agency costs and informed by past actions, adjusts its perception of a firm's future capital usage. Moreover, Walker et al. (2016) discusses the various costs of seasoned equity issuance, such as underwriting fees, disparities in information, and the agency costs that arise when management controls substantial cash. While the market generally reacts negatively to SEO announcements, with average returns falling between -2% to -4%, this response varies. The research highlights that the reasons for issuing equity and the subsequent market reactions are diverse, underscoring that the equity issuance process and investor responses are not unambiguous.

Kim and Weisbach (2008) analyzed 13,142 SEOs across 38 countries from 1990 to 2003, concluding that these offerings serve to raise investment capital and capitalize on favorable market conditions. Their research indicates that firms with low market-to-book ratios are more likely to allocate funds towards inventories, acquisitions, capital expenditures, and reducing long-term debt than their higher-valued counterparts, who prefer to keep more cash from cash per dollar raised. This pattern implies that lower-valuation firms typically use SEOs to finance new investments, whereas higher-valuation firms use SEOs to take advantage of their valuation. Further, DeAngelo et al. (2010) propose that young companies with high market-to-book ratios and lower operating cash flows are likely to issue stocks for funding investments, whereas older, more established companies with lower ratios tend to finance investments internally and pay out dividends. These studies align with Geddes (2003, pp. 212.213), who states that firms often issue SEOs to fund capital projects, acquire other businesses, repay debts, or behave opportunistically in positive market conditions.

DeAngelo et al. (2010) found that growth-stage companies engage more frequently in SEOs, a trend attributed to their requirement for capital to invest in growth. This demand for capital usually correlates with an initial increase in stock value before the SEO. This requirement for capital is further used to explain why stock prices might fall after the SEO, as the market reacts to the dilution and the costs associated with capitalizing on these growth opportunities.

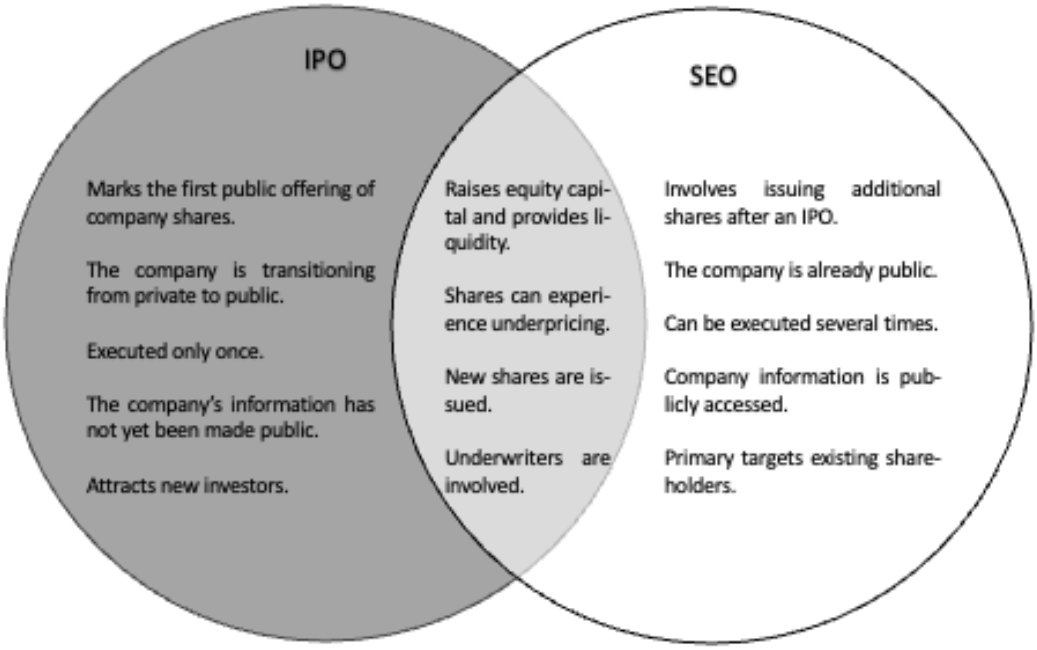

Figure 3. The Key Similarities and Differences Between IPOs and SEOs.

Young et al. (2023) investigated how a company's performance SEOs correlate with the market dominance and expense preference hypotheses. They found that companies with less competition and a higher market share typically benefit from SEOs when they effectively apply their market advantages. However, the performance of these companies can suffer if their managers choose to retain funds. The research supports the market dominance hypothesis, showing that such dominant companies often outperform both similar firms and those in more competitive sectors with lower market

shares. This indicates that well-positioned firms can use SEOs to further strengthen their competitive position by making good use of their substantial resources.

4.2.1 Market Timing

The timing of issues is not exclusive to initial public offerings; public companies often initiate SEOs when their stock prices are high or there is notable information asymmetry in the market (Kumar et al., 2018, p. 2). Market timing stands as the leading theoretical explanation for SEOs, based on the logical and credible idea that managers capitalize on favorable stock market conditions (Baker & Wurgler, 2002; DeAngelo et al., 2010; Loughran & Ritter, 1995, 1997). Companies that initiate an SEO generally have high share prices and grow significantly before the SEOs (Asquith & Mullins, 1986; Masulis & Korwar, 1986).

Kim and Weisbach (2008) and Loughran and Ritter (1995, 1997) identify managerial incentives as a key determinant in the market timing of SEOs. Kim and Weisbach (2008, pp. 296-298) posit that when a company's shares are perceived to be overvalued, management has a strong incentive to issue mote stock, capitalizing on favorable market conditions. Conversely, if the stock is considered undervalued, they tend to seek alternative financing possibilities, avoiding the dilution of equity at low prices. This approach indicates that the fraction of secondary shares in an offer is likely to be larger when managers, as potential sellers, believe the stock to be overvalued, suggesting an opportunistic use of market conditions to the firm's advantage.

Further, Wadhwa and Syamala (2019) conclusively examines that both market timing and market conditions significantly company's decision to issue SEOs in India. The research indicates that companies coordinate the timing of their seasoned equity offerings with periods of favorable market conditions, suggesting a tendency to issue shares in 'hot market' periods. Additionally, these decisions are informed by economic trends and investor sentiment, pointing to a comprehensive approach that weighs both immediate market opportunities and longer-term economic forecasts. Wadhwa and Syamala's

(2019) results highlight a notable trend of negative long-term performance following SEOs, suggesting that firms might indeed be successful in issuing overvalued equity to the market. The long-term performance of SEOs during these periods does not exhibit significant underperformance, implying that the SEOs issued during 'cold' times do not capitalize on overvaluation to the same extent as during 'hot' periods. This corresponds to Loughran and Ritter (1995, 1997) who also observe that firms issuing stocks during 'cold markets' do not underperform as much, suggesting that the timing of offerings within market cycles could be attributed.

Research by DeAngelo et al. (2010) suggests that while the market timing opportunities and the stage of the corporate lifecycle have a statistically significant influence on the decision to conduct an SEO, the need for cash is the primary motivation for companies to issue seasoned equity. The research finds that even substantial changes in market timing opportunities or the time a company has been listed lead to only minor adjustments in the company's likelihood of conducting an SEO, although these changes can be relatively significant since companies do not frequently sell stock. DeAngelo et al. (2010) note that a surprisingly high portion of the total number of SEOs and SEO revenues come from companies that are beyond the growth stage, possibly because these companies regularly distribute their cash flows and therefore may need to raise capital more often. Furthermore, the study shows that despite the theoretical attractiveness of market timing for issuing overvalued stock, companies with the best timing opportunities often choose not to issue stock. One reason may be that managers cannot accurately predict stock returns, or because the market can identify and appropriately devalue such strategic attempts by the companies.

Early research on SEOs suggests that markets tend to respond negatively to SEO announcements, with share prices experiencing an average decline of 2-3% near the announcement date (Asquith & Mullins, 1986; Masulis & Korwar, 1986). This adverse reaction is commonly viewed as being in line with Myers and Majluf's (1984) model, which attributes the negative market response to potential adverse selection problems.

Myers and Majluf (1984) contend that due to information asymmetry between issuers and investors, companies tend to offer shares that are of lower-than-average quality, implying that new equity issues often lead to a perceived decrease in firm value by the market. Similarly, Lucas and McDonald (1990) propose that the act of issuing equity can be interpreted negatively by the market, a consequence of either adverse selection or strategic market timing. It is theorized that companies may choose to buy back shares periodically when they believe it to be beneficial, and cautious management will seek to prevent the dilution of value for existing shareholders. Firms that are undervalued will act quickly to repurchase shares, whereas firms whose shares are overvalued will delay repurchases until such overvaluation corrects itself. The expected pattern in share prices will typically show a prolonged decline before a repurchase is announced, which is then followed by a rise in share price.

Under the concept of market timing, selling secondary shares is often seen by the market as insiders capitalizing on the right timing to sell shares that may be overvalued. Different types of share offerings can communicate various messages about a company to the market. According to Bradley and Yuan's (2013) research, competitors generally have a small but positive stock reaction of 0.26% to announcements of primary share SEOs, which reflects a competitive effect in the market. Conversely, these companies experience a 0.35% decline in stock prices following a secondary share SEO announcement, illustrating the contagion effect within the industry. The research suggests that when companies issue primary equity offerings, it often indicates a positive outlook for the industry since the assumption is that these funds are raised for investment in profitable projects. This sentiment is reflected in the positive correlation between competitors' reactions and the projected growth in earnings-per-share (EPS) by analysts. In contrast, secondary offerings, often involving insiders selling their shares, can be perceived as a sign of the company being overvalued, which tends to harm the valuation of competitive firms. If a company's share offering leads to unusually high stock performance, its competitors may be more inclined to conduct primary offerings.

4.2.2 Do SEOs Come in Cycles?

As SEOs and IPOs both involve equity raising, they may be influenced by common factors (Howe & Zhang, 2010, p. 730). Despite this, cycles in SEOs have received less attention from researchers.

One of the earliest types of research on SEO cyclicality was conducted by Choe et al. (1993). Choe et al. (1993) suggest that the occurrence of high-volume periods of SEOs is consistent with the expansionary phases. During these periods, companies tend to engage in SEO activity due to lower adverse selection costs, which are associated with more promising investment opportunities and lower uncertainty, which leads to more favorable conditions for equity issuance. Empirically, they find that announcements of SEOs convey less negative information about a company's equity value during these times, and the reaction to SEOs tends to be less negative during periods of economic expansion and when the volume of equity financing is higher. The business cycle variables have significant explanatory power in predicting SEO patterns during expansionary phases, whereas interest rate variables had little to no impact on SEO volume.

Further, Bayless and Chaplinsky (1996) observe the clustering of equity issues, affirming the existence of windows of opportunity that allow capital raising under favorable conditions. Their findings show that average price reactions are significantly less negative during 'hot market' periods and significantly more negative during 'cold markets'. The variability in market reactions is not attributed to differences in firm or market characteristics or time trends but is rather seen as indicative of a focus on firm-specific information in cold markets. This suggests that concerns regarding asymmetric information are heightened in such periods. Their results back the practice of considering market timing as an essential factor in equity issue decisions by managers and investment bankers.

While Choe et al. (1993) and Bayless and Chaplinsky (1996) both report changes in SEO volume over time, they each concentrate on a single explanation for this variation. The study by Howe and Zhang (2010) is the first to consider a wide range of explanations for the time-varying character of SEOs. They observe that while SEOs display cyclical patterns, they tend to be less volatile compared to those of IPOs. Their research offers strong empirical support for theories that the demand for capital and market timing are the primary drivers behind SEO volumes. Interestingly, factors such as investor sentiment and information asymmetry, which are significant in explaining IPO volumes, do not hold as much weight in the context of SEOs.

