Norwegian School of Economics
Bergen, Spring 2022

Determinants of Private Equity Exit Strategies

An Empirical Study of the Nordic Private Equity Market

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Master Thesis, MSc in Economics and Business Administration
Major: Financial Economics

NORWEGIAN SCHOOL OF ECONOMICS

Abstract

This thesis seeks to uncover the determinants of private equity (PE) exit strategies in the Nordics by examining the three most common exit routes available to PE firms: secondary buyouts (SBOs), initial public offerings (IPOs) and trade sales. Based on data received by Argentum, we construct a unique sample containing PE firm and fund characteristics, portfolio company characteristics and market conditions for 525 Nordic buyouts between 2008–2021. We find evidence of PE funds capitalizing on "windows of opportunities" by exiting through IPOs in hot stock markets to cash in on their investments at presumably higher valuations, which is consistent with previous research. Second, we find evidence that the purchasing buyout fund participating in an SBO singles out companies with better operating performance who exceed other companies in coping with higher levels of debt. Third, the probability of exiting through an SBO relative to an IPO tends to increase as the fund approaches maturity, highlighting the attractiveness of an SBO: it often achieves a high price, with low transaction risk and the shortest delay in receiving the proceeds.

There is no evidence suggesting that the increasing amount of committed, but unallocated, capital leads to a relative increase in SBOs or that PE funds closer to maturity tend to exit through SBOs when investments are made late in the fund's life cycle. These two findings are particularly intriguing as it contradicts the claims made by PE critics of asset flipping and SBOs being "pass-the-parcel" deals for managers willing to exploit PE funds' fee structures.

Furthermore, older companies with lower revenues and better asset utilization have a significantly higher probability of being exited through a trade sale, possibly illustrating third-party buyers' preferences in pursuing more mature companies relative to the preferences of PE funds. In line with several studies, we also find that IPOs appear to be the preferred exit choice for PE funds exiting larger portfolio companies. Last, we find no evidence regarding the impact of favorable credit markets or higher information asymmetry on the choice of exit channel.

Preface

This thesis has been written as a part of our MSc in Economics and Business Administration at the Norwegian School of Economics. The work concludes our major in Financial Economics.

The main motivation behind the thesis was to learn more about the constantly expanding private equity sector, especially in relation to the upsurge in Nordic buyout deals after the Covid-19 pandemic. Although the work has been extensive and demanding, we feel that we have been rewarded with substantial knowledge and invaluable insights into the Nordic private equity universe.

We would like to express our gratitude to our supervisor Jøril Mæland, for assisting us with insightful and constructive feedback during the process of working on this thesis. We also offer a special thanks to Manager Jon Fredrik Vassengen at Argentum Asset Management for providing us with essential data and valuable discussions around the choice of topic. Without the fundamental data on Nordic buyout exits, this study would not have been possible. Finally, we are grateful to our family and friends who supported us throughout the entire semester.

Norwegian School of Economics

Bergen, June 2022

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Contents

List of Tables

List of Figures

1 Introduction

A significant amount of value in private equity (PE) investments can be created through the timing of exit and choice of exit route. PE funds usually have a limited contractual lifetime of 10 years, with returns mostly coming as capital gains which can only be realized and distributed to investors after divestment. As the exit routes differ substantially in their allocation of issuing proceeds and their provision of incentives (Bienz & Leite, 2008), the exit decision is of imperative importance. Facilitating a high-value exit is cited by PE investors as an important post-investment source of value (Gompers, Kaplan, & Mukharlyamov, 2016), and is supported by research[1] showing that PE firms time capital market conditions. PE funds charge large fees from investors, making every part of the value maximization process important to outperform other asset classes and retain investors' trust, which is important for reputation and subsequent fundraising. Using a multinomial logistic regression model (MNL) and data provided by Argentum on all exits in the Nordic PE market between 2008–2021, this thesis seeks to study the following:

"What are the determinants of Private Equity exit strategies within the Nordic buyout segment?"

In general, private equity refers to equity investments in non-public companies. PE firms organize themselves as partnerships that raise capital and structure their investments in funds with limited liability. Capital is committed to PE funds by investors or other PE funds that act as limited partners (LPs), who cannot be directly involved in the funds' investment activities (Sahlman, 1990). The PE firms operate as general partners (GPs) by managing the capital and identifying attractive investment opportunities that generate returns for the LPs. In return, GPs are typically compensated by an annual management fee, which is usually a percentage of committed capital, a share of the profits called "carry" (normally 20 percent) and fees from companies in which they invest (Kaplan & Strömberg, 2009). Academic literature typically classifies PE into buyout and venture capital (VC), with this thesis diving into the buyout segment. Accordingly, PE and buyout will be used interchangeably throughout the thesis.

[1] See e.g., Axelson, Jenkinson & Strömberg (2013), Jenkinson & Sousa (2015) and Ljungqvist, Richardson & Wolfenzon (2020).

In a buyout transaction, PE funds usually seek to buy majority control in relatively mature companies, which we refer to as portfolio companies, by using substantial amounts of leverage relative to equity to finance the deals (Ang & Sorensen, 2012). After an investment, a portfolio company is typically held for five years, in which the PE fund looks to create value through three main aspects proposed by academia: (1) Firms are under-levered, (2) Firms are under-performing and (3) Firms lack capital or managerial expertise (Bienz, 2017). Subsequent to the value-creation period, fund managers must decide how to exit the investment.

PE investments can be exited through a variety of routes, the most frequent being initial public offerings (IPOs), trade sales and secondary buyouts (SBOs). Through an IPO, PE firms sell their shares to public investors by listing the company on a public stock exchange. In a trade sale, the entire company is sold to a third party, which is typically a competitor or company operating in the same industry. This can take the form of an acquisition, merger, or sale of shares or assets in the firm (Cumming & MacIntosh, 2003). Secondary buyouts (SBOs) are transactions where a PE firm sells a portfolio company to another PE firm (Degeorge, Martin, & Phalippou, 2016). Data availability limits our thesis to these three exit routes.

The various exit routes have different properties, which potentially make them better suited to maximize investor value given different characteristics related to the portfolio companies, PE funds and market conditions. IPOs are often viewed by investors as the most successful exit yielding the highest returns[2] but the divestment process is inefficient as the PE funds' shares tend to be locked up for at least six months, with the proceeds being more uncertain (Jenkinson & Sousa, 2015). Trade sales, on the other hand, involve an efficient divestment with less regulation and often superior pricing due to strategic buyers' willingness to pay higher premiums for synergies, market shares or entries. The market is also less cyclical than the IPO market (Povaly, 2006). However, some markets have few potential buyers, and there is more uncertainty and risk from the investors' point of view as PE funds do not give warranties to the buyers (Smith & Wall, 1997). SBOs have become increasingly popular as an exit strategy (Kaplan & Strömberg, 2009). Potential reasons may be the lower searching costs and lower adverse selection of SBOs due to other PE firms already having been invested in the company. This makes the exit process relatively more efficient than IPOs and trade sales. SBO is the exit route with the shortest delay in receiving proceeds and with the lowest transaction risk, as both PE firms participating in an SBO are familiar with the process (Anker & Stärk-Johansen, 2015).

[2] Although true, Bienz and Leite (2008) show that this might stem from a selection bias.

However, the increasing popularity of SBOs is interesting from an investor's point of view as to what additional value the buying PE firm can generate compared to that of the selling PE firm.

There are several motives for carrying out such a study at this juncture. Through the 21st decade, the PE industry has experienced substantial growth and attracted increased attention. Critics of PE argue that PE investments are influenced by market timing and mispricing between debt and equity markets, in essence accusing PE firms of engaging in asset flipping rather than maintaining ownership of companies for a sustained period.[3] Moreover, the Nordic PE market has developed with increasing deal activity and volumes in the aftermath of the financial crisis in 2007–2009 (BVCA, 2016). Global trends indicate large inflows of new capital into PE funds followed by soaring amounts of uninvested committed capital, referred to as "dry powder" (McKinsey & Company, 2018), implying increased competition. Following the first shock of the Covid-19 pandemic in March 2020, central banks lowered interest rates to zero and purchased massive amount of debt securities to boost spending, investments and provide liquidity in capital markets (European Central Bank, 2022; Congressional Research Service, 2021). Recently, stock markets have flourished with record-high expansions of traditional valuation multiples. All these events and trends make it increasingly interesting to analyze how dynamic markets and the attributes of the different exit routes affect the exit decision.

To address our research question, we define six hypotheses assisting us in uncovering the determinants of PE exit strategies. This involves an extensive study on how Nordic PE funds have responded to a dynamic environment with increased competition and volatile capital markets. Several studies[4] identify timing of capital market conditions as an important factor in the exit decision. Ceteris paribus, the market conditions of 2021 could incentivize exiting of PE portfolio companies through IPOs at an earlier stage as increased investor optimism generates higher valuations. Thus, hypothesis 1 seeks to answer if *better equity market conditions increase the likelihood of exiting through an IPO*. Further, PE funds are uniquely positioned to take advantage of mispricing between debt and equity markets (Demiroglu & James, 2010; Ivashina & Kovner, 2011). Considering the availability of cheap debt in the Nordics recently, and previous findings that favorable credit market conditions increase the

[3] See e.g., Rappaport (1990) , Gilligan & Wright (2020).
[4] See e.g., Gompers et al. (2016), Jenkinson & Sousa (2015), Ritter & Welch (2002).

amounts of SBOs relative to IPOs (Jenkinson & Sousa, 2015), hypothesis 2 claims that *favorable credit market conditions make SBOs relatively more likely to IPOs*.

The increase in dry powder is indicative of intensifying competition among PE funds, as more capital is chasing the same investments. Increased competition and pressure to spend capital incentivize GPs to burn money at the end of the investment period by investing any residual committed capital to collect management fees (Degeorge et al., 2016; Axelson, Strömberg & Weisbach, 2009). As SBOs have lower searching costs, lower adverse selection and a relatively quicker exit process, hypothesis 3 explores if *more dry powder in the market leads to an increase in SBOs relative to IPOs and trade sales.* Previous research[5] suggests that higher information asymmetries (IA) make PE funds prefer trade sales or SBOs to IPOs. External shocks like Covid-19 and the financial crisis generally lead to uncertainty in financial markets and potentially increase IA, which could change PE investors' exit preferences. Thus, hypothesis 4 claims that *PE funds prefer trade sales and SBOs relative to IPOs during times with high information asymmetry.*

In addition to market conditions, the exit decision could depend on several PE fund and firm characteristics. Some studies[6] suggest that the management fee structures of PE funds incentivize GPs to use SBO as an exit vehicle when the fund is closer to maturity to quickly spend committed capital and collect fees. Kaplan and Strömberg (2009) examine if asset flipping among PE fund managers can explain the increase in SBO popularity, without conclusive evidence. This gives rise to hypothesis 5, which is divided into two. Hypothesis 5.1 states that *PE funds closer to maturity tend to exit through SBOs as a quick way of spending committed capital when investments are made late in the fund's life cycle*, while hypothesis 5.2 propose that *PE funds closer to maturity tend to exit through SBOs to avoid an extension of the fund's life as there may be portfolio companies not ready for an IPO or a trade sale.*

Lastly, portfolio company characteristics are often described as the most prominent explanatory variables in understanding fund managers' exit decisions. Previous research particularly focuses on operating performance as a decisive factor, with conflicting findings in relation to the different exit routes. While Sudarsanam (2005) uncover that better-performing companies are more likely to engage in an SBO, Holm and Plagborg-Møller (2017) find the opposite. Others suggest that better operating performance is indicative of a favorable

[5] See e.g., Lucas & McDonald (1990), Cumming & MacIntosh (2003) and Chowdhury & Uddin (2021).
[6] See e.g., Cumming & MacIntosh (2003), Masulis & Nahata (2009) and Jenkinson & Sousa (2015).

opportunity to go public (Jain & Kini, 1994; Pagano, Panetta, & Zingales, 2002). As academia seems to be rather divided on the matter, it is compelling to examine the effect operating performance has on exit strategies for Nordic PE funds. Thus, hypothesis 6 states that *portfolio companies with strong operating performance are more likely to be exited through an SBO*.

A limited amount of research has been conducted on the topic in the Nordic PE market as the availability of data is scarce. As previous studies either focus on VC, other exit channels or different regions, we believe that our thesis can contribute further insights into how and why PE firms operate the way they do. Our findings offer additional academic value as the effects of the Covid-19 pandemic and the recent upsurge in Nordic PE deals are yet to be unveiled. Hence, this study aims to add to previous research on determinants of PE exit strategies with evidence from the Nordic PE market.

The data used in this thesis were collected through a variety of sources. A comprehensive dataset has been provided by Argentum, containing all investments and exits in the Nordic buyout segment between 2008–2021. Additionally, we have hand-collected PE fund and financial data for all portfolio companies through several databases, constructing a unique final sample of 525 PE exits. Data from equity and debt markets, GDP, dry powder and fundraising in the Nordic countries are also acquired through a variety of sources. Three panels of data are represented in the final dataset, classified as *PE fund and firm variables*, *portfolio company variables* and *macroeconomic variables*. To analyze the determinants of PE funds' discrete choice of exit route, a multinominal logistic regression model (MNL) is applied with SBO as the baseline category. The regression generates an odds ratio describing the probability effect on different exit strategies for all independent variables.

Our analysis provides evidence supporting hypothesis 1 that PE funds capitalize on "windows of opportunity" to cash in on their investments at higher valuations, with the finding that hot stock markets increase the probability of exiting through an IPO. Regarding hypotheses 2 and 4, the results show no evidence of credit market conditions and IA being important determinants of the exit choice. There is no conclusive evidence regarding hypotheses 3 and 5.1, which is quite interesting as it contradicts the claims made by PE critics of asset flipping and SBOs being "pass-the-parcel" deals for managers willing to exploit PE funds' fee structures.[7] Thus, we advocate in favor of Nordic PE investors' ability to achieve valuable deals

[7] Although inconclusive, hypothesis 3 leans toward a rejection at a 10 % significance level.

despite increased competition or having invested late in the fund's lifecycle. Moreover, the results are inconclusive regarding hypothesis 5.2 suggesting that SBOs are often used to avoid an extension of the fund's life. Lastly, we find evidence in support of hypothesis 6, where a better operating performance (represented by a higher EBIT margin) increases the probability of an SBO relative to an IPO. This indicates that the relative comparative advantage of raising and managing cheap debt is still an important element in PE value creation, as a stronger operating performance suggests a better ability to manage higher levels of debt. Other notable findings are that higher turnover-assets ratio and older companies increase the probability of trade sales, indicating that trade sale buyers pursue more mature companies with better asset utilization and less growth potential. We also find evidence supporting previous research that PE funds tend to exit larger portfolio companies through IPOs.

The remainder of this thesis has the following outline: Section 2 provides a presentation of the Nordic PE market. Section 3 serves as an overview of additional literature related to our research question. Sections 4 and 5 present the hypotheses and the data used to answer the hypotheses, while section 6 describes the methodology applied. The empirical results are presented and discussed in section 7 before section 8 provides the conclusion and suggestions for further research.

2 The Nordic Private Equity Market

PE in the Nordics, which includes Denmark, Finland, Norway and Sweden,[8] emerged during the early 1990s and has advanced into becoming one of the most successful and active markets in Europe (Spliid, 2013; BVCA, 2016). These countries have stable economies, high taxation, world-class educational and social security systems, and relatively homogeneous cultures, institutions and governments. Due to shared similarities and small cross-border differences relative to the rest of Europe, it seems justifiable to view the region as one. A high degree of confidence among the Nordic countries induces investors' perception of cross-border investments as less risky relative to other European countries, according to Spliid (2013).

The majority of research on PE provides evidence based on empirical data from the United States (U.S.), which is understandable considering the size and sophisticated nature of the U.S. market. In his article, Spliid (2013) emphasizes that differences in management culture, fundraising, credit markets and government regulations necessitate distinguishing between the Nordic and the U.S. market. The Nordic investment universe is considerably smaller and the buyout potential lower relative to GDP, with Sweden being the exception in terms of M&A (mergers and acquisitions) and stock market activity. Different jurisdictions and tax regulations complicate the fundraising process as Nordic governments are more eager to control and curtail PE tax advantages on interest deductibility and carried interest.

Furthermore, the availability of credit is scarcer than in the well-diversified U.S. market. Whereas the bond market typically plays an important role in the financing of U.S. deals, the banks tend to be the main providers of capital in Europe (Bienz, 2017), and accordingly in the Nordics. Nordic PE firms are largely dependent on international investors to grow, requiring offshore fund structures such as limited partnerships located in tax havens. Despite this, deal structuring rarely experiences any significant hurdles and tends to follow internationally well-recognized approaches (BVCA, 2016). The regional performance of Nordic PE has in fact consistently outperformed European and U.S. peers based on pooled horizon returns(Berchwood Partners, 2013).[9]

[8] Iceland is per definition a part of the Nordic countries but is excluded in the thesis due to a negligible amount of PE activity.
[9] Pooled horizon returns aggregate cash flows and residual value since a fund's inception.

