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The Impact of Industry on IPO Underpricing and Long-Term Performance

Evidence from Nordic Markets

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ABSTRACT:
The global IPO market has seen significant growth in recent years, with a marked surge in 2021, driven by favorable market conditions and strong investor demand. The Nordic IPO market has followed a similar trajectory, benefiting from these global trends. Notably, the technology sector has played a key role in driving IPO activity both globally and within the Nordic region, despite annual fluctuations in market dynamics.

Although IPO performance has been a prominent focus in financial research, particularly in terms of short-term and long-term outcomes, the IPO performance in the Nordic region has received limited attention. Specifically, the influence of industry sectors on IPO performance in this context remains underexplored. This study enhances understanding of the underpricing and long-term performance of IPOs in the Nordic markets, with a particular emphasis on the impact of industry sectors.

The study analyses 427 companies listed between 2012 and 2021 in Denmark, Finland, Norway, and Sweden. Following the TRBC Industry Classification, the companies are grouped into ten sectors: Basic Materials, Consumer Cyclicals, Consumer Non-Cyclicals, Financials, Healthcare, Industrials, Real Estate, Technology, Utilities, and Other. To assess IPO underpricing and long-term performance, the Nordic MSCI Index is used as a benchmark.

Using market-adjusted returns and an OLS regression model, the results show that IPOs generally exhibit significant initial abnormal returns, with notable variation across industry sectors. However, no statistically significant differences in underpricing are found across sectors. The highest level of underpricing was observed in the Consumer Non-Cyclicals sector, while the lowest was found in Basic Materials.

For long-term performance, the Wealth Relative method is used, showing that while some industries outperform expectations, differences across sectors are not statistically significant, except for the Real Estate sector. Instead, firm-specific factors, such as annual IPO volume in the issuance year, and initial returns, play a more substantial role in determining long-term performance.

KEYWORDS: Initial public offering, IPO, underpricing, long-term performance, industry, Nordic Markets

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TIIVISTELMÄ:
Maailmanlaajuiset listautumisantimarkkinat ovat kokeneet merkittävää kasvua lähivuosina. Erityinen nousu on ollut havaittavissa vuonna 2021 suotuisan markkinatilanteen ja vahvan sijoittajaintressin myötä. Pohjoismainen markkina on seurannut samankaltaista kehityskulkua. Teknologiasektori on ollut keskeisessä roolissa listautumisaktiivisuuden lisääntymisessä niin kansainvälisesti kuin Pohjoismaissa, huolimatta markkinadynamiikan vuosittaisista vaihteluista.

Vaikka listautumisannit ovat olleet keskeinen tutkimuskohde rahoitustieteissä, erityisesti lyhyen ja pitkän aikavälin suorituskyvyn osalta, Pohjoismaisten markkinoiden listautumisanteja on käsitelty rajallisesti. Erityisesti toimialasektoreiden vaikutus listautumisannin suorituskykyyn on jäänyt vähemmälle huomiolle. Tämä tutkimus syventää ymmärrystä listautumisantien alihinnoittelusta ja pitkän aikavälin suorituskyvystä Pohjoismaisilla markkinoilla, keskittyen eri toimialasektoreiden vaikutuksiin.

Tutkimuksessa analysoidaan 427 yrityksen listautumista ajanjaksolla 2012–2021 Suomessa, Tanskassa, Norjassa ja Ruotsissa. TRBC-toimialaluokituksen mukaisesti yritykset on jaoteltu kymmeneen sektoriin: Perusmateriaalit, Hyödykkeet, Kiinteistöt, Kulutustavarat sykliset, Kulutustavarat ei-sykliset, Rahoitus, Teknologia, Terveydenhuolto, Teollisuus ja Muut. Listautumisannin alihinnoittelun ja pitkän aikavälin suorituskyvyn arvioimiseksi käytetään vertailuindeksinä Pohjoismaista MSCI-indeksiä.

Hyödyntämällä markkinakorjattuja tuottoja ja OLS-regressiomallia, tutkimuksen tulokset osoittavat, että listautumisannit yleisesti näyttävät merkittävää alihinnoittelua tarkastellulla ajanjaksolla ja että toimialasektoreiden välillä on huomattavaa vaihtelua. Sektoreiden välillä ei kuitenkaan havaittu tilastollista merkittävyyttä alihinnoittelussa. Korkein alihinnoittelun taso löytyi Kulutustavarat ei-sykliset -sektorilta, kun taas matalin taso havaittiin Perusmateriaalit-sektorilla.

Pitkän aikavälin suorituskyvyn arvioinnissa käytetty Wealth Relative -menetelmä osoittaa, että vaikka tietyt toimialat ylittävät odotetut tulokset, sektoreiden väliset erot eivät ole tilastollisesti merkittäviä, lukuun ottamatta Kiinteistöt-sektoria. Sen sijaan yrityskohtaiset tekijät, kuten osakkeen listautumisvuoden kokonaislistautumismäärä ja listautumisannin alkutuotto, vaikuttavat merkittävästi pitkän aikavälin suorituskykyyn.

AVAINSANAT: Listautumisanti, osakeanti, alihinnoittelu, pitkän aikavälin suorituskyky, toimiala, Pohjoismainen markkina

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1 Introduction

The global Initial Public Offering (IPO) market has grown significantly over the past decade, with fluctuations driven by macroeconomic trends and shifts in investor sentiment. The COVID-19 pandemic further accelerated IPO activity, as government stimulus measures created favorable conditions for companies to go public. In 2021, global IPO proceeds reached a record $608 billion, an increase of $278 billion from the previous year (PwC, 2021). This growth was also reflected in the Nordic region, where IPO activity increased notably. Between 2012 and 2021, 429 IPOs were recorded across Norway, Sweden, Finland, and Denmark, with nearly 45% occurring in 2020 and 2021, highlighting the pandemic's impact on market dynamics (DataStream, 2024).

IPOs represent a key milestone for companies transitioning from private to public ownership, offering shares to the public for the first time. Companies listing on stock exchanges, such as Nasdaq Nordic or the Oslo Stock Exchange, weigh the benefits of going public against the associated disadvantages. Once listed, the company’s shares are traded on the chosen stock exchange. In the Nordic region, IPO activity is an important aspect of capital markets, reflecting the region's dynamic business environment and well-developed financial infrastructure. Companies listing in the Nordics benefit from transparent financial markets, a strong regulatory framework, and access to a diverse investor base, which support corporate growth and contribute to economic development in the region.

IPO performance has been a central topic in financial research, with a focus on both short-term and long-term performance. Many of these studies have identified various anomalies associated with IPOs. Probably the most notable anomaly is IPO underpricing, where shares are issued below their intrinsic market value, resulting in significant abnormal returns for investors on the first trading day. Notably, the degree of underpricing tends to vary significantly across different regions and time periods. For example, between 1980 and 2024, IPOs in U.S. primary markets were underpriced by an average of 18.9% (Ritter, 2024). In the Nordic region, underpricing levels between 2015 and 2021

averaged 11.9% in Finland, 16.2% in Sweden, 3.6% in Norway, and 22.8% in Denmark (Zhang & Neupane, 2024).

Underpricing is commonly viewed as a short-term phenomenon, but IPOs also exhibit a well-documented tendency for long-term underperformance. Ritter (1991) and Ritter & Welch (2002) found that U.S. IPOs often deliver weaker returns compared to market indices or comparable firms over extended periods. Similar findings have been reported in the Nordic markets. For example, Keloharju (1993) and Hahl et al. (2014) have highlighted that Finnish IPOs frequently underperform in the long run, raising concerns about their valuation and the efficiency of financial markets in pricing these offerings.

This study examines the performance of Nordic IPOs from 2012 to 2021, focusing on the impact of industry sectors on short-term underpricing and long-term underperformance. The analysis builds on methodologies from prior research while incorporating updated data. The sample includes IPOs from four Nordic countries—Finland, Denmark, Sweden, and Norway.

1.1 Purpose of the Study

The purpose of this study is to analyze the performance of Nordic IPOs from 2012 to 2021, focusing on the impact of industry sectors on two key aspects: short-term underpricing and long-term performance. While IPO underpricing and long-term performance have been widely studied globally, the influence of industry sectors appears to be limited, particularly in the Nordic context. Most existing studies on Nordic IPOs, such as Keloharju (1993), Hahl et al. (2014), and Zhang & Neupane (2024), have examined general trends in underpricing and performance but have primarily focused on firm-level characteristics, such as size, book-to-market, profitability, and leverage, without investigating the role of industry sectors in shaping IPO performance. Although research in this area is limited, there are some contributions, such as Westerholm (2006), which examined the impact of industry clustering on IPO returns in the Nordic markets and found a weak but positive relationship between industry concentration or clustering and high initial returns.

This study extends previous IPO literature by integrating an industry sector-focused analysis and addressing both short-term and long-term performance, providing new insights into IPO outcomes in the Nordic region amid current market conditions. IPOs are categorized into ten industry groups—Basic Materials, Consumer Cyclicals, Consumer Non-Cyclicals, Financials, Healthcare, Industrials, Real Estate, Technology, Utilities, and Other—to analyze industry impact on performance. The research builds on established methodologies from prior studies (e.g., Ritter, 1991; Keloharju, 1993; Brav et al., 2000; Alvarez, S., & Gonzalez, 2005; Hahl et al., 2014) and incorporates market data between 2012-2021. By combining insights into short-term underpricing and long-term performance, this study aims to enhance the understanding of the industry impact on post-IPO performance in Nordic markets.

1.2 Hypotheses

Previous IPO research consistently demonstrates that IPOs are significantly underpriced, a trend also observed in the Nordic region. For example, Keloharju (1993) reported an average underpricing of 8.7% for Finnish IPOs between 1984 and 1989, with smaller IPOs experiencing the highest levels of underpricing during this period. Similarly, Hahl et al. (2014) found that Finnish IPOs were underpriced by an average of 15.6% during the period from 1994 to 2006. Westerholm (2006) noted that underpricing in Nordic markets has intensified over time, particularly from the 1980s to the 2000s. More recent research by Zhang and Neupane (2024) indicates that IPOs in Nordic countries were underpriced during 2015–2021, with Denmark exhibiting the highest mean underpricing at 22.8% and Norway the lowest at 3.6%.

The first hypothesis suggests that industry factors influence the level of underpricing. This assumption is based on the idea that industry-specific characteristics—such as growth potential, investor sentiment, and market conditions—play a significant role in determining underpricing. Previous IPO research supports this view, with studies indicating that industry factors, including market conditions and sector-specific risks,

influence the degree of underpricing (e.g., Ljungqvist, 2007; Purnanandam & Swaminathan, 2004). The first hypothesis is stated as follows:

H_1: The level of IPO underpricing varies significantly across industry sectors in Nordic markets.

The first hypothesis lays the foundation for exploring underpricing across different industries. However, IPO performance is not limited to initial price movements; long-term performance also varies significantly and is highly relevant for investors and market participants. While short-term pricing anomalies in IPOs are well-documented, understanding long-term performance is essential for evaluating the sustained value and risks associated with these investments.

The long-term performance of IPOs has been well studied, with consistent evidence of underperformance compared to similar firms and market indices (e.g., Ritter, 1991; Keloharju, 1993; Ritter & Welch, 2002; Hahl et al. 2014). However, IPO outcomes are not uniform, as performance often varies due to differences in growth expectations, investor sentiment, and sector-specific risks. For instance, high-growth sectors like technology and biotechnology can experience greater long-term underperformance, driven by inflated initial valuations and speculative investor behavior (Purnanandam & Swaminathan, 2004). Accordingly, Hahl et al. (2014) found that the average market-adjusted return for holding Finnish IPO stocks during the first three years after issuance was -30% during the period 1994–2006, with value stock IPOs generating significantly higher long-term returns than growth IPOs.

Sectoral dynamics are particularly important in the Nordic markets, which have a diverse industrial base and unique economic conditions. Keloharju (1993) highlight that industry characteristics significantly affect IPO performance, with smaller firms and growth-oriented sectors often underperforming. Additionally, the cyclicality of IPO activity—where speculative industries dominate in "hot" markets and defensive sectors prevail in "cold"

markets—further illustrates the influence of industry factors on long-term outcomes (Helwege & Liang, 2004). Building on these findings, the second hypothesis proposes that industry sectors play a key role in shaping long-term IPO outcomes. The second hypothesis is defined as follows:

H_2: The level of IPO long-term price performance varies significantly across industry sectors in Nordic markets.

1.3 Structure of the Study

The study begins with an introduction outlining the purpose, research hypotheses, and structure of the thesis. The next two chapters provide the theoretical background: Chapter 2 covers IPO concepts, including motivations, the listing process, and valuation methods, such as discounted cash flow, dividend discount models, and multiples valuation. Chapter 3 examines IPO underpricing and long-term performance, exploring theories such as asymmetric information, signaling, institutional theories, and market-timing, followed by a review of empirical evidence.

Chapter 4 outlines the data and methodology, detailing the data collection process and the methods used to measure underpricing and long-term performance. Chapter 5 presents the results, including descriptive statistics and the impact of industry sectors on both initial and long-term IPO performance. Finally, Chapter 6 concludes the thesis, summarizing the findings.

2 From Private to Public: Initial Public Offering (IPO)

The next chapter examines Initial Public Offerings (IPOs), where private companies transition to public ownership by selling shares to the public. Going public is a major milestone, but the motivations for doing so vary. Common reasons include raising capital for growth, repaying debt, and providing liquidity for early investors. We delve deeper into the motivations for IPOs, the listing process, and the valuation methods used during the transition to public markets. For clarity and simplicity, the term Initial Public Offering will be referred to as IPO throughout this thesis.

2.1 Motivations Behind IPOs

To gain a deeper understanding of IPOs, it is essential to examine the motivations behind going public. These motivations vary across industries and regions but are primarily financial. Companies often pursue an IPO to raise capital for growth or to allow existing shareholders to sell their equity. Non-financial motivations, such as increased visibility and market credibility, are also relevant but are typically secondary and closely linked to the financial benefits of being publicly owned. Without these financial benefits, many entrepreneurs choose to remain private to avoid the regulatory challenges and increased scrutiny associated with being a public company (Ritter & Welch, 2002).