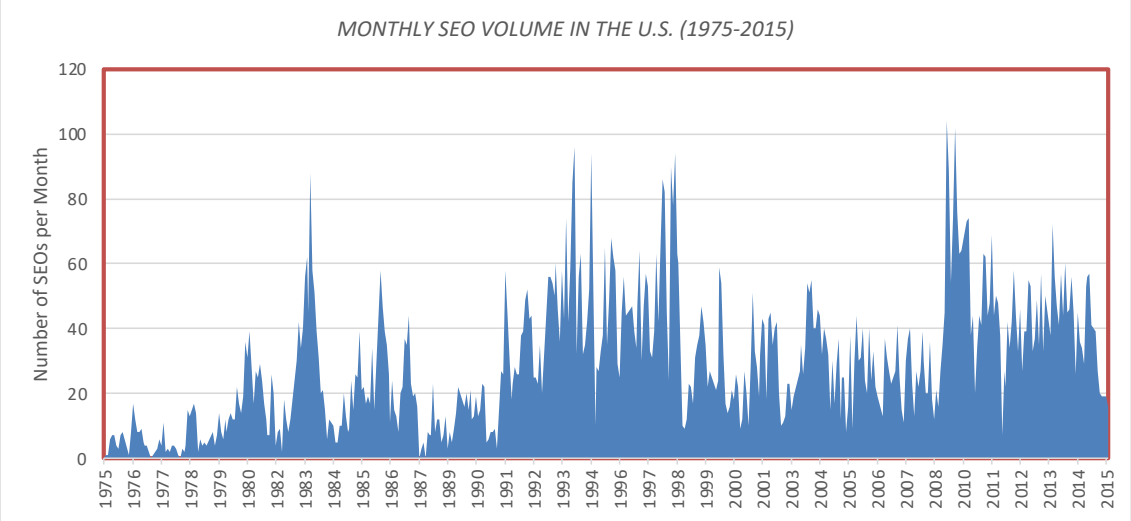

Figure 4. Monthly SEO Volume in the U.S. (1975-2015). Updated on 05/04/2024 from Jay Ritter's Website [https://site.warrington.ufl.edu/ritter/ipo-data/] to Cover the Period January 1975 - December 2015.

In Figure 4, there is notable fluctuation in the SEO volume throughout the 40 years, displaying distinct peaks and troughs indicating periods of high and low SEO issue volume (hot and cold issue markets). There are notable peaks in SEO volume that occur at certain periods, particularly in the late 1990s and the mid-2000s. These peaks might align with periods of economic or sector-specific booms, or bull markets. These peaks could also reflect market reactions to significant economic events. For instance, there is a visible decline in SEO volume around 2000, coinciding with the bursting of the dot-com bubble.

Similarly, the Global Financial Crisis around 2008-2009 seems to correlate with another downturn in SEO volume.

4.3 The Puzzles and SEOs

4.3.1 IPO Underpricing's Relation to Issuance of SEOs

Welch's (1989) signaling theory suggests that high-quality firms underprice their IPOs to get higher prices for seasoned offerings. So, a higher price on the seasoned offering eventually offset companies for their intentionally low initial pricing. The theory assumes that it is expensive for low-quality companies to imitate the appearance of high-quality companies and that there is always a risk that investors will discover the truth before these companies can enjoy any benefits from their disguise. By setting their IPO prices low, high-quality companies make it too costly for low-quality firms to try to appear as just as credible, which may lead them to disclose their lower quality. The model indicates that companies employ a multiple-issue strategy when they set the initial price and decide on the number of shares to be sold. Welch's (1989) model can also be applied to insider sales, suggesting that high-quality firms underprice their IPOs, which allows insiders to sell their shares at higher prices once the selling restrictions expire.

In later research, Welch (1996) suggested that when a company conducts an SEO, the timing of this offer can send a strong signal, as the underpricing can. Research by Jegadeesh et al. (1993) supports this later suggestion, discovering that companies that underprice their IPOs are more likely to issue SEOs and these issues tend to be larger. They also observed that the aftermarket performance of the company's stock after IPO tends to predict future SEOs better than initial underpricing. Based on their findings, they conclude that their results align more closely with the concept that market reactions provide better insight than signaling theories do. They believe that setting initial share prices low balances out market dynamics, acting as an indicator of a company's good quality to potential investors.

Loughran and Ritter's (2002) prospect theory proposes that company owner-managers do not mind setting lower IPO prices if it means that their overall wealth will significantly increase later. They argue that this would explain some of the extreme underpricing that has been observed since the mid-1990s. The prospect theory suggests that when companies offer a larger percentage of their stock, along with shares held by existing shareholders, usually have less underpricing. The reason for this is that a significant part of the company and shares from existing shareholders are put on sale, which increases the risk of value loss for these shareholders, prompting the company to pursue higher initial pricing. Loughran and Ritter (2004) further note that during times of economic booms, companies tend to prioritize long-term profit from insider trades and follow-on offerings over immediate returns from IPOs. Aggarwal et al. (2002) noted similar behavior among owner-managers, who often intentionally avoid setting their IPO prices too high to create an information momentum that benefits future share sales on the open market or in follow-on offerings.

Prospect theory and information-momentum theory indicate that by offering fewer shares during an IPO, insiders could increase demand and later sell follow-on offerings at higher prices. Zhang's (2005) study supports these theories, showing a trend where more insider involvement and share dilution during an IPO correlate with fewer and smaller offerings. Contrary to theoretical expectations, the data reveals that insiders are more likely to sell a greater number of shares in follow-on offerings if they sold a significant number during the IPO.

4.3.2 Understanding SEO Underpricing

Underpricing, while typically more associated with IPOs, is also a significant phenomenon in the SEO market. In the 1990s, SEOs experienced underpricing rates ranging from 2.92% to a peak of 3.72% in 1998, accounting for a considerable percentage of direct and indirect costs associated with issuing equity (Corwin, 2003). Despite

observable secondary-market prices which should theoretically lead to efficient pricing, underpricing persists.

Consistent with the evidence from IPOs, Corwin (2003) finds that SEO underpricing increases with uncertainty about a company's value. Altinkilic and Hansen (2003) also argue that expected discounting in SEOs compensates investors for uncertainty about the company's value and serves as a form of payment for positive issuer information. However, less connection is seen between underpricing and factors such as firm size or bid-ask spread, which suggests asymmetrical information plays a smaller role in SEO pricing. Moreover, underpricing seems to reflect temporary price pressure, particularly for larger offers and for stocks with less flexible demand.

SEO underpricing can be attributed to the strategic pricing decisions by underwriters. Corwin (2003) notes, that it is common for underwriters to set offer prices at the nearest dollar or quarter-dollar, leading to more substantial discounts for shares with low prices or those not already priced at quarter-dollar figures. Research by Corwin (2003) and Altinkilic and Hansen (2003) suggests that companies listed on the Nasdaq tend to experience greater underpricing compared to those listed on the NYSE or Amex, especially if they have lower stock prices and higher volatility in their stock returns. Corwin (2003) argues that the distinct pricing practices employed by these exchanges are the primary reason for this variation in underpricing. Typically, Nasdaq offerings are priced relative to the bid quote, whereas those on the NYSE are based on the closing transaction price. This difference in underwriting behavior reflects varying levels of confidence in the accuracy of the information provided by closing prices across the two markets. Lastly, Corwin (2003) notes that patterns of underpricing in SEOs often correlate with those in IPOs, hinting that these trends may be driven by changes in the relationships between underwriters and firms or shifts within the underwriting industry. These changes are seen to affect both the first-time and seasoned offerings in the capital markets.

Akhigbe and Whyte (2015) report a positive and statistically significant correlation between the efficiency of internal capital markets and SEO announcement returns. Previous research suggests that the negative returns seen after announcements of SEOs can be attributed to agency costs, particularly when the proceeds from these offerings are not being used effectively due to poor supervision (Welch, 1996; Kim & Weisbach, 2008). These studies indicate that insufficient monitoring of management's actions can lead to reduced interest in the offering, which in turn increases underwriting costs and associated risks.

Cline et al. (2012) analyzed 5,355 SEOs from 1988 to 2007, finding that while traditional initial-day returns averaged 3.29% (mean) and 1.44% (median), these returns dropped to just 0.21% (mean) and became significantly negative (-0.32% median) after adjusting for dilution from new shares and market performance. These mixed results suggest underpricing in SEOs may be partly due to overlooking these factors. Further analysis showed that the returns are also influenced by the length of lockup periods, discount reversals, prior company performance, and the reputation of the underwriters. Additionally, the study points out that the discount on SEOs was consistent at around 3% throughout the 1990s. Cline et al. (2012) also mention, that because these offerings frequently coincide with bullish market conditions, the timing of the offering could affect the initial returns.

According to Walker et al. (2016), capital markets remember the past behaviors of companies. They note that companies that are transparent about their spending of proceeds from SEOs often enjoy higher abnormal returns on future offerings. The study shows that subsequent SEOs often result in higher abnormal returns, with the largest increases seen in firms that withhold information about the use of proceeds, possibly due to the expense of disclosure. Firms that share this information see smaller increases as markets quickly price in the disclosed growth opportunities. Additionally, the research suggests that the credibility of a firm is linked to both the company's disclosure practices and the reputation of its leadership.

4.3.3 SEO Long-term Underperformance

In addition to underpricing, the phenomenon of long-term underperformance remains a significant SEO market characteristic. Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) define this as the ‘’*new issue puzzle*’’, which challenges the presumption of rational pricing in the security markets. Their research indicates that the common stock returns of industrial firms issuing SEOs are 40-60% lower than those of non-issuing firms throughout three to five years following the issue date. According to this new issue puzzle, these findings question the validity of the rational pricing model in securities markets, suggesting that the market's reaction to SEO announcements may be insufficient and that non-issuing firms may more accurately represent the risk attributes of firms issuing SEOs.

SEOs share various features with IPOs, such as reallocating a portion of the company's ownership rights from existing shareholders to new ones. Therefore, the potential for managers to leverage periods of stock overvaluation, as seen in IPOs, may extend to SEOs (Speiss & Affleck-Graves, 1995, p. 244). Speiss and Affleck-Graves’ (1995) research on 1,247 U.S. companies that made primary SEOs between 1975 and 1989 indicates that SEOs typically yield a median five-year return of 10%, which is considerably lower than the 42.3% return for non-issuing firms of similar size and industry. This suggests that the trend of lower returns over time, previously noted in IPOs by Ritter (1991), is also common in SEOs. These findings align with the idea that managers might issue equity based on proprietary information, particularly when the company's stock appears to be overvalued.

Similarly, Ritter (2003) observed an average stock market return of 72% in the year before an SEO, a -2% change upon announcement, and an approximate -30% post-issuance abnormal return over the five years compared to relevant benchmarks. Loughran and Ritter (1995) found a trend of long-term underperformance in U.S. IPOs and SEOs from 1970 to 1990. Expanding on this, their 1997 study of 1,338 SEOs from 1979 to 1989 confirmed that these companies typically saw poor stock performance and

a reduction in operational performance. Loughran and Ritter (1995; 1997) suggested that this could be attributed to managers issuing equity during times of inflated stock prices, exploiting windows of opportunity, and investor optimism about the company's future prospects.

Building on the windows of opportunity theory, the research by Clarke et al. (2001) found evidence that insiders are likely to issue stock at high valuations and may withdraw the offering if market reactions reduce the inflated valuation, indicating they capitalize on market opportunities. Their results show that completed and canceled SEOs show similar patterns in abnormal stock performance up to the announcement date. However, canceled SEOs typically see -13% abnormal performance from announcement date to cancellation, whereas completed SEOs do not show significant abnormal performance. Clarke et al. (2001) note that insider selling tends to increase before the announcement of both completed and canceled offerings, but it stays high post-announcement only for completed offerings. These findings suggest that insider trading patterns are aligned with the overvaluation of the company's stock. Furthermore, when insiders reduce their selling after the announcement of an SEO, it often predicts a higher chance of the offering being canceled, suggesting a reevaluation of the stock's value. The research by Clarke et al. (2001) concludes that there are market inefficiencies, as the market does not seem to fully reflect the negative implications of SEO announcements and associated insider trading.

Jegadeesh (2000) examines the long-run performance of companies issuing SEO and compares these results to various benchmarks. He finds that these companies consistently underperform across all benchmarks for five years following their equity issues, with this pattern holding for both small and large companies, and for growth and value companies. According to him, there are two potential explanations for this underperformance. First, SEOs could indicate an overvaluation of the firm. Second, they could be perceived as non-events, with any subsequent underperformance attributed to other firm-specific factors. Additionally, returns around earnings announcements post-

SEO were specifically examined, showing a 4.3% underperformance compared to benchmarks, hinting at the market's possible over-optimism about the firm's prospects. Aligning with Clarke et al. (2001), these findings suggest that this underperformance points to potential inefficiencies in market valuation processes, especially since these discrepancies persist beyond the short-term periods typically analyzed in event studies. An alternative explanation provided by Huang et al. (2014) for the long-run underperformance of stock following equity offerings is attributed to a sharper decline in idiosyncratic volatility resulting from young companies' pursuit of growth opportunities. Their findings reveal a significant abnormal reduction in average expected idiosyncratic volatility among SEO firms post-offering, particularly driven by their relative youth. Moreover, they note a considerable decline in abnormal returns among young SEO firms in the post-issue period, partly explained by concurrent abnormal reductions in expected idiosyncratic volatility. Notably, these findings remained robust across various market conditions, considerations of the leverage effect, accuracy of analysts' forecasts, and changes in SEO issuing costs.

