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Cross-Listing and Stock Returns: Evidence from Nordic Equity Markets

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ABSTRACT:

This thesis examines the stock market reactions to cross-listing events among Nordic companies, focusing on both short-term market responses and post-listing stock performance. Previous research on cross-listing has documented significant valuation effects in global markets, and evidence from highly developed and integrated Nordic capital markets remains relatively limited.

The empirical analysis is based on a sample of 28 cross-listing events involving Nordic companies from 1985 to 2026. An event-study methodology is used to analyze short-term market reactions around the listing date using cumulative abnormal returns (CAR) and buy-and-hold abnormal returns (BHAR). Long-term performance is evaluated over a 120-day period after the listing. The data for the study is obtained from the Bloomberg Terminal. Robustness checks using alternative benchmark models are employed to ensure that the results are not driven by model specification.

The findings show that cross-listing events do not generate statistically significant abnormal returns at the aggregate level in either the short or long term. However, company-level analysis reveals notable heterogeneity among companies. Companies that cross-list on major international exchanges experience more favorable long-term outcomes than those that cross-list within the Nordic countries. The findings provide limited support for the bonding hypothesis and are more consistent with liquidity and market segmentation theories. The findings highlight the importance of market integration and company-specific characteristics in affecting cross-listing outcomes.

KEYWORDS: Cross-listing, Nordic Capital Markets, Market Segmentation, Stock Performance, Bonding hypothesis

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TIIVISTELMÄ:

Tässä pro gradu -tutkielmassa tarkastellaan osakemarkkinoiden reaktioita pohjoismaisten yritysten rinnakkaislistautumisiin (cross-listing), keskittyen lyhyen aikavälin markkinareaktioihin ja listautumisen jälkeiseen osakekurssikehitykseen. Aiempi kirjallisuus on osoittanut, että rinnakkaislistautumisilla voi olla merkittäviä yritykseen kohdistuvia arvostusvaikutuksia kansainvälisillä markkinoilla. Tutkimuksia korkeasti kehittyneistä ja integroituneista pohjoismaisista pääomamarkkinoista on kuitenkin suhteellisen vähän.

Tutkielma perustuu 28 pohjoismaisen yrityksen rinnakkaislistautumistapahtumaan vuosina 1985–2026. Lyhyen aikavälin markkinareaktiota tarkastellaan tapahtumatutkimusmenetelmällä (event study), jossa hyödynnetään kumulatiivisia epänormaaleja tuottoja (CAR) ja osta-ja-pidä-poikkeavia tuottoja (BHAR) listautumispäivän ympärillä. Pitkän aikavälin vaikutuksia tarkastellaan 120 päivän ajanjaksolla listautumisen jälkeen. Tutkimuksessa käytetty aineisto on kerätty Bloomberg-tietokannasta. Tulosten luotettavuus varmistetaan herkkyysoanalyysillä, joissa hyödynnetään vaihtoehtoisia tuottojen vertailumalleja sen varmistamiseksi, ettei tulokset riipu mallivalinnasta.

Tulokset osoittavat, etteivät rinnakkaislistautumistapahtumat aiheuta tilastollisesti merkitseviä poikkeavia tuottoja aggregaattitasolla, lyhyellä eikä pitkällä aikavälillä. Yrityskohtainen analyysi paljastaa kuitenkin huomattavaa vaihtelua yritysten välillä. Suuriin kansainvälisiin pörssiin rinnakkaislistautuneet yritykset saavuttavat keskimäärin suotuisampia pitkän aikavälin tuottoja kuin yritykset, jotka ovat listautuneet ainoastaan pohjoismaisten pörssien välillä. Tulokset antavat rajallista tukea sitoutumishypoteesille (bonding hypothesis) ja ovat linjassa likviditeettiä ja markkinoiden segmentoitumista koskevien teorioiden kanssa. Tulokset korostavat markkinoiden integraation ja yritys kohtaisten tekijöiden merkitystä rinnakkaislistautumisen vaikutusten selittäjinä.

AVAINSANAT: Cross-listing, Nordic Capital Markets, Market Segmentation, Stock Performance, Bonding hypothesis

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Abbreviations

ADR	American Depositary Receipt
AR	Abnormal Return
BHAR	Buy-and-Hold Abnormal Return
CAPM	Capital Asset Pricing Model
CAR	Cumulative Abnormal Return
FDR	Finnish Depositary Receipt
EMH	Efficient Market Hypothesis
ESMA	European Securities and Markets Authority
LOOP	Law of One Price
NYSE	New York Stock Exchange
OLS	Ordinary Least Squares
PPP	Purchasing Power Parity
RWH	Random Walk Hypothesis
SDR	Swedish Depositary Receipt
U.S.	United States

1 Introduction

The growing integration of international financial markets has improved companies' opportunities to access capital and investors outside their domestic exchanges. Cross-listing is a common strategy for a company's internationalization, in which it lists its shares on a foreign stock exchange in addition to its domestic exchange. For instance, Nokia Oyj expanded its international visibility by cross-listing on the New York Stock Exchange (NYSE) in 1994 and later on Euronext Paris in 2015. Prior research suggests that cross-listing may increase companies' visibility, broaden the investor base, improve stock liquidity, and possibly increase company valuation (Foerster & Karolyi, 1999; Doidge et al., 2004). It can signal transparency and credibility, especially when entering highly regulated markets such as the United States (Coffee, 1999; Stulz, 1999).

Empirical research shows that cross-listing can result in significant changes in stock price behavior and trading activity, particularly around the listing event, as evidenced by abnormal returns and volume fluctuations (Karolyi, 2006; Miller, 1999). However, the magnitude and direction of these effects differ among markets and regulatory environments, demonstrating the context-dependent nature of cross-listing decisions. Beyond these short-term impacts, a fundamental question remains: what is the effect of cross-listing on companies' long-term stock performance?

The effects of cross-listing have been widely studied in global contexts. Research has an emphasis on large companies from emerging and European markets listed in the United States (Doidge et al., 2004; Miller, 1999). However, less attention has been paid to the Nordic region, which is characterized by openness, transparency, and highly integrated financial markets. This study aims to address this gap by employing an event study methodology on a sample of Nordic cross-listed companies to examine whether the return patterns documented in global markets hold in the Nordic context. The findings convey implications for both academic discussions on market efficiency and practitioners considering cross-listing decisions.

1.1 Purpose of the Study and Hypothesis Development

This study, inspired by Finland's small open economy and later extending the analysis to the Nordic countries, examines cross-listing not only as a financial strategy but also as a major step toward globalization. Cross-listing on foreign exchanges can considerably affect how both domestic and foreign investors perceive a company. (Karolyi, 1998). Studying the effects of these cross-listing events can help investors make informed investment decisions and allow companies to determine whether the sustained benefits of increased market exposure and liquidity are realized.

This study has two primary goals: first, to examine the short-term effects of stock returns around cross-listing events among Nordic companies, and second, to assess whether these effects persist over the long-term. The study uses an event study methodology to evaluate how cross-listing influences stock returns, market efficiency, and investor decision-making in a Nordic context. While Nordic companies are often included in larger European or global samples, they have not been studied as a unique empirical setting in this context. This study provides academic insights into the topic. It also has practical implications for investors and decision-makers considering the risks and the benefits of cross-listed securities.

Past international research indicates that cross-listing provides substantial advantages, including increased company value, liquidity, and investor base. Foerster and Karolyi's (1999) study shows significant abnormal returns surrounding the cross-listing announcement. Their study provides early evidence supporting the market segmentation hypothesis: cross-listing reduces barriers to international investment and improves access to foreign capital markets.

Lang et al.'s (2003) study shows that companies that cross-list in the U.S. experience improved analyst coverage and forecast accuracy, resulting in higher company valuations, which are directly tied to these improvements in information. They thus suggest that cross-listing enhances a company's value by shaping its information environment. Bris et

al. (2007) break down valuation effects into market segmentation and bonding mechanisms, noting that these mechanisms shape both the investor base and the disclosure standards under which a company operates. In addition, they document an increase in liquidity after the cross-listing.

The paper's general research question is whether cross-listing affects a company's stock performance. To address this question, the study examines both short-term market reactions and long-term post-event performance following cross-listings by Nordic companies. Based on the existing literature, the null hypothesis of this research is stated as follows:

$H0_1$ = Cross-listing events do not generate statistically significant abnormal returns for Nordic companies in the short-term.

The related alternative hypothesis is stated as follows:

$H1_1$ = Cross-listing events generate statistically significant abnormal returns for Nordic companies in the short-term.