According to Ritter and Welch (2002), a firm's stage in its life cycle, which reflects its maturity and readiness for public ownership, plays also a key role in the decision to pursue an IPO. However, this framework is not universally applicable. For instance, in developed economies like the United States, many large and mature firms choose to remain privately held. Similarly, in countries such as Germany and Italy, public companies are less common, and private firms often surpass public companies in terms of size and market influence. These variations show that going public is not an inevitable step in a firm's growth but rather a strategic decision influenced by firm-specific characteristics, industry conditions, and institutional factors. Differences in legal systems, financial markets, and cultural attitudes toward ownership further highlight the importance of context in

shaping IPO decisions (Pagano et al., 1998). This perspective challenges the traditional view of public listing as a natural progression, emphasizing the need to understand the unique incentives and constraints that influence firms' strategic choices.

Despite the extensive theoretical literature on IPO motivations, empirical validation remains challenging due to data limitations. Most research focuses on companies that successfully go public, leaving a significant gap in understanding the characteristics and decisions of private firms that choose to remain unlisted. This limitation hinders a comprehensive evaluation of theories related to IPOs (Ritter & Welch, 2002).

To address this issue, Pagano et al. (1998) conducted a study on Italian firms from 1982 to 1992, comparing companies that pursued an IPO with those that remained private. Their analysis focused on firms capable of undertaking an IPO, offering valuable insights into the factors influencing the decision to go public. The findings showed that larger firms with high market-to-book ratios were more likely to list their shares, often not to finance future growth but to restructure their balance sheets following significant investments. Additionally, the study highlighted benefits associated with IPOs, such as reduced credit costs and increased ownership turnover, demonstrating the diverse motivations behind going public. These results challenge the assumption that IPOs are primarily growth-driven and instead underscore the importance of financial restructuring and ownership reallocation in the decision-making process. This highlights the need to consider firm-specific factors and broader market conditions when analyzing IPO motivations.

Brau and Fawcett (2006) further investigated IPO motivations by surveying 336 Chief Financial Officers (CFOs) in the United States, highlighting significant differences in how the IPO process is perceived depending on firm-specific factors. The study identified the primary motivation for going public as creating publicly traded shares, which can be used as currency for future acquisitions. CFOs also emphasized the importance of retaining decision-making control and ownership, which often influenced their preference to

remain private. Furthermore, a company's IPO history, whether successful, withdrawn, or never pursued, played a crucial role in shaping executives' perceptions of the risks and challenges of public ownership. These experiences often influenced attitudes toward regulatory complexities and the long-term advantages of going public, illustrating the nuanced and context-dependent nature of IPO decision-making (Brau & Fawcett, 2006).

In a similar study, Bancel and Mittoo (2009) conducted a study surveying CFOs across 12 European countries between 1994 and 2004 to further explore the motivations for IPOs and stock exchange listings. Their findings strongly support theories that emphasize financial and strategic benefits, such as enhanced credibility, improved reputation, and increased financial flexibility for growth. Moderate support was also found for theories focusing on exit strategies, changes in power dynamics within firms, improved monitoring mechanisms, and the facilitation of mergers and acquisitions. In contrast, theories related to asymmetric information and reductions in the cost of capital received less support. Study also highlights key differences in how U.S. and European CFOs perceive external monitoring. While U.S. executives often view external monitoring as a significant cost of public ownership, European CFOs are more likely to see it as a substantial benefit. This contrast reflects differences in regulatory frameworks, corporate governance practices, and cultural attitudes toward transparency and accountability. These regional variations underscore the importance of understanding the contextual factors that shape firms' views on the costs and benefits of going public.

The studies discussed highlight that IPO motivations are diverse and highly context dependent. Firms are influenced by a combination of financial incentives, such as raising capital and restructuring finances, and strategic goals, such as enhancing reputation and increasing flexibility for growth and acquisitions. However, these advantages must be balanced against the regulatory and operational challenges of public ownership. These findings emphasize the need for a comprehensive approach to analyzing IPO decisions, considering the interplay between financial motivations, strategic objectives, and the broader market environment.

2.2 Listing Process

When a company decides to go public, selecting the appropriate market is a critical decision that influences regulatory requirements, investor access, and the overall success of the IPO. This study focuses on IPOs within the Nordic region, considering both primary and secondary markets.

The primary markets in Nordic countries include exchanges such as the Oslo Stock Exchange, Nasdaq Stockholm, Nasdaq Copenhagen, and Nasdaq Helsinki. These exchanges primarily cater to large, well-established firms and impose stringent listing requirements to ensure transparency, investor protection, and alignment with global regulatory standards. For example, companies listing on these primary markets typically need to demonstrate robust financial performance, a proven business model, and compliance with International Financial Reporting Standards (IFRS). Such requirements are designed to instill investor confidence and promote long-term market stability (Nasdaq, 2024a).

In contrast, the secondary markets, including platforms such as Spotlight Stock Market (formerly AktieTorget), the Nordic Growth Market (NGM), Oslo Axess, and Nasdaq First North, cater to smaller, high-growth companies. These markets offer a more flexible regulatory framework, enabling small and medium-sized enterprises (SMEs) to access public capital without the rigorous obligations of primary markets. Nasdaq First North, for example, operates branches in Denmark, Finland, Iceland, and Sweden and provides SMEs with the opportunity to achieve greater market visibility and attract investors while benefiting from lighter regulatory and disclosure requirements. Companies listing in secondary markets must typically appoint certified advisors to ensure compliance with market regulations.

The two-tiered structure of primary and secondary markets in the Nordic region reflects the diverse needs of companies at various stages of growth. While primary markets emphasize established operational and financial performance, secondary markets focus on

growth potential and sufficient working capital. Public float requirements also differ between these tiers: primary market listings often require at least 25% of shares to be offered to the public, whereas secondary markets, such as Nasdaq First North, typically require a minimum of 10% (Nasdaq, 2024b).

Additionally, some segments within secondary markets, such as Nasdaq First North Premier, align more closely with the standards of primary markets. This alignment creates a pathway for growing companies to transition to major exchanges as they mature and expand their operations, fostering scalability and long-term progression. The coexistence of primary and secondary markets in the Nordic region provides a comprehensive platform to support a wide range of companies in accessing public capital while accommodating their varying levels of readiness and strategic objectives.

The listing process typically spans 6 to 12 months and comprises several key phases. The timeline may vary depending on the company's level of readiness and the complexity of its business operations. Although specific regulatory requirements may vary slightly, the process is largely standardized across the Nordic region. The key phases of listing a company in the Nordic countries are as follows (Pörssisäätiö, 2024):

1. **Initial Planning**: Assess listing readiness, define objectives, select advisors (including underwriters), and establish governance, financial reporting (e.g., IFRS), and risk management frameworks.
2. **Preparation with Advisors:** Conduct due diligence, draft the prospectus, coordinate with authorities, and develop investor communication and marketing strategies.
3. **Listing Application:** Submit the application, finalize the prospectus with underwriters, conduct investor roadshows, and receive exchange approval.
4. **Trading Commencement:** Start trading with public announcements and maintain compliance with reporting and disclosure requirements.
5. **Post-Listing:** Implement investor relations programs, monitor market performance, and ensure adherence to regulatory and governance standards.

The partnership between the issuing company and its underwriters is a critical step in the IPO process. It determines the financial terms of the offering, the marketing strategy, and ultimately the success of the public listing. Underwriters assess the company's valuation, set the initial offering price, and promote the IPO to potential investors. For larger or more complex offerings, a syndicate of underwriters is often formed to share responsibilities, reduce risk, and ensure broader distribution of shares. This collaborative approach leverages the expertise of multiple institutions to maximize the chances of a successful outcome (Brealey et al., 2023).

The lead underwriter plays a crucial role in the IPO process by ensuring regulatory compliance, fostering investor confidence, and maximizing demand for the offering. Their responsibilities include conducting due diligence to verify the accuracy of the company's disclosures, preparing a comprehensive and transparent prospectus, and coordinating road show presentations to attract institutional investors. By effectively managing these tasks, the lead underwriter helps establish trust among investors and facilitates a successful public listing, ultimately contributing to the company’s long-term growth and market presence.

A key decision for a company preparing to go public is determining the type of agreement to establish with the underwriter, as this choice significantly influences the risk and profitability of the IPO. The most common method is the firm commitment approach, where the underwriter purchases all shares from the issuing company and assumes the full risk of selling them to the public. This approach can be highly profitable for the underwriter when demand for the shares is strong, as it earns the difference, or spread, between the purchase price and the final sale price. However, when market demand is uncertain or the offering carries higher risk, underwriters may prefer a best-efforts approach. In this arrangement, the underwriter agrees to sell as many shares as possible but does not guarantee the sale of the entire offering, thereby limiting both risk and potential profit. Another, less common, option is the all-or-none agreement, where the

IPO proceeds only if all shares are successfully sold. If even a portion of the shares remain unsold, the offering is canceled, leaving the issuing company without the anticipated capital and the underwriter without compensation (Brealey et al., 2023).

2.3 Valuation Process

Valuation represents a significant challenge in the IPO process, and its accuracy tends to improve as the process progresses. This improvement is primarily driven by the incorporation of new information, which refines initial estimates and enhances the reliability of the valuation. Underwriters play a pivotal role in this process by applying established methodologies to determine an appropriate price range for the IPO.

A particularly significant challenge arises in cases where no prior market price exists, such as with companies that have limited operational histories or operate in emerging industries. In these situations, determining an accurate valuation becomes more complex. Underwriters must rely heavily on their expertise, market knowledge, and professional judgment to reduce uncertainty and establish a valuation that is both credible and aligned with market expectations.

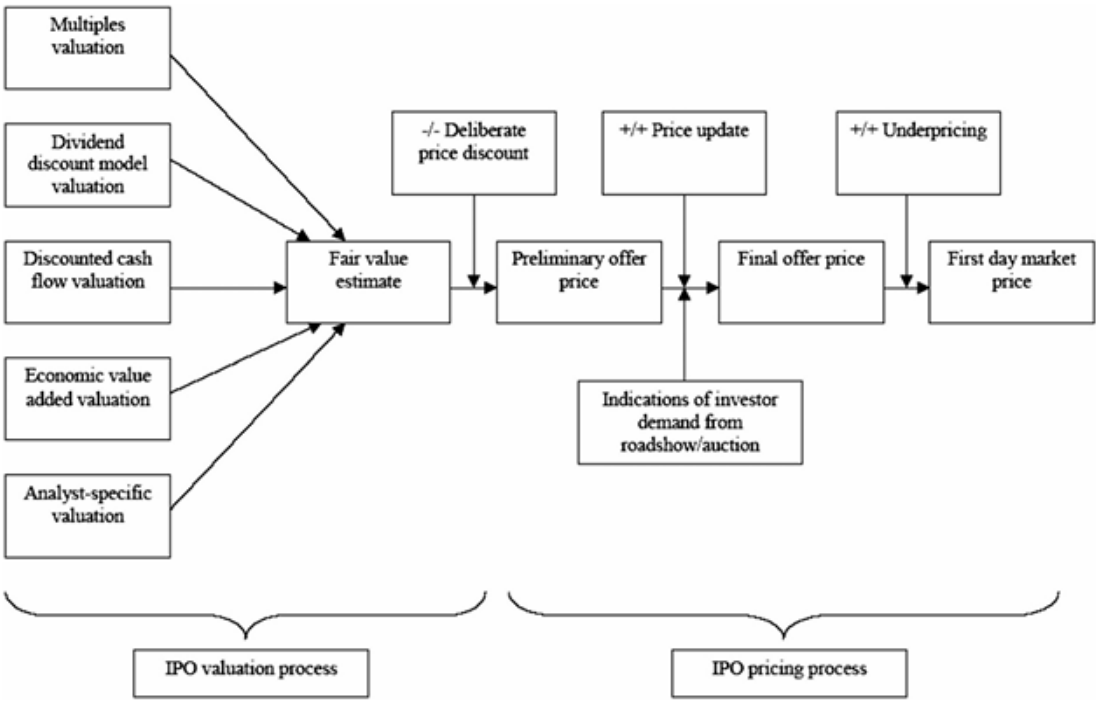

Figure 1. IPO Valuation and Pricing Process (Roosenboom, 2012)

In Figure 1, Roosenboom (2012) categorizes the IPO pricing process into two primary stages: valuation and pricing. During the valuation stage, underwriters employ various established valuation methodologies, such as multiples, discounted cash flow (DCF), dividend discount model (DDM), and economic value-added (EVA), to estimate the fair value of the company's shares. In addition to these conventional approaches, analysts often incorporate supplementary valuation techniques to enhance the comprehensiveness of their assessments.

After the valuation stage, underwriters refine their initial estimates to establish a preliminary offer price, often incorporating an IPO discount to attract early investors. This preliminary price is subsequently adjusted based on insights gathered from pre-IPO activities, such as investor roadshows and feedback (Roosenboom, 2012). The process concludes with the determination of the final offer price, which is set shortly before the IPO launch. However, the true market valuation of the company is revealed only when

trading begins on the secondary market, where share prices are influenced by supply and demand dynamics.

IPO valuation plays a critical role in finance, providing public market participants with their first opportunity to assess a company's assets and growth potential. However, achieving an accurate valuation remains a significant challenge, as the initial trading price often deviates from the offering price. This deviation typically results in underpricing, reflecting the complexities and uncertainties inherent in the IPO process. The underlying factors contributing to underpricing, as well as its broader implications, will be discussed in Chapter 3.

Valuation methodologies form the foundation of the IPO pricing process, providing underwriters with the tools to estimate a company's fair value with analytical rigor. Research indicates that no single valuation method is universally optimal; instead, the effectiveness of each approach depends on the specific context and characteristics of the company being evaluated. As a result, underwriters often adopt a tailored combination of valuation techniques to gain a holistic view of the company's value. By leveraging their expertise, they integrate multiple methodologies to assess market demand and establish fair offer prices. Commonly used approaches include multiples valuation, discounted cash flow (DCF) analysis, and the dividend discount model (DDM). These methods are typically applied in combination to serve as cross-references, thereby validating the estimated fair value and improving the overall accuracy of the valuation process (Roosenboom, 2012). Due to their widespread use, we will delve deeper into these three valuation methods.