There are some minor differences within the Nordic countries' economies. Sweden has the most mature PE market and has traditionally been the dominant player. Wage flexibility is low in all countries, and it is expensive and complicated to reduce staff, the exception being in Denmark. Traditionally, different types of firms make up different proportions of each country's economies. Whereas large international industrial corporations dominate in Sweden, Denmark's and Finland's economies are mostly made up of small- and medium-sized firms (SMBs), with a few exceptions (e.g., Novo Nordisk and Nokia). Firms operating in the energy sector, with oil and gas at the forefront, make up a large part of the Norwegian economy.

Various state-owned pension funds, insurance companies and banks constitute a diverse investor base and represent the vast majority of capital in Nordic PE (Berchwood Partners, 2013). International PE investments have increased in the wake of the financial crisis, representing slightly more than half of all international investment activity in the region (BVCA, 2016).

Recent trends show that Nordic fund managers are seeking to relocate fund structures onshore in the UK, Luxembourg, Denmark or Sweden, partly due to political pressure, public sentiment, and tax and regulatory developments (BVCA, 2016). Deal volumes, the number of transactions and funds raised in the Nordic region have increased since the financial crisis, although cyclicality clearly is evident in the data (Argentum, 2020). This is consistent with international trends showing that PE activity appears to experience recurring boom and bust cycles (Kaplan & Strömberg, 2009). Further descriptive statistics of data will be provided in the empirical analysis of this thesis in section 7.1 where we will highlight some of the trends.

3 Literature review

This section introduces additional literature which provides further insights into some of the concepts already presented in the introduction.

3.1 Private Equity

Literature and research on PE are often traced back to Jensen (1986), who use the free cash flow theory to find evidence that takeovers financed with debt outperformed the takeovers through an exchange of stock. In the article, he finds ways for managers to increase efficiency in the firms and not commit to value-destroying investments. Jensen (1989) argues that privately-owned organizations can manage resources more efficiently than the typical public corporation with dispersed shareholders, low leverage and weak corporate governance. Hence, PE can be a superior form of ownership better positioned to increase operational efficiency, productivity, shareholder value and financial performance. The more recent research of Morris and Phalippou (2020) finds evidence that PE has given investors superior returns compared to the public equity benchmarks up until 2006, with the outperformance evening out since then.

PE funds usually have a finite lifetime of 10 years, where their lifecycle can be divided into four phases: fundraising, investment, value-adding, and divestment (Lerner, 2000). During fundraising, capital is raised through private or institutional investors. After the fundraising period, the committed capital is normally invested within the first two years of the fund's life (Jenkinson & Sousa, 2015). In the value-adding phase, PE funds offer their advice and expertise to create value for the businesses, which are referred to as "portfolio companies" of the PE fund. Portfolio companies are normally held between three and seven years until the investment is exited, known as the divestment phase or exit (Cumming & Walz, 2010).

The GPs seek to capitalize on active investment strategies. This involves substantial screening and due diligence to identify investment opportunities in accordance with the fund's investment mandate to generate returns for the LPs (Kaplan & Strömberg, 2009), as well as actively managing the company post-investment (Døskeland & Strömberg, 2018). Covenants of the partnership are important to align the GPs' incentives to manage the fund in the interest of LPs. Although studying VC, Gompers and Lerner (1996) examine the use of contractual covenants in partnership agreements and find evidence that the covenants related to agency problems are the covenants that restrict GPs and their investments. Some typical restrictions are the size of

investments in one firm, use of debt and types of investments in different securities. In addition, GPs must provide at least one percent of total committed capital, which contributes to better alignment of interests with the investors' (Døskeland & Strömberg, 2018).

According to Morris and Phalippou (2020), one-third of a typical buyout transaction is funded by equity from LPs and two-thirds by debt from banks and other credit sources. Furthermore, Biesinger, Bircan and Ljungqvist (2020) find that value creation plans for PE firms have become increasingly differentiated for each of the portfolio companies. They highlight the importance of executing the value creation plans to generate investor returns and that managers have become more hands-on over time.

3.2 Exit Strategies

PE firms can exit their investments through a variety of channels, including initial public offerings (IPOs), trade sales, secondary buyouts (SBOs), management buyouts, and write-offs (Cumming & MacIntosh, 2003).[10] As this thesis primarily investigates IPOs, trade sales and SBOs, we will describe these exit routes in detail and review the most relevant literature in the following sections.

3.2.1 Secondary buyouts

Several studies[11] highlight that SBOs have increased in volume over the last two decades. Degeorge et al. (2016) examine whether SBOs create or destroy value for the investors. The authors start by addressing the claim that SBOs are just "pass-the-parcel" deals. This conjecture stems from the agency problem between GPs and LPs, where GPs have an incentive to invest excess capital, so-called "dry powder", at the end of the investment period to receive greater commissions. They proceed by investigating if the additional value to the portfolio company from the buyer may be enhanced due to complementary skills. Lastly, investors having stakes in several PE funds may find themselves on both the buying side and the selling side of an SBO transaction, which could be problematic as they end up paying large transaction costs. The study presents evidence that SBOs underperform and destroy value when made by buyers under pressure but perform equal to other buyouts when under no pressure. Moreover, buyouts where the buyer and seller have complementary skillsets outperform other buyouts (Degeorge et al.,

[10] Bankruptcy might also be an exit route but is excluded from our analysis as this is not an exit by choice or the actual exit strategy of a PE investment.
[11] See e.g., Degeorge et al. (2016), Jenkinson & Sousa (2015) and Strömberg (2007).

2016). These findings are partly consistent with Arcot et al. (2015) who find that pressured buyers and sellers are more likely to engage in SBOs and that the participation of a pressured seller (buyer) moves the transaction multiple significantly lower (higher).

Jenkinson and Sousa (2015) suggest a tendency of SBOs taking place when PE funds are closer to maturity than primary deals, indicating that SBOs may be a quick way of spending committed capital towards the end of the buying fund's investment period due to its desirable attributes of lower searching costs and lower adverse selection. This is consistent with the findings of Degeorge et al. (2016). Moreover, the choice of exit route is found to be heavily dependent on capital market conditions. Favorable debt markets (cheap debt and loose credit conditions) make SBOs relatively more likely than IPOs when portfolio company characteristics (higher cash flows, profitability and lower capital expenditures) increase the company's ability to bear significant amount of debt (Jenkinson & Sousa, 2015).

There are some additional benefits of choosing SBO as an exit route to the ones mentioned in the introduction. Relative to IPOs, SBOs seem to mitigate any IA arising from exogenous shocks in the economy, as PE investors tend to be more sophisticated than public investors (Cumming & MacIntosh, 2003). Additionally, selling to another PE fund often achieves a high price, with lower risk and shorter delay in receiving the proceeds compared to IPOs and trade sales (Jenkinson & Sousa, 2015). These attributes are all desirable to a PE fund.

In addition to the advantages highlighted above, there are potential disadvantages stemming from the sale process of an SBO. Wall and Smith (1997) warn that the management is likely to show divided loyalty when exiting through an SBO. The managers might benefit from a successful exit by the selling fund but could also receive an incentive package tied to further value creation from the purchasing fund. Striving for value maximization at exit contradicts managements' potential future performance-linked compensation which benefits from a lower valuation when the portfolio company is sold.

3.2.2 Initial public offerings

Some research has been done on the determinants of IPO as an exit route. Although studying VC, Gompers (1996) finds that young firms often raise a subsequent fund shortly after an IPO due to improved reputation. He suggests that firms use IPOs as a promotional tool in the early stage of the fund's investment period. Adding to this, Giot, Hege and Schwienbacher (2014) note that reputational concerns are most important early in a PE fund's life cycle. Jenkinson

and Sousa (2015) further propose that the findings of Gompers (1996) also apply to buyout funds. Additionally, they show evidence that the use of IPOs increases when stock markets have experienced strong growth, exploiting "windows of opportunity" in the markets. This is in line with the view of Ritter and Welch (2002), who assert that market conditions are the most important factor in an IPO decision.

Pagano et al. (2002) examine determinants of a company going public. They find that IPO decisions are positively affected by valuations of firms in the same industry. Additionally, the size of the company significantly affects the probability, where smaller companies are less likely to go public. Cefis et al. (2016) examine how industry and LBO-stage level specialization affect the exit strategies in PE and find that specialization increases the probability of IPOs and reduces holding periods (defined as the time from entry to exit of the investment) before going public. They also find that IPOs often involve the largest and oldest target companies, in line with the findings of Pagano et al. (2002). Although studying VC, Sørensen (2007) find that companies funded by more experienced PE firms are more likely to go public, following from the direct influence of more experienced funds and from sorting that leads experienced funds to invest in better companies.

The research on hot issue markets for IPOs goes back to Ibbotson and Jaffe (1975) and Ritter (1984) who find evidence that hot issue markets occur when there is a positive equilibrium between risk and expected initial return and an increase in the riskiness of the average IPO. These hot issue market periods lead to an increase in the IPO activity in the following years (Ritter, 1984). Further, Ritter (1991) and Loughran and Ritter (1995) exhibit that managers take advantage of these hot markets when going public to get the most attractive valuations. Brau and Fawcett (2006) add to this view by finding evidence that insiders seek to go public at times of hot stock markets, again referred to as "windows of opportunity".

Another important factor to consider in an IPO exit process is the degree of IA in the market, with Lucas and McDonald (1990) arguing that managers wait until they have good news before going public. Cumming and MacIntosh (2003) contribute further to this theory by finding that the IA between sellers and buyers is the most important factor in determining the exit route and thus, the selection of exit route should depend on the potential to minimize IA.

Lowry (2003) examines why IPO activity fluctuates over time and finds that companies' demand for capital and the level of investor sentiment significantly explain IPO fluctuations.

Thus, when companies reach a certain point in the business cycle, and the demand for equity capital grows, they often go public. Moreover, Lowry and Schwert (2002) find that similar companies from the same industries go public in the same periods and that the stock performance of similar firms leads to other firms going public. They continue by finding that information about the value of an IPO during registration influences prices and listing decisions for other companies. Positive information on registered firms, therefore, leads to higher initial returns, and consequently higher IPO activity. This illustrates that timing is driven by the attractiveness of the IPO market (Brau & Fawcett, 2006). Later studies also highlight that the probability of choosing IPO as an exit route is higher in a hot stock market and in markets with positive shocks and high valuations of listed firms (Jenkinson & Sousa, 2015; Baschieri, Carosi, & Mengoli, 2021). In relation to the holding period of PE investments, Giot and Schwienbacher (2007) find that the probability of exiting through an IPO reaches a peak at about 2.75 – 4 years into the holding period of the investment, before decreasing substantially. Summing up, IPO markets seem to be characterized by high volatility, making IPOs relatively attractive and unattractive at different points in time.

Several benefits of the company going public have been enlightened in previous research, e.g., gaining access to alternative financing sources (other than banks), greater bargaining power with banks and investor recognition. Additionally, the initial investors get opportunities for diversification as the shares can be traded publicly (as opposed to privately traded shares at considerable costs for the initiating party) and selling cash-flow rights to change the ownership structure in the company to maximize the proceeds from an eventual sale (Pagano et al., 2002). Ritter (1991) theorizes that companies can benefit from going public when other companies in the industry are overvalued to lower the cost of capital. Rajan and Servaes (1997) and Lowry and Schwert (2002) later find evidence in line with the theory of Ritter (1991).

There are also some disadvantages of an IPO process. In an IPO, the shares of a PE fund tend to be locked up for at least six months, making the disposal of significant stakes more difficult compared to an SBO or a trade sale (Jenkinson & Sousa, 2015). Ritter (1987) addresses the substantial costs of going public, such as administrative expenses like underwriter fees, registration fees and auditing fees. Other costs of going public are adverse selection costs, where investors are less informed than the issuer about the true value of the company. Hence, the probability of going public is positively correlated with the age or size of a company (Chemmanur & Fulghieri, 1999) and the loss of confidentiality rules, which can disclose

research and development projects and reduce the competitive advantage of a firm (Pagano et al., 2002). Smith and Wall (1997) highlight that IPOs have higher costs than other exit routes, while adding that IPO is not an option for small companies. This is in line with other studies, such as Pagano et al. (2002) and Cefis et al. (2016), who find evidence that size affects the probability of going public.

3.2.3 Trade sales

The trade sale process can either be conducted through an auction (managed or public) or through private processes, like a pre-emptive bid where one likely buyer is approached and targeted solicitation where several potential buyers are approached (Povaly, 2006). The transaction can take the form of a share deal, asset deal or a merger (Cumming & MacIntosh, 2003). Trade sales have historically been a popular exit route for PE funds.

Several studies[12] examine characteristics of target companies for the acquiring firms. Dietrich and Sorensen (1984) find evidence that the most important factor affecting a firm's attractiveness is the inability of incumbent management to generate sales per unit of assets. Other characteristics increasing the probability of an acquisition are low turnover, payout and financial leverage, high trading volume and smallness in aggregate market value. Later research suggests that both the liquidity of a company and better investor protection in a country increases the probability of an acquisition (Hasbrouck, 1985; Rossi & Volpin, 2004). Adding to this, Brar, Giamouridis and Liodakis (2009) find evidence that target companies are smaller, undervalued, less liquid, have low sales growth but exhibit strong short-term price momentum and have their shares actively traded. Jenkinson and Sousa (2015) show that trade sales tend to happen for smaller companies experiencing strong growth and that the choice between trade sales and SBOs is mainly subject to portfolio company characteristics. In relation to the holding period of PE funds' investments, Giot and Schwienbacher (2007) find that the probability of trade sale increases as the investment matures.

Previous studies articulate the advantages and disadvantages of a trade sale exit. Povaly (2006) highlights that trade sales achieve immediate divestment of the investment, giving the investor a high degree of certainty. Additionally, he shows that trade sales are more flexible, less regulated, have a higher degree of confidentiality, lower risk of business disruption and lower cancellation risk, with the process being simpler and less regulated than IPOs. Cumming and

[12] See e.g., Dietrich & Sorensen (1984), Hasbrouck (1985), Palepu (1986), Rossi & Volpin (2004), Camerlynck, De Langhe & Ooghe (2005) and Brar et al. (2009).

MacIntosh (2003) find that strategic buyers often require a lower risk premium than capital markets. These transactions might obtain better valuations than IPOs due to strategic buyers' willingness to pay higher premiums for synergies, market shares or market entries (Povaly, 2006). Moreover, trade sales normally have a faster and simpler execution process and cause lower transaction costs than IPOs, as the seller only needs to convince one buyer rather than a whole market compared to IPOs (Smith & Wall, 1997). Another advantage of trade sales is that parts of the business can be sold, which can benefit the valuation of the company (Povaly, 2006).

On the other hand, Smith and Wall (1997) point out that trade sales often are opposed by the management because of the loss of independence. Povaly (2006) adds to this view by highlighting dispiriting among employees resulting from uncertainty about individual careers due to a trade sale exit. Lastly, a trade sale exit decision typically causes a smaller reputational benefit than IPOs (Povaly, 2006). This indicates that trade sales are less probable for companies with smaller reputations.

4 Hypotheses

To address our research question, we want to examine the impact of a variety of variables. Here we discuss some variables that we find particularly interesting to highlight explicitly through hypotheses.

4.1 Market conditions

The main motivation for writing this thesis stems from the strong equity bull market in the wake of the Covid-19 pandemic. Several studies[13] find that capital market conditions are important determinants of the choice of exit route and that PE funds take advantage of so-called "windows of opportunity" to divest their investments at presumably higher valuations. As such, the first hypothesis originates from the assumption that PE firms take advantage of hot equity market conditions to sell portfolio companies and cash in on their investments. Gompers et al. (2016) investigate to what extent PE firms time the M&A and IPO markets in order to succeed with an exit. The authors uncover that PE firms themselves believe that they can create a meaningful amount of value by being able to buy low and sell high. They also find that achieving the expected operational plan and capital market conditions are roughly equally weighted in the exit decision, as quoted by the PE firms themselves. To see if the same findings apply to the Nordic PE market, we define the following hypothesis:

Hypothesis 1: *Better equity market conditions increase the likelihood of exiting through an IPO.*

A tightening of credit availability may affect the number of buyouts through a reduction of potential buyers as they may struggle to achieve bank financing of the deal. Oppositely, from the same argument, one may infer that a favorable credit market increases the number of potential buyers in the market through easier access to credit for financing the deals. One of two broad views about buyout capital structure is that PE funds use cheap debt to take levered bets on firms (Axelson et al., 2013), and thereby are uniquely positioned to arbitrage debt versus equity when leverage is cheap due to superior access to debt financing (Ivashina & Kovner, 2011; Demiroglu & James, 2010). By linking these arguments with the findings of

[13] See e.g., Pagano et al. (2002), Jenkinson & Sousa (2015), Gompers et al. (2016), Holm & Plagborg-Møller (2017)

Jenkinson and Sousa (2015), that favorable credit market conditions are followed by an increasing amounts of SBOs relative to IPOs, we formulate the following hypothesis:

Hypothesis 2: *Favorable credit market conditions make SBOs relatively more likely to IPOs.*

The amount of dry powder in the Nordic PE market has increased steadily after the financial crisis, alongside entry valuation multiples (PitchBook, 2022; Argentum, 2019). Presumably, this indicates increasing competition among PE funds. Lerner and Gompers (2000) find a strong positive correlation between the valuation of PE investments and capital inflows, which matches the tendency of PE returns declining when more capital is committed to this asset class (Kaplan & Strömberg, 2009). Both of the aforementioned studies support our notion that increasing dry powder is indicative of increasing competition. Degeorge et al. (2016) highlight the GP's incentive to invest excess capital at the end of the fund's investment period to receive management fees on invested capital. In these situations, an SBO is a popular choice due to lower searching costs for investments and lower adverse selection as other PE funds already have invested in the company. Axelson et al. (2009) note that the fixed investment period of PE funds incentivizes the GPs to burn money at the end of the investment period, facing a dilemma to spend the dry powder. Anecdotally, increased competition could make it easier to exit portfolio companies for the selling PE firm. Thereby, SBOs could be relatively more attractive due to the desirable attributes of an SBO concerning price, risk and proceeds.[14] Based on the notions made, the following hypothesis is drafted:

Hypothesis 3: *More dry powder in the market leads to an increase in SBOs relative to IPOs and trade sales.*

IA between buyer and seller might be an important factor determining the choice of exit route. In general, sellers tend to have more information about the underlying investment, whereas buyers tend to undervalue the firm under management when IA is high. Assuming PE funds maximize value, the choice of exit route could depend on the route minimizing IA to achieve the highest exit value possible. External shocks are examples of events potentially increasing the amount of IA between buyer and seller in financial markets (Chowdhury & Uddin, 2021). Two such events occur in our sample, namely the financial crisis of 2007–2009 and the Covid-19 pandemic.