While the short-term effects are well documented, their long-term persistence can vary depending on the destination markets and investor dynamics. Overall, the earlier research suggests that cross-listing can be a value-relevant event, although the magnitude and direction of its effects are highly context-dependent. The second set of hypotheses examines long-term stock performance following cross-listing:

$H0_2$ = Cross-listing does not lead to long-term improvement in stock value for Nordic companies.

$H1_2$ = Cross-listing leads to long-term improvement in stock value for Nordic companies.

1.2 Limitations and Structure of the Study

This study is structured as follows. Chapter 2 presents the theoretical background, covering key concepts from normative finance and market efficiency, behavioral finance, and the primary theoretical explanations for cross-listing. Chapter 3 reviews the relevant empirical literature, focusing on short- and long-term stock return evidence related to cross-listing, and identifies gaps in the current existing research, particularly in the Nordic region. Chapter 4 describes the data and defines the empirical methodology, including the event-study framework and long-term performance measures used in the analysis. Chapter 5 presents and discusses the empirical findings, while Chapter 6 concludes and summarizes the study's main findings.

Despite its contributions, the study shows certain limitations that should be considered when interpreting the results. First, as Karolyi (2006) noted, empirical studies of cross-listing events often face methodological challenges in separating the effects of cross-listing. Companies frequently cross-list alongside planned decisions such as expansions, acquisitions, or changes in disclosure procedures. These actions can affect stock market reactions and potentially distort event-study estimates, making it harder to separate the initial cross-listing effects from simultaneous decisions.

Second, the results are sensitive to the choice of benchmark and to market-level measurement. Although this study uses home-market indices to estimate expected returns, alternative benchmark specifications could affect the magnitude of abnormal returns, which is a documented limitation of event study methodologies (MacKinlay, 1997). Robustness checks using alternative expected-return models are employed to ensure that the study's findings are not influenced by a particular model choice.

Third, the sample faces multiple constraints. The relatively small number of cross-listing events involving Nordic markets limits statistical power and reduces the generalizability of the findings, as is common in studies focused on specific regions. One company is additionally excluded from the long-term analysis since it cross-listed on the NYSE in

February 2026, and insufficient post-event trading data were available at the time of analysis to calculate 120-day post-listing returns. The long-term analysis, therefore, includes only 27 companies, whereas the short-term analysis considers all 28 events.

The sample shows two sources of heterogeneity. The extended sample period covers varying market and institutional conditions, which may influence the observed effects on stock markets across differing time periods. It also shows noteworthy cross-sectional variation in company size, industry affiliation, and host exchange, which could lead to heterogeneous impacts that are not completely captured in the aggregate analysis. Therefore, these sources of heterogeneity should be considered when interpreting results that reflect average effects rather than uniform outcomes across enterprises.

Finally, the study's findings are affected by the joint hypothesis problem that is common in asset pricing and event study research. Abnormal returns tests simultaneously evaluate both the effect of the cross-listing event and the accuracy of the expected-return model used to measure abnormal performance (Fama, 1970; MacKinlay, 1997). As a result, failure to identify statistically significant abnormal returns may indicate either that there are no cross-listing effects or that the benchmark model has limitations, rather than proving definitive market efficiency. This issue should be considered when interpreting the results, as the conclusions about valuation effects depend on the modeling assumptions used.

2 Theoretical Background

2.1 Normative Finance and Market Efficiency

Normative finance theories assume that all investors behave rationally, have access to symmetrical fundamental information, and seek to maximize their expected returns while being compensated for the associated risks. These assumptions form the foundation for several foundational frameworks, including the Efficient Market Hypothesis (EMH), Modern Portfolio Theory (MPT), and asset-pricing models such as the Capital Asset Pricing Model (CAPM).

According to Fama (1970), financial markets are expected to operate efficiently under these conditions. This means that prices reflect all available information quickly and accurately. Price deviations from fundamental values are therefore expected to be rare and transitory, thereby limiting investors' ability to consistently earn abnormal returns. The EMH standardizes this concept by dividing market efficiency into weak, semi-strong, and strong forms, based on the quantity of information reflected in asset prices.

However, empirical evidence shows that financial markets do not always behave as normative models anticipate. This is evidenced by anomalies, delayed market responses, and systematic investor biases (De Bondt & Thaler, 1985; Shiller, 1981). For instance, Shiller (1981) shows that stock prices fluctuate far more than changes in underlying fundamentals can explain. This excess volatility suggests that asset prices are influenced by factors beyond rational changes in a company's fundamental information, and challenges the assumption that markets always effectively reflect such changes. These deviations have contributed to the development of behavioral finance, which offers alternative explanations for how investors process information, behave, and make decisions. The following sections explain the main concepts of normative finance, discuss their limitations, and present behavioral finance as a complementary perspective.

2.1.1 Efficient Market Hypothesis

In 1970, Eugene F. Fama introduced the Efficient Market Hypothesis (EMH), which has since become the foundation of modern financial economics. The Efficient Market Hypothesis states that the prices of securities quickly and fully reflect all available fundamental information, such as earnings announcements or changes in expected cash flows, while all investors act rationally. Under this view, price changes should occur only in response to new fundamental information. Non-fundamental factors, such as investor sentiment or salience, should not systematically affect prices. Therefore, security prices fluctuate randomly, and future returns cannot be predicted in advance from past price movements (Fama, 1970). This type of unpredictable movement is known as a "random walk" (Malkiel, 1973). Market efficiency under the EMH means that, in the long run, it is impossible to consistently achieve above-market returns, or so-called excess returns, on a risk-adjusted basis (Fama, 1970).

Within this framework, the cross-listing events should be quickly reflected in stock prices. Cross-listing may increase a company's visibility, expand its investor base, and improve stock liquidity (Foerster & Karolyi, 1999; Miller, 1999). However, in an efficient market, these improvements should not lead to persistent stock mispricing or lasting abnormal returns, as the stock price should adjust to reflect all new information available to the market.

Although widely accepted, the EMH has been criticized due to its inability to explain irrational market behavior, such as anomalies and deviations from rational decision-making. As a result, alternative perspectives such as behavioral finance and descriptive insights have emerged.

2.1.2 Three Forms of Market Efficiency

According to Fama (1970), market efficiency can be classified into three forms, based on the type of information fully incorporated into security prices: weak-form, semi-strong-form, and strong-form efficiency.

In weak-form efficient markets, security prices incorporate all historical trading information, including past prices and trading volumes. Under weak-form efficiency, technical analysis is ineffective, as future price movements cannot be predicted from historical price patterns. In semi-strong form efficient markets, security prices reflect all publicly available fundamental information, such as financial statements and earnings forecasts. Consequently, fundamental analysis cannot produce abnormal returns because all publicly available information is already reflected in asset prices. In strong-form efficient markets, security prices reflect all existing information, including non-public or insider information, meaning there is no possibility of excess returns even for individuals with access to such information. (Bodie et al. 2018, 338.)

The three forms thus differ in terms of the amount of information incorporated into market prices. The weak form considers only historical price data. The semi-strong form extends this to include all publicly available information. The strong form assumes that even private information is fully reflected. Each form builds on the informational assumptions of the previous one, providing an organized structure for assessing how efficiently markets process information and at what level of efficiency they operate.

2.1.3 Random Walk Hypothesis

Pearson (1905) described the random walk as a mathematical problem where a person takes steps of fixed length in a random direction. Each step is independent of the steps before it. Using the familiar “drunkard’s walk” analogy, Pearson showed that the final position after many steps cannot be predicted from the earlier path. In the field of

finance, the Random Walk Hypothesis (RWH) was introduced by mathematician Louis Bachelier in the early 1900s and later widely promoted by Burton Malkiel (1973) in a book "A Random Walk Down Wall Street". It is a core principle in normative finance, closely linked to the Efficient Market Hypothesis, particularly its weak form.

The random walk hypothesis argues that stock prices move unpredictably and that future prices cannot be predicted based on past prices. In markets that follow a random walk, price changes are independent and respond only to new, unanticipated information (Fama, 1970). As a result, using technical analysis or pattern-based forecasting strategies is unlikely to result in consistent abnormal returns.

The random walk hypothesis has clear implications for how markets should respond to events such as cross-listings. Cross-listed shares trade in multiple markets. Differing markets have varying levels of liquidity, regulation, and investor expertise. If prices follow a random walk, new information should be reflected immediately, and any abnormal returns should fade quickly (Fama, 1970). In practice, however, this may not always be the case, reflecting not only market structures but also investor behavior.