2.3.1 Discounted Cash Flow

The Discounted Cash Flow (DCF) model calculates a company's intrinsic value by discounting projected future free cash flows to their present value, providing a robust and versatile framework for valuation. This method is particularly effective for firms that do not consistently distribute dividends, as it shifts the focus away from dividend policies

or accounting adjustments and instead emphasizes the actual cash flows generated by the business. By focusing on free cash flows, the DCF model offers a comprehensive and reliable measure of value, capturing the underlying financial performance and growth potential of the company (Bodie et al., 2014). It is widely regarded as a cornerstone of modern valuation techniques due to its ability to assess a company's long-term financial viability and intrinsic worth.

In DCF analysis, cash flows are calculated using one of two primary methods: Free Cash Flow to the Firm (FCFF) or Free Cash Flow to Equity (FCFE). FCFF represents the after-tax cash flows available to both debt and equity holders and is discounted at the Weighted Average Cost of Capital (WACC) to determine the total value of the firm. The equity value is then derived by subtracting the firm's total debt from this figure. The calculation of FCFF is outlined as follows (Bodie et al., 2014):

$$FCFF = EBIT\ x\ (1 - t_c) + Depreciation - Capital\ Expenditures - \Delta NWC \quad (1)$$

In contrast, the FCFE method focuses on cash flows available exclusively to equity holders. These cash flows are discounted at the cost of equity to determine the market value of equity, providing a direct valuation from the perspective of equity investors. FCFE adjusts after-tax interest expenses and changes in net debt, ensuring that the valuation accurately reflects the cash flows available solely to shareholders. This method is particularly useful for investors seeking to evaluate the returns associated with equity ownership. The calculation of FCFE is outlined as follows (Bodie et al., 2014):

$$FCFE = FCFF - \big(Interest\ Expense\ x\ (1 - t_c)\big) + Depreciation - \Delta Net\ Debt \quad (2)$$

Aligning the discount rate with the corresponding cash flow type is crucial to ensure accurate valuation. The Weighted Average Cost of Capital (WACC) should be used to

discount FCFF, as it represents the combined cost of both debt and equity financing. In contrast, the cost of equity is applied to discount FCFE, as it reflects the returns required solely by equity investors. Any mismatch between the discount rate and the cash flow type can result in significant errors, reducing the reliability and accuracy of the valuation analysis.

A significant challenge of the DCF model lies in accurately estimating future cash flows, especially as uncertainty increases over longer time horizons. While the model assumes that a firm operates indefinitely, calculating an infinite series of cash flows is neither feasible nor practical. To address this, analysts typically forecast cash flows over a finite period, commonly spanning several years to a decade. This approach strikes a balance between achieving sufficient precision and maintaining practicality in the valuation process (Brealey et al., 2023).

To account for value beyond the forecast period, analysts calculate a terminal value at the end of the projection horizon. This is usually done using the Gordon Growth Model (also referred to as the Perpetuity Growth Formula), which divides the final projected cash flow by the difference between the discount rate and a conservative long-term growth rate. Selecting an appropriate growth rate is critical, as it has a significant impact on the terminal value and, consequently, the overall valuation. To ensure realism, the growth rate should be below the long-term average growth rate of the economy. An excessively high growth rate would result in an unrealistic valuation, implying a value greater than the combined worth of all global companies over time. The terminal value, calculated using the Gordon Growth Model, is expressed as follows:

$$TV = \frac{FCF_n}{r - g} \tag{3}$$

where TV represents the terminal value, FCF_n is the free cash flow in the final forecasted year, r is the discount rate, and g is the long-term growth rate. This formula

calculates the present value of perpetual cash flows beyond the forecast period, assuming a steady growth rate in perpetuity.

The overall firm value is calculated by summing the present values of the projected annual cash flows and the terminal value. Each cash flow, including the terminal value, is discounted using the appropriate discount factor for its respective year. This approach ensures that the valuation accurately accounts for both the forecasted cash flows during the projection period and the terminal value, which reflects the firm's long-term growth potential. By incorporating these components, the DCF model provides an estimate of the firm's intrinsic value, grounded in its expected future performance. The formula for calculating the intrinsic value of the firm is as follows:

$$P_0 = \sum_{t=1}^{T} \frac{FCF_t}{(1 + r)^t} + \frac{TV}{(1 + r)^T} \tag{4}$$

where P_0 represents the firm's intrinsic value, FCF_t is the free cash flow in year t, r is the discount rate, T is the number of years in the projection period, and TV denotes the terminal value. The formula captures the value of all forecasted cash flows during the projection horizon and discounts the terminal value to account for the firm's long-term financial prospects.

Although the DCF model is widely used in practice for valuing companies preparing for public markets, it has a less prominent presence in academic literature. However, empirical studies indicate that DCF valuations can be as precise as those derived from multiples. For example, Roosenboom (2012) found that underwriters employed the DCF model in 59.21% of IPO valuations for 228 firms listed on the French stock exchange between 1990 and 1999, highlighting its practical relevance in IPO pricing.

2.3.2 Dividend Discount Model

The Dividend Discount Model (DDM) calculates a company's intrinsic value by discounting its projected future dividends to their present value, providing a structured framework for evaluating shareholder value. The model assumes that shareholder value is maximized when a company invests in projects with returns exceeding the opportunity cost of capital. In such cases, shareholders may prefer the reinvestment of earnings rather than immediate dividend distributions, as reinvestment is expected to generate higher future returns and contribute to the firm's long-term value (Brealey et al., 2023).

Although the DDM is theoretically suitable for valuing growth companies, its practical utility decreases when expected dividends are forecasted far into the future. Furthermore, many firms may opt to return value to shareholders through share repurchases rather than traditional dividend payments. Share repurchases reduce the total number of outstanding shares, potentially increasing the dividends per share for remaining shareholders. This strategy does not undermine the validity of the DDM, as the model is fundamentally based on the present value of dividends distributed to shareholders holding non-repurchased shares (Brealey et al., 2023).

When a firm has an established history of paying dividends, applying the DDM becomes relatively straightforward. However, for firms with limited or no dividend history, estimating future dividends requires careful consideration and the development of robust assumptions to ensure a reliable valuation. The accuracy of the DDM in such cases hinges on the ability to project future dividend payments realistically while accounting for the firm's financial performance and growth potential. The DDM formula is expressed as follows:

(5)
$$P_0 = \sum_{t=1}^{T} \frac{D_t}{(1 + r_e)^t}$$

where P_0 represents the intrinsic value of the stock, D_t is the expected dividend at time, t and r_e denotes the required rate of return on equity. This formula discounts each future dividend to its present value and sums these values to determine the total present value of the expected dividend stream over the projection horizon.

Alternatively, future dividends can be forecasted up to a specified horizon date at which point a terminal value is added to account for the value of dividends beyond the forecast period. This enhances the DDM by accommodating long-term projections while consolidating the terminal value into the overall valuation. The revised DDM model is expressed as follows (Brealey et al., 2023):

(6) $$P_0 = \sum_{t=1}^{H} \frac{D_t}{(1 + r)^t} + \frac{(D_H + P_H)}{(1 + r)^H}$$

where P_0 represents the intrinsic value of the stock, D_t is the expected dividend at time t, r denotes the required rate of return, H is the horizon date, and P_H represents the terminal value. By including the present value of projected dividends up to the horizon date and the discounted terminal value, the model captures both short-term and long-term dividend expectations.

The accuracy of the DDM's valuation heavily depends on the assumptions made regarding future dividend payments and the cost of equity. An increase in the cost of equity or a reduction in projected dividends directly decreases the calculated present value of the firm. Forecasting dividends over an indefinite period presents significant challenges, as it heightens the risk of error in the valuation process. To simplify this complexity, Gordon's Growth Model offers an alternative by assuming a constant growth rate for dividends. Gordon's Growth Model is expressed as follows:

(7) $$P_0 = \frac{D_1}{(r_e - g)}$$

where P_0 represents the intrinsic value of the stock, D_1 is the forecasted dividend for the next year, r_e denotes the required rate of return on equity, and g is the expected growth rate of dividends. The model establishes a positive relationship between the stock price and both D_1 and g, reflecting how higher dividends and growth rates can increase the valuation. Conversely, it shows an inverse relationship with r_e, as a higher required rate of return reduces the present value of future dividends.

The model assumes $g < r_e$ to ensure a realistic valuation, as a growth rate exceeding the required rate of return would result in a mathematically invalid or negative stock price. Furthermore, as g approaches r_e, the denominator diminishes, leading to disproportionately high and potentially unrealistic stock price estimates (Brealey et al., 2023).

The DDM is particularly suitable for valuing mature and established companies, making it a common choice in the context of firms entering public markets. Roosenboom (2014) emphasizes its practical relevance alongside the DCF model, reporting that 52.91% of underwriters employed the DDM in their IPO valuations. Moreover, the study found that the DDM demonstrated the highest explanatory power among the valuation methods analysed, highlighting its effectiveness in capturing a company's intrinsic value (Roosenboom, 2014).

2.3.3 Multiples Valuation

Multiples valuation is particularly useful for companies preparing for an IPO, especially when they are young and have limited operating histories. In such cases, traditional valuation methods like DCF or DDM may be less practical due to the inherent difficulties in forecasting stable cash flows. Instead, multiples valuation relies on accounting metrics, such as earnings, revenues, or book value, in conjunction with valuation multiples derived from comparable firms in the same industry. This approach is widely supported in both academic literature and professional practice, as it provides a straightforward and market-oriented perspective on valuation. Kim and Ritter (1999) emphasize its relevance,

noting that multiples valuation is commonly used to benchmark IPO pricing and offer insights into a firm’s market value relative to its peers.

The multiples valuation method allows for direct comparisons between the issuing company's financial multiples and those of similar firms within the same industry. These comparable multiples are then used as proxies to estimate the company’s value. Ideally, this market-based approach should align with valuations derived from DCF and DDM methods, as all three are grounded in similar financial principles. However, the reliability of multiples valuation is highly dependent on the accurate valuation of comparable firms. It is essential that the market prices of these comparable firms reflect their intrinsic value rather than being influenced by speculative investor sentiment or market anomalies.

A critical step in multiple valuation is the selection of comparable firms. Underwriters go beyond industry classification, considering factors such as business operations, market segments, and growth potential to ensure accurate comparisons (Kim & Ritter, 1999). The establishment of valuation multiples relies heavily on well-defined earnings models, which serve as the foundation for benchmarking the issuer's performance against peer companies. s. Consistency in applying these models is vital to aligning valuations with the issuer's expectations while providing investors with reliable and transparent data to support informed decision-making.

The most used multiples in IPO valuations are derived by dividing a company’s market price (P) or enterprise value (EV) by key accounting metrics, providing an estimate of the market value of the company (Roosenboom, 2012). To ensure accurate valuation, these multiples must be adjusted to account for company-specific characteristics such as growth potential, profitability, and operational efficiency. Relying solely on industry averages without incorporating these adjustments can result in misleading valuations that fail to adequately reflect the unique attributes of the company (Kim & Ritter, 1999; Purnanandam & Swaminathan, 2004).

Roosenboom (2014) found that approximately 83.77% of underwriters use multiples valuation methods, making it the most widely employed approach in IPO valuations. The study identified the price-to-earnings (P/E) ratio as the most frequently applied multiple, followed by price-to-cash flow (P/CF), price-to-sales (P/S), price-to-book (P/B), and enterprise value (EV)-based ratios. These multiples are widely used due to their simplicity and adaptability, allowing underwriters to derive valuations that are easily interpretable and comparable across different firms.

The price-to-earnings (P/E) ratio can be calculated using either historical earnings (trailing P/E) or projected future earnings (forward P/E). Forward P/E ratios are often preferred in IPO valuations as they incorporate a company's anticipated growth potential, providing a more accurate reflection of future performance. Trailing P/E ratios, in contrast, rely exclusively on historical data (Kim & Ritter, 1999). The P/E ratio is mathematically expressed as:

$$P/E = \frac{market\ value\ of\ equity}{net\ income} = \frac{market\ value\ per\ share}{earnings\ per\ share} \tag{8}$$

While the P/E ratio is a widely utilized and accepted valuation tool, it is not without limitations. If a company reports negative earnings, the P/E ratio becomes inapplicable, and as earnings approach zero, the ratio can become highly volatile and unreliable. However, companies preparing for an IPO typically report positive revenues and earnings, as they are required to demonstrate financial viability and sufficient working capital to meet the listing requirements of exchanges.

Enterprise value (EV) multiples are calculated by dividing the market value of invested capital by key performance metrics such as EBITDA, free cash flow (FCF), or sales. These multiples are often considered more comprehensive than the P/E ratio because they account for a company's debt levels, providing a broader perspective on its financial structure. Moreover, EV-based multiples offer a clearer evaluation of operating income and profitability, as they are less affected by tax differences and accounting adjustments that

may distort net income. By focusing on metrics that are independent of a company's capital structure, EV multiples enable more accurate comparisons between firms with varying levels of financial leverage or differing tax environments.

For companies operating in diverse industries, employing multiple valuation methods is often crucial, as relying solely on a single approach may fail to capture the full complexity of the firm's value. Combining methods, such as those based on projected earnings and historical data, generally results in more accurate and comprehensive valuations. Incorporating a variety of metrics—including EV-to-sales, EV-to-operating cash flow, market-to-book ratios, P/E ratios, and price-to-sales multiples—provides a more nuanced understanding of a company's financial performance and market potential (Kim & Ritter, 1999). However, excessive reliance on multiples, particularly for young companies with unstable financial histories, can lead to significant inaccuracies. Therefore, a balanced approach that integrates quantitative metrics with qualitative factors, such as growth potential and industry dynamics, is essential to producing IPO valuations.

3 IPO Underpricing and Long-Term Performance

This chapter explores the phenomenon of IPO underpricing and its implications for both short- and long-term market performance. It examines the drivers behind underpricing, including theoretical frameworks such as asymmetric information, signaling, institutional theories, and market timing. Moreover, we discuss previous studies across various markets and time periods, offering valuable insights into both the short- and long-term performance of IPOs. These prior studies provide a solid foundation for our research, which focuses on the underpricing and long-term performance of Nordic IPOs.