[14] See section 1 "Introduction" and section 3.2.1 "Secondary buyouts" for further information.

According to Cumming and MacIntosh (2003), an IPO offers the least possibility of minimizing IA when exiting a PE investment. Relying heavily on investment bankers for relevant information, IPO investors are relatively less sophisticated than investors involved in a trade sale or an SBO, according to the authors. Moreover, as formerly noted, the IPO process is complex and usually does not represent an exit per se as stocks may be locked up for a certain period, with the proceeds being more uncertain. Assuming IA leads to a reduction in the potential selling price of a PE investment, and that Covid-19 and the financial crisis represent external shocks increasing the amount of IA in the financial markets, we propose the following hypothesis:

Hypothesis 4: *PE funds prefer trade sales and SBOs relative to IPOs during times with high information asymmetry.*

4.2 PE fund characteristics

Plausible theories for the choice of exit route may also be related to the characteristics of the PE firms and funds themselves. Cumming and MacIntosh (2003) note that as the fund approaches maturity, some portfolio companies may not be ready for an IPO or a trade sale, making SBOs relatively more attractive to avoid an extension of the fund's life. As described in section 3.2.1, the transaction risk in an SBO is relatively low with quick access to the proceeds. PE investors may also face liquidity pressure as the fund approaches maturity, which again favors the choice of SBO as an exit route (Masulis & Nahata, 2009). Although not significant, one of the models in the study of Jenkinson and Sousa (2015) shows that secondary deals tend to happen at a later point in the life of the purchasing fund than primary deals. This might suggest that PE firms invest in companies as a quick way of spending committed capital towards the end of the fund's investment period to collect fees,[15] with the purpose of offloading the investments through SBOs. Critics of PE argue that PE funds perform so-called "asset flipping" (Rappaport, 1990), meaning buying and re-selling assets within a short period without creating any meaningful value in the portfolio company. Although Kaplan and Strömberg (2009) find no evidence supporting such a theory, the recent decade's development of the PE market, with increasing popularity of SBOs, makes it interesting to review. Building on the remarks made by Cumming and MacIntosh (2003) and Jenkinson and Sousa (2015), we formulate two hypotheses on fund maturity:

[15] This is only valid if the PE fund charges a fee on invested capital.

Hypothesis 5.1: *PE funds closer to maturity tend to exit through SBOs as a quick way of spending committed capital when investments are made late in the fund's life cycle.*

Hypothesis 5.2: *PE funds closer to maturity tend to exit through SBOs to avoid an extension of the fund's life as there may be portfolio companies not ready for an IPO or a trade sale.*

4.3 Portfolio company characteristics

There are several arguments relating to how portfolio company characteristics could affect the choice of exit route. Operating performance is one of the foundations for discounted cash-flow analysis and valuation as it serves as a testament to the strength of the business. Being such an important measure in the valuation of companies, PE funds, trade sale buyers and public investors may emphasize it differently. While Sudarsanam (2005) finds companies exiting through SBOs to be relatively more profitable the year before exit, a survey by Gompers et al. (2016) additionally suggests that PE funds "use as much debt as the market will allow". This implies that companies with higher operating performance and liquidity are better suited for SBOs. However, Holm and Plagborg-Møller (2017) argue that some PE firms may generally attempt to offload poorly performing portfolio companies to other PE firms, who specialize in turnaround cases, through SBOs due to their quicker exit process relative to IPOs. They suggest that SBOs are less likely for portfolio companies with strong operating performance and more likely when portfolio company performance is weaker at the time of exit, as it enhances PE firms' comparative advantage in raising debt.

The literature on this matter is obviously divided but there seems to be consensus on the matter that both IPOs and SBOs are relatively more likely to trade sales when operating performance is strong.[16] Evidence shows that operating performance tends to peak prior to an IPO and that higher profitability is an indication of high prospects for future performance, ultimately leading to higher IPO valuations that provide higher returns to the PE firms (Jain & Kini, 1994; Pagano et al., 2002). How the inter-dynamics between IPOs and SBOs unfold are therefore uncertain. Anecdotally, the historical importance of leverage in PE value creation is strong in the academic literature. It could be plausible that purchasing PE funds are highly interested in buying companies that have a strong operating performance in order to increase leverage, and

[16] For SBOs relative to trade sales, see Sudarsanam (2005). For IPOs relative to trade sales, see Bienz and Leite (2008). As Bienz and Leite investigate VC, the notions made are not necessarily directly transferable to our thesis due to the monitoring needs proposed in their paper.

thus possibly returns due to the amplifying effect on equity returns and the disciplinary effect on management of adding leverage. Considering the arguments proposed, we define the last hypothesis:

Hypothesis 6: *Portfolio companies with strong operating performance are more likely to be exited through an SBO.*

5 Data

To test our hypotheses, a considerable amount of time and effort is put into the construction of a unique dataset. PE firms tend to be quite restrictive with regards to data sharing, and information on private companies is more limited than for public companies since they do not have the same obligations regarding disclosure of information. Thus, financial data on portfolio companies and specific fund data were manually collected through an extensive multi-step process to construct a sufficient sample containing enough observations to carry out this study. The following paragraphs will describe the data collection process and the variables used in the analysis.

5.1 Data sources

This thesis is primarily based on a dataset provided by Argentum Asset Management. The data include 1,151 Nordic PE-backed portfolio companies exited in the period 2008-2021, with investments dated between 2000–2021. The period is limited by the availability of data prior to the year 2000. The deals are categorized as either trade sale, IPO, SBO, management buyout, write-off, exit-by-merger or other exits. Information on the fund manager, sector, industry and headquarter of the portfolio company is provided, as well as the PE firms' country affiliation. To implement our analysis, we compile additional data from several sources for each deal and modify the existing dataset by filling in missing values. The final sample includes PE firm and fund characteristics, portfolio company characteristics and market conditions for 525 PE exits.

Accounting data for each portfolio company have primarily been obtained from Bureau van Dijk's database Orbis, except for Norwegian companies which have been retrieved through the SNF database. Additional information and missing values have been collected through Proff (for Norwegian companies), Bloomberg, and Refinitiv Eikon. Missing observations for Danish companies have been collected through the CVR database,[17] while Allabolag provided annual reports for some of the missing data on Swedish companies. All numbers have been converted to million U.S. dollars (USD) using the exchange rate at the end of each financial year to ensure that all the data are in the same format. Some portfolio companies report their numbers based on different fiscal years, where the fiscal year starts and ends mid-year. For these observations, we have calculated a weighted average to estimate the financial numbers at the end of

[17] Det Centrale Virksomhedsregister, a database with annual reports for all registered Danish companies.

December. This method has been incorporated for both income statements and balance sheet numbers, and is applied to the data to contain comparable financial data based on the same fiscal year for all portfolio companies in our dataset.

Only data on the PE firms involved in each deal were provided by Argentum, so PE firm and fund-specific data were obtained through SDC Platinum, Refinitiv Eikon and manual web searches on the PE firms' websites.[18] Some fund information was specifically provided through direct e-mail correspondence with the PE firms themselves. Missing values, e.g., on the establishment year of the portfolio companies, were collected through Pitchbook and manual web searches. Fund sizes stated in local currencies have been converted to historical USD, using the average exchange rate in each fund's vintage year.

Market data were collected through a variety of sources. Equity stock market data were collected for each country through Refinitiv Eikon, Oslo Børs and Nasdaq's home pages. The stock index returns in our analysis are quoted monthly and include all stocks registered at each marketplace to give a broad representation of the whole market and the market conditions PE portfolio companies operate in when going public. Debt market data and GDP growth for each country were obtained through Refinitiv Eikon.

Fundraising data have been gathered from Pitchbook's report "2022 Nordic Private Capital Breakdown". The fundraising data from Pitchbook are based on closed funds, meaning that the capital raised by a fund is only associated with one specific year even though the amounts for a fund were raised in two different years. Both the amounts raised and the number of funds raised are included in the data. One important distinction is that the fundraising data are based on PE funds located in the Nordics, whereas our definition of Nordic PE is based on where the portfolio companies' headquarters are registered. This implies that some of the investments made in Nordic portfolio companies have been made by funds located outside the Nordics. Dry powder data were collected from Pitchbook's report "2022 Nordic Private Capital Breakdown", which illustrates the level of dry powder in the Nordic PE universe from 2006–2021.

For deals exited through IPOs, Argentum defines the exit as when the PE fund has sold 100 % of its shares in the company. As we want to investigate market-timing effects on the choice of exit, we have manually collected IPO dates for relevant companies and replaced the original

[18] Vintage year, fund related to each deal, fund size, fund type, firm year.

dates of Argentum since some IPO exits can take several years. Hence, an IPO exit in our dataset is not exactly an exit but a start on the process of exiting. IPO dates were collected through the websites of each country's relevant stock exchange.[19] This dataset is supplemented with another dataset retrieved from Argentum, containing all IPOs in the period from 2006–2021. To avoid any sample selection bias occurring in our analysis, we have excluded the IPOs in 2006 and 2007 since there are naturally no other observations of trade sales and SBOs during these two years considering the original dataset from Argentum includes exits between 2008–2021.

5.2 Variables

The following section outlines the variables used in the final analysis.

5.2.1 Dependent variable

The choice of exit route will be treated as the dependent variable. The variable is multinomial and categorized as either SBO, IPO or trade sale.

5.2.2 Independent variables

Previous literature finds that several portfolio company-specific variables affect the choice of exit route. In line with the findings of Jenkinson and Sousa (2015) that SBOs are more likely for mature portfolio companies with higher capacity to generate cash-flows and earnings to support significant levels of debt, we include the variables *EBIT MARGIN, DEBT-ASSETS RATIO* and *TURNOVER-ASSETS RATIO*. *EBIT MARGIN* will be the main proxy for operating performance. When using EBIT (earnings before interest and taxes), we would ideally like to use the ordinary EBIT adjusted for non-recurring income and costs, which represent the relevant operating result connected to a company's core business. However, as this would require an extensive analysis of financial data for all portfolio companies in our sample, we argue that EBIT margin is a sufficient measure of operating performance in our analysis. EBIT could also be viewed as a proxy for a company's profitability as it reduces the possibility of financial statement manipulation. Furthermore, *DEBT-ASSETS RATIO* is included to see how a portfolio company's relative amount of leverage influences exit decisions, while *TURNOVER-ASSETS RATIO* serves as a proxy for productivity, meaning how well a company is utilizing its assets.

[19] Oslo Børs, Nasdaq Copenhagen, Nasdaq Stockholm and Nasdaq Helsinki.

Following the findings of Pagano et al. (2002) and Cefis et al. (2016), we include *REVENUE* and *COMPANY AGE* to see if the size and age of a company affect the relative probability of going public. All company-specific variables are measured in the last financial year prior to exit. Initially, we wanted to include capital expenditure as a variable but were unable to include it due to data availability.

Several PE firm and fund-specific variables are included in the analysis. Secondary buyouts tend to be exited later in the life of a PE fund than both trade sales and IPOs (Jenkinson & Sousa, 2015; Cumming & MacIntosh, 2003). As we are interested in testing two different dimensions regarding SBOs and fund maturity through hypothesis 5.1 and hypothesis 5.2, we define two variables: *FUND MATURITY INV* and *FUND MATURITY EXIT*. The variables are defined, respectively, as the fund maturity when investment is made and the fund maturity at exit. Fund maturity is calculated by using the funds' founding dates from the investment and exit dates. As PE firms usually only provide information about a fund's vintage year, we cannot be entirely sure of the exact date a fund is founded. Therefore, all founding dates are classified as July 1st or January 1st on the funds' vintage years, based on when the different funds make investments during that year. In general, we feel that this provides a sufficient representation of the funds' founding dates in our sample.

Furthermore, Jenkinson and Sousa (2015) find that fund size has a significant effect on the speed of exit. Combined with the finding that IPOs have significantly shorter holding periods relative to other exit routes, we include *FUND SIZE* to see if it affects the probability of exiting through an IPO. Although studying VC, Sørensen (2007) finds that companies with experienced investors are more likely to go public, following from the direct influence of more experienced funds and from sorting that leads experienced funds to invest in better companies. Subject to this finding, we include *PE FIRM AGE* to proxy for experience. In line with Jenkinson and Sousa (2015), PE firms founded before 1970 are attributed 1970 as the founding year since little activity existed in the Nordic PE industry prior to that date.

Moreover, there is evidence that funds tend to use IPOs as an early exit route, potentially making IPOs attractive as marketing devices to raise subsequent funds (Gompers, 1996). Additionally, PE firm behavior is increasingly affected by reputational concerns early in a fund's life (Giot et al., 2014). Based on this reasoning, we argue that first funds are marginally more likely to exit through an IPO than a follow-on fund. As such, we include a dummy variable for *FIRST FUND*.

Axelson et al. (2013) state that PE funds often use cheap debt to take levered bets on firms. Further, Jenkinson and Sousa (2015) find that credit market conditions largely affect the choice between IPO and SBO, where cheap debt markets are followed by an increasing amounts of SBOs. As a proxy for credit market conditions, we use the monthly yield spread between 10-year and 2-year government bonds to construct the variable *YIELD SPREAD.* A smaller spread signals a lower appetite for risk in debt markets, meaning it could be harder to raise debt for an SBO. A large difference implies better bank margins, the difference between loans, deposits and interest rate margins. A lower difference implies worse conditions in the credit market as the cost of borrowing increases. Norwegian portfolio companies are paired with Norwegian debt market data, Swedish companies with Swedish debt market data, and so on. For Danish companies, yields were only given as either bid or ask. Consequently, we calculated the average between the bid and ask yields for 10-year and 2-year government bonds, and hence calculated the spread. As we cannot be entirely sure when the decision to go through with an exit is made, we calculate a three-month average of the yield spread prior to the date of exit. Additionally, using a three-month average substantially reduces the multicollinearity with the dry powder variable in our final model compared to a yearly average.

Various academic articles[20] emphasize equity market conditions as an important factor to go public, as investors view attractive pricing as an opportunity to raise capital through an IPO and divest their shares. Resultingly, the local stock market's index returns are viewed as a good proxy for the state of the IPO market. We include *STOCK MARKET RETURNS* as a proxy for IPO activity. Since decisions to go public are made in advance, we pair each transaction with the local stock market index return recorded in the year before exit. This contrasts Jenkinson and Sousa's approach (2015) where they use the 4–6-month aggregated stock market return prior to exit. In our view, using quarterly stock market returns as a proxy for equity market conditions may underestimate how "hot" the equity market in fact is. Suppose the stock markets have been rising a lot the past nine months, and then reaches a plateau the last three months increasing only by 1%. In this case, our model would not interpret the equity market conditions as particularly hot, even though the market may be at a record-high, thereby implying a hot IPO market. Consequently, we choose to adapt our own approach as it better captures possible aggregated effects of a hot equity market. A drawback of our proxy is that we may end up underestimating some of the volatility in the IPO market, which contrasts our logic applied to

[20] See Ritter (2002), Gompers et al. (2016), Jenkinson & Sousa (2015), Axelson et al. (2013).

the yield spread variable where we capture some of the volatility in the debt market. However, a 12-month yield spread would not capture any aggregated effects, which is the case for stock market returns. We argue that this is the best approach without loss of generality as all accounting data are also reported on a yearly basis.

An information asymmetry dummy, *IA,* is constructed to test hypothesis 4. The variable includes two periods where the IA in capital markets is assumed to be high, namely the financial crisis and Covid-19 pandemic. We are particularly careful when defining the periods including a high level of IA as there may be a lot of other things happening within the specified time frame as well. By looking at the development of the Nordic stock markets and cross-validating the dates with relevant news articles (e.g., news of a vaccine for Covid-19), we are able to identify the periods where capital markets are most likely to suffer from increased IA. Note that the degree of IA probably differs between these two exogenous shocks. Whereas the financial crisis most likely increased IA in financial markets, the Covid-19 pandemic did not necessarily include the same degree of IA, despite markets experiencing increased volatility. Constructing the variable as a dummy specified for certain periods of time may be to simplify the complexity of IA. The exact variable definition can be found in *Table 5.1.* Lastly, to test hypothesis 3, we include yearly *DRY POWDER* to investigate how increasing competition affects exit strategies.