2.1.4 Law of One Price and Purchasing Power Parity

The Law of One Price states that in efficient markets, identical assets or services should trade at the same price among different markets when there are no frictions such as transaction costs, taxes, or capital controls (Kihn, 2011). In financial markets, LOOP implies that shares of the same company traded on multiple exchanges should have the same price.

Purchasing Power Parity (PPP) is an economic theory stating that exchange rates between two currencies should adjust so that identical goods cost the same in both countries when priced in a common currency. In other words, money should have the same

purchasing power across borders in efficient markets. PPP provides a measure for assessing whether a currency is overvalued or undervalued relative to another.

A famous illustration is the Big Mac Index, published by *The Economist*. The index compares the price of McDonald's standardized Big Mac across countries to highlight deviations from purchasing power parity and the law of one price (*The Economist*, 2026). Although the index is simplified, it demonstrates that even highly comparable goods can display significant price differences due to local costs and institutional factors.

Under this framework, cross-listing should not create company value on its own, as prices are already expected to fully reflect all available information. The previous cross-listing literature suggests several mechanisms, such as market segmentation, improved liquidity, and greater investor recognition, that can lead to value creation. Therefore, variations from the law of one price in cross-listed stocks are not anomalies but rather reflect existing frictions and behavioral factors, motivating empirical studies of the valuation effects of cross-listing.

2.1.5 Limitations of Normative Finance

Normative finance theories, including Eugene F. Fama's Efficient Market Hypothesis (EMH), have been widely criticized. Although market efficiency has been widely studied in financial research, extensive empirical evidence suggests that the three forms of market efficiency do not fully hold in practice.

One of the earliest theoretical critiques of the EMH was presented by Grossman and Stiglitz (1980), who argue that markets cannot be perfectly efficient when acquiring information is costly. If prices instantly incorporated all available information, investors would have no incentive to gather any information in the first place. (Grossman & Stiglitz, 1980.) Their study fundamentally contradicts EMH's assumption of costless information and shows that real-world frictions prevent markets from reaching full efficiency.

Normative finance further assumes frictionless markets, with no transaction costs, no trading constraints, and no major barriers to arbitrage. In practice, however, markets operate under various costs and frictions that prevent investors from behaving as perfectly rational utility maximizers. As a result, a gap emerges between the theoretical models and actual market behavior. (Kihn, 2011.) Such frictions increase the riskiness and practical difficulty of arbitrage. Pontiff (1996) studies the costs of arbitrage using closed-end funds. He discovers that they often trade at significant discounts or premiums relative to their net asset value over extended periods. He argues that arbitrage is both costly and risky, which prevents traders from eliminating mispricing, even when it appears theoretically straightforward. De Long et al. (1990) introduce the concept of “noise traders”, who trade on sentiment instead of fundamental information, generating excess volatility and mispricing. As a result, arbitrage risk increases, discouraging rational arbitrageurs from correcting mispricing.

According to Malkiel (2003), long-term, consistent deviations from market efficiency, commonly referred to as anomalies, challenge the normative view that prices fully and immediately reflect all available information and follow a random walk. Anomalies arise when real-world frictions, investor actions, or limits to arbitrage prevent prices from fully adjusting to new information, and they are often identified only after they have already occurred. Numerous anomalies have been documented in the literature. Wachtel (1942) was the first to analyze monthly return patterns and found that stock prices, particularly small-cap stocks, yield significantly higher returns in January. He noted that the effect was consistent over time. Banz (1981) found the size effect, showing that small-cap companies tend to yield greater risk-adjusted returns than large-cap companies. Fama and French (1992) documented the value premium, showing that both size and value factors consistently affect stock returns, with small companies outperforming large companies and high book-to-market stocks consistently outperforming growth stocks. Bernard and Thomas (1989) identified the post-earnings announcement drift (PEAD), which indicates that stock prices continue to move in the direction of an earnings surprise for several

weeks after the announcement. This drift pattern demonstrates that markets are slow to fully incorporate publicly available information. Examples such as the momentum effect, the value premium, and the January effect indicate that predictable return patterns may persist, and existing anomalies may enable investors to earn abnormal profits.

While the documented anomalies show persistent deviations from market efficiency, they do not explain why those deviations occur. Investor behavior is a key critique of normative finance. Normative finance assumes that investors are fully rational utility maximizers with consistent preferences, while research in behavioral economics challenges this assumption. Seminal research by Kahneman & Tversky (1979) demonstrates that people rely on cognitive heuristics and display consistent biases, such as loss aversion and overconfidence, resulting in variations from rational decision-making. Behavioral finance applies these insights to financial markets, indicating that investor psychology can have a major impact on asset pricing. De Bondt and Thaler (1985; 1987) document market overreaction, where investors systematically overreact to past information: past losers outperform past winners, indicating long-term return reversals. In addition, Shiller (1981) shows that stock price volatility is often greater than what fundamentals alone would justify. He suggests that psychological factors, along with investor sentiment, have a significant role in causing asset price deviations from fundamental values.

In conclusion, while normative finance provides a useful framework, its assumptions of fully rational investors and perfectly efficient markets do not capture the complexities of real-world financial behavior. Empirical evidence of anomalies, limits to arbitrage, and behavioral biases highlights persistent deviations from classical models, illustrating the importance of integrating alternative perspectives to better understand asset pricing and market dynamics.

2.2 Behavioral Finance and Descriptive Insights

Behavioral Finance (BF) began to develop in the late 1970s in response to the normative finance assumption that investors are completely rational and markets are perfectly

efficient, as growing evidence showed deviations from these assumptions and models. The literature generally organizes Behavioral Finance into two complementary foundations: psychological biases within investor decision-making and limits to arbitrage.

Building on insights from psychology and cognitive science, scholars such as Daniel Kahneman, Amos Tversky, and Richard Thaler have demonstrated that individuals systematically deviate from rational decision-making due to behavioral biases. Prospect Theory, introduced by Kahneman and Tversky in 1979, suggests that people evaluate losses and gains differently and are systematically irrational. Later, Thaler (1980) expanded on the ideas of Kahneman and Tversky by applying them to economics and introducing Mental Accounting, a concept that explains how individuals categorize and treat money differently based on its source or intended use, rather than treating it as fungible. Thus, De Bondt & Thaler (1985) provide the first major empirical evidence of psychological bias affecting the financial markets. Likewise, Robert J. Shiller (1981) demonstrated that real-world prices deviate from rational expectations due to psychological factors.

As a result, behavioral finance has developed into an interdisciplinary field that aims to explain how psychological factors affect financial decisions and market outcomes (Burton et al., 2013). Its significance has been recognized at the highest academic level, with several key pioneers receiving the Nobel Prize in Economics: Kahneman in 2002, Shiller in 2013, and Thaler in 2017. The main theories and ideas of behavioral finance that affect investor decisions and performance are explained in the following chapter.

2.2.1 Overview of Behavioral Finance Concepts and Insights

Behavioral Finance builds on concepts from psychology, sociology, and normative finance theory to better understand how people make financial decisions. Foundational work by Kahneman and Tversky (1979) demonstrates that people rely on cognitive heuristics and exhibit consistent biases, such as loss aversion and overconfidence, leading to

variations from rational decision-making. They introduced Prospect theory, which forms the theoretical foundation for many insights in behavioral finance. The prospect theory explains how people actually make decisions under risk, demonstrating that outcomes are evaluated based on expected gains and losses rather than absolute values. That indicates loss aversion, meaning that losses are perceived more strongly than equivalent gains. This results in inconsistent risk preferences based on whether outcomes are perceived as gains or losses.

The framing effect is closely linked to prospect theory. The way information is presented can notably influence decision-making, even when the underlying outcomes remain the same. The framing effect is a cognitive bias where people's decisions change based on how information is presented (Kahneman & Tversky, 1981). Prospect theory divides decision-making into two stages: the editing phase, in which individuals organize and simplify the presentation of options, and the evaluation phase, in which they judge options based on subjective values and possibly their own biased perceptions of probability (Kahneman & Tversky, 1979). In the decision-making process, the framing effect highlights the importance of carefully interpreting information to avoid biased or skewed judgments.

Mental accounting, developed by Richard Thaler in 1985, is a behavioral finance concept where people categorize and value money differently based on its origin or planned purpose, rather than treating it as equally valuable. This can lead to irrational decisions, such as treating tax refunds as 'free money' or keeping savings untouched while carrying expensive debt. The sunk cost fallacy is closely associated with mental accounting (Thaler, 1985). Individuals often continue investing money or time in failing projects simply because they have already invested resources in them, indicating a mental record of the funds spent (Thaler, 1985). In this way, mental accounting makes sunk costs feel relevant, even though it should not affect future decisions.