3.1 Underpricing

Assessing share value and volume during an IPO is a complex process that often results in underpricing—a phenomenon where the IPO offer price is set below the market's valuation, as evidenced by a higher closing price on the first trading day. Underpricing is commonly measured as the percentage difference between the initial offer price, which represents the price at which shares are sold during the IPO, and the first-day closing price, reflecting the market's valuation. The formula for underpricing expressed as follows:

$$Underpricing = \left(\frac{Closing\ Price - Initial\ Offer\ Price}{Initial\ Offer - Price}\right) x\ 100 \quad (9)$$

This measure highlights the discrepancy between the initial pricing expectations and the actual market valuation of the stock on its first trading day. By quantifying the degree of underpricing, it provides valuable insights into the efficiency of the IPO pricing process and the market's initial reaction to the offering.

Underpricing often results in companies "leaving money on the table," meaning that firms fail to capture the full value their shares could achieve in the market. This represents a missed financial opportunity, where the issuing company raises less capital than

it could have, had the shares been priced closer to their market value. The extent of this lost potential revenue can be calculated as the dollar value of the difference between the initial offer price and the aftermarket trading price, multiplied by the number of shares sold during the IPO. This is expressed in the following formula (Loughran & Ritter, 2004):

$$\begin{aligned} &Money\ Left\ on\ the\ Table \\ &= (Aftermarket\ Trading\ Price \\ &- Initial\ Offer\ Price)\ x\ Number\ of\ Shares\ Sold\ in\ IPO \end{aligned} \tag{10}$$

This metric provides a tangible measure of the financial opportunity cost incurred by the issuing company due to underpricing, highlighting the trade-off between attracting investors and maximizing the proceeds from the IPO.

In well-developed capital markets, where daily price fluctuations are unrestricted, underpricing typically becomes apparent by the end of the first trading day. In contrast, in less mature markets or those with regulatory restrictions on price stabilization, the full extent of underpricing may take several days or longer to manifest. These differences underscore the influence of market structure and regulatory frameworks on the timing and visibility of underpricing (Ljungqvist, 2007).

The phenomenon of IPO underpricing has been extensively documented across various markets and periods. Ibbotson's (1975) pioneering study identified an average initial return of 11.4% in U.S. IPOs from 1960 to 1970, laying the groundwork for subsequent research. Later studies confirmed the persistence of underpricing in diverse contexts. For instance, Keloharju (1993) reported an average underpricing of 8.7% in Finnish IPOs between 1984 and 1989. In the U.S., Loughran and Ritter (2004) observed that average underpricing was 7.3% during the 1980s, increased to 15% from 1990 to 1998, peaked at 65% during the Dot-com bubble (1999–2000), and declined to 12% in the post-bubble period (2001–2003). Boreiko and Lombardo (2011) documented an average underpricing of 12.5% in Italian IPOs from 1999 to 2008. Similarly, Hahl et al. (2014) found that

Finnish IPOs were significantly underpriced during the period 1994–2006, with an average first-day return of 15.6%. These findings highlight the persistent and variable nature of underpricing across markets.

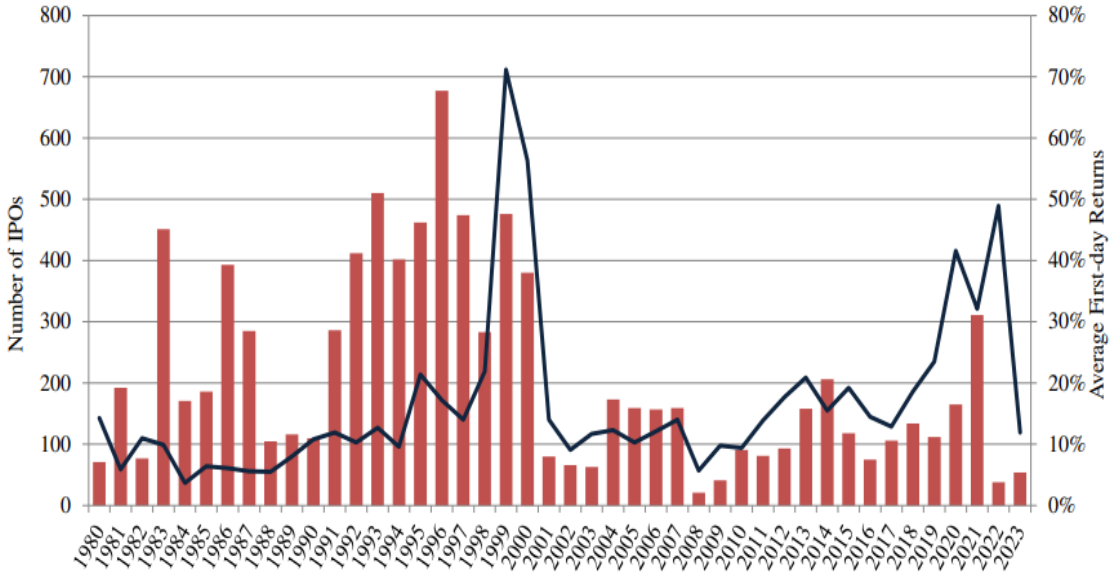

Figure 2. The Number of IPOs and average first-day returns per year (Ritter, 2024)

Figure 2 illustrates the number of IPOs and the equally weighted average first-day returns on major U.S. exchanges from 1980 to 2023 (Ritter, 2024). The black line, which represents the average first-day returns, reveals significant volatility, with a pronounced spike during the 2020–2021 period. During the same time, the number of IPOs also increased substantially, as shown by the red bars, suggesting heightened activity in the IPO market. This surge in IPO volume and underpricing likely reflects a "hot market" period, driven by favorable market conditions, investor optimism, and abundant liquidity, which encouraged both companies to go public and investors to participate actively. However, by 2023, both underpricing levels and IPO volume appear to have declined. This reduction likely indicates a cooling of market enthusiasm, increased market uncertainty, and more cautious investor sentiment, resulting in a more stabilized IPO market.

Recent research by Zhang and Neupane (2024) examines the impact of the COVID-19 pandemic on IPO underpricing, using a dataset of 6,113 IPOs across 32 countries. The findings reveal that IPOs issued during the pandemic experienced 17.6% higher underpricing compared to pre-pandemic offerings. This trend was influenced by firm-specific characteristics, financial intermediaries, and macroeconomic factors. Firms with strong fundamentals and reputable underwriters exhibited higher underpricing, while stronger shareholder protection and superior ESG performance mitigated the effect. Conversely, heightened economic policy uncertainty and increased government economic support contributed to elevated underpricing. Their analysis also highlights underpricing trends in Nordic countries between 2015 and 2021, where Denmark recorded the highest underpricing at 22.8%, followed by Sweden at 16.2%, Finland at 11.9%, and Norway at 3.6%.

Brau and Fawcett (2006) found that CFOs are generally aware of underpricing trends, with a median expectation of 10% underpricing, while the actual median observed in their study was 13.5%. The primary rationale for underpricing is that it compensates investors for the risks inherent in IPO investments. This reasoning aligns with several theoretical frameworks. Asymmetric Information Theory suggests that underpricing arises from information imbalances between issuers and investors, where issuers price IPOs lower to attract uninformed investors. Signaling Theory posits that underpricing serves as a signal of firm quality, reassuring the market of the issuer's long-term prospects. Institutional Theories highlight the influence of institutional investors, particularly through allocation practices that incentivize repeated participation in IPOs. Finally, Market Timing Theory asserts that issuers strategically underprice IPOs to exploit favorable market conditions and maximize demand.

To gain a deeper understanding of the underlying mechanisms driving IPO underpricing, the following sections will explore these theoretical frameworks in greater detail, offering insights into why this phenomenon occurs.

3.1.1 Asymmetric Information Theory

Asymmetric information, where one party in a financial transaction has more knowledge about a company's prospects, risks, and intrinsic value than the other, creates significant challenges in accurately pricing an IPO. Lowry et al. (2010) observe that companies characterized by higher levels of information asymmetry often exhibit greater return volatility and are more likely to be underpriced at issuance. Underpricing in such cases serves as a mechanism to offset the risks associated with valuation uncertainty, providing investors with additional compensation for the heightened unpredictability. This practice reflects the market's effort to balance the informational disadvantage faced by investors while ensuring sufficient demand for the offering.

A key implication of information asymmetry is the potential for issuing companies to adopt opportunistic strategies. Benveniste and Spindt (1989) note that firms often have detailed knowledge of their own operations, which allows them to present an overly favorable narrative to attract investors. Similarly, Ho et al. (2010) argue that the information gap between issuers and investors can incentivize firms to exploit this asymmetry for strategic advantage, particularly in markets where obtaining reliable information is costly. These practices can distort market perceptions, further complicating the valuation process and increasing the risks borne by investors.

Baron (1982) argues that underwriters, who possess a deeper understanding of market demand and valuation than issuers, use this informational advantage to set IPO prices intentionally lower. By doing so, underwriters can reduce the marketing efforts required to sell the offering while avoiding the risks associated with overpricing. This approach ensures a smoother market introduction and increases the likelihood of a successful offering. The practice of underpricing, therefore, not only mitigates the inherent risks of asymmetric information but also aligns with the strategic goals of underwriters to enhance their reputation and foster relationships with future clients.

Rock's (1986) Winner's Curse theory offers a compelling explanation for IPO underpricing in the context of information asymmetry. According to this model, informed investors, who possess superior insights into an IPO's true value, strategically invest only in offerings they identify as underpriced. In contrast, uninformed investors, lacking access to such insights, participate in all IPOs indiscriminately. This dynamic creates a "winner's curse" for uninformed investors, who are more likely to acquire shares in overvalued offerings, as informed investors avoid these opportunities. Consequently, uninformed investors may incur losses on overpriced IPOs, while informed investors consistently secure positive returns on undervalued offerings. Underpricing, therefore, acts as a compensatory mechanism to attract uninformed investors by reducing their risks and incentivizing broader participation in the IPO market (Rock, 1986).

The Winner's Curse effect often leads rational investors, particularly those without access to detailed information, to adopt a cautious approach towards IPO participation (Ritter & Welch, 2002). To address this reluctance and ensure adequate demand from uninformed investors while avoiding oversubscription by informed investors, issuers frequently resort to underpricing their IPOs (Rock, 1986). Furthermore, underwriters, who typically possess a more nuanced understanding of both market demand and the offering's intrinsic value compared to the issuing company, play a pivotal role in determining IPO pricing. Their expertise allows them to balance the competing interests of attracting a diverse investor base and optimizing the proceeds for the issuer, further influencing the extent of underpricing to achieve these objectives.

Asymmetric information theories suggest that the most undervalued IPOs should yield the highest initial-day returns as the market adjusts prices to align with fair value. However, empirical studies have provided evidence that challenges this assumption. For instance, Purnanandam and Swaminathan (2004) observed that overvalued IPOs during the period between 1980 and 1990 generated higher initial-day returns of 5% to 7% compared to undervalued IPOs, despite exhibiting weaker long-term risk-adjusted performance. These overvalued IPOs were characterized by lower profitability, higher

accruals, and overly optimistic analyst growth forecasts, which often deteriorated post-IPO as unrealistic projections failed to materialize. This decline in profitability underscores the role of investor sentiment, suggesting that short-term optimism can overshadow a rigorous evaluation of fundamental profitability metrics.

Ritter and Welch (2002) argue that while asymmetric information models have significantly shaped academic discourse on IPO underpricing, they alone are insufficient to fully explain the phenomenon. They contend that no single theoretical framework captures the complexity of IPO underpricing, emphasizing the need for a more holistic approach that integrates multiple perspectives, including behavioral factors and market dynamics.

3.1.2 Signalling Theory

When issuers possess more information about their firm's quality than investors, a "lemons problem" may arise. In such cases, rational investors might suspect that only lower-quality firms are willing to sell shares at the average market price. To distinguish themselves from lower-quality issuers, high-quality firms may strategically signal their value by deliberately underpricing their shares relative to their perceived market value. This intentional underpricing serves to deter imitation by lower-quality firms, as these firms are less likely to sustain the financial sacrifice associated with underpricing. High-quality issuers, however, anticipate recovering the initial costs of underpricing through subsequent opportunities for future capital issuance (Welch, 1989).

Underpricing can also create a perception among less-informed investors that the IPO represents a compelling investment opportunity, thereby generating increased demand. By attracting a broader investor base, underpricing serves to enhance the marketability of the offering and fosters initial investor confidence. This approach can build positive sentiment toward the stock, benefiting the issuing company by facilitating a successful market entry and laying the foundation for future capital-raising endeavours.

Additionally, this strategy aligns the interests of the issuer with those of early investors, creating a favorable market dynamic that supports long-term shareholder value (Welch, 1989).

However, empirical evidence for signaling theories in the context of IPOs remains inconclusive. While some issuers may intentionally underprice their shares to signal quality and pave the way for future equity issuances, other factors, such as post-IPO price performance, may independently influence entrepreneurs' decisions to seek additional funding. Jegadeesh et. al. (1993) suggests that long-term stock performance, rather than initial underpricing, is equally significant in prompting subsequent issuance activity. This finding indicates that the motivations behind further equity offerings may extend beyond the immediate effects of underpricing.

Similarly, Michaely and Shaw (1994) find no robust correlation between initial underpricing and the likelihood of subsequent seasoned equity offerings or dividend payments, casting doubt on the reliability of underpricing as a definitive signal of future quality. These findings suggest that while underpricing may play a role in IPO dynamics, it is insufficient as a standalone indicator of a firm's long-term strategic intentions or performance.

Despite the mixed empirical evidence, signaling theory retains its relevance in understanding IPO underpricing. The concept that issuers may intentionally "leave money on the table" to foster positive investor sentiment and stimulate demand aligns with observed patterns of IPO behavior. By underpricing shares, issuers can potentially enhance their market reputation and build credibility among investors, creating a foundation for stronger investor relationships and easier access to capital in future funding rounds. While underpricing may not serve as a definitive indicator of a firm’s long-term quality or strategic intentions, it remains a potentially effective tool for issuers aiming to establish market presence, attract a broad investor base, and support their financial objectives over the long term.

3.1.3 Institutional Theories

Institutional theories provide explanations for the phenomenon of IPO underpricing that extend beyond traditional market-based perspectives. These theories explore how structural and procedural elements within financial markets influence underpricing decisions. Key institutional explanations include lawsuit avoidance, price stabilization, and bonding mechanisms.