5.2.3 Control variables

GDP GROWTH for each country is included as a control variable. It is calculated as a yearly percentage change in GDP and is measured at constant prices and seasonally adjusted.

NUMBER OF FUNDS RAISED is added as a control variable as an additional proxy for competition. The variable is closely related to the dry powder variable, so we add numbers of funds raised to reduce potential endogeneity issues in the analysis. Although having data on both number of funds raised and amounts raised each year, we argue that the amounts raised would have been a better proxy for the competition as a low number of funds can considerably underestimate the effect of competition if the capital raised is large. However, due to detecting a high level of multicollinearity between the amount of fundraising and dry powder variable, the number of funds raised is applied to reduce potential multicollinearity problems.

Several studies[21] highlight how exit channels vary with holding period. Resultingly, we add HOLDING PERIOD as a control variable. This variable is defined as the period from investment to exit. We are somewhat uncertain about the inclusion of such a variable as some studies[22] show that exit-dynamics change during the holding period of the portfolio companies by using hazard rates. However, there are no major changes in the model containing the variable versus the model without it. We choose to keep the variable as changes are negligible and do not seem to pose any threat against the robustness of our analysis.

Table 5.1 provides an overview of all the variables used in the empirical analysis.

***Table 5.1** - Variable Descriptions*

Variable	Definition
Dependent	
Exit Type	0 if SBO, 1 if Trade Sale, 2 if IPO
Independent	
ln Fund Size ($m)	Closed fund size
ln Fund Maturity Inv	Investment date - vintage date fund
ln Fund Maturity Exit	Exit date - vintage date fund
ln PE Firm Age	(Exit year - PE firm founding year + 1). Set to 1970 if founding year prior to 1970.
First Fund	Dummy variable equal to 1 if first fund raised by PE firm
ln Revenue ($m)	Total sales value reported in financial statement in the last year before exit date
ln Portfolio Company Age	Exit year - Portfolio company founding year + 1
Turnover/Assets ratio (w)	Portfolio company Sales/Book value of Total Assets in the last year before exit date
EBIT margin (w)	Portfolio company EBIT/Revenue in the last year before exit date
Debt/Assets ratio (w)	Portfolio company Total Debt/Book value of Total Assets in the last year before exit date
Stock Returns* (w)	Last 12-months stock return on local stock market index in % in the last year before exit date
Yield Spread*	Average 1-3 month yield spread before exit between 10-year and 2-year government bonds
ln Dry Powder ($m)	Yearly dry powder in the Nordics
IA	Dummy variable for information asymmetry. Turns 1 if exit date is between August 28 2008 - April 09 2009 for the financial crisis and March 10 2020 - November 09 2020 for Covid-19 , 0 otherwise
Control	
GDP Growth* (w)	Last four quarters % change in GDP, seasonally adjusted and measured at constant prices
Number of Funds Raised	Number of PE funds raised per year
ln Holding Period	Exit date - Investment date

**Contry Specific: Data obtained from all countries, i.e., Norway, Sweden, Denmark and Finland. Each portfolio company have been paired with its own countries' macro data.*

This table describes all variables used in the empirical analysis. *ln* indicates which variables have been logged (natural logarithm) and (w) indicates which variables have been winsorized.

[21] See Jenkinson & Sousa (2015), Cumming & MacIntosh (2003), Giot & Schwienbacher (2007).
[22] See Giot & Schwienbacher (2007) or Jenkinson & Sousa (2015).

5.3 Data Limitations

The restrictive nature of PE data made it difficult to link all investments to a specific fund, as several of the PE firms did not disclose the fund affiliation of each investment. Consequently, approximately 150 investments were excluded from the original dataset provided by Argentum due to missing fund data. Some of the investments were also made by PE firms that either do not structure their investments in funds or do not have a fund structure like the typical PE fund, e.g., Ratos AB and The Sixth AP Fund. If included, these observations could potentially bias the conclusions made in this thesis. Moreover, some of the portfolio companies in Argentum's dataset were registered with two exits by the same PE fund. After careful examination, we found that the only actual change involved a change of ownership structure. An example is Technor, a portfolio company in HitecVision Fund IV. HitecVision invested in 2006 and 2009 according to the data, with an exit in 2014. However, the only change in 2009 was that Technor was acquired by Simtronics ASA, a company where HitecVision was a principal shareholder. As such, HitecVision Fund IV in reality invested in 2006 but only changed the ownership structure in 2009.

Collecting financial data was also challenging, e.g., for small Finnish portfolio companies with exits prior to 2011. Almost 300 companies were excluded from the final sample due to missing financial data. Revenue growth during the holding period of each investment and capital expenditure are excluded in the analysis as the MNL is sensitive to small sample sizes (Schwab, 2002). The number of buyouts drops drastically when these variables are included, which is possibly inadequate to detect any causal relationships. Moreover, we initially preferred data on corporate bond yield spreads or other credit spreads to proxy for credit market conditions. However, the Nordic bond market is still fairly young, small, and not as mature as the U.S. bond market with a low prevalence of credit ratings. Issues with data availability spanning back to 2008 made us accept yield spreads on government bonds as a proxy.

Various databases were used to construct the final sample. Since none of the databases shared any identification numbers etc. allowing us to merge the data more easily, a large part of the data was hand-collected and manually entered into an Excel spreadsheet during the data collection process. Thus, the risk of errors in our data set does exist. However, we manually cross-checked many of the companies afterward. The number of observations should also ensure that any effects of data errors are insignificant to our results. As such, we are confident that the risk is negligible.

6 Methodology

To assess how the proposed variables affect the choice of exit route, we apply a model used to analyze the discrete choice between a trade sale, IPO or SBO. Since our dependent variable represents a categorical and unordered choice of exit route,[23] it would be inappropriate to use linear regression considering that the predicted values are not measured on a ratio scale, the error terms are non-normally distributed and the dependent variable has more than two outcomes (Czepiel, n.d.).

The two most commonly used unordered probabilistic choice models are the multinomial logit (MNL) and the multinomial probit model (MNP), with the MNL being the most frequent one (Long & Freese, 2006). The models utilize different distributions. Whereas the MNP uses a multivariate normal distribution with no assumption of independent errors, the MNL uses a type-1 extreme value distribution with the assumption of independent and identically distributed errors. The MNL also makes the independence of irrelevant alternatives assumption (IIA). In practice, the two models are quite similar in nature, both being non-linear functions with probabilities bounded between 0 and 1 and a linking function yielding the well-known S-shape (Greene, 2020). This is beneficial since we want to allow the marginal probabilities to depend on different values of the regressor *X*. Empirical results should typically not hinge on the choice between a probit or logit model. Given that the MNP is the most computationally intensive model and that the MNL nearly always provides more accurate results, even when there is a violation of the IIA assumption (Kropko, 2008), we choose to apply the MNL.

6.1 General Utility Model of Private Equity

Before embarking on the multinomial logistic regression model itself, we find it helpful to theorize the overall decision-making process of a PE firm that is considering to exit a portfolio company, inspired by a random utility model presented by Greene (2020). Assuming that the manager of a PE fund *i (i=1,2,…,I)* chooses between a finite set of exit routes *J (j = 0,1,…, J)*, the utility of a particular alternative *j* can be written as

$$U_{i,j} = \beta_j Z_i + \varepsilon_{i,j} \tag{6.1}$$

[23] The categories cannot be ranked according to a scale.

where *j* represents the three different exit types, $U_{i,j}$ represents the utility of PE fund *i* of alternative *j* and Z_i is a vector representing the independent variables and control variables. β_j is the unknown coefficient we want to estimate and ε_{ij} is the error term. In the MNL model, the error term is assumed to be independent and identically distributed with Gumbel distribution (type-1 extreme value).

We assume that if a PE fund chooses *j*, it must be the utility-maximizing alternative among *J* utilities. Hence, a PE fund will maximize its utility by choosing the exit route that maximizes value given the relevant independent variables.

6.2 The Multinomial Logistic Regression Model

The multinomial logistic regression model (MNL) can be used to model the probability of an outcome as a function of the independent variables when the dependent variable is categorical and the independent variables are continuous or categorical. It is an extension of the binary logistic regression model, enabling us to analyze more than two categorical outcomes. Beneficial properties of the MNL include no assumption of normality, linearity or homoscedasticity.

The model utilizes one of the categorical outcomes on the dependent variable as a baseline level and then models the probability of belonging to the other categories relative to the baseline, conditional on the selected variables. Without any order or rank, the MNL assigns numbers to each exit route, with SBOs being the baseline category:

$$y_{it} = \begin{cases} 0 \ = \ if \ exit \ type \ is \ SBO \\ 1 \ = \ if \ exit \ type \ is \ IPO \\ 2 = if \ exit \ type \ is \ Trade \ Sale \end{cases} \tag{6.2}$$

The output yields coefficients relative to the selected baseline category and can be interpreted as the change in the log odds of the outcome relative to the baseline category. Formally, the log-odds ratio in the MNL can be denoted in line with Long & Freese (2006):

$$ln \ \Omega_{j|b}(x) = ln \frac{Pr(y = j|x)}{Pr(y = b|x)} = x\beta_{j|b} \ for \ j \ = \ 1 \ to \ J \tag{6.3}$$

where b is the baseline category and J represents the number of discrete categories of the dependent variable. Considering the J^{th} category to be the baseline, logits of the first $J - 1$ categories are constructed for each independent variable x with the baseline category in the denominator (Czepiel, n.d.; Greene, 2020). Since $ln\ \Omega_{b|b}(x) = ln\ 1 = 0$, it must hold that $\beta_{b|b} = 0$. I.e., the log odds of an outcome compared to itself is always 0, and thus the effects of any independent variables must also be 0. To compute the predicted probabilities, we solve these $J - 1$ equations, and the MNL model specifies the following choice probability of a PE fund i for exit routes of type j $(j = 0, 1, \ldots, J)$:

$$Prob(Y_i = j|Z_i) = \frac{e^{\beta_j Z_i}}{1+\sum_{k=1}^{J} e^{\beta_k Z_i}} \text{ for } j = 0,1, \ldots, J,\ \beta_0 = 0 \tag{6.4}$$

where Z_i is a vector representing the independent and control variables and β_j is the vector of the estimated coefficients. It is clear from *equation 6.4* that the probability of each observation belonging to an exit route is bounded between 0 and 1. In *equation 6.4*, only $J - 1$ equations need to be computed as we have included the baseline category among the J alternatives (as opposed to *equation 6.3*). The exact choice probability for the base $(y_i = 0)$ can be denoted:

$$P(y_i = 0) = \frac{1}{1 + \sum_{k=1}^{J} e^{\beta_k Z_i}} \tag{6.5}$$

Notice in *equation 6.3* that the odds ratio only depends on the coefficients for choice j. A change in any of the other choices' coefficients does not affect the ratio. In practice, this is referred to as the independence of irrelevant alternatives (IIA) assumption. MNL hinges on the IIA assumption, which states that the relation of the probabilities for choosing any two alternatives is independent of the presence of any other alternative (i.e, the dependent variable).

6.3 Maximum Likelihood Estimation

As opposed to ordinary linear regression (OLS) estimation of coefficients, logit models are non-linear regressions where the coefficients appear inside the distribution function. The parameters of the MNL are estimated using the maximum likelihood estimation (MLE). MLE chooses the unknown coefficients to maximize the likelihood function, which in turn is the joint probability distribution. In other words, the MLE selects the values of the parameters to maximize the probability of drawing the data that are actually observed. Computationally, these

coefficients are determined arbitrarily and then a reiterative process is implemented to obtain the MLE parameter values that best describe the full distribution of the observed data (Stock & Watson, 2020).

6.4 Interpretation of the model

Interpretation of the MNL is not straightforward. In our case, the probability of exiting through an IPO or a trade sale will be compared to SBOs, which is defined as the baseline category. Thus, the output of the MNLs coefficients can only be interpreted relative to the selected baseline category, which is evident from *equation 6.3*. The regression output reports logit coefficients relative to the baseline category. That is, the parameters represent the change in the logit coefficient of the outcome relative to the baseline category. Due to limited practical applicability, we choose to calculate relative risk ratios (odds) to allow an easier interpretation of the effect of a change in the independent variables on the dependent variables. The implementation is rather straightforward, as seen in *equation 6.3*, where the only modification needed to transform the coefficients to odds is by taking the exponentiated value of the logit coefficients.

Through the analysis, odds ratio and probabilities will be used interchangeably. We would like to emphasize that every time we mention an increase in probability, it is the relative change in the probabilities between different exit routes, which is represented by either a reduction or an increase in the odds ratio.

7 Empirical Analysis

The following sections provide descriptive statistics of the data and an empirical analysis of how PE fund characteristics, portfolio company characteristics and capital market conditions affect the choice of exit route. We provide a discussion of the regression results in relation to our stated hypotheses and evaluate the regression design and validity of the study.

7.1 Descriptive Statistics

Table 7.1 reports summary statistics of trade sales, IPOs and SBOs taking place in the Nordics between 2008–2021 with investments dated between 2000–2021. All other exit types are excluded. The table includes financial and fund data retrieved from various databases described in section 5, as well as macroeconomic data such as stock market returns, GDP growth and yield spreads between 10-year and 2-year government bonds for the Nordic countries.

Table 7.1 - *Summary Statistics for the Full Sample*

Variables	N	Mean	Median	St. Dev.	Min	Max
Panel A: PE Firm and Fund						
PE Firm Age (years)	721	21.38	20.00	10.17	2.00	52.00
Fund Maturity at Investment (years)	682	2.47	2.01	2.28	0.00	22.69
Fund Maturity at Exit (years)	683	8.03	7.88	3.20	0.97	24.92
Fund Size ($m)	669	1228.46	367.60	2091.89	7.30	14794.30
Holding Period (years)	764	5.66	5.29	2.67	0.40	17.79
Panel B: Portfolio Company						
Company Age (years)	919	38.81	27.00	37.47	1.00	436.00
Turnover ($m)	649	364.71	57.90	2382.55	0.09	54289.00
Turnover-Assets Ratio	647	1.29	1.09	1.11	0.00	10.47
EBIT ($m)	664	25.09	3.76	132.77	-610.25	2347.00
EBIT Margin (%)	648	0.37%	6.49%	66.04%	-1125.32%	71.32%
Total Debt ($m)	661	362.60	36.89	1525.30	0.02	14332.00
Debt-to-Assets Ratio	658	0.66	0.67	0.27	0.01	2.74
Total Assets ($m)	666	535.33	60.05	2291.07	0.04	24678.00
Panel C: Market Conditions						
Stock Index Returns (%)	919	11.05%	12.66%	17.21%	-62.85%	50.93%
Yield Spread	919	0.96	0.93	0.50	-0.96	2.59
Dry Powder ($m)	919	60035.70	49960.00	25600.58	29800.00	105780.00
Fundraising ($m)	919	10725.85	8280.00	8111.32	870.00	26800.00
Number of Funds Raised	919	16.50	18.00	5.96	4.00	30.00
GDP Growth (%)	919	1.40%	1.77%	2.13%	-8.07%	6.23%

This table contains summary statistics for the final sample of 919 exits from 2008-2021. The table illustrates the number of observations, mean, median and standard deviation for numeric variables in our dataset. The data is divided into three panels. Panel A reports PE firm and fund specific variables, including PE Firm Age, Fund Maturity at Investment, Fund Maturity at Exit, Fund Size and Holding Period. Panel B reports data from portfolio companies, including Company Age, Turnover, Turnover-Assets Ratio, EBIT, EBIT Margin, Total Debt, Debt-to-Assets Ratio and Total Assets. Lastly, Panel C reports macroeconomic variables, including Stock Market Returns, Yield Spread, Dry Powder, Fundraising, Number of Funds Raised and GDP Growth. Note that the market conditions are based on the numbers assigned to each buyout, e.g., the mean of "Stock Index Returns" is actually the mean of the assigned stock returns of all 919 buyouts included in the sample.

From *Table 7.1*, it is evident that the average PE investment is made approximately 2.5 years into the life of the fund with a holding period of 5.66 years. The median PE fund size is $367.6 million, where the standard deviation reveals large differences among funds, potentially highlighting the dominance of megafunds. In addition, a PE firm has on average 21 years of experience when exiting. Portfolio companies have revenues of $365 million on average the last fiscal year prior to exit, with a median of $58 million. The average EBIT margin amounts to 0.37 %, although with a median value of 6.5 %. Furthermore, an average debt/assets ratio of 0.66 indicate that portfolio companies have financed their assets with a larger portion of debt relative to equity before exit. Min and Max values highlight how some observations need to be examined thoroughly, e.g., when looking at the EBIT margin and Debt-to-Assets ratio.