Behavioral finance has identified various heuristics and cognitive biases that influence investors' financial decision-making. One of the most powerful behavioral phenomena in financial markets is herd behavior, which occurs when investors replicate the activities of others rather than depending on their own information or analysis (Banerjee, 1992). For instance, many people may buy trending stocks simply because other investors do so. Herding has been shown to disrupt market dynamics by accelerating price movements, driving bubbles, affecting market efficiency, and increasing the probability of market overreactions (Burton et al. 2013, p. 71-72).

De Bondt And Thaler (1985) examined investor overreaction in the financial markets. Overreaction occurs when investors respond excessively to new information, whether it is favorable or negative. Investors may overreact to both fundamental information and non-fundamental noise, such as sentiment or speculative trading. This reaction leads asset prices to temporarily deviate from their fundamental value. When news is viewed as favorable, investors may be overly optimistic and push prices too high, while after negative news, they might panic and push prices too low. Overreaction causes price deviations and increased market volatility, and leads to patterns such as mean reversion, where prices eventually return to more realistic levels as initial emotions fade (De Bondt & Thaler, 1985).

Salience refers to the extent to which an event captures investor attention. Highly visible events tend to attract increased focus from market participants, analysts, and the media (Barber & Odean, 2008). Cross-listing is a salient corporate action, as it may signal international expansion and is often associated with increased disclosure, analyst coverage, and an expanded investor base (Merton, 1987). Research in behavioral finance suggests that heightened salience can lead to investor overreaction, which causes short-term price pressure and abnormal returns that are not fully justified by changes in fundamentals (Barber & Odean, 2008).

Investor sentiment demonstrates changes of investor optimism or pessimism that are not directly connected to fundamental information (Baker & Wurgler, 2007). When sentiment is high, investors tend to overvalue stocks and react strongly to positive signals. When sentiment is low, the opposite happens. These sentiment-driven mispricings can persist when arbitrage is costly or limited. Shleifer and Vishny (1997) and Pontiff (1996) show that transaction costs, noise-trader risk, and short-selling restrictions limit rational traders from correcting price deviations. Two closely related mechanisms, salience and sentiment-driven mispricing, help explain why market reactions might occur despite normative finance theories predicting minimal or no valuation effects.

Together, these key concepts form the foundation of behavioral finance and descriptive insights. They highlight the importance of understanding how investors make financial decisions in practice and demonstrate that both investors and decision-makers should consider the consistent patterns of human decision-making, emotions, and cognitive limitations.

2.2.2 Importance of Behavioral Finance and Descriptive Insights

Many real-world market conditions, such as excessive volatility and deviations in stock returns that cannot be attributed to risk factors, cannot be fully explained by normative financial theories. These normative frameworks often fall short due to factors such as investor irrationality, market frictions, or information asymmetry. Behavioral finance addresses these limitations by combining psychological factors into the understanding of financial decision-making (Burton et al., 2013).

Individual investors can improve their decision-making by becoming more aware of behavioral biases. Recognizing tendencies such as salience, herd behavior, and loss aversion helps investors to think more critically about their choices instead of acting purely based on instinct or emotion. Barber and Odean (2000) showed that investors who trade excessively due to overconfidence tend to significantly underperform more rational

investors. This suggests that understanding these human biases is critical at the individual level to improve long-term financial success. Behavioral finance helps explain anomalies and patterns that normative models fail to account for, such as price deviations, for instance, bubbles, and market crashes. According to De Bondt & Thaler (1985), these deviations from rationality are not random. They are often rooted in collective psychological behavior, which makes behavioral finance a valuable complementary perspective for understanding market dynamics.

In the context of cross-listing, behavioral finance concepts and descriptive insights offer a valuable perception into why market reactions may differ from what normative theories predict. Instead of prices adjusting instantly, investors may rely on mental shortcuts or react emotionally to new information. This behavior can lead to short-term anomalies or consistent price deviations. Incorporating this behavioral viewpoint allows for a more comprehensive understanding of how investors may view foreign listings and acknowledges the important role of human behavior in shaping financial market dynamics.

In conclusion, behavioral finance narrows the gap between theoretical models and real-world market behaviors by incorporating human psychology into the understanding of financial markets. Its insights are not only academically significant but also highly practical, offering tools and frameworks that can improve financial decision-making at both the individual and institutional levels.

2.3 Cross-listing

Cross-listing expanded significantly in the 1990s, due to global financial liberalization, developments in trading technology, and the growth of international institutional investing. According to Karolyi (1998), cross-listing refers to the process of listing a company's shares on a foreign stock exchange in addition to its domestic exchange. Cross-listing enables companies to access global capital markets without relocating their headquarters or changing their primary regulatory environment (Karolyi, 1998). It is executed

through one of two mechanisms: a direct listing, which is a straightforward way to trade a company's shares abroad, or the issuance of depositary receipts (DRs), which are discussed in detail in section 2.3.1. (Karolyi, 1998).

A company's decision to cross-list is often complex and influenced by strategic and financial considerations. At the company-level, companies may seek to increase their visibility among international investors, lower their cost of capital, or signal their quality and ambition to global markets. (Karolyi, 1998; Pagano, 2002). Cross-listing is often viewed as a credibility signal, especially when a company lists in a market with stricter disclosure requirements or stronger investor protections. Companies that comply with stricter regulatory standards may reduce information asymmetry and improve their corporate reputation (Coffee 1999; Stulz, 1999). At the market level, cross-listing allows companies to overcome the barriers caused by segmented capital markets. A foreign listing provides access to a broader investor base and enhances liquidity by making shares available to additional market participants across different time zones (Merton, 1987).

Cross-listing can also affect a company's valuation and stock price behavior. Prior research implies that foreign listings may generate abnormal returns around the listing date, affect trading volume, and cause long-term adjustments in market performance (Foerster & Karolyi, 1999; Miller, 1999). However, these effects can vary greatly among markets, regulatory environments, and company-level characteristics. Companies from emerging countries often experience greater valuation benefits when listing in developed markets such as the U.S. This is due to increased investor protection and reduced information asymmetry (Doidge et al., 2004). Cross-listing can be viewed as a strategic tool to provide access to international capital markets and increased global competitiveness, particularly for Nordic companies with relatively small home markets.

Despite its potential benefits, cross-listing also presents certain challenges. Companies must agree to additional regulatory requirements, including higher reporting and listing costs, and manage potential differences in investor expectations across markets (Coffee,

1999; Pagano et al., 2002). In some cases, cross-listings may not lead to these expected benefits or valuation premiums, especially when investor interest in a company remains limited (Karolyi, 2006).

Overall, cross-listing can be viewed as a strategic decision that can strengthen a company's visibility, attract a broader investor base, and improve access to capital. However, cross-listing is a complex phenomenon. Its effects vary depending on market conditions, investor behavior, and company-level characteristics. Academic literature has globally studied the financial effects of cross-listing, with particular focus on its impact on stock returns, liquidity, and market integration (Karolyi, 1998; Miller, 1999; Karolyi, 2006). Several theoretical frameworks explain these outcomes, including signaling theory, the bonding hypothesis, investor recognition, market segmentation, and liquidity theory (Merton, 1987; Coffee, 1999; Pagano et al., 2002). These theories are discussed in detail in the following chapters. Together, they provide a comprehensive foundation for understanding why cross-listing may lead to abnormal returns, which constitutes the central empirical question of this study.

2.3.1 Depository Receipts as Cross-Listing Instruments

Companies can internationalize their equity through alternative mechanisms in addition to direct cross-listing of shares. Depository receipts (DRs) are financial instruments that enable companies to have their shares traded in foreign markets without issuing the underlying shares directly on those exchanges, using a simplified, regulated mechanism. A depository bank holds the company's domestic shares and issues tradable receipts representing ownership of those shares. These receipts can subsequently be bought and sold on foreign exchange in the same way as domestic securities. (ESMA, 2022.) In other words, rather than purchasing the underlying foreign shares directly, investors can acquire a receipt issued by a depository institution. This structure allows foreign companies to access international capital markets. Additionally, it provides investors with the

benefits of holding foreign securities without the administrative complexities of cross-border transactions.

The most common of depositary receipts is the American Depositary Receipt (ADR), which enables non-U.S. companies to access U.S. capital markets. ADRs are typically issued as either sponsored or unsponsored forms and are traded either over-the-counter or on major U.S. exchanges such as the NYSE or NASDAQ. By offering a familiar trading, settlement, and regulatory framework to U.S. investors, ADRs may broaden a company's investor base and increase visibility and liquidity in the host market. (Karolyi, 1998; Lander, 1995.) ADRs are further divided into three levels with varying regulatory requirements and market access. Level I ADRs, which trade over-the-counter and have minimal reporting requirements, offer limited visibility for companies seeking modest foreign market presence. Level II ADRs must be registered with the SEC and comply with U.S. GAAP, enabling listing on major U.S. exchanges and significantly increasing investor attention. Level III ADRs require the highest regulatory commitment, including complete registration and reporting, while also allowing companies to raise capital directly in the U.S. market. (Karolyi, 1998; Lander, 1995.)