These frameworks highlight the role of institutional actors—such as underwriters, issuers, and regulatory bodies—in shaping IPO pricing strategies. By addressing risks like potential litigation, post-IPO price volatility, and market scepticism, institutional theories emphasize how underpricing serves as a practical tool for mitigating challenges inherent in public offerings. Each explanation underscores the importance of aligning market practices with broader institutional goals, such as investor confidence, market stability, and long-term issuer reputation.

The lawsuit avoidance theory holds relevance in the United States, where the prevalence of an aggressive litigation culture significantly increases the legal risks faced by companies undergoing an IPO. According to this theory, underpricing serves as a protective measure to mitigate potential lawsuits by reducing the likelihood of investor dissatisfaction with the offering. Lowry and Shu (2002) estimate that nearly 6% of companies that went public in the U.S. between 1988 and 1995 faced legal action for alleged violations of IPO regulations. These lawsuits impose substantial direct costs, with damages averaging approximately 11% of IPO proceeds, alongside indirect costs such as management time, resource allocation, and reputational damage. Such legal challenges can tarnish the credibility of both the issuing company and its underwriting investment bank, leading to higher future capital costs and diminished financing opportunities. As a result, underpricing is viewed as a form of "insurance" against litigation, providing issuers with a practical means to reduce legal exposure. Empirical evidence suggests a positive

correlation between heightened litigation risk and increased levels of underpricing, further supporting the protective role of this strategy (Lowry & Shu, 2002).

Another institutional perspective on IPO underpricing emphasizes the role of price stabilization, a practice typically undertaken by the investment bank underwriting the issuance. Stabilization efforts involve the underwriter's active commitment to supporting the stock price in the aftermarket, ensuring it remains above the offering price by repurchasing shares when necessary (Hanley et al., 1993; Ljungqvist, 2007; Ruud, 1993). Ruud (1993) argues that IPOs are not inherently underpriced but are instead priced to reflect their true market value, with stabilization measures acting as a safeguard against initial price volatility. This strategy includes a "bulk discount" applied to the offering price, accounting for the substantial volume of shares entering the market simultaneously. The bulk discount not only mitigates the impact of immediate oversupply but also reassures investors of price support during the critical early trading period. Post-listing, market dynamics are expected to naturally stabilize, allowing prices to reflect long-term valuation. By implementing stabilization measures, underwriters enhance investor confidence, protect against initial price drops, and facilitate a smoother transition into the secondary market.

Benveniste et. al. (1996) explores the motivations behind price stabilization, positing that an underwriter’s commitment to maintaining the stock price above the offering price serves as a bonding mechanism with investors. This commitment discourages the underwriter from overstating investor interest or artificially inflating the IPO price before the offering. The stabilizing bid, which provides investors with a reliable exit option, is paired with an implicit assurance of underpriced share allocations as a reward for demonstrated interest. This approach signals to the market that the underwriter has confidence in the offering’s value and is willing to incur the costs of stabilization to support the stock in the aftermarket. However, excessive reliance on stabilization efforts may inadvertently create opportunities for less-engaged investors to exploit these mechanisms by underreporting their actual interest to benefit from the price support. Such behavior could

undermine the intended effects of stabilization, highlighting the need for careful calibration of these strategies to align underwriter and investor incentives effectively.

3.1.4 Market-Timing Theory

IPOs are frequently categorized into "hot" and "cold" market periods. A "hot market" refers to times of heightened investor demand and increased IPO activity, characterized by a surge in the number of IPOs, elevated initial valuations, and robust first-day returns. These periods are typically fuelled by optimistic investor sentiment, which drives enthusiasm for new listings and often results in significant oversubscription of IPO shares.

Hot markets create favorable conditions for companies seeking to go public, as they are more likely to raise substantial capital and achieve strong post-listing performance. This investor optimism reduces the perceived information asymmetry and associated costs, providing companies with "windows of opportunity" to conduct IPOs under more advantageous terms. Such market conditions allow issuers to capitalize on favorable investor sentiment while minimizing the risks traditionally associated with public offerings (Bayless & Chaplinsky, 1996).

According to Ritter (1991), heightened investor sentiment during bullish market conditions allows companies to set higher initial share prices for their IPOs. The timing of the offering becomes critical, as launching during these favorable "windows of opportunity" can lead to substantial underpricing, resulting in significant first-day trading returns for investors. High levels of IPO activity during such periods may also contribute to elevated underpricing, as increased competition for shares amplifies demand. Underwriters, aiming to leverage favorable market dynamics, often encourage more firms to go public when valuations surpass expectations. Conversely, during periods of market downturn or lower valuations, underwriters are more likely to advise against proceeding with an IPO, prioritizing long-term strategic considerations over short-term opportunities (Ritter & Welch, 2002).

Once these favorable market conditions, or "windows of opportunity," close, the IPO market typically cools, resulting in fewer companies pursuing public listings. The market-timing theory posits that firms strategically choose to issue equity during periods of elevated stock valuations to capitalize on favorable terms for raising capital. By leveraging strong investor optimism, companies can secure higher prices for their shares than would be possible during periods of lower valuations. Conversely, during times of depressed valuations, firms may opt to repurchase their own shares, effectively reacquiring equity at a discount. This strategic approach enables companies to optimize capital costs and enhance shareholder value by issuing shares when overvalued and repurchasing them when undervalued. Such timing strategies not only maximize the financial benefits derived from favorable market conditions but also reflect a deliberate effort to align corporate financing decisions with market dynamics, as emphasized by Baker and Wurgler (2002).

Loughran and Ritter (2004) provide empirical support for the cyclical nature of IPO activity and pricing by analyzing the dynamics of "hot markets" during the dot-com bubble and the subsequent "cold" period. Their findings reveal that average underpricing exceeded 50% during the hot market phase, in stark contrast to significantly lower levels observed during the cold period. This divergence is primarily attributed to heightened investor optimism and, at times, irrational exuberance characteristic of hot markets. The "fear of missing out" (FOMO) among investors intensifies demand for IPO shares, driving up first-day returns. Such conditions underscore the interplay between market sentiment and pricing dynamics, illustrating how investor psychology and broader market trends can profoundly influence the outcomes of public offerings.

Lowry (2003) identifies several critical factors influencing aggregate IPO volume, including investor sentiment—measured through the discount on closed-end funds—growth opportunities, and adverse selection considerations. Lowry’s research highlights that periods characterized by strong investor optimism and favorable growth prospects tend to drive higher levels of IPO issuance. Notably, study observes a significant relationship

between high initial returns on IPOs and subsequent IPO activity. Specifically, periods with elevated first-day returns often lead to a surge in IPO issuances approximately six months later. This pattern suggests that robust initial returns create a favorable environment for companies contemplating public offerings. Firms are motivated to capitalize on heightened investor enthusiasm and demand, thereby strategically timing their IPOs to align with periods of strong market sentiment.

3.2 Evidence on the Long-Term Performance

The long-term performance of IPOs has been extensively analysed in financial research, with a consensus that IPO underpricing is predominantly a short-term phenomenon. Empirical evidence reveals distinct patterns in the performance of IPO stocks both in the immediate aftermath of issuance and over extended periods. Although IPOs frequently demonstrate significant underpricing at the time of their launch, they are often found to be overvalued in the long term, leading to suboptimal performance in subsequent years.

Ritter's (1991) seminal study of 1,526 U.S. IPOs issued between 1975 and 1984 provides compelling evidence of long-term underperformance. The findings indicate that IPO companies often fail to sustain the gains observed on their first trading day, significantly underperforming relative to comparable industry peers over the subsequent three years. On average, IPO firms delivered returns of -17%, compared to 61.86% for non-IPO firms of similar size and industry characteristics. The underperformance was particularly pronounced among younger companies, suggesting that overvaluation may be driven by overly optimistic growth expectations at the time of issuance. Furthermore, when IPO firms were compared to public companies with similar market capitalization and book-to-market ratios, IPOs—often characterized as small, growth-oriented firms—consistently ranked among the lowest-performing asset classes in recent decades.

Expanding upon this analysis, Ritter and Welch (2002) investigated U.S. IPOs issued between 1980 and 2001, focusing on both market-adjusted and style-adjusted returns over a three-year horizon. Their findings revealed that IPOs delivered market-adjusted returns

of -23.4% and style-adjusted returns of -5.1%, indicating a persistent underperformance relative to firms of comparable size and book-to-market ratios. This underperformance was consistent across various return metrics, including buy-and-hold returns and Fama-French regression analyses. On average, IPOs exhibited a monthly underperformance of 21 basis points, which compounded to an approximate cumulative underperformance of -7.6% over the three-year period. Notably, IPOs and their comparable peers yielded relatively modest returns compared to broader market indices, even during periods of robust overall market performance.

Further supporting these findings, Keloharju (1993) investigated Finnish IPOs issued between 1984 and 1989, uncovering a similar pattern of long-term underperformance. Keloharju highlighted that Finnish IPOs, like their U.S. counterparts, exhibited pronounced underperformance, particularly among smaller firms and across certain industries. On average, investments in Finnish IPOs returned only 79 cents for every dollar invested over a three-year period when benchmarked against the OMXH index (Helsinki Stock Exchange). Performance was even weaker when compared to the equally weighted HSE index, indicating significant challenges in maintaining value post-IPO. Keloharju's findings emphasize that the phenomenon of IPO underperformance is not confined to U.S. markets but reflects broader trends across different financial contexts.

Consistent with these findings, Hahl et al. (2014) analysed 67 Finnish IPOs issued between 1994 and 2006, reporting similar patterns of long-term underperformance. Their study found that Finnish IPOs, on average, yielded a market-adjusted return of -30% over the first three years post-issuance. However, value stock IPOs demonstrated significantly stronger long-term performance compared to growth IPOs, closely tracking the market index. This suggests that the overall underperformance observed in the sample is primarily driven by the weaker returns of growth stock IPOs.

IPO underperformance, defined as the tendency for post-IPO returns to fall below expected benchmarks over a specified period, is often attributed to overvaluation during

the IPO process. This overvaluation is typically followed by a temporary aftermarket surge, after which prices gradually decline to reflect intrinsic value over the long term (Purnanandam & Swaminathan, 2004). Purnanandam and Swaminathan (2004) argue that investors frequently overvalue IPOs based on optimistic growth projections, often overlooking fundamental profitability metrics. This behavior contributes to inflated offering prices and subsequent corrections as market expectations realign with actual performance.

Interestingly, these findings highlight a paradox in IPO valuation dynamics: while underpricing at issuance is a well-documented phenomenon, leading to significant first-day returns, long-term performance often reflects overvaluation. This duality suggests that underwriters may deliberately set offer prices below their theoretical maximum to generate initial demand and ensure a successful launch, inadvertently contributing to early underpricing. However, as these optimistic valuations prove unsustainable, prices adjust downward in the longer term, resulting in underperformance.

While most research supports the notion of long-term IPO underperformance, some scholars have challenged this consensus by emphasizing the role of methodological nuances in interpreting results. Fama (1998) argues that many anomalies, including IPO underperformance, can be mitigated or eliminated with refined methodological approaches, such as more robust statistical adjustments. Brav et al. (2000) build on this critique, suggesting that the Fama three-factor model fails to fully account for the unique characteristics of IPO stocks in explaining their long-term performance. They propose a characteristic-based model, which incorporates firm-specific attributes, as a superior framework for evaluating IPO returns. Using this model, their findings suggest that IPOs underperform the Fama three-factor model's expectations by approximately 40%.

Previous research has also highlighted unique patterns in certain markets that deviate from the typical trends in IPO performance. Thomadakis et al. (2012) identified what they termed the "Greek exception," in which Greek IPOs during the economic boom

surrounding Greece's Eurozone entry exhibited notably strong post-IPO performance. This anomalous trend, however, proved to be short-lived and was likely a reflection of strategic market timing rather than an indication of sustained outperformance. Similarly, Helwege and Liang (2004) examined IPOs across periods of varying market activity and found no significant differences in long-term profitability, firm size, or sales growth between IPOs issued in high-activity (“hot”) and low-activity (“cold”) markets when compared to broader market indices. Nonetheless, they noted that IPOs from hot markets often exhibited weaker short-term performance, suggesting that while market conditions play a role in shaping initial returns, they do not consistently explain long-term underperformance.

For investors, identifying patterns in IPO pricing and performance may offer opportunities to develop trading strategies capable of achieving above-average returns. The presence of persistent aftermarket performance anomalies also raises questions about the informational efficiency of the IPO market. These findings lend support to Shiller’s (1990) hypothesis that both equity and IPO markets are influenced by speculative fads, which contribute to price fluctuations independent of fundamental valuations. Furthermore, the cyclicality of IPO volumes suggests that issuers may strategically time offerings to coincide with favorable market conditions, leveraging periods of heightened investor optimism to maximize proceeds. Finally, the long-term aftermarket returns of IPO firms play a crucial role in determining their cost of external equity capital. Weaker aftermarket performance effectively lowers the cost of equity by reducing the return expectations of future investors.

In conclusion, while IPOs frequently experience significant underpricing in the short term, their long-term performance is often characterized by underperformance relative to comparable firms and broader market indices. This persistent trend has been explained by factors such as overvaluation driven by overly optimistic growth projections, strategic timing of IPOs to exploit favorable market conditions, and the influence of investor sentiment at the time of issuance. However, exceptions to this pattern demonstrate that

underperformance is not a universal phenomenon. Market-specific factors, such as unique economic conditions or structural characteristics, can mitigate these trends. This variability underscores the need for an understanding of IPO performance dynamics, emphasizing the importance of both local market contexts and broader economic conditions in shaping outcomes.

4 Data and Methodology

In this chapter, the data and methodology used to empirically examine research hypotheses will be presented. As outlined in the introduction, the first hypothesis proposes that industry influences IPO underpricing in the Nordic markets. The second hypothesis posits that industry affects the long-term performance of IPOs in the Nordic markets, where long-term performance is defined as one-year post-IPO performance.

First, we present the data utilized in the study, including its characteristics and sources. Following this, the research methodology employed to analyze IPO underpricing and one-year performance across industries is described.