Table 7.2 - *Summary Statistics for Sub-samples*

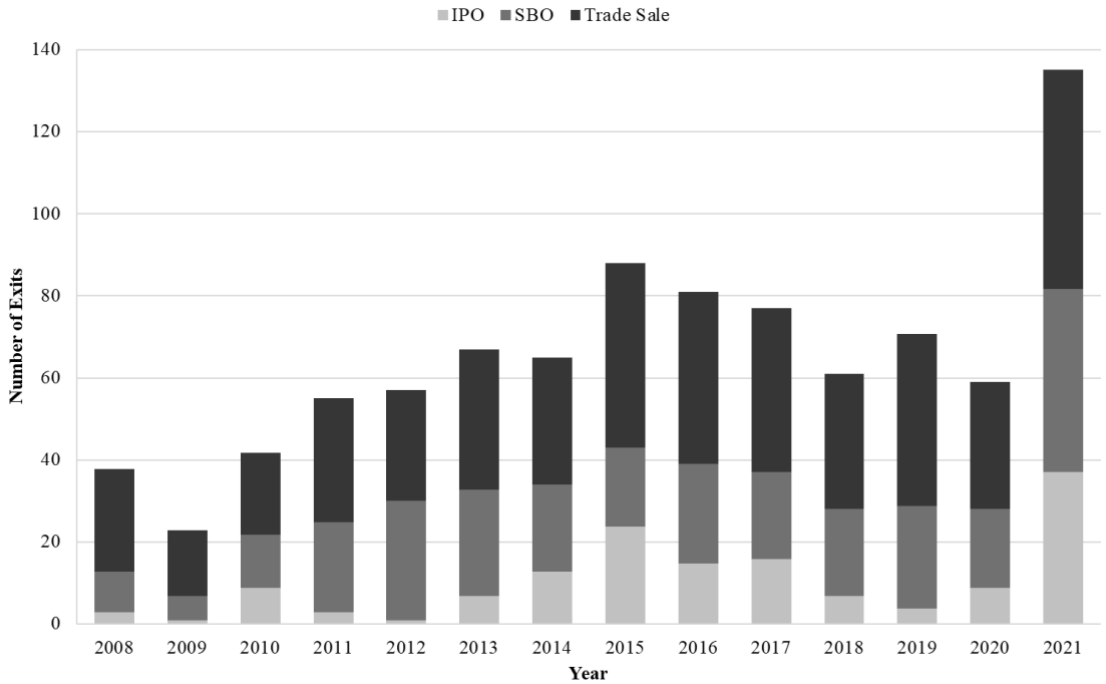
Variables	Trade Sales		SBO		IPO	
	Mean	Median	Mean	Median	Mean	Median
Panel A: PE Firm and Fund						
PE Firm Age (years)	20.76	20.00	21.37	19.00	23.76	22.00
Fund Maturity at Investment (years)	2.47	2.12	2.57	2.00	2.21	1.84
Fund Maturity at Exit (years)	7.97	7.83	8.26	7.88	7.71	8.07
Fund Size ($m)	926.60	340.90	1178.73	327.00	2413.49	976.05
Holding Period (years)	5.63	5.27	5.68	5.41	5.72	5.31
Panel B: Portfolio Company						
Company Age (years)	40.44	29.00	36.27	26.00	38.83	24.00
Turnover ($m)	102.41	36.03	158.57	61.98	1373.49	243.74
Turnover-Assets Ratio	1.42	1.25	1.22	1.07	1.06	0.89
EBIT ($m)	5.66	1.54	14.41	4.72	94.98	16.72
EBIT Margin (%)	-1.43%	4.67%	7.02%	9.17%	-5.80%	7.28%
Total Debt ($m)	68.03	20.68	188.55	42.30	1425.17	165.17
Debt-to-Assets Ratio	0.66	0.66	0.65	0.65	0.69	0.69
Total Assets ($m)	170.09	32.21	246.02	69.02	2002.56	283.97
Panel C: Market Conditions						
Stock Index Returns (%)	9.27%	11.63%	11.44%	13.11%	15.84%	17.12%
Yield Spread	0.98	0.97	0.93	0.89	0.92	0.84
Dry Powder ($m)	58487.04	49960.00	59727.31	49960.00	65533.36	49960.00
Fundraising ($m)	10152.32	8280.00	10647.77	8280.00	12688.86	8280.00
Number of Funds Raised	16.50	17.00	16.60	17.00	16.28	18.00
GDP Growth (%)	1.34%	1.77%	1.42%	1.75%	1.51%	1.86%
Number of observations	469		301		149	

This table contains summary statistics for subsamples of the different exit routes in the dataset. *Panel A* reports summary statistics for PE firms and funds for each exit route, including PE Firm Age, Fund Maturity at Investment, Fund Maturity at Exit, Fund Size and Holding Period. *Panel B* reports portfolio company-specific variables from the year before exit, including Firm Age, Turnover, Turnover-Assets Ratio, EBIT, EBIT Margin, Total Debt, Debt-to-Assets Ratio and Total Assets. Lastly, *Panel C* reports macroeconomic variables, including Stock Market Returns, Yield Spread, Dry Powder, Fundraising, Number of Funds Raised and GDP Growth.

Table 7.2 presents summary statistics for the different subsamples of exit routes. The variables are divided into different panels, as in *Table 7.1,* and highlight trends in the Nordic PE market. On average, PE funds exiting their investments through IPOs tend to be larger ($2,413 million), more experienced (23.8 years) and exit at an earlier point of the fund's life (7.7 years) relative to SBOs and trade sales. Investments are also made earlier in the life cycle of funds for IPO exits (2.2 years). Moreover, it is interesting to note that SBOs tend to happen when funds are closer to maturity (8.33 years). The average portfolio company exiting through an IPO is larger ($2,002 million), has higher revenues ($1,373 million) and a smaller EBIT margin (-5.8 %) than SBOs. However, the median EBIT margin (7.3 %) substantially differs from the average, suggesting there are some highly influential observations. Trade sales tend to happen for older portfolio companies (40.44 years) with an EBIT margin of -1.43 % and lower revenues ($102.41 million), as well as a higher turnover/assets ratio at 1.42 and a debt-to-assets ratio of 0.66. Regarding SBOs, this exit channel is realized for portfolio companies that on average have better operating performance (7.02 %) and a marginally lower debt-to-assets ratio (0.65).

Concerning the market conditions reported in *Table 7.2*, we can see that IPO exits tend to happen when stock markets have been rising 15.84 % over the last 12 months prior to exit. The median value of the yield spread variable is smaller (0.92) when IPOs are used as an exit, although the differences are quite small between exit routes.

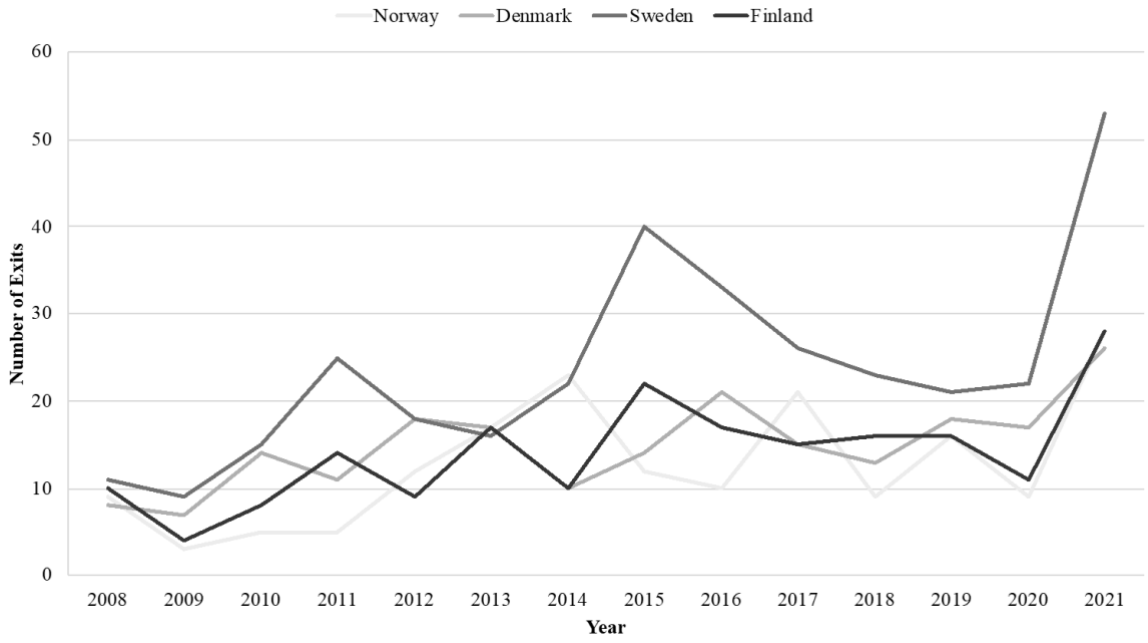
Figure 7.1 - *Number of Exits from 2008–2021*



This figure shows the distribution of the different exit routes from the total sample, containing 919 observations. The diagram reports the number of exits by year in the Nordic PE market, categorized as IPOs, SBOs and trade sales.

Figure 7.1 illustrates the distribution of exit routes by exit year for the full sample with 919 observations. From the figure, we can see that there are some recurring boom and bust cycles. For example, the Nordic exit market experienced a boom in the aftermath of the Covid-19 pandemic in 2021 but only 22 exits were recorded during and after the financial crisis in 2009. IPOs appear to undergo a larger degree of cyclicality than the two other exit channels. Trade sales are definitely the most popular exit route, accounting for approximately 40–50 % of yearly exits. There also seems to be an increase in the number of exits per year, indicating a growing Nordic PE market.

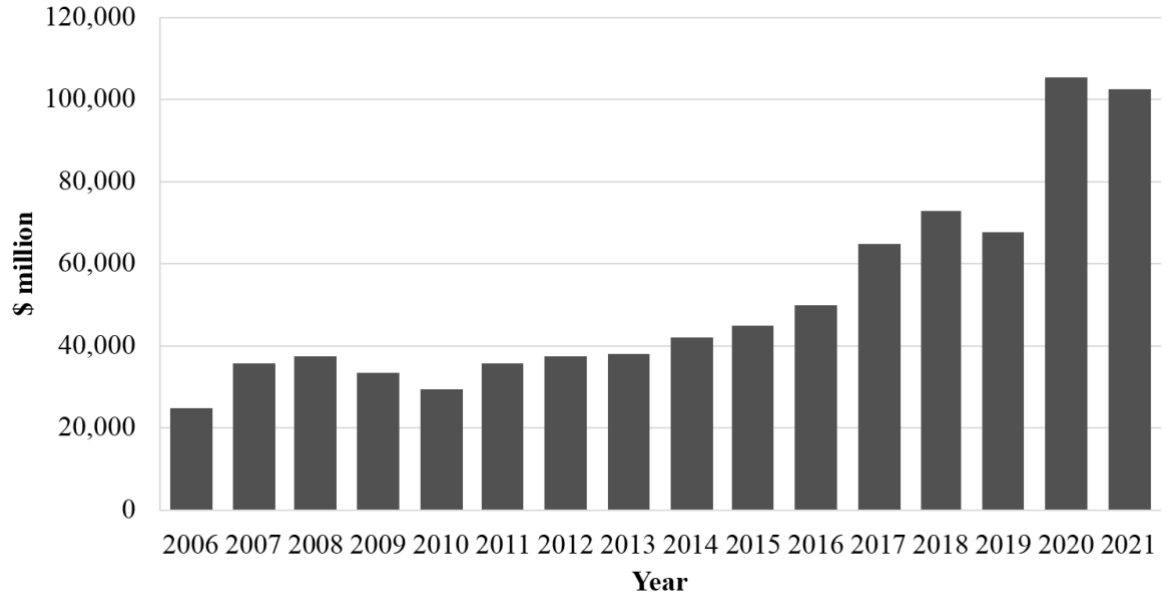
Figure 7.2 – *Number of Exits from 2008–2021 by Country*



The figure shows the distribution of PE exits by year in the Nordic countries Denmark, Finland, Norway and Sweden.

Figure 7.2 illustrates the number of exits by country. The figure shows that Sweden has the largest and most mature PE market among the Nordic countries, which is evident throughout the period. The three other countries appear to be rather similar in terms of exit volume, with Norway showing some slightly different tendencies, i.e., between 2014–2017, which could be related to the Norwegian economy's oil dependency. The crude petroleum index dropped over 50 % in the second half of 2014 (Mead & Stiger, 2015), which seemingly introduced a reduction in Norwegian PE exits in 2015 and 2016 compared to the other Nordic countries. Additionally, global demand from the Norwegian petroleum sector was estimated to be approximately 18 % of their mainland GDP in 2015 (Nordbø & Stensland, 2015), which illustrates the close correlation between the oil price and the Norwegian economy.

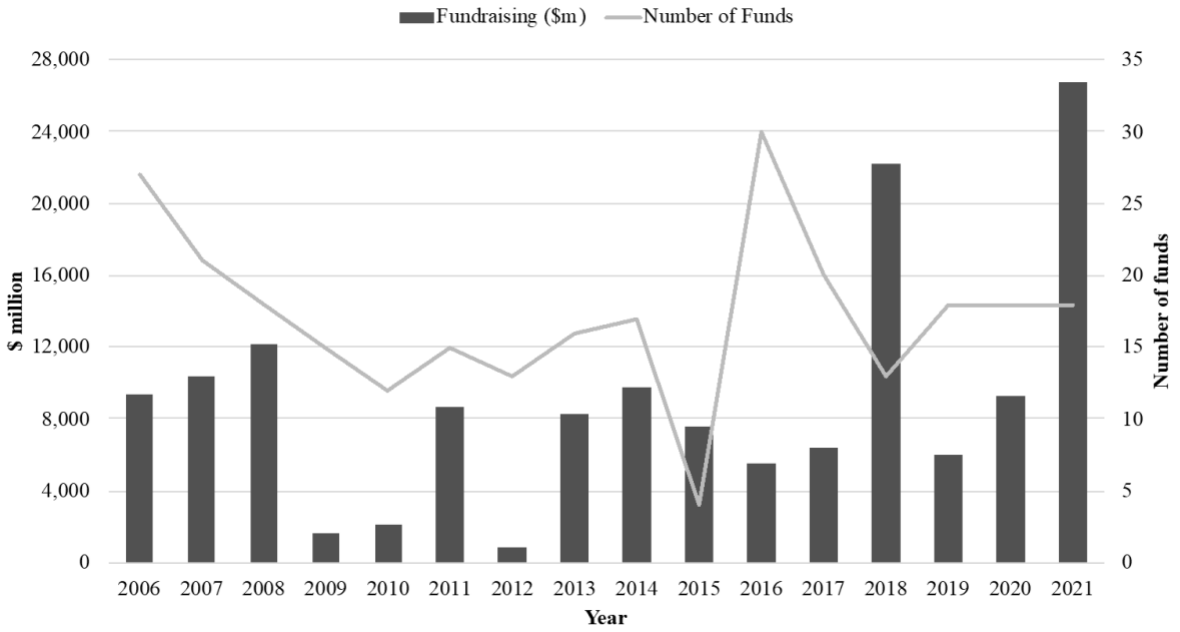
Figure 7.3 – *Historical Dry Powder from 2006–2021*



This figure illustrates the amount of dry powder in the Nordic PE market from 2006–2021, reported in $ million.

Figure 7.3 depicts the amount of dry powder in the Nordic PE market in the period 2006–2021. The figure underlines the steady growth of the Nordic PE market exhibited through exit volume in *Figure 7.1* and shows that the amount of dry powder has flourished over the past five years, with a large spike in 2020 and 2021.

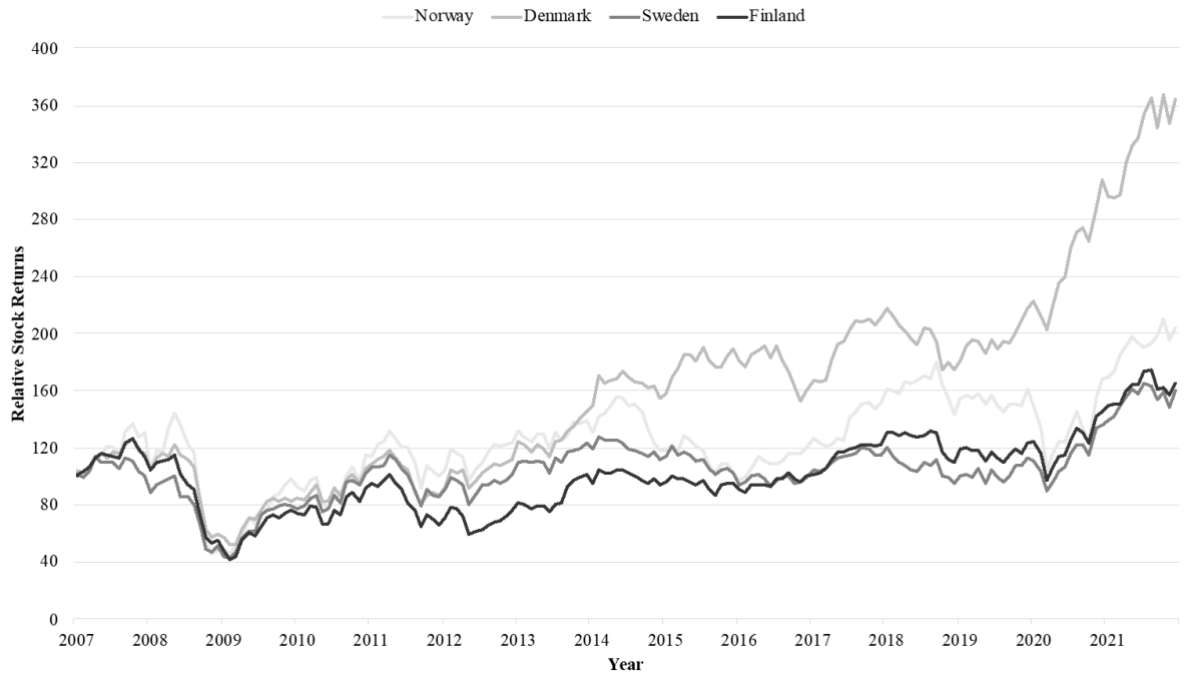
Figure 7.4 – *Fundraising and Number of Funds Raised from 2006–2021*



This figure illustrates the fundraising in $ million and the number of funds raised by year in the period 2006–2021.