Eckbo et al. (2000) address the *new issue puzzle* in their research of 7000 seasoned equity and debt issues. They observe that issuer underperformance can be attributed to lower systematic risk exposure for issuing firms compared to similar companies. This reduction in risk exposure occurs as equity issues reduce leverage, and therefore decrease their stocks' expected returns relative to their matched companies. In addition, equity issues significantly increase stock liquidity, further reducing expected returns compared to non-issuers. It is noted that some studies argue that the long-term underperformance following an equity offering simply reflects the reduced systematic risk exposure resulting from the offering. Eckbo et al. (2000) conclude that the *new issue puzzle* arises from the failure of the matched-firm technique to provide a proper control for risk, a conclusion that holds across different issue characteristics and factor model frameworks. They suggest that the persistent long-term underperformance of stocks post-equity issues remains largely unexplained, emphasizing the importance of exploring potential explanations for the underperformance of SEOs.

An alternative perspective, supported by Fama (1998), suggests that the low returns experienced by these firms are not solely caused by the act of issuing SEOs. Rather, they argue that the relationship between certain characteristics of SEOs, such as their low market-to-book ratios and high past returns, and future returns, may better explain the observed performance. This perspective indicates that SEOs might seem to underperform simply because they are not compared against the correct benchmark.

5 Cultural Differences Between the Offerings

In the following chapter, the performance of IPOs and SEOs from different countries is examined. Given the extensive research on SEOs is predominantly from the U.S., the section on SEOs is relatively brief in comparison to the more detailed exploration of IPOs.

5.1 The Performance of IPOs and SEOs Across Countries

Short-run underpricing and long-run underperformance of IPOs is a global phenomenon, but the extent varies due to differing market dynamics. Variations in underpricing can be attributed to different selling mechanisms, firm-specific characteristics, and institutional constraints (Loughran et al., 1994).

Country	Sample Size	Time Period	Avg. Initial Return	Country	Sample Size	Time Period	Avg. Initial Return
Australia	2,377	1976-2021	20.5%	Mexico	149	1987-2017	9.9%
Austria	106	1971-2018	6.2%	Netherlands	245	1983-2021	12.0%
Belgium	154	1984-2017	11.0%	New Zealand	277	1979-2022	15.5%
Brazil	385	1979-2023	24.8%	Norway	368	1984-2021	10.3%
Canada	813	1971-2022	6.8%	Poland	359	1991-2022	12.4%
Chile	88	1982-2019	6.8%	Portugal	33	1992-2017	11.5%
China	4,983	1990-2022	162.2%	Russia	64	1999-2013	3.3%
Denmark	190	1984-2021	7.6%	Saudi Arabia	126	2003-2021	179.2%
Egypt	74	1990-2017	9.4%	Singapore	722	1973-2021	24.7%
Finland	244	1971-2021	14.5%	South Africa	342	1980-2018	17.2%
France	904	1983-2021	9.4%	South Korea	2,312	1980-2022	52.0%
Germany	840	1978-2020	21.8%	Spain	204	1986-2021	9.5%
Greece	373	1976-2013	50.8%	Sweden	446	1980-2023	28.2%
Hong Kong	2,301	1980-2021	40.5%	Switzerland	173	1983-2021	24.6%
India	3,304	1990-2022	82.1%	Taiwan	1,974	1980-2021	37.6%
Indonesia	889	1990-2023	52.2%	Thailand	785	1987-2021	39.8%
Italy	413	1985-2018	13.1%	Turkey	529	1990-2022	13.0%
Japan	4,065	1970-2022	49.0%	UK	5,309	1959-2020	15.7%
Malaysia	571	1980-2019	50.3%	US	13,811	1960-2023	17.5%

Table 2. Equally Weighted Average Initial Returns (Loughran et al., 1994; Updated January 31, 2024)

In Table 2, ***Greek IPOs*** showed an average underpricing of 50.8%, which significantly surpassed initial returns seen in rest of the Europe and larger markets, such as the U.S., which has an average initial return of 17.5%. The research by Thomadakis et al. (2012) revealed an atypical trend present in Greek IPOs that challenges the usual narrative where underpricing is typically followed by a decline in performance. Their results show that Greek IPOs sustained significant long-run overperformance and provided investors with substantial long-run adjusted returns ranging from 40.82% to 4.11% for approximately two years after listing. However, after about two years, the trend reversed, with the three-year returns turning negative, indicating that the initial overperformance was not permanent. It is important to note, that this phenomenon occurred during Greece's economic boom, and in late 2009, the Greek crisis started.

Further, Dasilas and Leventis (2013) found that ***Greek SEOs*** experienced a significant positive stock market response at the time of the announcement, diverging from the commonly observed negative market reaction to such announcements. This was particularly evident during Greece's late '90s economic boom, as companies actively leveraged favorable market conditions to fund expansions and growth through SEOs. The study suggests that the presence of major shareholders in management roles, which usually signal confidence to investors, contributed to this anomaly. While the initial market reception to Greek SEOs was favorable, reflecting trust in strong ownership and governance, the research highlighted a subsequent downturn in share prices and company performance over the long run. This pattern suggests that the initial positive response may have been overly optimistic, possibly resulting in inefficient use of the capital raised and an increased dependence on debt financing to cover dividend payments.

Table 2 illustrates that, on average, ***German IPOs*** are underpriced by 21.8%. Ljungqvist's (1997) research notes that German IPOs during 1970 and 1993 were generally underpriced by 9.2%, indicating that the underpricing has continued and increased during recent years. Ljungqvist (1997) also observed that German IPOs yielded a return

12% lower than the market over the first three years. Further, Stehle et al. (2000) reported that German IPOs typically underperform in the long-run and exhibit an average annual abnormal return of -2.3%, which Is lower than that of SEOs. In contrast, seasoned equities have shown an average annual return of +3.5%, which may imply a steadier performance relative to newly listed equities.

In their study investigating the post-IPO operating performance in ***European*** markets, Pereira and Sousa (2017) question whether a 'Berlin Wall' still exists, dividing Eastern and Western European companies based on their post-IPO performance trends. Their analysis, covering IPOs from 1995 to 2006, reveals a general downturn in post-IPO performance, with a particularly sharp decline for firms in emerging Eastern European markets. Notably, these firms exhibited an average underpricing of 5.22%, markedly higher than the 2.73% for their Western counterparts, indicative of the greater risks and incentives offered by Eastern entities to attract investors. Additionally, they detected a more aggressive earnings management and strategic timing of IPOs by Eastern companies, which often coincide with periods of peak operational performance. This approach is aimed at optimizing short-term investor interest, though it may not support stable long-run performance. The study further notes that such performance declines are heightened by less developed legal and financial structures in these emerging markets, adding to post-IPO challenges and suggesting a persistent divide in European IPO performance.

Happ and Schiereck (2017) examined the impact of SEO announcements on the shareholder value of 12 ***European*** real estate corporations between 1997 and 2013. They discovered a significant negative impact on shareholder value, with abnormal returns averaging -1.5% for the three days ending on the announcement. The results indicate that high insider ownership can mitigate negative effects on shareholder value after SEO announcements. However, large cash reserves might signal potential mismanagement, negatively influencing investor sentiment. Also, the results suggest that larger firms see a more pronounced negative effect, possibly due to a broader base

of shareholders who are more prone to sell off shares after an equity issue announcement.

The data in Table 2 indicates that ***Saudi Arabia*** exhibits the highest degree of underpricing at a rate of 179.2%. The research by Mayes and Alqahtani (2015) investigates this underpricing, noting an average underpricing of 267.14%, which is among the highest globally. Analyzing a sample of 72 IPOs from 2004 to 2010, they acknowledge the influence of traditional factors such as company size and market timing on underpricing. However, they highlight that Sharia compliance plays a significant role in reducing IPO underpricing. Companies not adhering to Sharia principles show an adjusted initial return as high as 400%, while Sharia-compliant firms experience a substantially lower underpricing at 164%. This contrast underscores the impact of Sharia compliance in mitigating uncertainty and influencing the pricing strategies of Saudi companies, suggesting a path toward more efficient pricing and economic gains by reducing the *money left on the table* at the time of IPOs.

5.2 Contrasts in Offerings: The Nordic's

In the context of the global market, the Nordic IPO market is relatively small and is marked by more strict listing standards than those employed in other European countries. (Westerholm, 2006, p. 25). Research by Bask and Nätter (2021) provides a comparative analysis, indicating that Nordic IPOs generally experience less underpricing compared to those in larger markets such as the U.S. and the U.K. However, as seen in Table 2, Sweden is an exception to this trend with a reported significant average first-day returns of 28.2% (1980-2023). In comparison, Finland had a first-day return of 14.5% (1971-2021) and Denmark saw a 7.6% (1984-2021) return.

Westerholm (2006) reports that the Nordic IPOs had average initial returns between 8.5% and 22%, with an average of 17% for the period 1991-2002. Despite the high initial returns, long-term performances were weak in Sweden and Finland, whereas in Denmark, IPOs performed in line with the market index. Westerholm (2006) found that

industry clustering is weakly and positively correlated to high initial returns, suggesting that asymmetric information impacts initial returns in ways that are not predicted by existing theoretical models. Furthermore, the study suggests that Nordic companies launching IPOs during *hot issue markets* are more likely to face significant underperformance in the long term, possibly due to an initial overvaluation.

Studies of ***Finnish*** IPOs have consistently shown a trend of initial underpricing followed by long-run underperformance. As discussed before, Keloharju (1993) examined Finnish IPOs from 1984 to 1989 and found that despite an average initial return of 8.7%, the average three-year market-adjusted buy-and-hold return (BHAR) is -26.4%. Smaller companies did experience a more severe decline in their long-run performance, potentially due to Rock's (1986) *winner's curse*. Westerholm's (2006) research confirmed this trend of underpricing and reported an average level of underpricing of 21.9% during 1991-2002 and further noted that over a five-year post-IPO period, these companies underperformed the market with an average return of -12.6%, highlighting the risks of long-term investment in these assets. Further analysis by Hahl et al. (2014), covering Finnish IPOs from 1994 to 2006, revealed that while growth stocks were modestly underpriced with higher returns shortly after going public, value stocks proved to be more robust for long-term investment, aligning closely with market index returns over three years. The long-run underperformance with the average market-adjusted return of -30% for these IPOs can be primarily attributed to factors such as company size and market momentum. Despite a mean initial return of 15.6%, growth stocks did not sustain their market outperformance and conversely, value stocks demonstrated significantly better long-term returns, suggesting that they are a more viable long-term investment option compared to growth stocks in the Finnish market. Together, these findings suggest that Finnish IPOs tend to attract initial interest with their underpricing but generally do not maintain strong performance in the long term, with value stocks offering more stable returns compared to growth stocks.

Rydqvist's (1997) research on ***Swedish*** IPOs indicates a tradition of favoring parties with existing relationships with the firm, such as employees, customers, and suppliers, as investors, suggesting that underpricing served as indirect compensation for these parties. Following the 1990 tax regulation adjustments that reclassified underpriced shares as ordinary income and restricted investment bank employees' purchases of IPO units, the average underpricing of shares dramatically dropped from 41% to 8%. This indicates a substantial decrease in the tax-related advantages previously gained from distributing underpriced shares to favored groups. Further, results by Westerholm (2006) show that IPOs on the Stockholm Exchange's stricter A-list' had an average initial return of 17.1%, while those on the lower entry requirement 'O-list' had a return of 15.7%. Despite these promising starts, the long-term return over five years post-IPO was a negative 3.8% per year when compared to the market's average annual return of 4.8%. While the short-term returns for IPOs seemed favorable with an initial return of 11.7%, this did not offset the long-term underperformance, leading to an overall modest return. Investors with a portfolio of all Swedish IPOs from 1991 to 2002 would have experienced a mix of profitable investments and significant losses from delisted companies.