As a result, higher ADR levels may signal stronger credibility and commitment to investors. This aligns with both signaling theory and the bonding hypothesis, which will be discussed in the following chapter. To clarify the institutional differences among depositary receipt structures, Table 1 summarizes the main types of depositary receipts and highlights their regulatory requirements, trading venues, and economic functions.

Table 1. Overview of Depositary Receipts

Type of Depositary Receipt	Region / Market	Trading Venue	Regulatory Requirements	Capital Raising	Primary Function
ADR – Level I	United States	Over-the-counter (OTC)	No full SEC registration, home-country reporting	No	Basic U.S. market presence with minimal regulatory burden
ADR – Level II	United States	NYSE / NASDAQ	SEC registration with U.S. GAAP / IFRS reconciliation	No	Increased visibility, liquidity, and investor base
ADR – Level III	United States	NYSE / NASDAQ	Full SEC registration with U.S. GAAP / IFRS reconciliation, public equity offering	Yes	Capital raising, bonding/signaling
ADR – Unsponsored	United States	OTC	Initiated by depositary bank, limited disclosure	No	Passive trading access without issuer commitment
GDR (Global Depositary Receipt)	Europe / Global	European or international exchanges	Varies by exchange, less stringent than U.S. ADRs	In certain cases	Access to multiple non-U.S. markets
SDR (Swedish Depositary Receipt)	Nordic (Sweden)	Nasdaq Stockholm	Local regulatory framework, Swedish custodian holds shares	In certain cases	Local trading access for foreign companies
FDR (Finnish Depositary Receipt)	Nordic (Finland)	Nasdaq Helsinki	Local regulatory framework, Finnish custodian holds shares	In certain cases	Local trading access for foreign companies
NDR / DDR	Nordic (Norway / Denmark)	Local exchanges	Local regulatory framework, Norway/Denmark custodian holds shares	No	Local trading access for foreign companies

In Europe and other regions, different types of depositary receipts, such as Global Depositary Receipts (GDRs), have the same function as ADRs. They allow foreign companies to trade on local exchanges in addition to their domestic exchanges. In the Nordic region, the best-known example is the Swedish Depositary Receipt (SDR), which is used on Nasdaq Stockholm, and a Swedish custodian bank holds the underlying foreign shares. (ESMA, 2022). Other Nordic exchanges offer similar, though less common, instruments such as Norwegian Depositary Receipts (NDRs) and Danish Depositary Receipts (DDR), which likewise allow foreign companies to trade locally without a direct listing (ESMA, 2022). Due to the Nordic region's high degree of global participation and advanced market infrastructure, depositary receipts provide a practical mechanism for integrating foreign companies into local markets while maintaining familiar trading conditions for domestic investors.

2.3.2 Dual-Listed Companies

Dual-listed companies (DLCs) are closely linked to the cross-listing literature as they provide a useful setting for studying price convergence across markets. Like cross-listed companies, DLCs have their stocks traded on more than one stock exchange at the same time. However, unlike traditional cross-listings, the two share classes represent the same claims on the company's cash flow. In a DLC structure, two legally separate companies, often functioning in different countries, operate as a single economic entity through equalization agreements (Kihn, 2011). These agreements ensure that cash flows, dividends, and voting rights are aligned. Well-known examples include Royal Dutch/Shell and BHP Billiton, although DLC structures have become less common over time.

Theoretically, dual-listed companies test the law of one price (LOOP) directly. As discussed, securities with the same cash flows should trade at the same price in a common currency (Kihn, 2011). Any consistent price deviations that fundamental factors cannot explain represent violations of LOOP. Like the price differences across countries, as shown by the Big Mac Index (The Economist, 2026), price differences in dual-listed companies can be explained by practical market frictions. These include, for instance, transaction costs, market segmentation, currency frictions, and limits to arbitrage (Kihn, 2011).

From an empirical standpoint, the structure of DLCs also reduces the joint-hypothesis problem often encountered in asset-pricing tests. Since the two share classes represent contractually identical claims, any deviations from price parity can be attributed more directly to market frictions than to model misspecification. This makes DLCs a particularly clean context for studying price convergence.

Although DLCs are rare and thus unsuitable for large-sample analyses, the evidence they provide on segmentation and arbitrage limits offers valuable context for understanding the conditions that determine whether cross-listing succeeds or fails in integrating prices across markets.

2.3.3 Credibility Mechanisms: Signaling Theory and Bonding Hypothesis

Cross-listing decisions may convey implicit messages about company quality, governance, and long-term commitment to transparency (Coffee, 1999; 2002). Signaling theory (Spence, 1973) and the bonding hypothesis (Coffee, 1999; Stulz, 1999) share a common foundation and explain why cross-listing may be viewed as a credible signal and how it affects market reactions. Both theories suggest that cross-listing is an expensive and voluntary commitment that low-quality companies would be unable to implement, making it an essentially credible signal to investors. While signaling theory emphasizes the information provided to the market through this commitment, the bonding hypothesis focuses on the legal and governance implications of this commitment (Coffee, 1999; Stulz, 1999).

Signaling theory is based on Spence's (1973) foundational work. He demonstrated that in markets where information is not asymmetric, informed parties can credibly signal their quality to uninformed parties through costly and visible actions. The key condition for a signal to be credible is that it must be too costly for low-quality companies to replicate, indicating a trait known as the separating equilibrium. Ross (1977) extended this argument to capital structure decisions in financial markets, claiming that companies use financial choices as signals of their realistic quality to outside investors. Because investors cannot determine a company's true quality or future performance, they rely on expensive, credible signals that are difficult for low-quality companies to replicate. Companies may signal their quality through a variety of costly actions, from dividend policies and debt issuance (Ross, 1977) to governance improvements and voluntary disclosure practices (Coffee, 1999). A signal is effective when it provides the market with new information that allows investors to adjust their expectations about the company's value (Ross, 1977).

In terms of cross-listing, the decision to list shares on a foreign market serves as a reliable signal for several reasons. Cross-listing exposes the company to greater regulatory scrutiny, increased disclosure requirements, and a more sophisticated investor base, all of

which lead to actual costs for the company (Coffee, 1999; Stulz, 1999). High-quality companies with strong fundamentals can more easily absorb these costs. Thus, the act of cross-listing itself conveys company quality to the market in a credible way. The company can signal confidence in its governance, financial reporting, and long-term prospects by voluntarily entering a more demanding market (Doidge et al., 2004).

According to signaling theory, the market will respond favorably to a cross-listing announcement, and the strength of this reaction will be higher for companies with more severe information asymmetry between managers and outside investors. Cross-listing may thereby broaden the company's investor base, enhance its market reputation, improve stock liquidity, and reduce information asymmetry between management and international market participants (Doidge et al., 2004).

The bonding hypothesis emphasizes the governance commitments that result from cross-listing, whereas signaling theory concentrates on information conveyed through it. The Bonding hypothesis, developed by Coffee (1999) and Stulz (1999), suggests that companies from countries with weakened investor protection and insufficient legal enforcement can credibly commit to higher governance standards by voluntarily submitting to the increased legal and regulatory environment of a foreign exchange. In this sense, cross-listing functions as both a signal and a legally binding commitment that constrains managerial conduct and reduces the risk of minority shareholders being expropriated (Coffee, 1999; Stulz, 1999).

According to Coffee (1999), the bonding mechanism operates through two primary channels. Legal bonding occurs when a company is exposed to the jurisdiction of foreign securities regulators, such as the SEC, through a cross-listing. This exposes the company to increased disclosure requirements and legal liability. Reputational bonding occurs when the increased visibility and analyst scrutiny generate unofficial market-based incentives for good governance, independent of formal legal enforcement (Coffee, 1999).

Reese and Weisbach (2002) and Coffee (1999) further demonstrate that cross-listing in the U.S., where regulatory standards are particularly stringent, serves as a credible commitment to upholding minority shareholder interests and maintaining high-quality financial disclosures, thereby reducing agency costs and increasing company value in the eyes of international investors.