Figure 7.4 shows the number of funds raised and fundraising (in $m) in the Nordic PE market. The amount of fundraising boomed in 2018 and 2021 following the growth in the Nordic PE market. Additionally, we can see the decline in fundraising in 2009 following the financial crisis. The number of funds raised and fundraising in dollars do not seem to correlate to a large degree. A large number of funds (30) raised a relatively low level of capital ($5.54 billion) in 2016, in contrast to the year 2018 when a lower number of funds (13) raised a substantially larger amount of capital ($22.18 billion). This matches the global trend where megafunds account for nearly 30 % of all fundraising (McKinsey & Company, 2019).

Figure 7.5 – *Stock Returns 2007–2021*

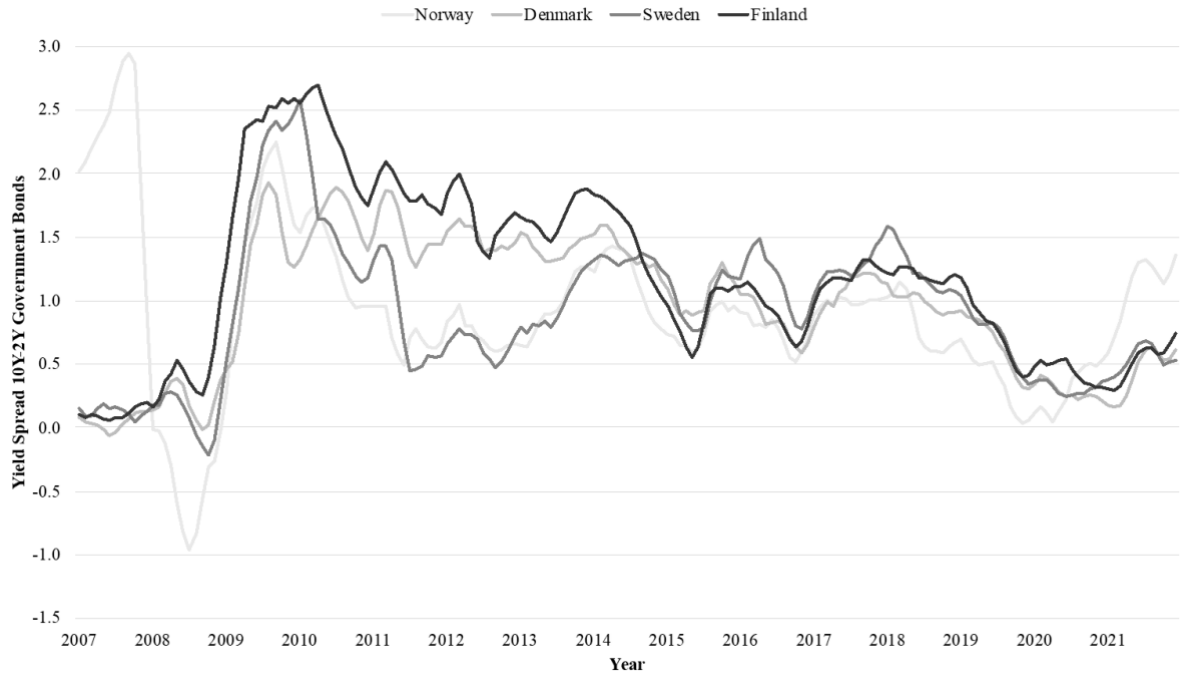


This figure shows the relative stock returns for the Nordic countries in our sample period from 2007–2021. The relative stock returns are calculated using 100 as a base and monthly stock returns to provide comparable index data from the different countries.

Figure 7.5 exhibits the stock market development for the indices of the Nordic countries in the period 2007–2021. The chart shows a major decline in mid-2008 during the financial crisis, marking the start of one of the periods we have defined with high levels of IA in the market. The other period included in that variable is the Covid-19 outbreak in March 2020. This can be observed by the sharp decline at the beginning of 2020. Besides this, the stock market has generated abnormal returns since mid-2020 in the aftermath of the Covid-19 pandemic, creating a hot equity market with high valuations. This is particularly evident when looking at the growth of the Danish stock market since 2020. When comparing the stock returns to the increased number of exits in 2021 from *Figure 7.1,* particularly for IPOs, our data indicate that

the equity market might trigger public sales of portfolio companies among PE investors. Additionally, our data might indicate that investors generally delay their exit decisions when levels of IA are high as the number of exits seems to decrease in 2009 and 2020 compared to the year before.

Figure 7.6 – *Yield Spread 2007–2021*



This figure illustrates the monthly difference between 10-year and 2-year government bonds for the Nordic countries in the period 2007–2021. Yield spreads are based on monthly numbers.

Figure 7.6 illustrates the monthly yield spread between 10-year and 2-year government bonds in the period 2007–2021. The figure shows how yield spreads vary during periods with high volatility and that macroeconomic shocks often generate worse conditions in the credit markets. From *Figure 7.1,* we could see an increase in SBO activity in 2011–2013 following the attractive debt market conditions after the financial crisis. In general, the Nordic countries have seen a steady decrease in yield spreads after this period until the Covid-19 pandemic caused the yield spread to increase again, especially in Norway. Most of the decrease probably stems from changes in the 10-year note as 2-year notes have been close to zero in recent years.

7.2 Multinomial Logistic Regression Results

The exit route probability is based on a multinomial logistic regression model with exit routes as the dependent variable, which takes the value 0 if the exit route is an SBO, 1 if IPO and 2 if

trade sale. SBO is used as the baseline category in all models, meaning that the probability of an IPO and a trade sale is calculated relative to an SBO, expressed as the odds ratio.

Table 7.3 reports the main empirical results of the thesis. We run five models in total, in which one model is run for each set of characteristics (fund, portfolio company and capital market conditions) before running two final regressions including all the variables. The reasoning behind running two final models is that we obtain a high level of multicollinearity between the holding period variable and fund maturity exit. Interpretation of the fund maturity exit variable would be meaningless as estimates may be biased between the two variables affected by multicollinearity. Thus, we run an additional model leaving out holding period. Furthermore, all five regressions control for industry and country-specific fixed effects using dummy variables, in addition to control variables, to reduce endogeneity issues. Other validity-related matters will be discussed in full under section 7.3. All interpretations of results are made from the fourth and fifth specifications of the model to avoid omitted variables bias. The goodness of fits of the models also suggest that these two specifications are the most informative.

Limitations concerning data availability restrict the number of observations for Models 4 and 5 due to missing fund sizes and financial accounting data. Thus, the model containing only macroeconomic variables has a substantially higher number of observations. Consequently, the number of observations drops in all other regressions.

Models 1-3 separates each set of explanatory variables into different models. Although we only interpret the results from Models 4 and 5 for analytical purposes, some interesting takes are to be mentioned. First, we register that Models 1 and 3 have the least explanatory power of the three, with Model 3 being the least explicable although having the most observations. Model 2, using portfolio company variables, provides the best test results of the three. This could indicate that portfolio company characteristics are the most important factors in explaining the choice of exit channel for PE funds, supporting the views of Jenkinson and Sousa (2015). Model 2 delivers better significance on the likelihood-ratio test than Models 4 and 5. However, the log-likelihood test and pseudo R^2 do not seem to provide satisfying results, invalidating the model. Additionally, the separated models probably suffer from omitted variable bias.

When controlling for all explanatory variables in Models 4 and 5, the test results show improved explanatory power of the models as a result of including all variables in Models 4 and 5.

Table 7.3 - *Results from the Multinomial Logistic Regression Model (MNL)*

	Model 1		Model 2		Model 3		Model 4		Model 5	
	IPO	TS	IPO	TS	IPO	TS	IPO	TS	IPO	TS
PE Firm and Fund Variables										
ln Fund Size	**1.659*****	**0.860****					0.959	0.911	0.948	0.919
	(0.109)	(0.074)					(0.153)	(0.107)	(0.154)	(0.107)
ln Fund Maturity Inv	1.099	**0.913***					0.984	1.005	1.056	1.041
	(0.098)	(0.054)					(0.091)	(0.064)	(0.097)	(0.066)
ln Fund Maturity Exit	0.463	2.007							**0.498***	0.781
	(0.703)	(0.431)							(0.415)	(0.303)
ln PE Firm Age	0.742	1.462					0.776	**1.678***	0.847	1.574
	(0.373)	(0.246)					(0.464)	(0.311)	(0.472)	(0.317)
First Fund (dummy)	0.437	1.300					0.380	1.198	0.407	1.169
	(0.552)	(0.283)					(0.635)	(0.353)	(0.644)	(0.354)
ln Holding Period	1.292	**0.410*****					0.624	**0.645***		
	(0.531)	(0.325)					(0.320)	(0.229)		
Portfolio Company Variables										
ln Company Age			**0.694****	**1.507*****			0.962	**1.614*****	0.961	**1.557*****
			(0.158)	(0.131)			(0.191)	(0.145)	(0.190)	(0.143)
ln Revenue			**2.142*****	**0.717*****			**2.323*****	**0.724*****	**2.353*****	**0.719*****
			(0.107)	(0.076)			(0.145)	(0.091)	(0.146)	(0.091)
Turnover-Assets Ratio			**0.577*****	**1.414*****			**0.709***	**1.472*****	**0.719***	**1.478*****
			(0.171)	(0.109)			(0.193)	(0.131)	(0.193)	(0.130)
EBIT Margin			**0.170****	**0.409***			**0.168****	0.449	**0.162****	0.472
			(0.766)	(0.526)			(0.864)	(0.557)	(0.865)	(0.553)
Debt-to-Assets Ratio			0.903	0.952			1.964	1.094	1.953	1.067
			(0.603)	(0.430)			(0.696)	(0.479)	(0.694)	(0.479)
Macroeconomic Variables										
Stock Returns					**3.802***	0.410	**22.342****	1.086	**20.204****	0.985
					(0.812)	(0.556)	(1.318)	(0.902)	(1.311)	(0.898)
Yield Spread					1.167	**1.415***	1.339	0.979	1.330	0.964
					(0.267)	(0.186)	(0.413)	(0.275)	(0.411)	(0.274)
ln Dry Powder					**1.822***	1.353	**2.618***	1.146	**2.610***	1.119
					(0.348)	(0.252)	(0.537)	(0.369)	(0.535)	(0.368)
IA (dummy)					1.391	1.522	2.676	0.881	2.621	0.834
					(0.563)	(0.403)	(0.802)	(0.564)	(0.803)	(0.563)
ln Number of Funds Raised					**0.648****	0.805	0.666	0.706	0.670	0.700
					(0.221)	(0.171)	(0.342)	(0.253)	(0.342)	(0.251)
GDP Growth					166.533	2.168	5.003	0.045	8.006	0.029
					(5.505)	(4.038)	(8.447)	(6.747)	(8.457)	(6.733)
Fixed Effects										
Country Fixed Effects	Included		Included		Included		Included		Included	
Industry Fixed Effects	Included		Included		Included		Included		Included	
Constant	0.136	2.327	0.106**	1.203	0.002	0.115	0.00001**	0.531	0.00001**	0.744
	(1.303)	(0.844)	(0.973)	(0.682)	(3.777)	(2.751	(6.041)	(4.041)	(6.029)	(4.033)
Observations	698		635		919		525		525	
Log-Likelihood	-639.420		-534.500		-897.560		-427.650		-428.430	
Pseudo R^2	0.073		0.182		0.027		0.204		0.202	
p > chi2	0.000		0.000		0.007		0.000		0.000	
LR Test (chi2)	100.192*** (df = 30)		238.477*** (df = 28)		49.957** (df = 30)		218.897*** (df = 50)		217.355*** (df = 50)	

This table presents the results of the MNL regressions on Nordic PE exits between 2008–2021. The dependent variable is exit route, using SBO as the baseline category. The columns IPO and TS represent the other exit routes. Model 1 uses the PE firm and fund specific variables *Fund Size, Fund Maturity Inv, Fund Maturity Exit, PE Firm Age, First Fund (dummy)* and *Holding Period*. Model 2 uses variables related to the portfolio company, including *Revenue, Company Age, Turnover-Assets Ratio, EBIT Margin* and *Debt-to-Assets Ratio*. *Company Age* is measured at exit, while other variables are measured the year before exit. Model 3 includes macroeconomic variables representing market conditions, including *Stock Returns, Yield Spread, Dry Powder, IA (dummy), Number of Funds Raised and GDP Growth*. Model 4 excludes *Fund Maturity (Exit)* and Model 5 excludes *Holding Period*, both using 525 observations in the regressions. All models include country and industry fixed effects. Statistical significance is denoted by *, ** and ***, indicating significance levels at 10%, 5% and 1% respectively. The table additionally includes results of log-likelihood, pseudo R^2, p > chi2 and likelihood-ratio (LR) tests.

7.2.1 Probability of exiting through an SBO

Results show evidence that a higher EBIT margin reduces the odds of exiting through an IPO compared to an SBO at the 5 % significance level, advocating in favor of *hypothesis 6* which states that strong operating performance is a plausible determinant of an SBO exit. The odds of exiting through an IPO relative to an SBO decreases by approximately 0.84 % when the EBIT margin increases by one percentage point.

The indication of a higher EBIT margin for SBOs relative to IPOs is interesting. Previous research[24] emphasizes that the operating performance of companies going public tends to peak before an IPO. Nonetheless, our findings align with the results of Jenkinson and Sousa (2015) but contrast the findings of Holm and Plagborg-Møller (2017), thus suggesting that the notions made by Holm and Plagborg-Møller might be of minor importance. A higher EBIT margin implies an improvement in a company's ability to manage higher levels of debt. An economic inference to be made from this may be that a company's ability to tolerate large amount of debt is a relatively more attractive feature for the purchasing PE fund. Thus, a relative comparative advantage of raising and managing cheap debt may still be an important element in PE value creation, as proposed by academia (Bienz, 2017).

Relative to trade sales, there are no systematic differences[25] in the probability of an SBO resulting from higher EBIT margins. One potential explanation may be that most of the growth potential making portfolio companies attractive to PE funds has been realized already but the businesses are still decent trade deals. More mature companies, beyond the typical phases in a company's life cycle where PE funds specialize in creating value, may make a great add-on to trade buyers. This could be due to a solid reputation and a strong market position further enhancing the trade buyer's performance.

Furthermore, there seems to be a tendency of SBOs to be exited later in the fund's life relative to IPOs, although only significant at the 10 %-level. This provides minor evidence in support of *hypothesis 5.2* which states that PE funds closer to maturity tend to exit through SBOs, suggesting that SBOs may be an attractive exit route to avoid an extension of the fund's life when portfolio companies may not be ready for an IPO. If fund maturity at exit increases by one year, the odds of exiting through an IPO is approximately 50 % lower compared to an SBO

[24] See e.g., Jain & Kini (1994) and Pagano et al. (2002).
[25] Although showing a decrease in the odds of trade sales when EBIT margin increase, results are non-significant.

according to Model 5. Jenkinson and Sousa (2015) also find a tendency in their final model but obtain no significant results. Other papers swiftly touch on the matter on a superficial level but focus on other elements in their empirical analysis. As such, our findings make an interesting contribution to existing PE literature as it is the first paper revealing such a relationship within the buyout segment. The weakness of our findings is that the results are inconclusive at a 10 %-level.

There are several interesting reflections to be made from *hypothesis 5.2* in addition to the previous ones. Considering the increasing popularity of SBOs since the early 2000s and the surging amount of dry powder in the market, SBOs may be a response to an increasing need for better liquidity in the PE market. By buying and selling portfolio companies to each other, PE funds provide liquidity through SBOs. The divestment process of an SBO is relatively fast, the transaction risk is low and the delay in receiving any proceeds is shorter (Anker & Stärk-Johansen, 2015). When funds approach maturity, SBOs might be an attractive exit channel, providing better liquidity, to avoid an extension of the fund's life. Our findings therefore partly support *hypothesis 5.2*, adding to the findings of Jenkinson and Sousa (2015) and Degeorge et al. (2016). We would still like to advocate moderation when interpreting these results as they are only significant at the 10 %-level, which is below the desired 5 %-level we practice in this thesis. Further, there is no significant evidence regarding the choice between SBO and trade sale.

The results show no significance in support of nor against the other hypothesis related to PE fund maturity, namely *hypothesis 5.1*. Systematically investing and exiting portfolio companies through SBOs at a later stage in the fund's life cycle could strengthen the critics of PE who argue that fund managers exploit PE fund fee structures and engage in asset flipping. However, no such relationships are revealed in our study.