Jakobsen and Sørensen (2001) analyzed the long-run performance of 76 stocks of ***Danish*** non-financial firms, issued in the Copenhagen Stock Exchange from January 1984 to December 1992. These IPOs generally underperformed both the Danish Total Stock Index and matching companies' stocks. Five years after issuance, the volatility-adjusted underperformance compared to the market was 30.4% and 13.1% compared to matching companies' stocks. Later, Jakobsen and Voetmann (2005) conducted a study on the long-run performance of 142 IPOs and 413 SEOs in Denmark from 1983 to 1998. They found that both IPOs and SEOs exhibited underperformance over a five-year period, with IPOs underperforming by 43.7% and SEOs by 38.1% in volatility-adjusted BHAR. The underpricing was more pronounced for equity offerings issued during *hot issue markets* compared to *cold issue markets*. The analysis of volatility-adjusted performance across both *hot* and *cold markets* revealed similar underperformance after one year, but after five years, *hot issue*s significantly underperformed by 50.0%, while *cold issues* showed

an underperformance of 22.6%. Their study suggests that investing in equity offerings during *cold issue markets* may be more favorable in the long run than during *hot issue markets*. Lastly, Westerholm (2006) found an average initial return of 8.5% and a long-run return over five years of 0.3%, indicating that IPO performance is in line with the market. Danish IPOs displayed lower initial returns during the period from 1991 to 2002 compared to other Nordic markets, suggesting there might be less information asymmetry.

Overall, the Nordic IPO market presents a mix of promising initial returns and modest long-term performance, with differences observed across individual countries. In the following chapter, I will empirically examine the performance of Denmark, Finland, and Sweden, analyzing their initial and long-term performance.

6 Data and Methodology

6.1 Research Data

This study's data includes daily stock price data provided by the London Stock Exchange Group (former Refinitiv Workspace). Further, the daily exchange rates for Danish Kronor (DKK) and Swedish Kronor (SEK) are sourced from the London Stock Exchange Group.

The stocks' daily prices and revenue indexes and the Nordic MSCI Index (the used benchmark index) were sourced from DataStream. Nordic MSCI Index provides a relevant benchmark for evaluating the performance of stocks in the Nordic region, ensuring that the study's findings are regionally appropriate.

The Fama-French six-factor data were sourced from Kenneth French's website, which provided European daily factor data. For the risk-free rate, Germany's daily yield of the current 10-year federal bond was used, with data obtained from Deutsche Bundesbank Eurosystem.

To ensure comparability, the returns and prices of Danish and Swedish IPOs and SEOs were converted to euros using the exchange rate on the exact date. Using daily exchange rates for conversion ensures that the study accurately reflects the impact of currency fluctuations on stock returns, thereby enhancing the comparability of the results across different currencies. This conversion was performed using the following formula:

$$Converted\ Price_{i,t} = Price\ in\ Local\ Currency_{i,t} \times Exchange\ Rate_t \quad (4)$$

where:

- $Converted\ Price_{i,t}$ is the price of the stock *i* on day *t* in euros (EUR).
- $Price\ in\ Local\ Currency_{i,t}$ is the price of stock *i* on day *t* in the local currency (DKK or SEK).

- $Exchange\ Rate_t$ is the exchange rate from the local currency to euros (EUR) on day t.

The data sample includes IPOs from 2014 to 2021 and SEOs from 2014 to 2018. The differences in the examined period for IPOs and SEOs are due to data availability constraints. For SEOs, delisted companies and those with incomplete or missing data were excluded to ensure the reliability of the results. Similarly, for IPOs, companies with incomplete or missing data were left out of the sample.

6.1.1 IPO Data Sample

As seen in Table 3, the data consists of 153 IPOs from Denmark, Finland, and Sweden. Sweden's IPO market is significantly more active compared to Finland and Denmark, accounting for 102 out of the total 153 IPOs in the sample. The year 2021 marks the highest number of IPOs, with a total of 41, which can be attributed to the post-pandemic recovery and increased market activity (Ernst & Young, 2021).

Table 3. Number of IPOs per Year and Country

Year	***Denmark***	***Finland***	***Sweden***	***Total IPOs***
2014	2	2	9	13
2015	1	4	14	19
2016	2	3	10	15
2017	3	6	17	26
2018	4	5	9	18
2019	2	2	6	10
2020	1	2	8	11
2021	3	9	29	41
Total IPOs	**18**	**33**	**102**	**153**

The underpricing of IPOs and SEOs is calculated using Equation 5. This calculation involves comparing the first-day closing price to the offer price set by the company when it decides to go public of issue additional equity. This formula captures the immediate gain or loss to investors who purchased the stock at the offer price and sold it at the

closing price on the first day. Significant underpricing suggests that the shares were offered at a discount relative to their market value (Ritter, 1991; Purnanandam et al., 2004; Ljungqvist, 2007).

$$Initial\ return_i = \frac{First\ Day\ Closing\ Price_{i,t+1} - Offer\ Price_{i,t}}{Offer\ Price_{i,t}} \quad (5)$$

where,

- $First\ Day\ Closing\ Price_{i,t+1}$ is the market price at which the stock closes on its first trading day.
- $Offer\ Price_{i,t}$ is the price at which the company's shares are offered to investors during the IPO or SEO.

The average underpricing of IPOs fluctuates significantly over the years, reflecting changing market conditions and investor sentiment during the sample period. As seen in Table 4, underpricing ranges from 2.91% (2015) to 19.75% (2020). The peak underpricing in 2020 aligns with the economic uncertainty and market volatility caused by the COVID-19 pandemic. This high level of underpricing is likely due to the increased risks perceived by the investors, leading companies to set lower offer prices to ensure successful IPOs (Baker et al., 2020). The overall average underpricing for the eight-year sample is 10.32%, indicating that IPOs generally tend to be priced below their market value. This finding aligns with previous literature on Nordic IPO initial returns, which also demonstrates a consistent trend of underpricing (Loughran et al., 1994).

Table 4. IPO Underpricing by Year

Year	***Average Underpricing of the IPO***
2014	6,25 %
2015	2,91 %
2016	10,22 %
2017	8,39 %
2018	10,07 %
2019	9,86 %
2020	19,75 %
2021	14,01 %
Total Average Underpricing	**10,32 %**

Table 5 shows the industries to which companies launching IPOs belong. The data indicates a well-distributed interest in IPOs across various industries, with a clear preference for rapidly growing sectors such as Technology and Healthcare, as well as fundamental economic sectors such as Consumer Cyclicals and Industrials.

Table 5. Number of IPOs by Industry

Industry	***Number of IPOs per Industry***
Academic & Educational Services	2
Basic Materials	5
Consumer Cyclicals	32
Consumer Non-Cyclicals	4
Energy	2
Financials	13
Healthcare	19
Industrials	29
Real Estate	8
Technology	37
Utilities	2
Total	**153**

6.1.2 SEO Data Sample

The SEO data sample consists of 157 offerings (Table 6). Similar to IPOs, Sweden has the most SEOs (118), indicating a more active market for both SEOs and IPOs. This trend also suggests Swedish companies are more likely to seek additional capital through SEOs.

Table 6. Number of SEOs by Year and Country

Year	***Denmark***	***Finland***	***Sweden***	***Total SEOs***
2014	5	1	22	28
2015	6	3	22	31
2016	4	5	29	38
2017	3	8	33	44
2018	3	1	12	16
Total SEOs	**21**	**18**	**118**	**157**

Table 7 presents the average underpricing of SEOs, which remains relatively constant over the five years, with values ranging from 13.67% (2018) to 16.94% (2016), and an overall average of 15.25%. This consistency suggests that companies offering SEOs typically set their offer prices at a discount to attract investors, resulting in immediate gains for investors who purchase the offering at the offer price. Overall, the steady underpricing levels reflect a stable market environment for SEOs during this sample period.

Table 7. SEO Underpricing by Year

Year	***Average Underpricing of the SEO***
2014	15,07 %
2015	16,06 %
2016	16,94 %
2017	13,91 %
2018	13,67 %
Total Average Underpricing	**15,25 %**

Another trend similar to IPOs can be seen in the issuance structure of SEOs, shown in Table 8, where the number of SEOs across different industries is highlighted. Like IPOs, SEOs are concentrated in the Healthcare, Technology, and Industrial sectors, with healthcare leading in SEOs and Technology coming second. This similarity in industry distribution in IPOs and SEOs suggests that companies in these sectors are consistently seeking additional capital to fund expansion and innovation.

Table 8. Number of SEOs by Industry

Industry	***Number of SEOs per Industry***
Basic Materials	13
Consumer Cyclicals	9
Consumer Non-Cyclicals	3
Energy	7
Financials	13
Healthcare	58
Industrials	19
Real Estate	9
Technology	26
Total	**157**

6.2 Data Limitations

This study's extensive data collection from the London Stock Exchange Group, DataStream, Kenneth French's website, and Deutsche Bundesbank provides a robust foundation. However, several limitations might impact the results and their comparability. The IPO data covers the years from 2014 to 2021, including the COVID-19 pandemic's effects, whereas the SEO data only spans from 2014 to 2018. This difference introduces temporal biases since economic conditions and market sentiments varied significantly during these periods. With 153 IPOs and 157 SEOs, the relatively small sample sizes might limit the study's statistical power, making it harder to detect significant effects. Furthermore, daily data introduces high volatility and noise, affecting short-term performance analysis and resulting in large datasets that can be challenging to manage.

Moreover, the regression models might miss key variables like market sentiment and firm-specific characteristics, reducing their explanatory power. Excluding companies with incomplete data might introduce bias, particularly if these firms have systematically different characteristics. Additionally, the sectoral and regional concentration—focused heavily on Technology, Healthcare, and Industrials, and with higher activity in Sweden—may not fully represent the broader Nordic market. Extensive manual data handling also increases the risk of human errors.

6.3 Methodology

6.3.1 Event Study

This study employs an event study methodology to examine the impact of IPOs and SEOs on investor returns, using the Fama-French Six-Factor Model to estimate the expected returns. Event studies are commonly used in finance and economics research to analyze the impact of specific events on stock prices (MacKinlay, 1997). They measure the abnormal returns on the stock price following the announcements of events such as mergers, acquisitions, macroeconomic shocks, and in this case, IPOs and SEOs. Ritter (1991) examined the long-term performance of IPOs using the event study method, highlighting its capabilities in capturing market reactions to corporate events.

As a part of the event study, event windows must be defined. As IPOs do not have any data before the listing date, the IPO event windows are [0, 1], [0, 7], [0, 30] and [0, 90]. For the SEOs, event windows are [-1, 1], [-7, 7], [-30, 30] and [-90, 90]. The study can comprehensively analyze the market's reactions to IPOs and SEOs across different time horizons by employing these event windows. Specifically, the immediate reaction windows ([0, 1], [-1, 1]) capture the market’s instant response to the announcements. The short-term reaction windows ([0, 7], [-7, 7]) provide insights into how the market adjusts over the first week. The medium-term reaction windows ([0, 30], [-30, 30]) offer a view of the market’s behavior over a month, while the long-term reaction windows ([0,

90], [-90, 90]) reveal the prolonged impact over three months. However, the lack of prior data for IPOs affects the comparability between IPO and SEO results. In contrast, SEO event windows can be extended to include periods before the announcement, allowing for a more detailed analysis of market reactions leading up to the event.

Event studies often use daily data to provide a detailed analysis of stock price movements. Daily data is beneficial because it captures the immediate market reactions to announcements, which is critical for understanding their short-term effects. However, MacKinlay (1997) expressed that using daily data introduces complications and makes the data collection more challenging, as experienced in this study's process. One issue related to event studies is the uncertainty of the event date. It can be difficult to determine the exact event date, as the event might have happened on the previous day, affecting the results. For this study, the event date for IPOs was set to start from the date there was stock data available. For SEOs, it was the announced event date. Another concern is that treating the closing price as the daily price can introduce bias. This is because the closing price is the price of the last transaction, and the last transactions do not occur at the same time every day (MacKinlay, 1997).

The Fama-French Six-Factor Model was chosen over the traditional market model because it offers a more detailed explanation of stock returns by incorporating additional factors beyond the market risk. Traditional models, such as the Capital Asset Pricing Model (CAPM), consider only market risk and often fail to capture other significant sources of return variation (Fama & French, 1993). The inclusion of size, value, profitability, investment, and momentum factors allows for a more accurate estimation of expected returns, considering a wider range of market influences (Fama & French, 2015). The Fama-French Six-Factor Model is an extension of the original Three-Factor Model designed to better explain the returns of diversified portfolios compared to the market. The formula for the Six-Factor Model goes as follows:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,M}\left(R_{M,t} - R_{f,t}\right) + \beta_{i,SMB}SMB_t + \beta_{i,HML}HML_t + \beta_{i,RMW}RMW_t + \beta_{i,CMA}CMA_t + \beta_{i,MOM}MOM_t + \epsilon_{i,t} \quad (6)$$

where,

- $R_{i,t} - R_{f,t}$ is the excess return of asset *i* over the risk-free rate $R_{f,t}$ at time *t*.
- α_i is the intercept of asset *i*, representing the average returns that are not explained by the model.
- $\beta_{i,M}$ is the sensitivity of the asset's returns to the market excess return.
- $\beta_{i,SMB}$ is the sensitivity to the size factor (small minus big).
- $\beta_{i,HML}$ is the sensitivity to the value factor (high minus low).
- $\beta_{i,RMW}$ is the sensitivity to the profitability factor (robust minus weak).
- $\beta_{i,CMA}$ is the sensitivity to the investment factor (conservative minus aggressive).
- $\beta_{i,MOM}$ is the sensitivity to the momentum factor.
- $\epsilon_{i,t}$ is the error term, representing the idiosyncratic risks not captured by the model.