Doidge et al. (2004) provide the most influential empirical evidence connecting both signaling theory and the bonding hypothesis to the effects of cross-listing on valuation. They discover that cross-listed companies have a significant valuation premium over their non-cross-listed domestic peers after studying a large sample of foreign companies cross-listed in the U.S. They attribute this finding to the improvements in governance and credibility commitments associated with U.S. listing requirements. According to Doidge et al. (2004), these findings suggest that the valuation premium is particularly pronounced for companies from countries with weak investor protection, where the bonding commitment to stronger governance standards carries the greatest credibility value. Moreover, they also find that the premium is larger for companies with greater growth opportunities, consistent with the signaling hypothesis that cross-listing communicates company quality and prospects to the market. This finding has direct implications for the abnormal return analysis conducted in this study.

Given the relatively high governance standards already prevalent in Nordic markets, the bonding effect may be less pronounced than in emerging markets. However, the increased monitoring can still result in significant bonding and signaling benefits for Nordic companies listing on major exchanges such as the NYSE or the London Stock Exchange, particularly through reputational bonding and greater investor attention.

2.3.4 Investor Recognition and Market Segmentation

While signaling theory and the bonding hypothesis describe cross-listing as a way to build credibility for a company, market segmentation and investor recognition provide

more comprehensive explanations based on how the capital markets are structured and the informational environment in which investors operate. Both frameworks predict that cross-listing increases company value by expanding the investor base, but they differ in the mechanism through which this expansion occurs. Market segmentation theory attributes the valuation effect to the removal of structural barriers that previously prevented foreign investors from accessing a security, while investor recognition theory emphasizes the role of awareness and information in determining which securities investors choose to hold. In other words, they differ fundamentally in whether the constraint is due to market access or investor awareness, and their relative importance may vary across markets and over time. Together, these frameworks suggest that cross-listing generates positive abnormal returns not only because of the information it communicates to the market, but also because it expands the base of potential investors.

Market segmentation occurs when barriers prevent investors from freely accessing securities across different markets. This leads to differences in asset pricing across national borders. These barriers may be legal, regulatory, informational, or practical in nature, and their existence implies that identical or similar assets can have different values across markets. Errunza and Losq (1985) established the theoretical foundation for market segmentation in international finance. They show that when investors face limitations on holding foreign securities, those securities carry a segmentation premium that reflects the limited pool of eligible investors. Cross-listing makes the stock accessible to a broader investor base (Foerster & Karolyi, 1999). This increase in access lowers the segmentation premium by increasing demand and raising the price. Because the market expects the segmentation premium to decline after the listing, the segmentation hypothesis forecasts positive abnormal returns around the cross-listing event.

While market segmentation operates at the structural level, investor recognition addresses the behavioral and informational aspects of cross-listing valuation effects. Merton (1987) developed the theoretical foundation for this theory in his model of capital market equilibrium with incomplete information, suggesting that investors only hold

securities they are aware of, and therefore companies with a broader investor base tend to command higher valuations. According to Merton (1987), extending the number of investors who recognize a company lowers the shadow cost of incomplete information, resulting in a decreased required return and a higher stock price. Applied to cross-listing, the investor recognition hypothesis suggests that listing on a foreign exchange increases company visibility, attracts media and analyst attention, and introduces the stock to investors who were previously unaware of it (Merton, 1987). These effects from increased investor recognition lower the company's cost of capital and lead to positive abnormal returns around the listing event (Foerster & Karolyi, 1999; Merton, 1987).

Foerster and Karolyi (1993; 1999) provide seminal empirical evidence connecting cross-listing valuation effects to both market segmentation and investor recognition. They examined a large sample of non-U.S. companies listing in the United States and found significant positive abnormal returns during the period surrounding the cross-listing event. This supports both the segmentation and investor recognition hypotheses. Their findings suggest that cross-listing reduces the cost of capital by expanding the company's investor base and increasing its visibility in international capital markets. Importantly, they document a post-listing decline in returns, which they attribute to the progressive absorption of the segmentation premium as the investor base stabilizes, supporting the semi-strong form of market efficiency.

With respect to the Nordic home market's limited size and reliance on domestic institutional investors, the investor recognition effect may be particularly relevant in this context. Nordic companies that cross-list on larger exchanges may gain access to a broader and more diversified investor base, which could lead to greater recognition effects than for companies from larger, more internationally integrated home markets.

2.3.5 Liquidity Theory

In financial markets, liquidity refers to the degree to which a security can be traded without significantly affecting its price (Kyle, 1985; Amihud & Mendelson, 1986). In the context of cross-listing, the liquidity theory suggests that listing shares on foreign exchange increases a stock's overall trading activity. This improves liquidity in both the domestic and foreign markets (Foerster & Karolyi, 1999). Amihud and Mendelson (1986) established theoretical groundwork for the relationship between liquidity and asset pricing. Their study demonstrates that investors expect a return premium for holding illiquid securities. As liquidity increases, this premium diminishes, lowering the company's cost of capital and resulting in a corresponding increase in stock price.

Liquidity is defined in various ways in academic literature. The bid-ask spread is a commonly used statistic. It represents the cost of trading a security and reflects three underlying components: order processing, inventory, and information asymmetry costs (Stoll, 1989). According to Stoll (1989), a narrower spread indicates higher liquidity, meaning that investors face lower transaction costs when buying or selling the security, and vice versa. Trading volume is a common alternative measure that captures liquidity by measuring the sensitivity of price changes to the amount of trading activity. When this sensitivity is high, liquidity is reduced. (Amihud & Mendelson, 1986). The basic idea is that in a liquid market, trades can be executed without causing significant price movements since there is enough buyer and seller activity to absorb the order flow. When even modest trading volume generates significant price fluctuations, the market is considered illiquid (Amihud & Mendelson, 1986).

Cross-listing has been empirically proven to improve liquidity through several channels. Foerster and Karolyi (1993) analyzed Canadian companies that cross-listed in the United States and discovered that cross-listing results in a significant increase in trading volume in the domestic market. They demonstrate that cross-listing expands the investor base by making the stock accessible to foreign investors who may have previously faced barriers to trading the security. Their findings reveal that cross-listing attracts greater analyst

coverage and media attention, which enhances information flow and narrows bid-ask spreads. The increased trading volume across multiple exchanges boosts market liquidity, making it easier to execute large trades without significant price impacts (Foerster & Karolyi, 1993). Notably, the results show that the increase in trading volume remains significant in the post-listing period, implying that this increase in liquidity is not a temporary phenomenon. Shleifer and Vishny (1997) further emphasize that expanding the investor base reduces the impact of individual trades on prices and improves market liquidity. A more diversified group of market participants improves the market's capacity to absorb order flow without significant price disruption.

2.4 Nordic Capital Markets

The Nordic capital markets include the equity exchanges of Denmark, Finland, Sweden, Norway, and Iceland. This study also considers cross-listed companies that operate in the closely integrated Nordic and Baltic exchange environment, such as Nasdaq Tallinn. The Nordic markets are recognized as among the most advanced, transparent, and well-regulated in the world, despite their relatively small size compared with major global financial centers such as New York and London. The Nordic capital markets are characterized by a strong legal and regulatory framework that guarantees investor protection and market integrity, high levels of institutional investor engagement, and strong corporate governance norms (NSA, 2026).

The majority of Nordic equity trading takes place on Nasdaq Nordic, which operates the stock exchanges in Helsinki, Stockholm, Copenhagen, and Reykjavik under one unified trading platform. Oslo Børs represents Norway's equity market, which operates autonomously but is tightly integrated with the Nordic market through cross-border trading and comparable regulatory standards. Despite this high degree of integration, the Nordic markets remain relatively small in terms of market capitalization (NSA, 2026). The limited market capitalization of domestic markets has historically encouraged companies to seek

additional financing and visibility by cross-listing on larger foreign exchanges, particularly in the United States or other major European markets (Pagano et al., 2002).

The Nordic markets have several characteristics that are particularly relevant for cross-listing. The Nordic region is widely regarded as having strong corporate governance, particularly in terms of shareholder rights and investor protection (Nenova, 2003). This high level of governance quality affects the implications of the bonding hypothesis discussed earlier. Since Nordic companies already operate under strong governance frameworks, the additional bonding benefit from cross-listing may be less noticeable than for companies in emerging markets with weaker institutional environments. Furthermore, Nordic markets are characterized by relatively high ownership concentration. Large institutional investors and founding families often hold significant controlling stakes in companies (Faccio & Lang, 2002). Even in a high-governance environment, the signaling and bonding effects of cross-listing may be relevant due to the possibility of agency conflicts between controlling and minority shareholders caused by this ownership structure.