We find no evidence of favorable credit markets being an important exit determinant. Hence, *hypothesis 2* is neither supported nor rejected as of this analysis. There are several ways to rationalize such a finding. Credit market conditions may not be an important determinant relative to other variables. However, the lack of significance may also be a consequence of an inadequately defined proxy of credit market conditions. As the availability of credit spreads going back to 2008 is limited in the Nordics, yield spreads were the most viable option to proxy for credit market conditions. Hence, there may still exist causalities between exit channels and credit market conditions, even though this study does not uncover any.

In *hypothesis 3*, we state that increasing amount of dry powder in the PE market should lead to an increase in SBOs relative to IPOs and trade sales. No results indicate such a relationship between the variables. Rather opposite, the regressions show a different tendency than the previous research of Arcot et al. (2015) and Degeorge et al. (2016). They suggest that SBOs are a way for PE fund managers to quickly spend excess capital, which should increase the probability of SBOs relative to IPOs with more dry powder in the market. In our case, IPOs seem to increase in frequency relative to SBOs when dry powder increases, although only significant at the 10 %-level. Thus, we would be careful when interpreting these results. This missing interrelationship between dry powder and SBOs might stem from the fact that the Nordic PE market does not seem to experience any substantial increase in the popularity of SBOs. When examining *Figure 7.1*, we see that there is an increase in SBOs after 2008 and 2009 but no clear trend after this (except for the large spike in 2021).

Anecdotally, the dry powder in the PE market could be a lagging indicator of how stock markets have evolved in recent years. As most PE funds and investors view IPOs as the most successful exit route yielding the highest returns, we speculate if an increasing frequency of IPO exits would attract investor attention and generate larger amount of committed capital to the asset class. We would also like to point out that zero-bound interest rates and record-high stock markets may increase the relative attractiveness of non-public markets as the number of good alternative investment opportunities are few, thus, serving as an explanation for the increasing amounts of committed capital and dry powder.

One conjecture to be made is that if SBOs are really just “pass-the-parcel” deals, an increase in dry powder should probably lead to an increase in SBOs relative to other exit channels. However, this is not the case according to our results. Thus, one may actually advocate in favor of the PE industry’s ability to generate good deals in an ever-harder transaction climate and that PE as an asset class is highly skilled at creating value, despite a larger degree of competition. This is even more pronounced when considering the increasing entry multiples in recent years (Argentum, 2019). Concluding on this matter would require data on the returns of each PE investment that has been exited, which we do not have access to. Still, there seems to be a trend among Nordic PE investors that contradicts the expectations in *hypothesis 3*.

7.2.2 Probability of exiting through an IPO

Our findings advocate in favor of *hypothesis 1* which states that PE funds time equity market conditions, thus implying that fund managers seek to take advantage of attractive valuations

and so-called "windows of opportunity". When using stock returns as a proxy for equity market conditions, the odds ratio of exiting through an IPO in Model 4 increases by 21.34 % with a one percentage point increase in stock market returns. This is significant at the 5 %-level in both Model 4 and 5. The results provide evidence that hot equity market conditions make IPOs appealing as an exit strategy, plausibly due to attractive valuations relative to SBOs and trade sales.[26] Hence, the findings of numerous previous studies[27] seemingly apply to the Nordic PE market as well. In light of the findings, one may infer that the inefficient divestment process and extensive regulation of an IPO need to be compensated for by a premium in the pricing of the company, which is possibly more prominent for an IPO during a hot stock market.

Further, the dry powder coefficient is significant at 10 %, thereby leaning towards a rejection of *hypothesis 3*. However, as illustrated in section 7.1, the amount of dry powder in the Nordic PE market has flourished over the last two years. Parallel to this, stock markets boomed in the aftermath of the Covid-19 pandemic, initiating an increase in the number of IPOs in 2021. Despite the correlation between dry powder and stock returns not being noteworthy high, the results here should be interpreted carefully, as we clearly point out in section 7.2.1. Adding to this, our results indicate that the equity market has more influence on PE fund's exit strategy than the amount of dry powder in the market, with stock returns being significant at the 5 %-level.

In Model 5, the odds ratio of fund maturity at exit is significant at the 10 %-level, representing an approximate decrease in the odds of 50 % for exiting through an IPO relative to SBO when the fund maturity at exit increases one year. These tendencies support the study of Giot and Schwienbacher (2007), suggesting that IPOs are used as an early exit route in the lifetime of both the investment and fund.

The portfolio company-specific variables provide statistically significant coefficients at the 1 %-level for revenue and 5 %-level for EBIT margin.[28] Larger revenues increase the probability of choosing IPO as an exit route. As revenue is perceived as an estimate of a company's size (and strongly correlates with total assets), these results provide evidence that the probability of choosing IPO as an exit channel increases for holdings in larger companies. The findings

[26] *Table 10.3*, with IPO as a baseline, shows that the results are significant relative to trade sales as well.
[27] See Ritter (1991), Loughran & Ritter (1995), Ritter & Welch (2002), Brau & Fawcett (2006) and Jenkinson & Sousa (2015).
[28] EBIT margin findings were extensively discussed in section 7.2.1 for SBOs. Hence, we refer to this section for further implications of the finding.

support the studies of Chemmanur and Fulghieri (1999), Pagano et al. (2002) and Jenkinson and Sousa (2015), who find that the same applies in other regions. Larger companies obtain more attractive valuations for PE investors at exit. A possible explanation is that larger companies often find it easier to gain investors' trust, causing PE fund managers to consider an IPO as a more attractive alternative for larger portfolio companies. Additionally, the costs of going public are substantial compared to the other exit routes. This naturally makes IPO a more probable exit route compared to an SBO for larger companies as they usually are more capable of managing these costs.

7.2.3 Probability of exiting through a trade sale

Regarding trade sales, there is no statistically significant evidence for or against *hypothesis 4*, which states that IA in the market increase the probability of trade sale or SBO relative to IPO. However, when examining the data, we see a substantial reduction in the number of transactions during the two periods defined within the IA variable. The original sample contains a total of 49 observations during periods with high IA, which in total amounts to 16 months. In comparison, the 12-month average number of exits is approximately 69 during normal years. There is a possibility that the number of transactions during these periods is insufficient to detect any potential causalities given that multinomial logistic regression is sensitive to small sample sizes of the independent variables (Schwab, 2002). Thus, our proxy for IA may be inefficient. Although inconclusive, we cannot refrain from pointing out that the substantial reduction in transactions during the financial crisis and the Covid-19 pandemic on its own is a strong indication of higher IA. The data shows a slight increase in trade sales compared to IPOs and SBOs in those periods compared to the total sample.[29] The share of trade sales in periods with high IA is 56 %, compared to 50.7 % for normal periods in the sample. This shows a slight tendency toward trade sales increasing and the total amounts of exits decreasing during periods with higher IA.

Our results suggest that portfolio company characteristics are the most important factors when explaining the choice between trade sale and SBO, in line with Jenkinson and Sousa (2015). Company age, revenue and turnover-assets ratio are all significant for trade sales at the 1 %-level. A larger turnover-assets ratio and a higher company age increase the probability of exiting through a trade sale compared to an SBO. The results for company age can be explained by PE funds' tendency to specialize in investing and developing relatively younger portfolio

[29] The comparison is exhibited in *Table 10.5* of the appendix.

companies. Other companies with more experience in the specific sectors of portfolio companies might rather specialize in further developing companies later in the company's life cycle. This could be the reason that SBOs are more likely for younger companies, while older companies are more likely to be acquired by larger companies or competitors in the same sector.

As for the turnover-assets ratio, larger companies or competitors specializing in the same sector often use this measure to evaluate possible investments. The turnover-assets ratio is a measure of productivity, indicating how well a company is using its resources (assets) to generate revenue. However, this measure is not always comparable when evaluating companies in different sectors as it varies widely between industries. Based on our findings on company age, PE funds seem to prefer investing in relatively less mature companies. Other investors, who specialize or operate in the target company's sector, often invest in more mature companies. A higher turnover-assets ratio generally indicates high productivity, which signals that a company is approaching a later stage in its life cycle where there is less growth potential. Hence, a higher turnover-assets ratio is plausibly more valuable for trade sale buyers than it is for PE funds who rather explore companies with relatively higher growth potential. This may explain why our models show that a higher turnover-assets ratio increases the probability of a trade sale relative to an SBO, which is in line with the research of Dietrich and Sorensen (1984).

Another significant coefficient is revenue, providing evidence that larger companies have a smaller probability of exiting through a trade sale relative to SBOs and IPOs.[30] This highlights some of the anti-trust issues trade sale buyers might be subject to that restrict consolidation within certain industries and thus, are more likely to restrict larger transactions. These issues do not apply to PE firms participating in SBO or IPO exits, making larger transactions more probable for these exit channels. As anti-trust laws are well-developed within all Nordic countries to protect consumers and ensure fair competition, trade deals including smaller companies may have a higher probability of being approved by the competition authorities who enforce such regulations. This could serve as an explanation for this particular finding.

[30] *Table 10.3*, with IPO as a baseline, shows that the results are significant relative to trade sales as well.

7.3 Regression Design and Validity

The MNL is a relatively applicable model considering that there are no assumptions of normality, linearity or homoscedasticity. However, some methodical assessments still need to be made. All results from the validity tests are included in *Table 7.3 "Results from the Multinomial Logistic Regression Model (MNL)."*

7.3.1 Independence of Irrelevant Alternatives (IIA)

MNL hinges on the IIA assumption, which was described in relation to *equation 6.5*. Introducing an extra exit route in the analysis should not significantly alter the relative probabilities between the existing exit routes. A violation of the IIA assumption will lead to biased and inconsistent estimates of the MNL coefficients. We can examine the validity of the IIA assumption by applying a Hausman-McFadden test (Hausman & McFadden, 1984).

The Hausman-McFadden test can be specified according to Greene (2020):

$$H = \left(\hat{\theta}_{Full} - \hat{\theta}_{Sub}\right)' \left\{\widehat{Var}(\hat{\theta}_{Full}) - \widehat{Var}(\hat{\theta}_{Sub})\right\}^{-1} \left(\hat{\theta}_{Full} - \hat{\theta}_{Sub}\right) \quad (7.\ 1)$$

where H is asymptotically distributed as chi-squared with degrees of freedom equal to the rows in $\hat{\theta}_{Full}$ if IIA is true.

In practice, we perform the test by omitting one of the categories (i.e., IPO or trade sale) and then re-estimate the model for that particular sub-sample. Thus, parameters are estimated once using the full set of categories and for a subset of categories. If the IIA assumption holds, H_0 conjecture that $\hat{\theta}_{Full}$ and $\hat{\theta}_{Sub}$ yield consistent and efficient estimates. To increase robustness, the test was performed for all three possible sub-samples: one omitting trade sale and one omitting IPO, with the baseline category SBO being apparent in both. Lastly, one test omits SBOs and sets IPO as the baseline category.

The results show no evidence of any violation of the IIA assumption, as no tests reject H_0. Note that one of the test statistics in Model 5 is negative when omitting SBOs. Hausman and McFadden (1984) describe this phenomenon as being quite common and conclude that negative values are evidence in support of the IIA holding, which is probably why R programming assigns a p-value of 1 to the negative chi-squared value obtained in the test. An overview of the results can be found in *Table 7.4.*

***Table 7.4** - Hausman-McFadden Tests of the IIA Assumption*

Omitted variable	Chi2	Df	P-value	Evidence
Model 4				
IPO	1.7519	25	1.000	IIA holds
Trade Sale	0.2966	25	1.000	IIA holds
SBO	3.2453	25	1.000	IIA holds
Model 5				
IPO	5.8633	25	1.000	IIA holds
Trade Sale	1.3967	25	1.000	IIA holds
SBO	-5.0990	25	1.000	IIA holds

This table provides the results of the Hausman-McFadden test of Model 4 and Model 5. H0: Odds of the outcomes are independent of other alternatives. Differences in coefficients of the sub-sample model are not significant and systematic. Even though the p-value is reported to be 1, in reality, it is 0.99999 etc.

7.3.2 Non-Perfect Separation

MNL assumes non-perfect separation of the dependent variable. That is, if the categories of the dependent variable are perfectly separated by the regressors, unrealistic coefficients will be estimated and the analysis will greatly exaggerate the effect sizes (Starkweather & Moske, 2011). Complete or quasi-complete separation is reported by R programming, meaning it will not be an issue unless our vector of independent and control variables perfectly allocates all observations to their category. No such issues were reported, and we conclude that the assumption of non-perfect separation is satisfied.

7.3.3 Outliers and multicollinearity

Similar to other regression models, MNL should be carried out with careful consideration of outliers and particularly influential observations. Since we are interested in the effects of, e.g., hot equity market conditions, on the choice of exit route, we do not want to remove influential observations entirely. As a result, certain variables are winsorized or logged. Yield spread is the only variable neither winsorized nor logged, considering that the variable is already an average of 1–3-month yield spreads. Further treatment of the variable could alter potential effects in the analysis. A full description of the variables is provided in *Table 5.1*.

Checking for multicollinearity among the independent variables is also necessary to ensure that the predictive power of the model is reliable. A high degree of correlation between revenue and portfolio company size was detected (correlation of 0.73). The decision to retain revenue as a variable and exclude total assets is based on multiple arguments. Firstly, the power of the model to identify independent variables with statistically significance seems to be higher with

the revenue variable compared to portfolio company size. Secondly, revenue may be considered a sufficient proxy for any effects that may arise due to portfolio company size. Hence, we argue that the variable could be left out without losing any information on the causal relationships we are investigating. A complete description of the results can be found in the correlation matrix in *Table 10.1* of the appendix.

7.3.4 Goodness of fit – McFadden's Pseudo R^2

Multinomial logistic regression does not have an equivalent to the standard OLS regression's R-squared that can express the proportion of variance in the dependent variable explained by the independent variables. McFadden's Pseudo R^2 measures the fit of the model through improvement in the log-likelihood value relative to having no independent variables (Stock & Watson, 2020). Interpretation is not straightforward, and values tend to be considerably lower than OLS R-squared. A rule of thumb is that values of 0.2 to 0.4 for McFadden's pseudo R^2 indicate a very good model fit (Hensher & Stopher, 1979).

Table 7.3 reports pseudo R^2 for all models. Since Models 4 and 5 present pseudo R^2's at respectively 0.204 and 0.202, we conclude that the models are a far better fit than the intercept model in predicting the outcomes.

7.3.5 Goodness of fit – Likelihood ratio test

Comparisons between the models can also be evaluated using a likelihood ratio test. Essentially, a likelihood ratio test provides the significance of the difference between the likelihood ratio of a model with predictors minus the likelihood ratio of a model with only a constant in it. Results from the test yield information on the predictive power of the model with regressors, and if they can be attributed to chance or not (Menard, 1995). Test results for all models suggest that the variables included significantly improve the models, with Models 2, 4 and 5 yielding the largest test values, thus being the best fits.

7.3.6 Sample selection bias

Our final sample is also carefully assessed with regard to sample selection bias. The transparency requirements and regulations that companies going public are subject to, are far more stringent than for private companies remaining private (SBO and trade sale transactions). Hence, we were suspicious of any sample selection bias arising from the reporting of financial statements in various databases. By comparing the original data of companies provided by Argentum to the final dataset used in the analysis, we uncover no evidence suggesting such a

bias in our sample. Each exit channel and financial year is sufficiently represented, which was the main concern regarding the possible increased probability of having IPO observations in the final sample. However, we cannot entirely rule out the possibility of any selection bias existing in our data. A table presenting comparisons of the full sample and the final sample used in the analysis is provided in *Table 10.4* of the appendix.

7.3.7 Endogeneity

We cannot entirely rule out the possibility of any endogeneity in our models, that is if there are any variables outside of the model causing the correlation between our dependent and independent variables through the error term. Being able to identify causalities in our model involves assuming an expected value of zero for the error term. Unobservable factors potentially affecting the correlation between exit route and independent variables may be the preferences of PE firms. The choice of exit route could stem from a certain preference toward that exit route. For instance, a PE firm specializing within a certain industry could be hypothesized to have a preference toward, e.g., trade sales. Despite the aforementioned, the size and diversity in our data contemplate a seemingly small probability of this being the case. Still, prudence is advised when interpreting the findings of our thesis. Ultimately, one could use an instrumental variable with no impact on the dependent variable, that impacts the independent variables to proxy for the independent variables' effect on the exit route. However, we did not find such a variable.

8 Conclusion

The purpose of this thesis is to shed light on the determinants of private equity (PE) exit strategies related to the three most common exit routes: SBOs, IPOs and trade sales. Whereas previous papers focus on regions like the U.S., European and global PE markets, or the venture capital segment, we seek to uncover the dynamics of the buyout segment in the Nordics using a final sample of 525 PE transactions. Based on data received by Argentum consisting of Nordic portfolio companies exited by PE funds between 2008–2021, we construct a unique dataset with PE firm and fund characteristics, portfolio company characteristics and market conditions to test several hypotheses.

Our empirical analysis discloses a series of interesting findings. First, we find evidence of PE funds capitalizing on "windows of opportunities" by timing IPO exits to cash in on their investments at more attractive levels. That is, when stock markets have been rising strongly, the probability of an IPO increases significantly, which is consistent with previous research. Second, there is no evidence suggesting that the increasing amount of dry powder lead to a relative increase in SBOs or that PE funds closer to maturity tend to exit through SBOs when investments are made late in the fund's life cycle. These two findings are particularly intriguing as it contradicts the claims made by PE critics of asset flipping and SBOs being "pass-the-parcel" deals for managers willing to exploit PE funds' fee structures. Thus, we advocate in favor of the PE industry's ability to generate good deals and that Nordic PE fund managers are highly skilled at creating value despite increasing competition among PE funds.