Abnormal Returns can be calculated using the market model. In this study, Daily Abnormal Returns represent the difference between the realized and estimated expected returns based on the Fama-French Six-Factor Model. $AR_{i,t}$ denotes the abnormal return at time *t* for each stock and is calculated as follow:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_{i,M}\left(R_{M,t} - R_{f,t}\right) + \beta_{i,SMB}SMB_t + \beta_{i,HML}HML_t + \beta_{i,RMW}RMW_t + \beta_{i,CMA}CMA_t + \beta_{i,MOM}MOM_t) \quad (7)$$

where,

- $R_{i,t}$ is the excess return of asset *i*.
- α_i is the intercept of asset *i*, representing the average returns that are not explained by the model.
- $\beta_{i,M}$ is the sensitivity of the asset's returns to the market excess return.

- $\beta_{i,SMB}$ is the sensitivity to the size factor (small minus big).
- $\beta_{i,HML}$ is the sensitivity to the value factor (high minus low).
- $\beta_{i,RMW}$ is the sensitivity to the profitability factor (robust minus weak).
- $\beta_{i,CMA}$ is the sensitivity to the investment factor (conservative minus aggressive).
- $\beta_{i,MOM}$ is the sensitivity to the momentum factor.

To determine whether IPO and SEO announcements result in abnormal returns for investors, the Average Abnormal Return (AAR) is calculated. AAR measures the abnormal return over a specific period and be calculated over the entire event window or specific sub-periods, such as [-1, 1] and [0, 30], to capture the effects around the announcement dates. The AAR equation goes as follows (Ritter, 1991):

$$AAR_t = \frac{1}{N}\sum AR_{i,t} \tag{8}$$

Where:

- AAR_t represents the Average Abnormal Return for the period *t.*
- *N* is the number of announcements.
- $AR_{i,t}$ is the Abnormal Return for the *i*'th announcement on day *t*.

To measure the overall impact of an event over an event window, individual abnormal returns are summed to create a cumulative abnormal return (CAR) (Ritter, 1991):

$$CAR_{t_1,t_2} = \sum_{t=t_1}^{t_2} AR_t \tag{9}$$

In an event study with multiple observations of individual event types, Cumulative Average Abnormal Returns ($CAAR$s) can be calculated to represent the mean values of these events. $CAAR$s provides the average returns for the data, where *n* represents the

number of observations during the event period. $CAARs$ is calculated as follows (Ritter, 1991):

$$CAAR = \frac{1}{n}\sum_{i=1}^{n} CAR(t_1, t_2) \tag{10}$$

By using this methodology, we can systematically analyze the impact of the IPO and SEO announcements on investor returns and gain insights into the market's reaction to these events. This approach ensures that the analysis considers the multidimensional nature of risk and return, providing a robust framework for evaluating the effects of equity offerings on firm value.

7 Results

7.1 IPOs

In Table 9, the analysis of CAARs over various event windows does not reveal statistically significant abnormal returns at the 1%, 5%, or 10% levels. This finding aligns with earlier research by Ritter (1991), which documented that while IPOs often show initial short-term returns, these profits typically diminish, leading to long-run underperformance. The standard deviation, which measures the volatility of the abnormal returns, does decrease over the longer event windows, from 0.0703 ([0, 1]) to 0.0276 ([0, 90]), suggesting that the variability of abnormal returns decreases as the time passes. The combination of low t-statistics and high p-values supports the conclusion that IPOs do not offer significant abnormal returns over the examined periods, reflecting the findings of previous studies. Specifically, the CAAR for the [0, 1] window is 0.00480207, indicating a slight positive abnormal return immediately after the IPO, whereas the CAAR for the [0, 90] window is much lower at 0.00018402, suggesting that any initial returns disappear over a longer period.

Table 9. Cumulative Average Abnormal Returns (CAARs) and Statistical Significance of IPOs.

	[0, 1]	***[0, 7]***	***[0, 30]***	***[0, 90]***
CAARs	0,00480207	0,00074752	0,00045637	0,00018402
st. dev	0,07027732	0,04592941	0,03095523	0,02761025
t-stat	1,19529224	0,23769876	1,01234009	0,77963065
p-value	0,23290	0,81215	0,31143	0,43562
N	306	1219	4715	13683

* refers to significance at the 10% level (<0.10); *** refer to significance at the 5% level (<0.05); *** refer to significance at the 1% level (<0.01).

Table 10 presents the regression statistics for IPOs for all the event windows, showing the limited explanatory power of the models. The Multiple R values, which indicate the correlation between observed and predicted returns, are modest across all event windows. Similarly, the R-Square and Adjusted R-Square values are rather low,

suggesting that only a small fraction of the variance in IPO returns is explained by the used models. Standard errors decrease from 0.0701 in the [0, 1] event window to 0.0283 in the [0, 90] windows, indicating a better model fit over longer windows. These findings are consistent with Loughran and Ritter (1995), who highlighted the challenges in predicting IPO performance due to high variability. Despite the large number of observations, the models demonstrate limited predictive power, emphasizing the complexity of factors influencing IPO returns.

Table 10. Regression Statistics of IPOs.

	[0, 1]	***[0, 7]***	***[0, 30]***	***[0, 90]***
Multiple R	0,21351301	0,12476911	0,15890895	0,19672435
R-Square	0,04558781	0,01556733	0,02525206	0,03870047
Adjusted R-Square	0,02643572	0,0106939	0,02400981	0,03827872
Standard Error	0,07009323	0,04649055	0,03170619	0,02828678
Observations	306	1219	4715	13683

Table 11 provides coefficient estimates and their statistical significance for various factors affecting IPO returns across the different event windows. The Market Risk factor (MktRF) consistently shows a significant positive impact on IPO returns across all windows, with its effect being most pronounced in the [0, 90] window. These results suggest that market-wide movements are a strong predictor of IPO performance, aligning with Loughran and Ritter (1995), who emphasized the role of market conditions in their study. The Size factor (SMB) and Momentum factor (MOM) are also significant across multiple event windows. For instance, SMB shows significant positive coefficients in the [0, 7], [0, 30], and [0, 90] windows, indicating that smaller IPOs tend to outperform larger ones, which supports the findings of Fama and French (1993). Further, MOM is significant in the [0, 30] and [0, 90] windows, implying that companies with strong recent performance continue to perform well post-IPO.

Table 11. Coefficient Estimates and Statistical Significance of IPOs.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
[0, 1]						
Intercept	0,00448509	0,00406938	1,10215624	0,27128012	-0,0035232	0,01249335
MktRF	0,00736029	0,00548127	1,34280733	0,18035284	-0,0034265	0,01814705
SMB	0,01195799	0,01230868	0,97150835	0,33208045	-0,0122646	0,03618062
HML	-0,0275336	0,01770386	-1,5552307	0,12094894	-0,0623735	0,00730637
RMW	-0,0606805	0,02063629	-2,9404758	0,00353291**	-0,1012913	-0,0200697
CMA	0,02398529	0,02714197	0,88369736	0,37756959	-0,0294282	0,07739878
MOM	0,00746705	0,00647902	1,15249688	0,25003754	-0,0052832	0,02021729
[0, 7]						
Intercept	-0,0003664	0,00134742	-0,2719281	0,78572362	-0,0030099	0,00227713
MktRF	0,00529112	0,00172462	3,06799865	0,00220278**	0,00190756	0,00867468
SMB	0,00619028	0,0037354	1,65719199	0,09773947*	-0,0011383	0,01351885
HML	-0,0051802	0,00540432	-0,9585239	0,3379898	-0,015783	0,00542269
RMW	-0,0136045	0,00661068	-2,0579561	0,0398078**	-0,0265741	-0,0006348
CMA	0,00189424	0,00807061	0,23470827	0,81447481	-0,0139397	0,01772817
MOM	0,00396036	0,00223766	1,76986537	0,07700096*	-0,0004298	0,00835049
[0, 30]						
Intercept	-0,0005913	0,00046713	-1,265849	0,20562978	-0,0015071	0,00032448
MktRF	0,00521259	0,00060917	8,55685489	1,5492E-17***	0,00401833	0,00640685
SMB	0,0031411	0,00134324	2,33843902	0,01940612*	0,00050771	0,00577448
HML	-0,0014967	0,00176286	-0,8489973	0,39592595	-0,0049527	0,00195936
RMW	-0,0038317	0,00235333	-1,6281996	0,10354948	-0,0084453	0,00078194
CMA	-0,0051577	0,00253254	-2,0365613	0,04174986**	-0,0101226	-0,0001927
MOM	0,00212074	0,00080191	2,64460507	0,00820578**	0,00054862	0,00369287
[0, 90]						
Intercept	-0,0008002	0,00024338	-3,2880304	0,00101146***	-0,0012773	-0,0003232
MktRF	0,00608774	0,00030757	19,7932098	5,4219E-86***	0,00548486	0,00669061
SMB	0,00368556	0,0007033	5,24036978	1,6264E-07***	0,00230699	0,00506412
HML	-0,0010341	0,00093248	-1,1089821	0,26745741	-0,0028619	0,00079368
RMW	-0,0024119	0,00119778	-2,0136396	0,04406694**	-0,0047597	-6,408E-05
CMA	-0,0041282	0,00130804	-3,1559998	0,00160296***	-0,0066921	-0,0015642
MOM	0,00107719	0,00042993	2,50548917	0,01223974**	0,00023447	0,00191992

* refers to significance at the 10% level (<0.10); ** refer to significance at the 5% level (<0.05); *** refer to significance at the 1% level (<0.01).

Conversely, the Profitability factor (RMW) has a significant negative impact in the [0, 1] and [0, 7] periods, suggesting that more profitable firms may see lower initial returns, possibly due to high investor expectations. The Investment factor (CMA) and Value factor (HML) have mixed significance across different periods, reflecting their varied impact on IPO performance over time. Altogether, the results highlight the complexity of predicting IPO returns, with market risk, size, and momentum being key factors, while profitability and investment strategies also play important roles under certain conditions.

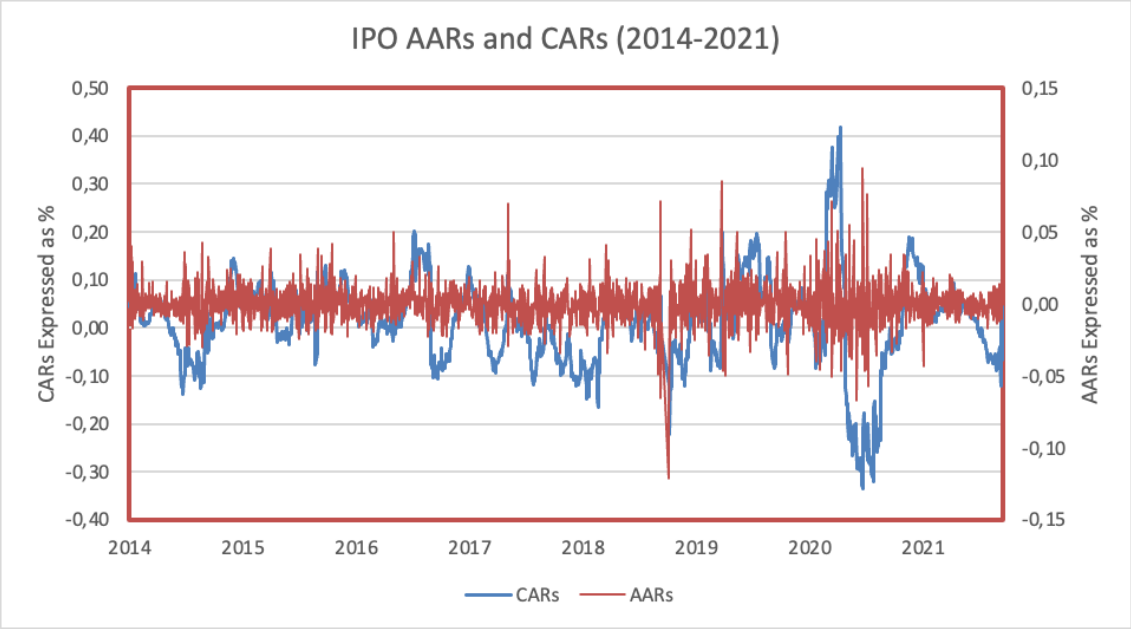

Figure 5. IPO AARs and CARs (2014–2021)

The AARs and CARs from 2014 to 2021 are illustrated in Figure 5. The red line represents the AARs and shows frequent fluctuations around zero, indicating periods of both positive and negative abnormal returns. Notably, these fluctuations increase around 2017 and 2020, which may correspond to periods of heightened market activity or external events impacting IPO performance. The CARs, represented in blue, illustrate the cumulative effect of these abnormal returns over time. Significant trends include declines in late 2019 and during 2020, which could be linked to wider market downturns and the COVID-19 pandemic. In contrast, peaks in 2017 and late 2019 suggest periods of prolonged positive performance. These patterns suggest that macroeconomic factors and market events have a substantial impact on overall IPO returns.