These characteristics make the Nordic capital markets a particularly interesting setting for studying the effects of cross-listing on stock returns. The emerging-market environments dominate much of the cross-listing literature. In contrast, Nordic markets are fundamentally different, with high governance standards, comparatively small domestic markets, a strong international orientation, and concentrated ownership structures. Together, these exchanges form a highly integrated regional capital market that affords companies access to a sophisticated regional investor base and enables cross-border investment. These factors offer a valuable setting for testing whether the predictions about cross-listing effects hold in Nordic markets.

3 Literature Review

This chapter reviews the empirical literature related to cross-listing and its effects on stock returns. While the theoretical framework explains how cross-listing might influence a company's returns through mechanisms such as market efficiency, liquidity, and behavioral explanations, the literature review focuses on prior empirical findings concerning both short-term and long-term stock price performance. Existing research shows mixed evidence on whether cross-listing generates abnormal returns around the listing event and whether these effects last over time.

The literature is organized into three main sections. The first section examines short-term abnormal returns associated with cross-listing announcements, typically using event study methodologies. The second section focuses on long-term stock performance following cross-listing and assesses whether initial effects persist or fade over time. The final section covers the literature on cross-listing in the Nordic countries. Together, these studies highlight that the market context, company characteristics, and institutional environments all play crucial roles in shaping cross-listing outcomes. Notably, the limited empirical evidence focusing specifically on Nordic companies remains narrow. This gap underscores the need for further research in this setting, thereby motivating the hypotheses tested in this thesis.

3.1 Short-Term Return Evidence

Extensive evidence documents positive abnormal returns following a company's cross-listing. Karolyi (1998) provides an early survey of empirical studies on the effects of cross-listing, reporting mixed but systemic patterns in stock return performance over time. In the short-term, share prices tend to respond favorably to cross-border listings within the first month after listing. However, the magnitude and persistence of these returns vary considerably, depending on market environment and company-specific factors. Karolyi (1998) additionally shows that trading activity generally increases after cross-listing.

Most importantly, he finds that cross-listing can significantly reduce companies' exposure to domestic market risk. This leads to an average decrease in the cost of equity capital of approximately 126 basis points. This suggests that the primary benefits of cross-listing may arise from risk reduction and lower capital costs, rather than from sustained abnormal returns.

Foerster and Karolyi (1999) present seminal evidence on the stock price effects of cross-listing. Using an event-study methodology, they examined 153 non-U.S. companies that cross-listed on U.S. exchanges from 1976 to 1992. They found significant abnormal returns of around 19 % in the year before the listing and during the listing week. However, their findings also reveal a consistent decline after the listing, with stocks underperforming by roughly 14 % in the year following cross-listing. The authors interpret this pattern as evidence that pre-listing price increases may be due to temporary liquidity improvements or market segmentation effects. These effects fade as information asymmetries decline.

Miller (1999) studied 181 companies from 35 countries that cross-listed in the U.S. through Depositary Receipts (DRs) between 1985 and 1995. Using an event-study methodology, he finds significant positive short-term abnormal returns. The three-day cumulative abnormal return is on average +1,15 %. This effect is even stronger for companies listed on major exchanges such as the NYSE or NASDAQ, where abnormal returns reach around +2,63 %. These findings suggest that cross-listing can increase a company's visibility and credibility by exposing it to stricter disclosure standards and by providing access to a broader investor base. As a result, investor recognition may improve, and perceived governance quality may be stronger, especially when cross-listing in more prominent markets.

Similarly, Eun and Sabherwal (2003) study Canadian companies that cross-listed in the United States and examine how prices adjust across the two markets. Their results indicate that cross-listing leads to price adjustments in both markets, with U.S. exchanges

having a significant impact on short-term price discovery. They find that U.S. markets account for approximately 38,1 % of overall price discovery, and this effect remains economically significant over time. These findings indicate that new information is rapidly incorporated into prices across markets, providing empirical support for semi-strong market efficiency in the context of cross-listed stocks.

Melvin and Valero (2009) study how the cross-listing of foreign companies in U.S. markets affects their main domestic competitors. They find that primary rival companies experience negative short-term abnormal returns of approximately $-2,2\%$ over an 11-day window around the cross-listing date. From a signaling and behavioral perspective, cross-listing sends a positive signal about the quality, transparency, and credibility of a company. This is due to stricter disclosure requirements and increased visibility in U.S. markets. As investors react to this signal, non-listed competitors are viewed less favorably, placing them at a relative disadvantage. The findings show that the signaling effect is particularly strong for competitors in developed markets and for companies with greater growth opportunities. Overall, the results suggest that the negative spillover reflects a short-term reassessment by investors rather than changes in long-term competitive fundamentals.

Esqueda (2017) studies market timing in cross-listing decisions. The study shows that companies often choose to list abroad during high valuation periods. The author's findings highlight the importance of company-level factors, as companies that cross-list are systematically different from those that do not. These companies often tend to time listings to align with favorable market conditions. Consequently, the abnormal returns observed around cross-listing events may partly reflect existing valuation trends instead of the direct effects of the listing itself. The study addresses the importance of carefully interpreting event study evidence and recommends using methodologies that account for selection and timing effects.

More recent research shows that managers often try to time capital market conditions. This suggests that corporate financing and listing decisions may be influenced by perceived market valuations rather than purely by fundamentals (Graham, 2022). Graham (2022), based on CFO surveys, reports that managers frequently attempt to time the market using simple rules aimed at short-term valuation peaks. This behavior indicates that companies may strategically choose to cross-list when investor sentiment is positive or valuations are high, which can lead to short-term abnormal returns around listing events, without necessarily indicating lasting value creation.

Academic literature shows that the effects of cross-listing vary depending on the destination market and the degree of market integration. Alexander et al. (1988) studied international cross-listings on major exchanges in the United States, the United Kingdom, and Japan. The sample included over 30 countries. They find no consistent evidence of positive abnormal stock returns around the cross-listing event. Instead, their results indicate that the stock returns often decline after cross-listing, especially for companies from outside Canadian markets. The authors suggest that cross-listing reduces market segmentation and improves international risk sharing, which lowers expected returns instead of creating short-term valuation gains. These findings complement Karolyi's (1998) survey evidence. The study similarly concludes that although short-term valuation effects may occur, the main long-term benefits of cross-listing stem from reduced risk exposure, better market integration, and lower capital costs.

Bris et al. (2007) analyze cross-listings across multiple destination markets and show that stock returns during the announcement period depend strongly on exchange characteristics. They find that cross-listings on major U.S. exchanges, such as the NYSE and NASDAQ, are associated with positive abnormal returns of about 0,4 % to 1,1 % around the announcement date. In contrast, listings in markets with weaker investor protection and regulatory standards tend to yield smaller or negative effects. Their findings highlight the importance of regulatory quality, market depth, and disclosure standards in shaping investor reactions to cross-listing events. Overall, the results indicate that the

features of the destination market play an important role in determining how cross-listing affects a company's valuation.

King and Segal (2009) studied primarily Canadian companies that cross-list on the U.S. markets. They show that market reactions depend on the company's information environment before the listing. The results indicate that companies facing high information asymmetry before cross-listing experience significantly positive abnormal returns around the announcement, typically in the range of 2–4 %. In contrast, well-known companies from already transparent environments display weak or insignificant market reactions. These findings suggest that cross-listing creates value mainly by improving information disclosure and visibility. The benefits of cross-listing are most significant for companies that experience a notable increase in transparency and disclosure. The findings of King and Segal (2009) are consistent with both the signaling and bonding hypotheses.

Additionally, Roosenboom and Van Dijk (2009) examine European companies cross-listing in the United States and analyze how market reactions vary across countries. They study listings from 1985 to 2005 and document average cumulative abnormal returns of about 1,3 % over a three-day window around the cross-listing announcement. They also identify substantial heterogeneity across companies. Companies from the United Kingdom exhibit relatively small or insignificant market reactions, while companies from Continental Europe, especially those from civil law countries, experience stronger positive abnormal returns. These findings are consistent with the bonding hypothesis, suggesting that companies from weaker legal and investor protection environments benefit more from cross-listing in the U.S. This is due to increased credibility and stronger governance commitments.