4.1 Data

The IPO dataset was primarily derived from LSEG Workspace and Datastream, encompassing IPOs conducted in the Nordic countries—Denmark, Finland, Norway, and Sweden—between 2012 and 2021. While Iceland is geographically part of the Nordic region, it was excluded from this study due to its low IPO activity during the examined period (only two IPOs). Iceland's inclusion would have contributed little to the overall analysis, thereby justifying its exclusion from the dataset.

This study focuses on traditional IPOs, defined as public sales of shares, while excluding private placements and offerings limited solely to institutional investors. To ensure the dataset's relevance and reliability, only IPOs classified as "Live," indicating active trading on the stock market, were included. Furthermore, the analysis was restricted to IPOs where the security type was designated as "Common Shares." In cases where critical data was missing from the primary sources, supplementary information was gathered from official company announcements or the websites of the respective stock exchanges. Certain IPOs had to be excluded due to limitations in data availability, as comprehensive and reliable information for those offerings was not accessible.

By including IPOs both primary and secondary markets, the dataset provides a comprehensive framework for analyzing IPO activity across the Nordic stock exchange ecosystem. The primary markets comprise major exchanges such as the Oslo Stock Exchange, Nasdaq Stockholm, Nasdaq Copenhagen, and Nasdaq Helsinki. Secondary markets include platforms such as AktieTorget (now Spotlight Stock Market), the Nordic Growth Market (NGM), Oslo Axess, and Nasdaq First North, which operates branches in Denmark, Finland, and Sweden.

Year	Denmark	Finland	Norway	Sweden	Total
2012			1	1	2
2013	1	1	6	1	9
2014	1	4	11	12	28
2015	1	6	6	31	44
2016	3	5	2	19	29
2017	4	7	10	41	62
2018	7	8	4	20	39
2019	3	3	5	12	23
2020	10	2	23	16	51
2021	17	21	30	72	140
Total	47	57	98	225	427

Table 1. IPO Activity by Country (2012-2021)

The final dataset includes a total of 427 IPOs conducted between 2012 and 2021, with Table 1 presenting the distribution of IPO activity across the Nordic countries. In 2021, approximately 33% of the IPOs during the entire period occurred, reflecting the acceleration of IPO activity driven by government stimulus measures that created favorable conditions for companies to go public amid the COVID-19 pandemic. Sweden emerges as the dominant player, accounting for 225 IPOs—more than half of the total sample—underscoring its central role in the Nordic IPO market during the study period. Norway follows with 98 IPOs, while Finland and Denmark contribute 57 and 47 IPOs. These figures highlight Sweden's leading position and the varying dynamics of IPO activity across

the region. From this point onward in the study, the data is combined to represent the Nordic region, without separating it by individual countries.

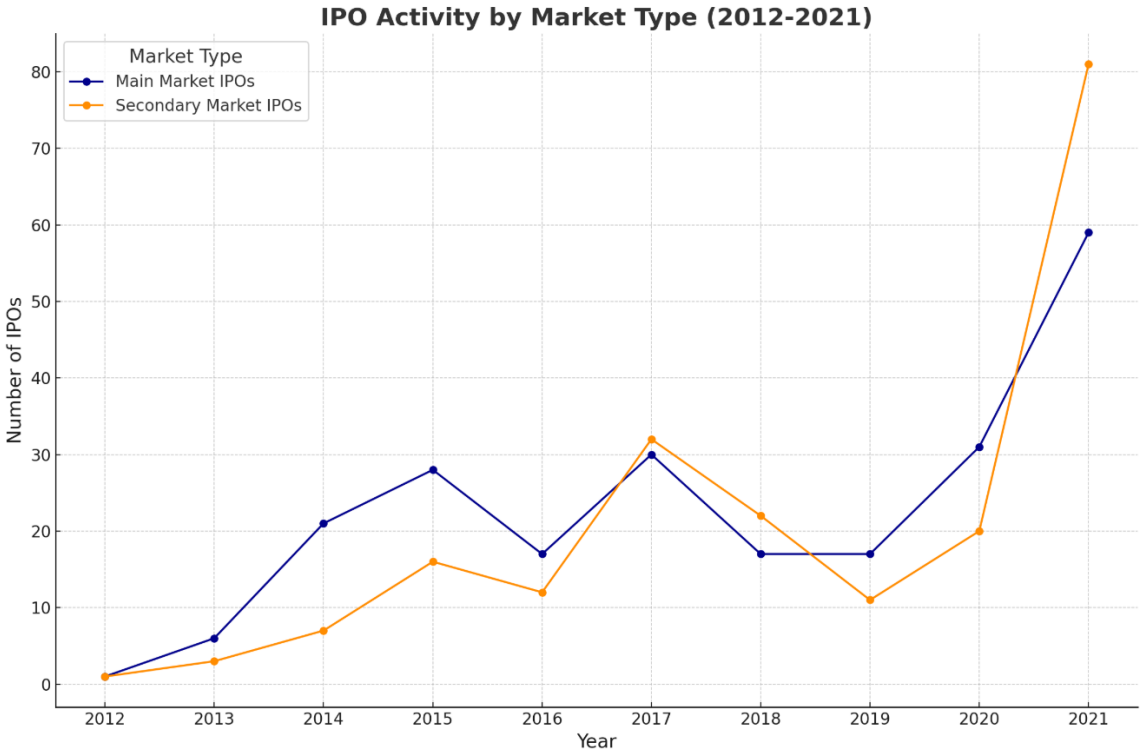

Figure 3. IPO Activity by Market Type (2012-2021).

Figure 3 shows IPO activity in the Nordic region from 2012 to 2021, segmented into main and secondary markets. Of the total 427 IPOs during this period, 52% were listed on the main markets and 48% on the secondary markets. IPOs on the main markets dominated, particularly in 2014 and 2015, with 21 and 28 IPOs respectively, reflecting the preference of larger, more established companies to list on these markets. However, starting in 2016, the secondary markets experienced significant growth, surpassing the main markets in certain years, such as 2017 (32 secondary market IPOs compared to 30 on the main markets). This trend reflects the increasing appeal of secondary markets to smaller, growth-oriented firms.

The classification of IPOs by industry follows the TRBC Industry Classification, including sectors such as Academic & Educational Services, Basic Materials, Consumer Cyclicals,

Consumer Non-Cyclicals, Energy, Financials, Government Activity, Healthcare, Industrials, Real Estate, Technology, and Utilities. Due to the limited number of IPOs in the Academic & Educational Services, Energy, and Government Activity sectors—only 11 IPOs in total during the study period—these categories were consolidated into an 'Other' classification to enhance analytical clarity. As a result, the analysis focuses on 10 industry categories.

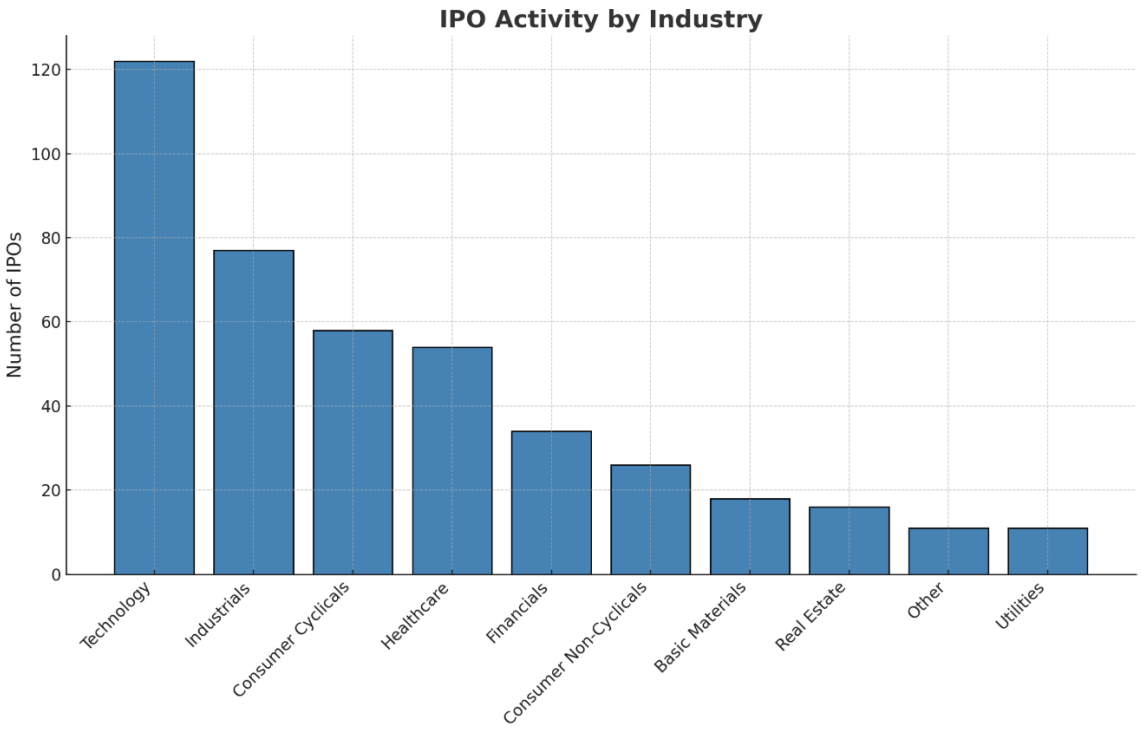

Table 2. IPO Activity by Industry (2012-2021)

Table 2 provides an analysis of IPO activity by industry, highlighting the dominance of the Technology sector, which accounted for 122 IPOs. Industrials followed with 77 IPOs, while Consumer Cyclicals and Healthcare recorded 58 and 54 IPOs. Other sectors, including Financials (34 IPOs), Consumer Non-Cyclicals (26 IPOs), Basic Materials (18 IPOs), Real Estate (16 IPOs), Other (11 IPOs), and Utilities (11 IPOs), exhibited moderate to lower activity, reflecting their niche or stable market dynamics. These numbers emphasize the predominance of high-growth, innovation-driven sectors like Technology and Industrials in shaping the Nordic IPO landscape.

To evaluate IPO underpricing and long-term performance, the Nordic MSCI Index was chosen as the benchmark for the study, offering a regionally relevant and comprehensive standard for comparison. This index is well-suited for analyzing Nordic IPOs as it encompasses a diverse range of companies from Denmark, Finland, Norway, and Sweden, effectively capturing the economic and market dynamics of the region. By including large-, mid-, and small-cap stocks, the Nordic MSCI Index provides a balanced representation of the overall market environment in which IPOs operate. Its diversified composition ensures that sectoral and market-capitalization biases are minimized, allowing for a robust and equitable comparison of post-IPO performance.

4.2 Methodology

This study investigates IPO underpricing and long-term underperformance, focusing on the influence of industry-specific factors. Prior research has highlighted significant abnormal returns associated with underpricing, while long-term performance has often lagged market benchmarks. To examine these phenomena in the Nordic markets, this study applies following methodology to measure abnormal returns linked to IPOs.

4.2.1 Measuring Underpricing

Initial returns are calculated to assess underpricing by comparing the company's offer price on the first trading day to its closing price at the end of that day. This measure provides insights into the immediate market response to the IPO. The formula for calculating initial returns (IR) is expressed as follows:

$$IR_i = \frac{P_{i,t+1} - P_{i,t}}{P_{i,t}} \tag{12}$$

where $P_{i,t+1}$ represents the closing price of the stock on the first trading day, and $P_{i,t}$ denotes the initial offering price. This calculation highlights the percentage change in

the stock price relative to its offering price, capturing the level of underpricing. Such an approach aligns with established methodologies in IPO performance studies, facilitating a standardized and robust evaluation of initial market reactions.

The market-adjusted returns method is widely employed in IPO research to measure abnormal returns, particularly in studies analyzing developed markets. This methodology is adopted in the present thesis as a proxy for abnormal returns. Abnormal returns $(AR_{i,t})$ are defined as the difference between the return of IPO i in period t $(R_{i,t})$ and the return of the benchmark b in the same period $(R_{b,t})$. The formula abnormal returns (AR) expressed as follows:

(13) $$AR_{i,t} = R_{i,t} - R_{b,t}$$

As mentioned earlier, the Nordic MSCI Index is used as the benchmark to represent market returns, as it provides a comprehensive measure of overall market performance across Nordic countries.

The statistical significance of both initial and aftermarket abnormal returns is evaluated using a Student's t-test to ensure a robust analysis of return patterns. The t-test is used to evaluate the null hypothesis $(H_0 : AR = 0)$, which assumes no abnormal returns over the specified holding period. The t-statistic (t) is calculated as follows:

(14) $$t = \frac{AR - 0}{S/\sqrt{n}}$$

where AR represents the average abnormal return, S is the standard deviation of abnormal returns, and n is the number of observations. This method follows established practices in IPO studies (e.g., Ritter, 1991) and assumes that abnormal returns are normally distributed and independent. Statistical significance is assessed at the 10%, 5%, and 1% levels, denoted by *, **, and ***, respectively.

Student's t-test relies on specific assumptions to ensure its validity as an analytical method. First, abnormal returns (ARs) should follow a normal distribution. However, as noted by Keloharju (1993), IPO studies often reveal excess kurtosis and right-skewness, which can challenge this assumption. Second, the returns must be independent. Since this study focuses on one-day returns, the independence assumption is satisfied as overlapping observations are not an issue.

To address potential deviations from normality, the Kolmogorov-Smirnov test is applied. If the test produces p-values below 0.10, the data is considered non-normally distributed. In such cases, medians are reported as a robust measure of central tendency. This approach ensures that the analysis remains reliable and comprehensive, even when data deviates from normality.

To assess the influence of industry on abnormal returns over a specified holding period, an Ordinary Least Squares (OLS) regression model with industry dummy variables is employed, following the framework outlined by Ritter (1991). Each dummy variable represents a specific industry, taking the value of one if a firm belongs to that sector and zero otherwise. The OLS regression is specified as follows:

$$AR_{i,t} = B_0 + B_1 LN(1 + Age_i) + B_2 Vol_i + B_3 Industry\ Dummy_i + e_i \quad (15)$$

Where:

- $AR_{i,t}$: Abnormal return of IPO i at time t.
- $LN(1 + Age_i)$: The natural logarithm of one plus the firm's age, measured as the difference between the IPO year and the founding year.
- Vol_i: Annual IPO volume in the issuance year, divided by 100.
- $Industry\ Dummy_i$: Dummy variable that takes the value of 1 if the issuing firm belongs to the specific industry and 0 otherwise
- e_i: The error term

This regression model evaluates the influence of firm-specific factors (age and volume) and industry effects on IPO abnormal returns. The Technology sector is used as the intercept (reference group) because it represents the highest number of IPOs during the analysis period, making it a logical baseline for comparison. Using Technology as the reference allows for meaningful interpretation of the effects of other industries relative to this dominant sector.