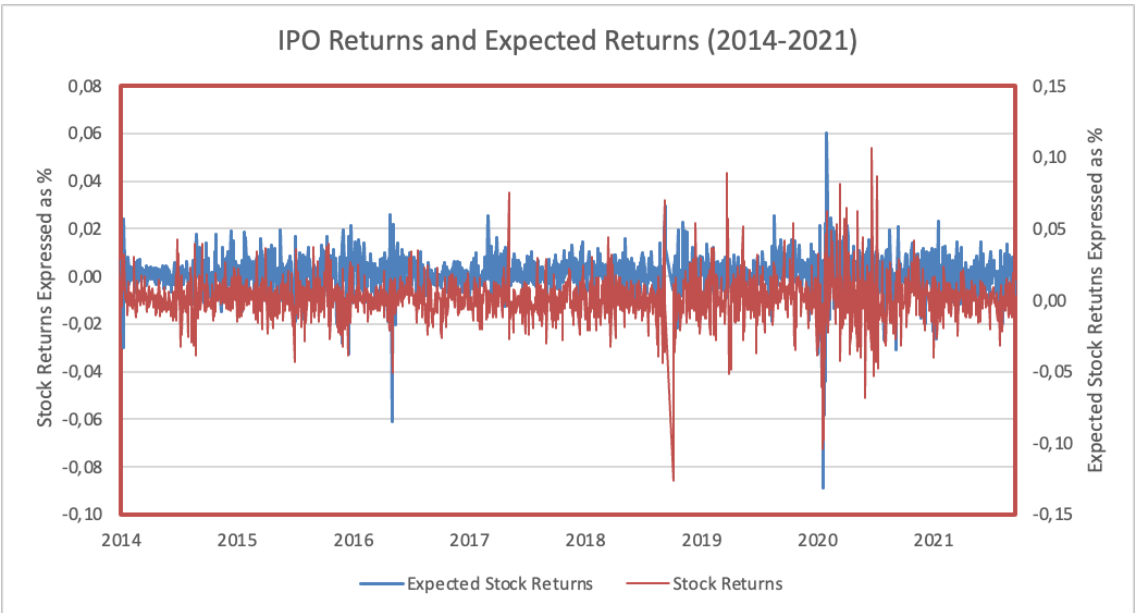

Figure 6. IPO Returns and Expected Returns (2014-2021)

Figure 6 illustrates the comparison between the actual stock returns and expected stock returns. The figure shows that the actual returns, shown in red, frequently deviate from the expected returns, shown in blue, with notable volatility in 2016, 2017, and 2020. These significant deviations in 2020 are most likely mirroring the impact of the COVID-19 on the stock market and its stability.

7.2 SEOs

Table 12 provides statistics of CAARs for SEOs across all event windows. The CAARs are consistently negative across all periods, with values ranging from -0.0008927 ([-1, 1]) to -0.0005368 ([-90, 90]) window. The standard deviations are relatively stable, suggesting consistent variability in stock returns. The t-statistics and p-values shows the significance of the results: the [-1, 1] window shows a t-statistic of -2.1688252 and p-value of 0.030330832, significant at the 5% level, indicating a negative market reaction immediately around the SEO announcements. The longer event windows, [-30, 30] and [-90, 90], show highly significant negative returns with p-values of 0.000000913 and 0.000000003 respectively, significant at the 1% level. These results indicate that SEOs

generally lead to significant underperformance relative to expected returns, especially over the longer event windows, possibly reflecting the investor concerns regarding the potential dilution effect and the firm's need for additional funding. This is consistent with previous research by Asquith and Mullins (1986) and Masulis and Korwar (1986), who observed negative market reactions to equity offerings, emphasizing the impact of SEO announcements on investor returns.

Table 12. Cumulative Average Abnormal Returns (CAARs) and Statistical Significance of SEOs.

	[-1, 1]	***[-7, 7]***	***[-30, 30]***	***[-90, 90]***
CAARs	-0,0008927	-0,0004567	-0,0007345	-0,0005368
st. dev	0,01302975	0,01387791	0,0139019	0,01439702
t-stat	-2,1688252	-1,5463832	-4,9130247	-5,9259423
p-value	0,030330832**	0,122155430	0,000000913***	0,000000003***
N	544	2207	8648	25338

* refers to significance at the 10% level (<0.10); ** refer to significance at the 5% level (<0.05); *** refer to significance at the 1% level (<0.01).

The regression statistics are presented in Table 3 The Multiple R values are relatively low for the shorter windows, indicating weak correlations, but increase significantly in the [-90, 90] window, suggesting a stronger relationship over longer terms. Similarly, R-Square values are minimal for the shorter event windows, around 0.0003, but rise to 0.581 in the [-90, 90] window, indicating the model explains a substantial variance in returns. Further, the standard error decreases over time, demonstrating better model fit over time. Overall, the statistics indicate that although short-term models exhibit limited explanatory power, their accuracy improves considerably over longer periods, highlighting the significance of using extended event windows in evaluating SEO performance.

Table 13. Regression Statistics of SEOs.

	[-1, 1]	***[-7, 7]***	***[-30, 30]***	***[-90, 90]***
Multiple R	0,05545615	0,04535794	0,03887373	0,76214623
R-Square	0,00307538	0,00205734	0,00151117	0,58086688
Adjusted R-Square	-0,0029362	-0,0006643	0,00081785	0,5807676
Standard Error	0,04827857	0,0472336	0,05028608	0,00599755
Observations	544	2207	8648	25338

Table 14 provides coefficient estimates and their statistical significance for various factors affecting SEO returns across the different event windows. In the [-1, 1] event window, the intercept is significantly negative with a p-value of 0.001088, which indicates a general negative market reaction immediately around the SEO announcement. This is consistent with the findings of Asquith and Mullins (1986). The MktRF, SMB, and HML factors do not show significance in this window. However, in the [-7, 7] windows, the intercept remains negative at the significance level of 1%, and both HML and RMW are significant at the 10% level, suggesting that value and profitability factors start to influence the returns after a week. The intercept remains highly significant at the 1% level in the [-30, 30] window, and MktRF is significant at the 5% level, indicating that the market risk becomes an important factor over a month, aligning with Masulis and Korwar (1986). Further, CMA is substantial at the 10% level. In the [-90, 90] window, several factors including the intercept, HML, RMW, and CMA show high significance, emphasizing the importance of value, profitability, and investment factors over a three-month window. These long-term findings are consistent with Loughran and Ritter (1995), who highlighted the influence of firm-specific characteristics on long-term returns following equity offerings. Table 14 shows that, while immediate market reactions to SEOs are negative, various financial factors grow more significant over time, reflecting their nuanced and dynamic impact on SEO performance.

Table 14. Coefficient Estimates and Statistical Significance of SEOs.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
[-1, 1]						
Intercept	-0,0050483	0,0015409	-3,2762936	0,001088***	-0,0080720	-0,0020246
MktRF	-0,0009949	0,0020338	-0,4891817	0,6248209	-0,0049859	0,0029961
SMB	-0,0042453	0,0044357	-0,9570798	0,3387595	-0,0129497	0,0044591
HML	-0,0022100	0,0083505	-0,2646526	0,7913319	-0,0185966	0,0141766
RMW	-0,0012423	0,0097111	-0,1279298	0,8982304	-0,0202990	0,0178143
CMA	0,0002952	0,0097972	0,0301299	0,9759695	-0,0189304	0,0195208
MOM	-0,0043933	0,0034436	-1,2757657	0,2023361	-0,0111509	0,0023643
[-7, 7]						
Intercept	-0,0042407	0,0010125	-4,1883659	0,0000292***	-0,0062263	-0,0022552
MktRF	0,0010263	0,0013389	0,7665137	0,4434530	-0,0015994	0,0036520
SMB	0,0002814	0,0029697	0,0947643	0,9245107	-0,0055423	0,0061051
HML	-0,0092894	0,0054450	-1,7060401	0,0881418*	-0,0199674	0,0013885
RMW	-0,0111382	0,0064442	-1,7283906	0,0840585*	-0,0237756	0,0014993
CMA	0,0011103	0,0061793	0,1796797	0,8574206	-0,0110076	0,0132282
MOM	-0,0015242	0,0021843	-0,6978168	0,4853655	-0,0058077	0,0027593
[- 30, 30]						
Intercept	-0,0048607	0,0005432	-8,9490234	4,3325543	-0,0059255	-0,0037960
MktRF	0,0014176	0,0007216	1,9643327	0,0495235**	0,0000030	0,0028322
SMB	-0,0004119	0,0015769	-0,2611741	0,7939645	-0,0035031	0,0026793
HML	0,0001124	0,0028625	0,0392798	0,9686682	-0,0054987	0,0057236
RMW	-0,0020351	0,0033577	-0,6060949	0,5444677	-0,0086170	0,0045468
CMA	-0,0053387	0,0032109	-1,6626849	0,0964117*	-0,0116327	0,0009554
MOM	-0,0008203	0,0011487	-0,7140824	0,4751955	-0,0030720	0,0014314
[-90, 90]						
Intercept	0,0001229	0,0000609	2,0165203	0,0437561**	0,0000034	0,0002423
MktRF	0,0138543	0,0107029	1,2944435	0,1955241	-0,0071240	0,0348325
SMB	0,0001369	0,0007172	0,1909104	0,8485973	-0,0012688	0,0015426
HML	0,0070655	0,0000527	134,1568562	0*	0,0069622	0,0071687
RMW	-0,0056890	0,0001127	-50,4851444	0*	-0,0059099	-0,0054681
CMA	-0,0039075	0,0001774	-22,0240173	1,6950070	-0,0042552	-0,0035597
MOM	-0,0021088	0,0002341	-9,0069806	2,2635006	-0,0025677	-0,0016499

* refers to significance at the 10% level (<0.10); ** refer to significance at the 5% level (<0.05); *** refer to significance at the 1% level (<0.01).

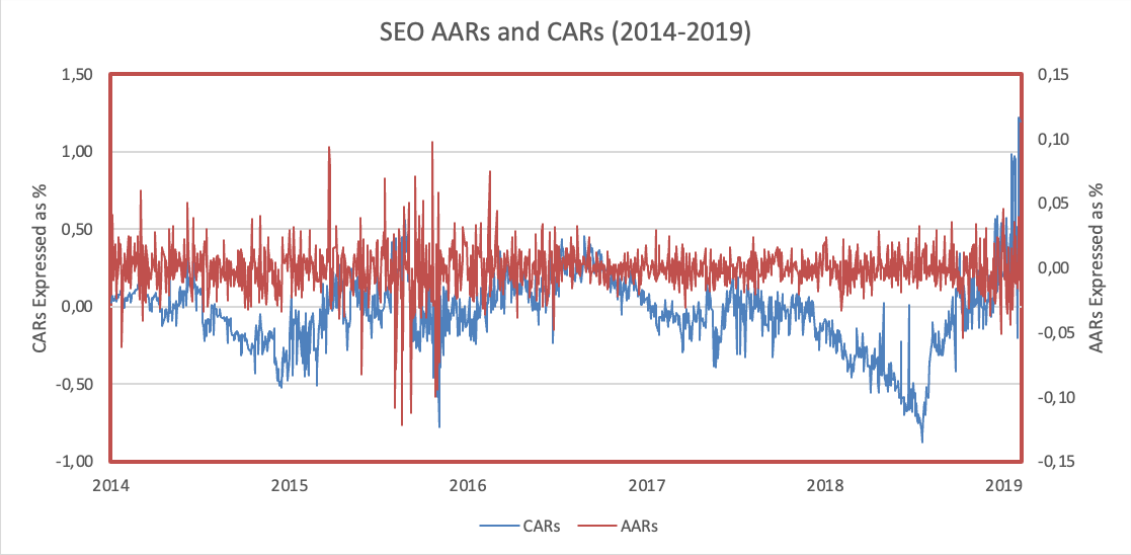

Figure 7. SEO AARs and CARs (2014-2019)

The AARs and CARs for SEOs from 2014 to 2019 are displayed in Figure 7. Like IPOs, for SEOs AARs fluctuate around zero, indicating periods of both positive and negative abnormal returns. Initially, CARs are close to zero, but noticeable downward trends are observed around 2016 and late 2018, indicating sustained negative performance. Conversely, there were times of positive cumulative returns, particularly at the end of 2018 and early 2019, indicating that SEOs outperformed market expectations.