Third, we find evidence that the purchasing buyout fund participating in an SBO singles out companies with better operating performance who exceed other companies in coping with higher levels of debt. Anecdotally, this suggests that a relative comparative advantage of raising and managing cheap debt is still an important element in PE value creation, as proposed by academia. Further, investments exited later in the fund's life tend to have a higher probability of being an SBO relative to an IPO, potentially highlighting the attractiveness of an SBO: it often achieves a high price, with low transaction risk and the shortest delay in receiving the proceeds. These attributes are all desirable to a PE fund, suggesting that SBOs might be used to avoid an extension of the fund's life.

Portfolio company characteristics are the most decisive determinants of a trade sale. Older companies with less revenues and better asset utilization (measured by a higher turnover-assets

ratio) have a significantly higher probability of being exited through a trade sale, which illustrates third-party buyers' preferences in pursuing more mature companies relative to the preferences of PE funds. Last, we find no support for favorable credit markets increasing the likelihood of an SBO or that higher information asymmetry (IA) increases the likelihood of trade sales and SBOs.

The systematic differences between different exit strategies uncovered in this thesis highlight that the exit decision is of paramount importance to PE funds, and presumably PE value creation. Despite experiencing increasing competition and volatile capital markets, Nordic PE funds seem to be highly versatile and skilled at finding ways to create value for investors.

8.1 Limitations of the study

A limitation of our study is that we treat an IPO as an exit per se, even though it does not necessarily involve a complete divestment of ownership like a trade sale and an SBO. This could be a simplification of the complexities and dynamics present in a share sale exit.

Examining Nordic PE through an MNL regression model was challenging due to the difficulty of obtaining enough observations, which was mainly due to the data availability of portfolio company characteristics. As such, revenue growth and capital expenditure were excluded. The inclusion of these variables could have revealed information on causalities. In general, the lack of high-quality data in PE is a limitation.

8.2 Future research

Initially, we also wanted to look at differences in the timing of the exit decision between exit routes. Due to the substantial amount of time spent on collecting data and the general scope of a master thesis, we do not dive into these dynamics.

Research on how exit strategies of PE firms have developed alongside the emergence of second-tier stock exchange markets, e.g., Euronext Growth or Nasdaq First North, is scarce. Considering the strong significance of the equity market conditions variable, it would be interesting to see if PE funds take advantage of the lower listing requirements of secondary markets to divest companies through IPOs with increased frequencies when markets are hot and discuss it in relation to investor protection.

Our results do not provide significant results in relation to how IA and exogenous shocks in the markets affect exit decisions. Although inconclusive, we cannot neglect the tendencies we identify in the dataset during the financial crisis and the Covid-19 pandemic. The full sample of exits between 2008–2021 uncover an increase in trade sales during periods of uncertainty, indicating that trade sales could serve as a "safe haven" for PE funds exiting during these periods. Additionally, the total number of exits substantially decreases during these periods, potentially expanding holding periods or funds' existence. Thus, investigating if fund managers delay exit decisions due to uncertainty could contribute with valuable insights in the PE literature and an understanding of how fund managers operate.

Access to PE data through databases like Preqin is limited and quite expensive. Gaining access to the returns of each investment and how debt levels of companies exited through SBOs change after the investments from purchasing funds could be utilized to further conclude on some of the notions we make in this thesis regarding value creation.

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10 Appendix

Table 10.1 - *Correlation Matrix*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) ln Fund Size	1																	
(2) ln Fund Maturity Inv	-0.073	1																
(3) ln Fund Maturity Exit	0.004	0.436	1															
(4) ln PE Firm Age	0.398	0.065	0.204	1														
(5) ln Number of Funds Raised	0.026	0.036	0.058	0.110	1													
(6) First Fund Dummy	-0.323	0.021	-0.017	-0.497	0.038	1												
(7) ln Holding Period	0.064	-0.202	**0.746**	0.162	0.025	-0.048	1											
(8) ln Revenue	0.436	-0.016	0.040	0.100	-0.095	-0.161	0.077	1										
(9) ln Portfolio Company Age	0.144	-0.024	0.165	0.064	-0.060	-0.022	0.193	0.203	1									
(10) Turnover/Assets Ratio	-0.225	0.051	0.028	-0.178	-0.034	0.101	0.009	0.219	0.006	1								
(11) EBIT Margin	0.113	0.091	-0.048	0.054	0.014	-0.070	-0.096	0.189	0.111	0.055	1							
(12) Debt/Assets Ratio	-0.079	0.013	0.074	0.007	-0.025	0.080	0.070	0.084	-0.069	0.090	-0.117	1						
(13) ln Total Assets	**0.601**	-0.057	0.025	0.230	-0.062	-0.230	0.086	**0.733**	0.153	-0.399	0.069	-0.000	1					
(14) Stock Returns	0.087	-0.034	0.007	0.041	-0.093	-0.013	0.026	0.022	-0.024	-0.132	-0.009	-0.082	0.116	1				
(15) Yield Spread	-0.047	-0.096	-0.038	-0.146	-0.287	-0.005	0.032	0.021	0.068	-0.007	-0.066	0.011	0.025	0.041	1			
(16) ln Dry Powder	0.084	0.063	0.131	0.239	0.433	-0.001	0.082	-0.091	-0.065	-0.022	0.016	-0.022	-0.059	0.156	-0.478	1		
(17) GDP Growth	0.092	-0.046	-0.016	0.016	0.023	-0.109	0.015	0.001	0.028	-0.038	-0.006	-0.015	0.024	-0.144	0.215	-0.016	1	
(18) Information Asymmetry Dummy	0.002	0.059	0.005	-0.022	0.111	0.110	-0.022	-0.074	-0.015	-0.009	-0.012	-0.114	-0.074	-0.161	-0.332	0.190	-0.304	1

This table reports the multicollinearity between all independent variables and control variables. Correlation coefficients > |0.50| are indicated in bold. Note that *PORTFOLIO COMPANY SIZE* was removed due to the level of multicollinearity and proxied for through the *REVENUE* variable. Also, the correlation between *HOLDING PERIOD* and *FUND MATURITY EXIT* was taken into account by adding an extra regression model.

Table 10.2 - *Distribution of Exits between Country and Industry*

	Exit Route			
	IPO	SBO	Trade Sale	Total
Panel A: Country				
Norway	30	55	94	179
Denmark	25	74	110	209
Sweden	66	119	149	334
Finland	28	53	116	197
Panel B: Industry				
Cleantech	3	9	17	29
Consumer	41	67	105	213
Energy	5	11	22	38
Financials	2	5	3	10
Health Care & Life Science	13	29	57	99
ICT	28	62	75	165
Industrials	42	104	163	309
Infrastructure	1	2	0	3
Other	14	10	24	48
Utilities	0	2	3	5

This table exhibits how the different exit routes in our dataset are distributed among countries, represented in *Panel A,* and industries, represented in *Panel B*. The sample consists of all 919 observations of IPOs, SBOs and trade sales in the buyout segment from the sample provided by Argentum.

Table 10.3 - *MNL Regression with IPO as Baseline Category*

	Model 1		Model 2		Model 3		Model 4		Model 5	
	SBO	TS	SBO	TS	SBO	TS	SBO	TS	SBO	TS
PE Firm and Fund Variables										
ln Fund Size	**0.603*****	**0.518*****					1.042	0.949	1.055	0.970
	(0.109)	(0.106)					(0.153)	(0.152)	(0.154)	(0.153)
ln Fund Maturity Inv	0.910	**0.831****					1.017	1.021	0.947	0.986
	(0.098)	(0.093)					(0.091)	(0.091)	(0.097)	(0.098)
ln Fund Maturity Exit	2.159	**4.334****							**2.007***	1.568
	(0.703)	(0.665)							(0.415)	(0.403)
ln PE Firm Age	1.347	**1.969***					1.289	**2.162***	1.181	1.858
	(0.373)	(0.359)					(0.464)	(0.459)	(0.472)	(0.467)
First Fund (dummy)	2.289	**2.975****					2.632	**3.152***	2.459	**2.874***
	(0.552)	(0.539)					(0.635)	(0.629)	(0.644)	(0.639)
ln Holding Period	0.774	**0.317****					1.602	1.033		
	(0.531)	(0.500)					(0.320)	(0.309)		
Portfolio Company Variables										
ln Company Age			**1.441****	**2.171*****			1.040	**1.679*****	1.041	**1.620*****
			(0.158)	(0.171)			(0.191)	(0.194)	(0.190)	(0.194)
ln Revenue			**0.467*****	**0.335*****			**0.430*****	**0.311*****	**0.425*****	**0.306*****
			(0.100)	(0.106)			(0.145)	(0.149)	(0.146)	(0.151)
Turnover-Assets Ratio			**1.733*****	**2.450*****			**1.410***	**2.075*****	**1.391***	**2.056*****
			(0.171)	(0.171)			(0.193)	(0.191)	(0.193)	(0.191)
EBIT Margin			**5.885****	2.407			**5.958****	2.677	**6.176****	2.914
			(0.766)	(0.723)			(0.864)	(0.818)	(0.865)	(0.821)
Debt-to-Assets Ratio			1.107	1.054			0.509	0.557	0.512	0.547
			(0.603)	(0.602)			(0.696)	(0.700)	(0.694)	(0.701)
Macroeconomic Variables										
Stock Returns					**0.263***	**0.108*****	**0.045****	**0.048****	**0.049****	**0.049****
					(0.812)	(0.772)	(1.318)	(1.317)	(1.311)	(1.312)
Yield Spread					0.857	1.213	0.747	0.731	0.752	0.725
					(0.267)	(0.254)	(0.413)	(0.408)	(0.411)	(0.406)
ln Dry Powder					**0.549***	0.742	**0.382***	0.438	**0.383***	0.429
					(0.348)	(0.330)	(0.537)	(0.543)	(0.535)	(0.542)
IA (dummy)					0.719	1.095	0.374	0.329	0.382	0.318
					(0.563)	(0.526)	(0.802)	(0.806)	(0.803)	(0.806)
ln Number of Funds Raised					**1.543****	1.242	1.502	1.060	1.491	1.045
					(0.221)	(0.203)	(0.342)	(0.332)	(0.342)	(0.334)
GDP Growth					0.006	0.013	0.200	0.009	0.125	0.004
					(5.506)	(5.278)	(8.447)	(8.402)	(8.457)	(8.435)
Fixed Effects										
Country Fixed Effects	Included		Included		Included		Included		Included	
Industry Fixed Effects	Included		Included		Included		Included		Included	
Constant	7.344	17.092**	9.475**	11.400**	408.931	46.828	177,517.900**	94,275.340*	120,957.000*	89,968.040*
	(1.303)	(1.246)	(0.973)	(0.981)	(3.777)	(3.578)	(6.041)	(6.091)	(6.029)	(6.078)
Observations	698		635		919		525		525	
Log-Likelihood	-639.420		-534.500		-897.560		-427.650		-428.430	
Pseudo R^2	0.073		0.182		0.027		0.204		0.202	
p > chi2	0.000		0.000		0.007		0.000		0.000	
LR Test (chi2)	100.192*** (df = 30)		238.477*** (df = 28)		49.957** (df = 30)		218.897*** (df = 50)		217.355*** (df = 50)	

This table presents the results of the MNL regressions of Nordic PE exits between 2008–2021. The dependent variable is exit route, using IPO as the base category. The columns SBO and TS represent the other exit routes. Model 1 uses the PE firm and fund specific variables *Fund Size, Fund Maturity Inv, Fund Maturity Exit, PE Firm Age, First Fund (dummy)* and *Holding Period*. Model 2 uses variables related to the portfolio company, including *Revenue, Company Age, Turnover-Assets Ratio, EBIT Margin* and *Debt-to-Assets Ratio*. *Company Age* is measured at exit, while other variables are measured the year before exit. Model 3 includes macroeconomic variables representing market conditions, including *Stock Returns, Yield Spread, GDP Growth, Dry Powder, Number of Funds Raised* and *IA (dummy)*. Model 4 excludes *Fund Maturity (Exit)* and Model 5 excludes *Holding Period*, both using 525 observations in the regression. All models include country and industry fixed effects. Statistical significance is denoted by *, ** and ***, indicating significance level at 10%, 5% and 1% respectively. The table additionally includes results of log-likelihood, pseudo R^2, p > chi2 and likelihood-ratio (LR) tests.

Table 10.4 - *Full vs. Final Sample*

	Exit Route							
	IPO	*% IPO*	SBO	*% SBO*	Trade Sale	*% Trade Sale*	Total	*% of Total*
Full Sample								
2008	3	*7.9%*	10	*26.3%*	25	*65.8%*	38	*4.1%*
2009	1	*4.3%*	6	*26.1%*	16	*69.6%*	23	*2.5%*
2010	9	*21.4%*	13	*31.0%*	20	*47.6%*	42	*4.6%*
2011	3	*5.5%*	22	*40.0%*	30	*54.5%*	55	*6.0%*
2012	1	*1.8%*	29	*50.9%*	27	*47.4%*	57	*6.2%*
2013	7	*10.4%*	26	*38.8%*	34	*50.7%*	67	*7.3%*
2014	13	*20.0%*	21	*32.3%*	31	*47.7%*	65	*7.1%*
2015	24	*27.3%*	19	*21.6%*	45	*51.1%*	88	*9.6%*
2016	15	*18.5%*	24	*29.6%*	42	*51.9%*	81	*8.8%*
2017	16	*20.8%*	21	*27.3%*	40	*51.9%*	77	*8.4%*
2018	7	*11.5%*	21	*34.4%*	33	*54.1%*	61	*6.6%*
2019	4	*5.6%*	25	*35.2%*	42	*59.2%*	71	*7.7%*
2020	9	*15.3%*	19	*32.2%*	31	*52.5%*	59	*6.4%*
2021	37	*27.4%*	45	*33.3%*	53	*39.3%*	135	*14.7%*
Total	**149**	***16.2%***	**301**	***32.8%***	**469**	***51.0%***	**919**	
Final Sample								
2008	2	*11.8%*	4	*23.5%*	11	*64.7%*	17	*3.2%*
2009	0	*0.0%*	2	*22.2%*	7	*77.8%*	9	*1.7%*
2010	7	*29.2%*	6	*25.0%*	11	*45.8%*	24	*4.6%*
2011	1	*6.3%*	7	*43.8%*	8	*50.0%*	16	*3.0%*
2012	0	*0.0%*	16	*51.6%*	15	*48.4%*	31	*5.9%*
2013	5	*14.7%*	14	*41.2%*	15	*44.1%*	34	*6.5%*
2014	11	*25.6%*	14	*32.6%*	18	*41.9%*	43	*8.2%*
2015	16	*31.4%*	8	*15.7%*	27	*52.9%*	51	*9.7%*
2016	7	*14.9%*	14	*29.8%*	26	*55.3%*	47	*9.0%*
2017	15	*27.8%*	14	*25.9%*	25	*46.3%*	54	*10.3%*
2018	6	*14.3%*	14	*33.3%*	22	*52.4%*	42	*8.0%*
2019	1	*2.4%*	15	*35.7%*	26	*61.9%*	42	*8.0%*
2020	7	*18.9%*	12	*32.4%*	18	*48.6%*	37	*7.0%*
2021	20	*25.6%*	24	*30.8%*	34	*43.6%*	78	*14.9%*
Total	**98**	***18.7%***	**164**	***31.2%***	**263**	***50.1%***	**525**	

This table exhibits the distribution among the different exit routes for every year of the sample and in total. The exits are categorized in *IPO*, *SBO* and *Trade Sale*. %*IPO, %SBO* and %*Trade Sale* represent the share of the different exits of the total number of exits each year. The table presents two samples. *Full Sample* represents all IPOs, SBOs and Trade Sales in our sample period from the dataset provided by Argentum with 919 observations. *Final Sample* represents the final sample of 525 observations used in the analysis. The purpose of this table is to illustrate how the weighting of each exit channel and each year in our sample period changes from the *Full Sample* to the *Final Sample*, in order to consider whether the *Final Sample* is exposed to sample selection bias.

Table 10.5 - *Exits During IA Periods vs. the Rest of the Sample*

	Exit Route						
	IPO	*% IPO*	SBO	*% SBO*	Trade Sale	*% Trade Sale*	Total
IA Periods	7	*14.3%*	14	*28.6%*	28	*57.1%*	49
Normal Periods	142	*16.3%*	287	*33.0%*	441	*50.7%*	870

This table exhibits the number of exits, categorized in *IPO*, *SBO* and *Trade Sale* divided in two periods: periods with information asymmetries and normal periods. *IA Periods* consists of the financial crisis defined from August 28 2008 – April 09 2009 and the Covid-19 pandemic defined from March 10 2020 – November 09 2020. *Normal Periods* represents the rest of the dataset, excluding the *IA Periods*. *IPO, SBO* and *Trade Sale* exhibit the number of the different exits in the two periods, while *Total* shows the total number of exits in the two periods. %*IPO, %SBO* and %*Trade Sale* represent the share of the different exits of the total number of exits in the two periods.