4.2.2 Measuring Long-Term Performance

In this study, long-term performance is assessed over a one-year period, starting from the offering price. A market-adjusted method is employed to measure the one-year IPO returns, following methodologies established in prior research. Specifically, this study adopts the approach used by Ritter (1991), Keloharju (1993), Brav et al. (2000), Alvarez and Gonzalez (2005), and Hahl et al. (2014), which utilize wealth relatives (WRs) to assess market-adjusted IPO performance.

Wealth relatives (WRs) serve as a comprehensive metric for assessing IPO performance. A WR value greater than 1.00 indicates that the IPO outperformed the market during the period, while a WR value below 1.00 suggests that the market outperformed the IPO. To calculate WRs, the holding period return (HPR) must first be determined using the following formula:

$$HPR_{i,t} = \prod_{t=1}^{T}\left(1 + r_{i,t}\right) - 1 \tag{16}$$

where $HPR_{i,t}$ represents the cumulative return for security i over the holding period T, and $r_{i,t}$ denotes the return for security i in period t. This formula calculates the total return by compounding individual period returns across the holding period. Wealth Relatives (WRs) is then calculated by adjusting the holding period return for market returns, as shown below:

(17) $$WR_{i,t} = \frac{1 + HPR_{i,t}}{1 + r_{m,t}}$$

where $WR_{i,t}$ represents the Wealth Relative for security i during period t, $HPR_{i,t}$ is the holding period return for security i, and $r_{m,t}$ denotes the market return for the same period.

Finally, equally-weighted average wealth relatives (WR_t) are calculated separately for each industry group and for the overall sample to analyze comparative performance. The mean wealth relative for a specific period (t) is determined using the following formula:

(18) $$WR_t = \frac{1}{n}\sum_{i=1}^{n} wr_{i,t}$$

where WR_t represents the average wealth relative for period i, $wr_{i,t}$ is the wealth relative for security i during period t, and n denotes the number of securities in the sample. This equally-weighted approach ensures that all securities contribute equally to the average, irrespective of their size or market capitalization. Each $wr_{i,t}$ measures the relative performance of a security compared to the market during the same period.

To assess whether the mean WR differs significantly from 1.00, the same Student's t-test methodology used for initial abnormal return analysis is applied. This test evaluates the null hypothesis ($H_0 : WR = 1$), which posits no significant deviation from market performance. The t-statistic is calculated as follows:

(19) $$t = \frac{WR - 1}{S/\sqrt{n}}$$

where WR represents the mean wealth relative, S is the standard deviation of WR, and n denotes the sample size. The t-statistic measures the deviation of WR from the null hypothesis value (1.00), normalized by the standard deviation and adjusted for sample size. Statistical significance is assessed at the 10%, 5%, and 1% levels, denoted by *, **, and ***, respectively. This approach ensures consistency in testing across both short-term and long-term performance evaluations.

Finally, an OLS regression is conducted to examine the impact of industries on the one-year performance of IPOs. The cross-sectional model is closely aligned with the model used to calculate initial abnormal returns but differs primarily in the dependent variable and the inclusion of IR, which captures the underpricing effects, following the methodology outlined by Ritter (1991). The OLS regression equation is expressed as follows:

$$WR_{i,t} = B_0 + B_1 IR + B_2 LN(1 + Age_i) + B_3 Vol_i + B_4 Industry\ Dummy_i + e_i \quad (20)$$

Where:

- $WR_{i,t}$: Wealth Relative for IPO i during period t, representing the one-year performance relative to the market.
- IR: The market-adjusted initial return for IPO i.
- $LN(1 + Age_i)$: The natural logarithm of one plus the firm's age, measured as the difference between the IPO year and the founding year.
- Vol_i: Annual IPO volume in the issuance year, divided by 100.
- $Industry\ Dummy_i$: Dummy variable that takes the value of 1 if the issuing firm belongs to the specific industry and 0 otherwise
- e_i: The error term

5 Results

In the first section, descriptive statistics are presented, followed by a separate discussion of industry effect on initial and long-term performance of Nordic IPOs.

5.1 Descriptive Statistics

Variables	Mean	Median	Std.	Min	Max	N
Underpricing%	13,17	3,46	0,35	-47,67	250,92	427
1 Year Return%	12,73	-0,70	0,80	-91,64	432,77	427
LN(1+age)	2,55	2,64	1,03	0,00	4,80	427
Vol	0,74	0,51	0,47	0,02	1,40	427

Table 3. Descriptive Statistics for Full Dataset

Table 3 presents descriptive statistics for full data sample during the period. Nordic IPOs have exhibited significant underpricing during the study period. The average underpricing for the entire data sample is 13.17%, with a median of 3.46%, reflecting substantial variability (range: -47.67% to 250.92%) during the 2012–2021 period. The one-year return averages 12.73%, with a median of -0.70%. This suggests that while a few IPOs achieve substantial gains, the majority underperform over the long term, as indicated by the wide range (-91.64% to 432.77%). These findings, consistent with prior research, highlight the existence of the IPO underperformance and underpricing anomalies.

Underpricing%						
Variables	Mean	Median	Std.	Min	Max	N
Basic Materials	3,68	-0,46	0,15	-24,13	38,01	18
Consumer Cyclicals	7,92	2,31	0,18	-26,41	71,75	58
Consumer Non-Cyclicals	16,75	12,67	0,22	-11,49	66,38	26
Financials	16,09	5,54	0,33	-35,61	107,83	34
Healthcare	17,02	0,86	0,48	-20,01	250,92	54
Industrials	12,58	1,21	0,40	-47,67	200,02	77
Other	14,82	4,16	0,22	-5,17	59,81	11
Real Estate	10,75	5,70	0,19	-1,96	77,38	16
Technology	15,01	5,14	0,39	-40,03	176,45	122
Utilities	5,45	0,53	0,25	-31,10	57,72	11

Table 4. Descriptive Statistics for Underpricing

Table 4 presents industry variations in IPO underpricing in Nordic markets. Healthcare (17.02%), Consumer Non-Cyclicals (16.75%), and Financials (16.09%) exhibit the highest mean underpricing, with Healthcare significantly influenced by extreme outliers. Technology (15.01%) and Industrials (12.58%) also display substantial variability, marked by high maximum values. In contrast, Utilities (5.45%) and Basic Materials (3.68%) have the lowest mean underpricing levels. Basic Materials is the only sector with a negative median (-0.46%), indicating that a significant portion of IPOs in this sector were overpriced.

1 Year Return %						
Variables	Mean	Median	Std.	Min	Max	N
Basic Materials	-3,02	-3,96	0,53	-72,12	149,46	18
Consumer Cyclicals	8,77	2,90	0,81	-90,12	432,77	58
Consumer Non-Cyclicals	18,90	11,30	0,51	-53,72	177,67	26
Financials	18,60	-1,42	0,93	-63,27	406,74	34
Healthcare	29,26	-9,79	0,97	-74,30	330,47	54
Industrials	0,66	-4,76	0,61	-90,71	302,27	77
Other	-11,19	-48,25	0,56	-56,27	103,56	11
Real Estate	48,00	44,13	0,73	-75,68	186,54	16
Technology	11,32	-0,79	0,89	-91,64	398,60	122
Utilities	18,31	-0,56	0,87	-68,41	182,05	11

Table 5. Descriptive Statistics for 1 Year Return

Table 5 illustrates the variations in 1 year IPO returns across different industries in the Nordic markets. Significant differences are observed across industries. Real Estate records the highest mean returns (mean: 48.00%, median: 44,13%), followed by Healthcare (29.26%) and Consumer Non-Cyclicals (18.90%). Financials (18.60%), Utilities (18.31%), and Technology (11.32%) show moderate performance, while Industrials (0.66%) and Basic Materials (-3.02%) exhibit low or negative mean returns. The Other category has the poorest performance (mean: -11.19%, median: -48.25%).

LN(1 + Age) is the natural logarithm of one plus the difference between the IPO year and the firm's founding year. Vol is the annual number of IPOs in the issuance year, divided by 100.

LN(1+age)						
Variables	Mean	Median	Std.	Min	Max	N
Basic Materials	3,15	3,57	1,46	0,00	4,79	18
Consumer Cyclicals	2,97	2,92	0,88	0,00	4,80	58
Consumer Non-Cyclicals	2,29	2,25	1,16	0,00	4,32	26
Financials	2,21	2,74	1,40	0,00	4,76	34
Healthcare	2,39	2,71	0,82	0,00	3,61	54
Industrials	2,71	2,71	1,08	0,00	4,78	77
Other	2,49	2,48	0,75	1,61	3,78	11
Real Estate	2,55	2,55	1,29	0,00	4,74	16
Technology	2,40	2,48	0,81	0,00	4,45	122
Utilities	2,38	2,30	0,82	1,10	3,91	11

Table 6. Descriptive Statistics for LN(1+Age)

In Table 6, the variation in firm maturity is shown. It should be noted that the reported values are logarithmic, meaning they cannot be directly interpreted as average years but instead reflect a transformed scale. Basic Materials (mean: 3.15) and Consumer Cyclicals (mean: 2.97) represent the oldest firms in the sample, indicating longer operational histories. In contrast, Consumer Non-Cyclicals (mean: 2.29), Financials (mean: 2.21), Technology (2.40), and Utilities (2.38) feature youngest firms, suggesting relatively recent establishment or market entry.

Vol						
Variables	Mean	Median	Std.	Min	Max	N
Basic Materials	0,85	0,57	0,52	0,02	1,40	18
Consumer Cyclicals	0,70	0,51	0,47	0,09	1,40	58
Consumer Non-Cyclicals	0,83	0,51	0,50	0,23	1,40	26
Financials	0,89	0,62	0,50	0,23	1,40	34
Healthcare	0,57	0,48	0,36	0,09	1,40	54
Industrials	0,81	0,51	0,49	0,23	1,40	77
Other	0,75	0,62	0,54	0,09	1,40	11
Real Estate	0,51	0,42	0,38	0,09	1,40	16
Technology	0,76	0,62	0,47	0,02	1,40	122
Utilities	0,61	0,39	0,52	0,09	1,40	11

Table 7. Descriptive Statistics for Vol

Table 7 presents the overall IPO market activity across industries during the issuance year. Financials (mean: 0.89), Basic Materials (0.85) record the highest number of IPOs during years of high overall market activity, indicating that firms in these sectors tend to list when IPO markets are particularly active. Consumer Non-Cyclicals (0.83) and Industrials (0.81) also show high means, suggesting similar timing patterns. In contrast, Healthcare (0.57) and Real Estate (0.51) report the lowest means, reflecting a tendency to list during less active IPO market periods.

5.2 Industry Impact on Initial Performance

This chapter presents empirical findings on the initial performance of Nordic IPOs, with a focus on industry-specific factors influencing outcomes. The analysis follows the market-adjusted methodology outlined in Section 4.2.1.

AR	*Mean %*	*Median %*	*Std.*	*Kolmogorov-Smirnov*	*t Stat*	*N*
Basic Materials	3,59	-0,35	0,15	0,21	1,02	18
Consumer Cyclicals	7,92***	1,47	0,18	0,15	3,35	58
Consumer Non-Cyclicals	17,21***	12,47	0,22	0,17	3,93	26
Financials	16,15***	5,67	0,33	0,18	2,90	34
Healthcare	17,05**	0,97	0,48	0,27***	2,62	54
Industrials	12,5***	0,67	0,39	0,28***	2,78	77
Other	14,64*	4,41	0,22	0,23	2,22	11
Real Estate	10,77**	6,10	0,19	0,26	2,23	16
Technology	14,96***	5,66	0,39	0,16***	4,27	122
Utilities	5,77	1,21	0,25	0,14	0,77	11

*Statistical significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10*

Table 8. Initial Abnormal Returns (ARs)

Initial abnormal returns (ARs) are presented in Table 8. The results indicate that certain industries exhibit higher levels of underpricing. The Consumer Non-Cyclicals (17.21%), Financials (16.15%), and Healthcare (17.05%) sectors exhibit the highest mean abnormal returns, all statistically significant at the 1% or 5% levels. Similarly, Technology (14.96%), Industrials (12.50%), and Other (14.64%) demonstrate strong abnormal returns, both statistically significant at the 1% level. Moderate abnormal returns are observed in Consumer Cyclicals (7.92%) and Real Estate (10.77%), significant at the 1% and 5% levels, respectively. In contrast, Basic Materials (3.59%) and Utilities (5.77%) display the lowest mean abnormal returns, with no statistical significance. Notably, the negative median AR for Basic Materials (-0.35%) suggests that overpricing occasionally occurs in this sector.

Healthcare (Std. = 0.48) and Technology (Std. = 0.39) show the highest variability in abnormal returns, reflecting significant dispersion within these sectors. In contrast, Basic Materials (Std. = 0.15) and Consumer Cyclicals (Std. = 0.18) exhibit the lowest variability, indicating more consistent returns. The Kolmogorov-Smirnov test reveals significant

deviations from normality in abnormal returns for Healthcare (0.27), Industrials (0.28), and Technology (0.16) at the 1% level, suggesting the presence of extreme values or outliers that contribute to the observed variability and influence mean returns.

The Kolmogorov-Smirnov (K-S) statistics in the table assess the normality of initial performance (AR) for IPOs across various sectors. The smallest K-S values are observed in Utilities (0.14), Consumer Cyclicals (0.15), and Technology (0.16***). While the deviations in Utilities and Consumer Cyclicals are minor and not statistically significant, the value for Technology is statistically significant at the 1% level, indicating potential non-normality in its AR distribution. The largest K-S values are found in Healthcare (0.27***) and Industrials (0.28***), both statistically significant at the 1% level, suggesting substantial deviations from normality. These results indicate that extreme values may influence the mean ARs, contributing to the observed variability in initial IPO performance across industries.