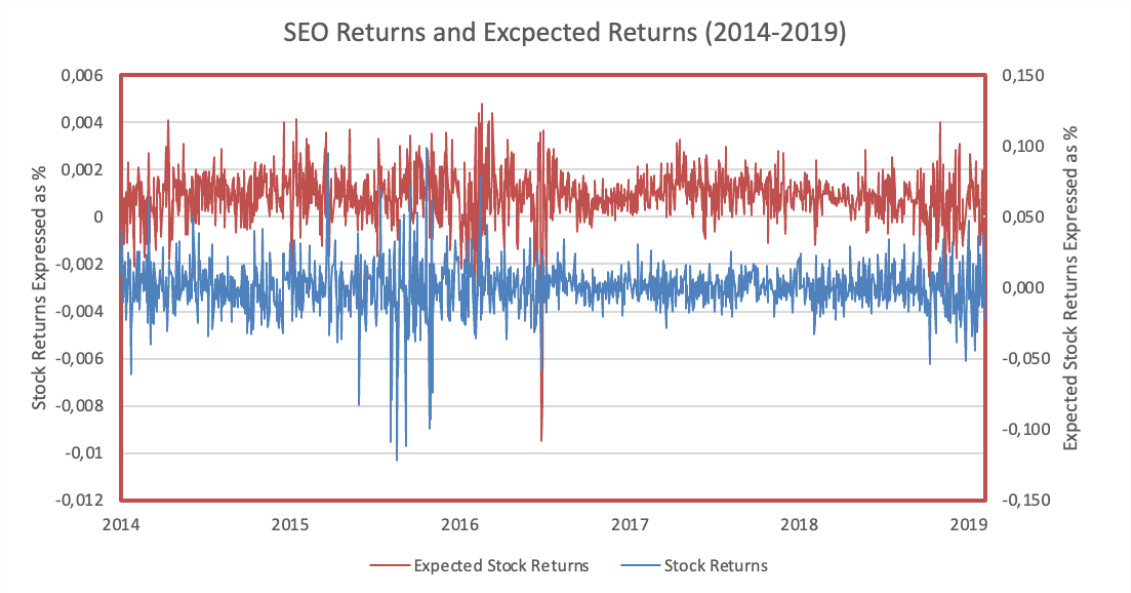

Figure 8. SEO Returns and Expected Returns (2014–2019)

Figure 8 illustrates the comparison between the actual stock returns and expected stock returns. The actual returns deviate frequently from the expected returns, indicating that SEO performance often diverges from market predictions. Actual returns show noticeable jumps and drops, particularly around 2015, 2016, and late 2018, suggesting significant market reactions to specific events or periods of heightened uncertainty. Expected returns remain relatively consistent, fluctuating within a narrow range, reflecting the market models' projected performance. However, the persistent differences between the actual returns from these expectations highlight the challenges in accurately predicting SEO performance and investor behavior. Overall, Figure 8 shows the unpredictability and volatility of SEO returns, pointing to the limitations of market models in capturing the full range of factors influencing SEO performance.

7.3 How and Why Do IPOs and SEOs Differ?

7.3.1 Initial Underpricing

The most surprising result is that IPOs did not exhibit statistically significant underpricing on the first trading date, which contradicts the well-known 'IPO Puzzle' and the findings of previous literature that document significant positive initial returns for IPOs due to initial underpricing. Research by Ritter (1991), Ibbotson (1975), Loughran and Ritter (2002), and Ritter and Welch (2002) all support the presence of initial underpricing of IPOs, strengthening the expectation of significant first-day returns. In contrast, SEOs did show statistically significant negative returns around the announcement date, aligning with previous literature. The lack of significant underpricing for Nordic IPOs during the event window may be due to factors such as more efficient markets, strict regulatory frameworks, and more conservative pricing strategies by underwriters.

However, as shown in Table 4 and Table 7, IPO underpricing is evident in the Nordic market on an annual basis, even when utilizing the same dataset as the event study. The emphasis on daily returns produces high volatility and short-term noise, which may hide underlying trends. Additionally, the regression models used, including the Fama-French

Six-Factor Model, may lack essential explanatory variables such as market sentiment and firm-specific features, limiting their capacity to capture underpricing accurately. Finally, the methodology for estimating abnormal returns may need to be more robust to detect underpricing, emphasizing the importance of alternate methodologies and robustness tests.

$H_{0,a}$: There is no significant difference in the initial underpricing between IPOs and SEOs in the Nordics.
$H_{1,a}$: IPOs exhibit greater underpricing compared to SEOs in the Nordics.

Regarding the initial underpricing hypotheses, the study's results do not support either hypothesis. The lack of statistically significant underpricing for IPOs, contrasted with the significant negative returns for SEOs, indicates that SEOs experience greater initial market reactions. Therefore, $H_{1,a}$ is not supported by the data. Consequently, the study fails to reject the null hypothesis $H_{0,a}$, as IPOs do not exhibit significantly greater initial underpricing compared to SEOs.

7.3.2 Long-term Underperformance

The study reveals significant differences in the long-run performance of IPOs and SEOs in the Nordics. Over the extended event window [0, 90], IPOs do not exhibit statistically significant abnormal returns. In contrast, SEOs show significant long-run underperformance over the [-90, 90] window, indicating that they experience more pronounced negative market reactions over time.

$H_{0.b}$: There is no significant difference in the long-run underperformance of IPOs and SEOs in the Nordics.
$H_{1,b}$: SEOs exhibit greater long-run underperformance relative to the market compared to IPOs in the Nordics.

These results lead to the rejection of the null hypothesis $H_{0,b}$, as there is a significant difference in the long-run performance between IPOs and IPOs. Specifically, the data support the alternative hypothesis $H_{1,b}$, indicating that SEOs exhibit greater long-run underperformance relative to IPOs.

8 Conclusions

The findings of this study indicate that IPOs and SEOs exhibit different characteristics and performance patterns in the Nordic markets. Unlike global trends, Nordic IPOs do not show significant initial underpricing but rather demonstrate a consistent performance with minimal initial gains. However, IPOs exhibit long-term underperformance, reflecting initial market over-optimism. On the other hand, SEOs show minimal initial underpricing but significant long-term underperformance, indicating negative market adjustments over time caused by factors such as share dilution and overvaluation.

These trends in performance highlight unique regional dynamics within the Nordic markets, differentiating them from global trends. The application of the Fama-French Six-Factor Model has provided a comprehensive understanding of abnormal returns, highlighting the role of market risk, size, value, profitability, investment, and momentum factors in explaining stock returns. However, the study does not consider company-specific factors, which may have an impact on the study's overall results.

The results did partially back the hypotheses on the initial underpricing and long-term performance. Despite IPOs not exhibiting significantly greater initial underpricing compared to SEOs, SEOs demonstrated greater long-term underperformance relative to IPOs.

These results can have important implications for both investors and companies in the Nordic markets. Investors can apply this information to improve their investment strategies in IPOs and SEOs by understanding the risks and returns associated with these equity offerings. Companies can use these findings to improve their timing and method of equity offerings, aligning their strategies with market conditions to enhance performance.

For further research, it is recommended to align the IPO and SEO data samples to ensure consistency over time. Additionally, examining how different types of SEOs influence

their performance would provide valuable insights into the impact of various offering techniques. Future research should also include cross-market comparisons to identify regional differences, examine the effects of recent regulatory changes, and explore the role of behavioral finance in market anomalies. Extended studies tracking long-term firm performance, sector-specific analyses, and research into market timing strategies and investor demographics will further offer new knowledge and help to understand the dynamics of equity offerings.

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Appendices

Appendix 1. The Data Sample of IPOs (2014-2021)

Issue Date	*Issuer Name*	*Issue Date*	*Issuer Name*
20.2.2014	Bufab AB	27.3.2018	Bygghemma Group First AB
12.3.2014	ISS A/S	23.4.2018	Happy Helper A/S
26.3.2014	OW Bunker A/S	17.5.2018	Ovzon AB
2.4.2014	Recipharm AB	7.6.2018	NetCo Group A/S
4.4.2014	Verkkokauppa.com Oyj	8.6.2018	Better Collective A/S
8.4.2014	D Carnegie & Co AB	14.6.2018	Kojamo Oyj
16.6.2014	Com Hem Holding AB	18.6.2018	VMP Oyj
18.6.2014	Bactiguard Holding AB	19.6.2018	Projektengagemang Sweden AB
26.6.2014	Scandi Standard AB	28.6.2018	Calliditas Therapeutics AB(WAS 71724F)
25.9.2014	Inwido AB	21.11.2018	Scape Technologies A/S
9.10.2014	Granges AB	29.11.2018	Oma Saastopankki Oy
2.12.2014	NP3 Fastigheter AB	4.12.2018	Jetpak Top Holding AB
4.12.2014	Nixu Oyj	5.12.2018	Azelio AB
4.2.2015	Ferratum Oyj	6.12.2018	Lime Technologies AB
5.2.2015	Eltel AB	6.12.2018	Q-Linea AB
12.2.2015	Dustin Group AB	11.4.2019	Karnov Group AB
5.3.2015	NNIT A/S	6.5.2019	Konsolidator A/S
13.3.2015	Detection Technology Oy	22.5.2019	Danish Aerospace Company A/S
26.3.2015	Asiakastieto Group OYJ	5.6.2019	John Mattson Fastighetsforetagen AB
22.4.2015	Tobii AB	14.6.2019	Mentice AB
4.6.2015	Magnolia Bostad AB	24.9.2019	EQT AB
9.6.2015	Collector AB	15.10.2019	Relais Group Oy
16.6.2015	Coor Service Management Holding AB	4.12.2019	Optomed Oyj
16.6.2015	Nordax Group AB	9.12.2019	24Storage AB
18.6.2015	Pandox AB	12.12.2019	Qleanair Holding AB
26.6.2015	A Group Of Retail Assets Sweden AB	12.2.2020	Musti Group Oyj
29.6.2015	Capio AB	3.6.2020	Nanoform Finland Oyj
15.10.2015	Bravida Holding AB	16.9.2020	Readly International AB
23.11.2015	Dometic Group AB	12.10.2020	Wastbygg Gruppen AB
1.12.2015	Scandic Hotels Group AB	18.11.2020	Fortinova Fastigheter AB
2.12.2015	Camurus AB	18.11.2020	HusCompagniet A/S
10.12.2015	Consti Yhtiot Oy	24.11.2020	Nordnet AB
10.2.2016	Scandinavian Tobacco Group A/S	25.11.2020	Renewcell AB
16.3.2016	LeoVegas AB	4.12.2020	Thunderful Group AB
25.4.2016	Nepa AB	8.12.2020	Fasadgruppen Group AB
25.4.2016	Lehto Group Oyj	14.12.2020	Scandinavian Biogas Fuels International AB

28.4.2016	Resurs Holding AB	26.1.2021	Nexcom A/S
29.4.2016	Tokmanni Group Oyj	8.2.2021	Nimbus Group AB
9.6.2016	Nordic Waterproofing Holding A/S	10.2.2021	Fractal Gaming Group AB
9.6.2016	DONG Energy A/S	18.2.2021	Kreate Group Oy
10.6.2016	B3IT Management AB	19.2.2021	Cint Group AB
28.9.2016	Internationella Engelska Skolan i Sverige Holdings II AB	25.2.2021	Desenio Group AB
28.10.2016	Tobin Properties AB	18.3.2021	RugVista Group AB
22.11.2016	Alligator Bioscience AB	18.3.2021	Nightingale Health Oyj
29.11.2016	DNA Oyj	23.3.2021	Embellence Group AB
30.11.2016	Bygg Partner i Dalarna Holding AB	23.3.2021	Idun Industrier AB
8.12.2016	Edgeware AB	24.3.2021	ACQ Bure AB
22.2.2017	Oncopeptides AB	24.3.2021	LMK Group AB
22.3.2017	Next Games Oy	24.3.2021	Orthex Oyj
23.3.2017	MIPS AB	24.3.2021	Sitowise Group Oyj
31.3.2017	Ambea AB	26.3.2021	Pierce Group AB
6.4.2017	SSM Holding AB	23.4.2021	Modelon AB
6.4.2017	Actic Group AB	26.4.2021	Hemnet Group AB
11.5.2017	Kamux Oyj	29.4.2021	Nilar International AB
19.5.2017	Munters Group AB	21.5.2021	Cedergrenska AB
23.5.2017	Medicover AB	24.5.2021	Arla Plast AB
31.5.2017	Boozt AB	25.5.2021	Aligro Planet Acquisition Co AB
15.6.2017	Green Mobility A/S	27.5.2021	Linc AB
20.6.2017	Bonesupport Holding AB	3.6.2021	MilDef Group AB
21.6.2017	Conferize A/S	3.6.2021	Permascand Top Holding AB
28.9.2017	Rovio Entertainment Oy	7.6.2021	Sleep Cycle AB
5.10.2017	Balco Group AB	9.6.2021	Toivo Group Oyj
9.10.2017	Handicare Group AB	15.6.2021	RVRC Holding AB
10.10.2017	Terveystalo Oy	15.6.2021	CodeMill AB
11.10.2017	Climeon AB (publ)	15.6.2021	Solwers Oyj
12.10.2017	BioArctic AB	15.6.2021	Green Hydrogen Systems A/S
13.11.2017	Gofore Oyj	16.6.2021	Acast AB
21.11.2017	IRRAS AB	17.6.2021	Hexicon AB
23.11.2017	TCM Group A/S	22.6.2021	Creaspac AB
5.12.2017	Tempest Security AB	22.6.2021	OX2 AB
7.12.2017	Efecte Oyj	23.6.2021	tbd30 AB
8.12.2017	Mag Interactive AB	23.6.2021	Spinnova Oyj
11.12.2017	Lyko Group AB	23.6.2021	Puuilo Oyj
21.3.2018	Harvia Oyj	24.6.2021	Virala Acquisition Co Oyj
22.3.2018	Green Landscaping Holding AB	24.6.2021	Linkfire ApS
22.3.2018	Altia Oyj	29.6.2021	First Venture Sweden Private AB
		1.7.2021	Profoto Holding AB

Appendix 2. The Data Sample of SEOs (2014-2018)

Issue Date	*Issuer Name*	*Offer Type*
21.1.2014	Strategic Investments A/S	Placement
24.1.2014	Genmab A/S	Placement|Accelerated Bookbuilt
27.1.2014	NeuroVive Pharmaceutical AB	Rights
19.2.2014	Rejlers AB	Placement
19.2.2014	C-RAD AB	Firm Commitment|Placement
7.3.2014	Oasmia Pharmaceutical AB	Accelerated Bookbuilt
11.3.2014	AP Moller-Maersk A/S	Accelerated Bookbuilt
13.3.2014	Victoria Park AB	Firm Commitment|Rights
19.3.2014	HQ AB	Rights
28.3.2014	NTR Holding A/S	Placement
31.3.2014	Biotech-IgG AB	Rights
8.4.2014	Hansa Medical AB	Rights
14.4.2014	Sotkamo Silver AB	Rights
29.4.2014	WntResearch AB	Rights
13.6.2014	Impact Coatings AB	Rights
3.7.2014	ProfilGruppen AB	Rights
3.7.2014	Oasmia Pharmaceutical AB	Accelerated Bookbuilt|Placement
27.8.2014	Precio Systemutveckling AB	Placement
5.9.2014	BasWare Oyj	Accelerated Bookbuilt|Placement
30.9.2014	Precio Systemutveckling AB	Rights
30.9.2014	Vindico Security AB	Rights
8.10.2014	Kungsleden AB	Rights
17.10.2014	Clinical Laserthermia Systems AB	Placement
29.10.2014	Bavarian Nordic A/S	Placement
14.11.2014	TrustBuddy International AB	Firm Commitment|Placement
19.11.2014	Cassandra Oil AB	Placement
19.11.2014	Clinical Laserthermia Systems AB	Rights
5.12.2014	Oasmia Pharmaceutical AB	Rights
20.1.2015	Kopy Goldfields AB	Rights
27.1.2015	Dignitana AB	Rights
29.1.2015	EXINI Diagnostics AB	Rights
6.2.2015	Easyfill AB	Rights
10.2.2015	Ixonos Oyj	Placement
13.2.2015	Matas A/S	Block Trade|Accelerated Bookbuilt
20.2.2015	NeuroVive Pharmaceutical AB	Firm Commitment|Placement
3.3.2015	Oriola-KD Oyj(NOW 8F3312)	Firm Commitment|Rights
18.3.2015	H+H International A/S	Accelerated Bookbuilt|Placement
19.3.2015	HQ AB	Rights

25.3.2015	Metsa Board Oyj	Firm Commitment|Rights
30.3.2015	Clinical Laserthermia Systems AB	Placement
31.3.2015	Opus Group AB	Rights
1.4.2015	Micropos Medical AB	Rights
2.4.2015	Hansa Medical AB	Rights
28.4.2015	Senzime AB	Placement
6.5.2015	OraSolv AB	Rights
8.5.2015	NeuroVive Pharmaceutical AB	Firm Commitment|Placement
21.5.2015	C-RAD AB	Placement
8.6.2015	Nordic Camping & Resort AB	Placement
22.6.2015	Nordjyske Bank A/S	Rights|Firm Commitment
22.6.2015	Jays AB	Rights
25.6.2015	Mackmyra Svensk Whisky AB	Rights
29.6.2015	ProstaLund AB	Rights
1.7.2015	Dignitana AB	Placement
23.9.2015	Cassandra Oil AB	Placement
18.11.2015	Dsv As	Block Trade|Accelerated Bookbuilt|Offer for Sale
7.12.2015	Ostjydsk Bank A/S	Placement
8.12.2015	Danske Andelskassers Bank A/S	Firm Commitment|Rights
17.12.2015	Rejlers AB	Block Trade|Placement|Accelerated Bookbuilt
17.12.2015	Taurus Energy AB	Rights
1.2.2016	ADDvise Group AB	Placement
5.2.2016	Clinical Laserthermia Systems AB	Rights
12.2.2016	Obducat AB	Rights
25.2.2016	Seamless Distribution AB	Block Trade|Placement|Accelerated Bookbuilt
15.3.2016	Scanfil Oyj	Accelerated Bookbuilt|Placement
21.3.2016	Aqeri Holding AB	Placement
23.3.2016	Sponda Oyj	Rights|Firm Commitment
13.4.2016	Bavarian Nordic A/S	Accelerated Bookbuilt|Placement
15.4.2016	Parans Solar Lighting AB	Rights
27.5.2016	Photocat A/S	Placement
31.5.2016	Etteplan Oyj	Firm Commitment|Rights
8.6.2016	Genovis AB	Rights
9.6.2016	Castellum AB	Placement
10.6.2016	Dignitana AB	Rights
17.6.2016	SSAB AB	Placement|Firm Commitment
21.6.2016	SSH Communications Security Oyj	Placement|Block Trade|Accelerated Bookbuilt
28.6.2016	LIDDS AB	Rights
7.7.2016	Cassandra Oil AB	Rights
13.7.2016	Seamless Distribution AB	Placement|Firm Commitment
1.9.2016	Swedol AB	Rights

15.9.2016	Star Vault AB	Rights
21.9.2016	Technopolis Oyj	Rights
30.9.2016	Zealand Pharma A/S	Placement|Firm Commitment|Accelerated Bookbuilt
5.10.2016	NKT Holding A/S	Block Trade|Firm Commitment|Accelerated Bookbuilt
5.10.2016	Aqeri Holding AB	Placement
6.10.2016	Catena AB	Firm Commitment|Block Trade|Accelerated Bookbuilt
6.10.2016	C-RAD AB	Placement
17.10.2016	Elanders AB	Firm Commitment|Rights
17.10.2016	Biotech-IgG AB	Rights
21.10.2016	Probi AB	Rights
1.11.2016	Micropos Medical AB	Rights
18.11.2016	Easyfill AB	Rights
25.11.2016	ADDvise Group AB	Placement
29.11.2016	PledPharma AB	Rights
5.12.2016	Amhult 2 AB	Rights
7.12.2016	Active Biotech AB	Rights
13.12.2016	ProstaLund AB	Rights
20.12.2016	Tobii AB	Rights
23.1.2017	Dios Fastigheter AB	Placement|Firm Commitment
6.2.2017	VBG Group AB	Rights
14.2.2017	Sotkamo Silver AB	Placement
15.2.2017	Photocat A/S	Placement
3.3.2017	Honkarakenne Oyj	Placement
13.3.2017	Episurf Medical AB	Rights
22.3.2017	Genesis IT AB	Placement
24.3.2017	Suomen Hoivatilat Oyj	Accelerated Bookbuilt|Firm Commitment|Block Trade
24.3.2017	Kungsleden AB	Rights
28.3.2017	Senzime AB	Rights
31.3.2017	Rejlers AB	Rights
5.4.2017	QT Group Oyj	Rights
10.4.2017	Genovis AB	Placement
13.4.2017	LIDDS AB	Placement
20.4.2017	Josab International AB	Rights
31.5.2017	Jays AB	Placement
15.6.2017	SSH Communications Security Oyj	Block Trade|Firm Commitment|Accelerated Bookbuilt
15.6.2017	Ortivus AB	Rights
16.6.2017	Auriant Mining AB	Rights
19.6.2017	LIDDS AB	Placement
5.7.2017	Oasmia Pharmaceutical AB	Rights
6.7.2017	Biotech-IgG AB	Placement
4.9.2017	Acando AB	Placement

8.9.2017	Auriant Mining AB	Rights
14.9.2017	Getinge AB	Rights
22.9.2017	Beijer Electronics AB	Rights
22.9.2017	Biotech-IgG AB	Placement
4.10.2017	Salling Bank A/S	Rights|Firm Commitment
6.10.2017	Cassandra Oil AB	Rights
18.10.2017	Nitro Games Oyj	Placement
18.10.2017	MedicPen AB	Rights
23.10.2017	WntResearch AB	Rights
25.10.2017	ZetaDisplay AB	Placement
26.10.2017	Nixu Oyj	Placement|Firm Commitment|Accelerated Bookbuilt
27.10.2017	BioPorto A/S	Placement
31.10.2017	Impact Coatings AB	Placement
2.11.2017	Cleantech Invest Oyj	Placement
3.11.2017	NeuroVive Pharmaceutical AB	Firm Commitment|Placement
9.11.2017	SAS AB	Placement|Firm Commitment|Accelerated Bookbuilt
29.11.2017	Hansa Medical AB	Accelerated Bookbuilt|Placement|Firm Commitment
14.12.2017	Seamless Distribution AB	Rights
15.12.2017	Loudspring Oyj	Placement|Firm Commitment
19.12.2017	Impact Coatings AB	Rights
27.12.2017	Dignitana AB	Rights
12.1.2018	Taurus Energy AB	Rights
12.1.2018	Cassandra Oil AB	Placement
15.1.2018	LIDDS AB	Placement
24.1.2018	Arctic Minerals AB	Placement
15.2.2018	Jays Group AB	Rights
19.2.2018	Xavitech AB	Rights
7.3.2018	Senzime AB	Placement
19.3.2018	Elos Medtech AB	Rights
26.3.2018	Implementa Hebe AB	Rights
16.4.2018	Mons Bank A/S	Firm Commitment|Rights
18.4.2018	Sparekassen Sjaelland-Fyn A/S	Rights
15.6.2018	Caverion Oyj	Firm Commitment|Accelerated Bookbuilt
18.6.2018	H+H International A/S	Firm Commitment|Rights
21.6.2018	ZetaDisplay AB	Rights
4.7.2018	Arbona AB	Rights
26.10.2018	MedicPen AB	Firm Commitment|Rights