LN(1 + Age) is the natural logarithm of one plus the difference between the IPO year and the firm's founding year. Vol is the annual number of IPOs in the issuance year, divided by 100.

AR	*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*N*
Technology (Intercept)	0,159	0,059	2,691	0,007	
Basic Materials	-0,101	0,089	-1,144	0,253	
Consumer Cyclicals	-0,053	0,056	-0,948	0,343	
Consumer Non-Cyclicals	0,016	0,075	0,210	0,834	
Financials	0,000	0,068	-0,003	0,998	
Healthcare	0,033	0,057	0,572	0,568	
Industrials	-0,020	0,051	-0,400	0,690	
Other	0,000	0,109	-0,003	0,998	
Real Estate	-0,023	0,093	-0,248	0,804	
Utilities	-0,083	0,109	-0,759	0,448	
LN(1+age)	-0,023	0,017	-1,373	0,170	
Vol	0,061	0,036	1,674	0,095	
Regression					427

Table 9. Regression results using ARs as the dependent variable

Table 9 presents the regression results with initial abnormal returns (ARs) as the dependent variable, analyzing the effects of industry dummies, firm maturity, and IPO market activity during the issuance year. The Technology sector serves as the reference group, providing a baseline for comparison given its prominence in IPO activity.

The coefficient for Technology (0.159) represents the baseline abnormal returns for this sector, which are statistically significant at the 1% level ($p = 0.007$). This indicates that IPOs in the Technology sector generate positive abnormal returns compared to zero, serving as a benchmark. However, the results do not indicate whether the Technology sector's performance is statistically different from other industries.

Coefficients for Other Industries:

- Positive coefficients, such as for Consumer Non-Cyclicals (0.016), suggest slightly higher abnormal returns compared to Technology, but this difference is not statistically significant ($p = 0.834$).
- Negative coefficients, such as for Basic Materials (-0.101), indicate slightly lower abnormal returns relative to Technology, though again, these differences are not statistically significant ($p = 0.253$).

The lack of statistical significance ($p > 0.05$) for all industry coefficients implies that there is no strong evidence to suggest that abnormal returns in other sectors differ meaningfully from those in Technology, indicating that the industry does not have a significant impact on abnormal returns. Observed differences may result from random variation rather than meaningful industry effects.

Firm-specific variables:

- Firm maturity (LN(1+Age)) has a negative coefficient (-0.023), suggesting that older firms may experience slightly lower abnormal returns, but this effect is not statistically significant ($p = 0.170$).

- IPO market activity (Vol) shows a positive coefficient (0.061), indicating that higher IPO volume in the issuance year is associated with slightly higher abnormal returns. This relationship is marginally significant ($p = 0.095$), hinting at a potential but weak link between market conditions and IPO performance.

Based on the results, there is insufficient evidence to support the first hypothesis of the thesis, which posits that the level of IPO underpricing varies significantly across industry sectors in Nordic markets. While the Technology sector exhibits statistically significant positive abnormal returns compared to zero, the coefficients for other industries are not statistically significant ($p > 0.05$). This suggests that there is no robust evidence of meaningful differences in underpricing levels across industry sectors relative to the Technology sector.

5.3 Industry Impact on Long-Term Performance

This chapter investigates the impact of industries on IPO performance over the long term, defined in this study as a one-year period. The analysis employs market-adjusted methods as outlined in Section 4.2.2.

WR	*Mean*	*Median*	*Std.*	*Kolmogorov-Smirnov*	*t Stat*	*N*
Basic Materials	0,88***	0,97	0,36	0,14	10,35	18
Consumer Cyclicals	1,03***	0,94	0,63	0,16*	12,56	58
Consumer Non-Cyclicals	1,16***	1,07	0,47	0,12	12,73	26
Financials	1,22***	1,08	0,76	0,23*	9,36	34
Healthcare	1,22***	0,99	0,90	0,20**	9,92	54
Industrials	1,03***	0,94	0,62	0,12	14,43	77
Other	0,84***	0,70	0,55	0,21	5,08	11
Real Estate	1,42***	1,39	0,61	0,14	9,34	16
Technology	1,07***	0,88	0,78	0,14**	15,11	122
Utilities	1,19***	0,81	1,05	0,31	3,78	11

*Statistical significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10*

Table 10. Wealth Relatives (WRs)

Wealth Relatives (WRs), representing the one-year performance of IPOs, are presented in Table 10. The results highlight significant differences in performance across industries. Real Estate (1.42), Financials (1.22), and Healthcare (1.22) exhibit the highest mean WRs, all statistically significant at the 1% level, indicating strong outperformance relative to the market. Similarly, Utilities (1.19) and Consumer Non-Cyclicals (1.16) also show substantial mean WRs, suggesting favorable long-term returns for these sectors. Moderate one-year performance is observed in Technology (1.07) and Industrials (1.03), both statistically significant at the 1% level. These results suggest stable but less pronounced outperformance compared to the leading sectors. Consumer Cyclicals (1.03) also demonstrates moderate performance, with statistical significance at the 1% level. In contrast, Basic Materials (0.88) and Other (0.84) report the lowest mean WRs, both statistically significant at the 1% level, indicating underperformance relative to the market over the one-year period.

The variability in WRs is captured by standard deviations, which reveal notable differences across industries. Healthcare (Std. = 0.90) and Financials (Std. = 0.76) exhibit the highest variability, indicating significant dispersion in one-year performance within these sectors. Conversely, Consumer Non-Cyclicals (Std. = 0.47) and Basic Materials (Std. = 0.36) demonstrate lower variability, suggesting more consistent performance across firms within these industries.

The Kolmogorov-Smirnov (K-S) statistics presented in Table 8 evaluate the normality of one-year returns (WRs) for IPOs across various sectors. The smallest K-S values are observed in Consumer Non-Cyclicals (0.12), Industrials (0.12), and Basic Materials (0.14), indicating minor deviations from normality, none of which are statistically significant. In contrast, the largest values are found in Financials (0.23*) and Healthcare (0.20**), suggesting substantial deviations from normality, significant at the 10% and 5% levels, respectively. The Other sector exhibits a relatively high K-S value (0.21), but it does not reach statistical significance. Statistically significant K-S values are identified in Consumer Cyclicals (0.16*; $p < 0.10$), Financials (0.23*; $p < 0.10$), Healthcare (0.20**; $p < 0.05$), and Technology (0.14**; $p < 0.05$). These findings point to potential non-normality in the WR distributions within these sectors.

LN(1 + Age) is the natural logarithm of one plus the difference between the IPO year and the firm's founding year. Vol is the annual number of IPOs in the issuance year, divided by 100. IR is the market-adjusted initial return.

WR	*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*N*
Technology (Intercept)	1,172	0,112	10,508	0,000	
Basic Materials	-0,081	0,166	-0,488	0,626	
Consumer Cyclicals	-0,010	0,105	-0,100	0,921	
Consumer Non-Cyclicals	0,098	0,140	0,695	0,487	
Financials	0,178	0,126	1,411	0,159	
Healthcare	0,066	0,107	0,615	0,539	
Industrials	-0,012	0,095	-0,131	0,896	
Other	-0,231	0,205	-1,128	0,260	
Real Estate	0,292	0,174	1,680	0,094	
Utilities	0,146	0,205	0,711	0,478	
LN(1+age)	0,013	0,032	0,396	0,692	
Vol	-0,331	0,068	-4,847	0,000	
IR	0,821	0,092	8,935	0,000	
Regression					427

Table 11. Regression results using WRs as the dependent variable

Table 11 presents the regression results with Wealth Relatives (WRs) as the dependent variable, examining the effects of industry dummies, firm maturity, IPO market activity during the issuance year, and initial returns (IR). The Technology sector serves as the reference group (intercept), providing a baseline for comparison due to its prominence in IPO activity.

The coefficient for Technology (1.172) represents the baseline one-year performance (WR) for the sector, which is statistically significant at the 1% level (p = 0.000). This indicates that, on average, IPOs in the Technology sector outperform the market over the one-year period. However, the regression results do not provide evidence that this performance is significantly different from other sectors.

Coefficients for Other Industries:

The coefficients for other industries indicate deviations from the Technology sector's performance:

- Positive coefficients, such as for Real Estate (0.292, p = 0.094), suggest slightly higher one-year returns relative to Technology, though this result is only marginally significant (p < 0.10). Consumer non-cyclicals (0.098, p = 0.487) and Financials (0.178, p = 0.159) also show positive coefficients but lack statistical significance.
- Negative coefficients, such as for Basic Materials (-0.081, p = 0.626) and Utilities (-0.083, p = 0.448), indicate lower one-year returns compared to Technology, though these differences are not statistically significant.

The lack of statistical significance (p > 0.05) for most industry coefficients suggests that there is no strong evidence of meaningful differences in one-year returns between Technology and other sectors, except for Real Estate, which shows a marginally significant deviation.

Firm-Specific Variables:

- Firm maturity (LN(1+Age)) has a small positive coefficient (0.013, p = 0.692), suggesting that older firms may experience slightly higher one-year returns, though this effect is not statistically significant.
- IPO market activity (Vol) has a negative coefficient (-0.331, p = 0.000), indicating that higher IPO volumes in the issuance year are associated with lower one-year returns. This result is statistically significant at the 1% level, highlighting the potential impact of market-wide conditions on long-term performance.
- Initial returns (IR) have a strong positive coefficient (0.821, p = 0.000), indicating that higher initial returns are a significant predictor of better one-year performance. This result is statistically significant at the 1% level, suggesting that investor enthusiasm on the first trading day may carry forward into longer-term performance.

Based on the findings, there is insufficient evidence to support the second hypothesis, which posits that IPO long-term performance varies significantly across industry sectors in Nordic markets. While there are observable differences in one-year returns (WRs) across industries, the regression results indicate that these differences are not statistically significant ($p > 0.05$) for most sectors relative to the Technology sector, except for Real Estate, which shows a marginally significant positive deviation ($p = 0.094$). Instead, firm-specific factors play a more substantial role. Higher IPO volumes in the issuance year are associated with significantly lower one-year returns ($p = 0.000$), while higher initial returns strongly predict better long-term performance ($p = 0.000$). Firm maturity does not show a significant effect. These findings suggest that industry effects on long-term IPO performance are limited, with firm-specific factors, particularly initial returns and market conditions, playing a more critical role.

6 Conclusion

Market participants consistently search for opportunities to achieve excess returns, with Initial Public Offerings (IPOs) emerging as a key area of focus in recent years. A primary factor behind this interest is IPO underpricing, a phenomenon extensively explored in behavioral economics. Research consistently identifies underpricing as setting the offering price below the market's true value, typically leading to a notable price increase on the first trading day. This underpricing is often measured by the percentage difference between the offer price and the first day closing price, allowing early participants to realize short-term gains. However, despite these initial gains, IPOs are often linked to weak long-term performance, a pattern known as the "long-term underperformance anomaly." This suggests that while IPOs may be priced attractively in the short term, they are frequently overvalued in the long run, resulting in suboptimal returns over time.

This thesis examines these two anomalies by analyzing IPOs in the Nordic markets between 2012 and 2021, aiming to provide new insights into IPO performance in this region, which has received limited attention in existing research. Recently, the technology sector has assumed a prominent role in IPO markets, emphasizing the significance of industry-specific factors in shaping IPO performance. Therefore, this study focuses on analyzing the impact of industry on IPO outcomes.

The final dataset includes 427 companies listed on the main or secondary stock exchanges in Denmark, Finland, Norway, and Sweden during the specified period. The data was primarily sourced from LSEG Workspace and Datastream, with supplementary information obtained from official company announcements or the respective stock exchanges. This dataset is analysed by examining first-day returns to assess underpricing and one-year market-adjusted returns to evaluate long-term performance, focusing on how industry sectors influence IPO outcomes. he Nordic MSCI Index serves as the benchmark, providing a regionally relevant standard for comparison.

The first hypothesis posits that IPO underpricing varies significantly across industry sectors in the Nordic markets. Market-adjusted returns and an OLS regression model are used to assess the impact of industry sectors on the initial performance of IPOs. As expected, the results align with the underpricing anomaly, showing significant abnormal initial returns for Nordic IPOs during the study period, with notable variation across industry sectors. The lowest mean underpricing was observed in Basic Materials (3.59%), while the highest was found in Consumer Non-Cyclicals (17.21%). However, there is insufficient evidence to confirm that IPO underpricing varies significantly across industry sectors in the Nordic markets. Despite observed differences in initial abnormal returns, no statistically significant effect of industry on these returns was found, indicating no strong evidence of meaningful sectoral differences in underpricing.

The second hypothesis posits that the level of long-term IPO performance varies significantly across industry sectors in the Nordic markets. To test this, the Wealth Relative method and an OLS regression model are used to examine the impact of industry sectors on the long-term performance of IPOs. Nordic IPOs The results reveal significant performance differences across industries. Despite some variation, several sectors have outperformed expectations based on previous studies. The highest mean one-year performance is observed in the Real Estate sector, while the lowest is found in the Other-category. Although differences in one-year returns (WRs) exist across industries, these differences are not statistically significant relative, except for Real Estate, which shows some statistical significance.

Instead, firm-specific factors have a more substantial impact on long-term performance. Notably, higher IPO volumes in the issuance year, often indicative of "Hot IPO Markets," are linked to significantly lower one-year returns. Additionally, higher initial returns are strong predictors of better long-term performance. Both factors are statistically significant. These findings indicate that industry effects on long-term IPO performance are limited, with firm-specific factors, particularly initial returns and market conditions, playing a more decisive role. Although the empirical results do not support the hypotheses, the

study provides valuable insights into the underpricing of Nordic IPOs by industry and their long-term performance.

Finally, it is important to acknowledge some limitations of the study. The study defines long-term performance as one-year post-IPO, which may not fully capture longer-term trends or growth trajectories. Some IPOs may reveal their true potential beyond this one-year window, limiting the assessment of their long-term success. An improvement could involve extending the evaluation period to three years, as in studies such as those by Ritter (1991), Ritter and Welch (2002), and Hahl et al. (2014). Additionally, the regression models could be enhanced by incorporating other relevant factors, such as company fundamentals like profitability, which may influence underpricing and long-term IPO performance. Including new factors to the model could help reduce omitted variable bias.

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