Table 2. Key Empirical Studies on Short-Term Cross-Listing Effects

Study	Sample / Market	Methodology	Key Finding	Key Interpretation
Karolyi (1998)	International evidence	Literature review	Generally positive short-term returns	Market segmentation: Main benefits through risk reduction and lower cost of capital
Foerster & Karolyi (1999)	153 non-U.S. companies listing in the U.S.	Event study	Strong positive returns before and around listing, post-listing underperformance	Market segmentation & Liquidity: Strengthened liquidity and segmentation effects that fade over time
Miller (1999)	181 companies from 35 countries listing in the U.S.	Event study	Positive CARs of 1,15% over 3 days, 2,63% for NYSE/NASDAQ	Signaling: Increased visibility, investor recognition, and credibility
Eun & Sabherwal (2003)	Canadian companies cross-listed in the U.S.	Price discovery analysis	Significant short-term price adjustments	Market integration: Improved information incorporation and price discovery across markets
Melvin & Valero (2007)	Foreign companies listing in the U.S.	Event study	Negative abnormal returns of 2,2% for competitor companies	Signaling: Signaling and behavioral factors affecting competitors
Esqueda (2017)	Foreign companies listing in the U.S.	Event study	Positive short-term returns during high-valuation periods	Market timing & Sentiment: Market timing by controlling shareholders, short-term returns may reflect timing rather than initial listing effects
Graham (2022)	Global companies	Survey-based empirical analysis	Managers actively attempt to time capital market conditions when issuing securities	Market timing & Sentiment: Market timing by managers, short-term returns may reflect timing rather than initial listing effects
Alexander et al. (1988)	Multiple destination markets	Event study	No consistent positive abnormal returns	Market integration: International risk sharing, lower expected returns
Bris et al. (2007)	Multiple destination markets	Event study	Positive CARs of 0,4%–1,1% for major U.S. exchanges	Bonding: Regulatory quality and investor protection drive reactions
King & Segal (2009)	Primarily Canadian companies listing in the U.S.	Event study	Positive CARs of 2–4% for high asymmetry firms	Bonding & Signaling: Information improvement
Roosenboom & Van Dijk (2009)	European companies listing in the U.S.	Event study	Average CARs of 1,3%, heterogeneous by country	Bonding: Stronger effects for companies from weaker legal environments

Table 2 summarizes key empirical studies on short-term market reactions to cross-listing events. The reviewed studies include varying samples, methodologies, and reported abnormal returns. The findings are classified by underlying mechanisms to better understand the effects of cross-listing. Overall, empirical evidence is generally positive in the short-term. However, the magnitude and direction of short-term effects differ across destination markets, regulatory environments, and company-specific characteristics. This overview shows the heterogeneity of cross-listing effects and provides context for the empirical analysis in this study.

3.2 Long-Term Return Evidence

As discussed before, the effects of cross-listing vary depending on the destination market and the degree of market integration. Sarkissian and Schill (2004) analyze the overseas listing decision of 526 foreign companies. They show that companies tend to cross-list in

markets where they already have strong economic and informational ties. The authors find that companies do not choose listing locations randomly but rather based on trade connections, geographic proximity, and investor familiarity. This suggests that market segmentation is often already limited at the time of listing. Therefore, the potential for large valuation gains from cross-listing may be smaller than suggested by traditional segmentation models. The study highlights the importance of selection effects and offers an explanation for why cross-listing does not always lead to significant or permanent improvements in company valuation.

Doidge et al. (2004) provide strong evidence on the valuation effects of cross-listing from a sample of 1251 companies from 31 countries. They use Tobin's Q as a measure of company value and show that cross-listed companies trade at a significant valuation premium of approximately 16,5 % over similar non-cross-listed companies in the same country. Importantly, they show that this premium varies based on company characteristics. Companies with strong growth opportunities and those emerging from countries with weaker investor protection experience higher premiums. The authors interpret this valuation premium as support for the bonding hypothesis, as cross-listing enables companies to credibly commit to higher disclosure standards and stronger investor protection by subjecting themselves to U.S. securities regulation. These findings indicate that cross-listing can create value through both short-term market reaction and lasting improvements in company valuation.

Sarkissian and Schill (2009) analyze whether valuation gains associated with overseas listings last over time. They use a global sample of 1676 cross-listings across 25 countries. The study shows that companies typically experience a significant run-up in valuation before the listing. Tobin's Q increases by approximately 20 to 30 % in the pre-listing period. However, these returns largely disappear within three to five years after being listed. As a result, there is no significant permanent valuation premium over the longer term. The authors report little evidence of consistent abnormal stock return performance. This suggests that early valuation increases reflect temporary investor optimism rather than

lasting improvements in company fundamentals. Overall, the findings suggest that the benefits of cross-listing are not necessarily permanent and that market expectations tend to adjust downward over time.

Similarly, Gozzi et al. (2008) study cross-listing activity among companies from emerging markets and find that long-term results vary widely. The authors confirm positive short-term market reactions around cross-listing events. However, they find that long-term benefits depend strongly on company characteristics. Larger companies and companies with strong pre-listing governance and financial transparency are more likely to experience lasting improvements in company performance and in access to financing after the cross-listing. Smaller companies, in contrast, face higher relative compliance costs and limited ability to take advantage of foreign market access, leading to weaker long-term effects and partial mean reversion. The findings highlight that cross-listing benefits are not universal. Instead, they depend on companies' capacity to translate market access into lasting economic gains.

More recent work by Doidge et al. (2009) shows that cross-listing activity has declined over time. Their study shows that cross-listings in the U.S. and London have become less appealing since 2002. This decline occurred when the regulations and disclosure requirements were tightened following the enactment of Sarbanes–Oxley. However, the authors argue that this decline was driven by changes in company characteristics rather than by increased regulatory costs following the Sarbanes–Oxley Act. The authors also note that a cross-listing premium remained consistent throughout the sample period, suggesting that the benefits of U.S. listing were not significantly weakened by regulatory changes after 2002.

Table 3 summarizes key empirical studies examining the long-term valuation effects of cross-listing. The table shows differences in sample characteristics, methodologies, and reported abnormal returns. The findings are classified according to the underlying theoretical mechanisms.

Table 3. Key Empirical Studies on Long-Term Cross-Listing Effects

Study	Sample / Market	Methodology	Key Finding	Key Interpretation
Sarkissian & Schill (2004)	526 foreign companies, global	Overseas listing choice analysis	No systematic permanent valuation improvement	Market Segmentation: Strong selection effects, companies' list where integration already exists
Doidge et al. (2004)	1 251 companies from 31 countries	Panel analysis using Tobin's Q	Persistent valuation premium of 16.5%, heterogeneous	Bonding: Stronger effects for weak governance countries
Sarkissian & Schill (2009)	1 676 cross-listings in 25 countries	Panel / Valuation analysis	Pre-listing run-up of 20–30%, no permanent premium	Market Sentiment: Temporary investor optimism, mean reversion over time
Gozi et al. (2008)	Emerging-market companies	Panel / Valuation analysis	Long-term benefits conditional on company size and governance	Bonding & Company-level Characteristics: Ability to exploit market access matters
Doidge et al. (2009)	U.S. and London cross-listings	Panel analysis	Cross-listing premium persists despite decline in activity	Company-level Characteristics: Decline driven by company characteristics, not changes in regulatory

Overall, research on the long-term effects of cross-listing shows that while it can increase company value, the benefits are not uniform across companies and may not be permanent. Early studies document valuation effects that are consistent with the bonding hypothesis and signaling theory. The effects come from improved investor protection, especially for companies in weak-governance environments. For many companies, valuation effects appear temporary and may reflect short-term investor optimism rather than lasting improvements in the company's fundamentals. Taken together, the prior evidence indicates that long-term cross-listing outcomes depend critically on where companies list, when they list, and whether they have the capacity to utilize increased market integration into actual long-term economic benefits.

3.3 Nordic-Related Studies and Research Gap

In well-developed European markets, the effects of cross-listing are more modest. Recent research on European cross-listings provides important context for understanding Nordic market dynamics. Hietala (1989) provides a foundational analysis of market segmentation, using the Finnish stock market as a natural laboratory during a period when Finnish residents were restricted to holding only domestic securities, while foreign investors could trade freely. Taking advantage of this institutional setting, the study derives

required rates of return for different investor groups and shows that foreign investors were willing to pay higher prices for unrestricted shares. As a result, unrestricted securities traded at a significant premium relative to otherwise identical restricted shares. The empirical evidence strongly supports the market segmentation hypothesis, demonstrating that ownership restrictions generate substantial price differentials. This study is particularly relevant to the cross-listing literature, as it establishes the theoretical foundation for understanding how the loosening of investment barriers, such as cross-listing, can reduce segmentation premiums and lower a company's cost of capital. It also helps explain why Nordic companies faced strong incentives to list abroad during the late 1980s and early 1990s, when regional market segmentation was especially pronounced.

Høie and Andersson (2024), in their Master's Thesis, examine European companies, including Swedish, Norwegian, Danish, and Finnish companies, that cross-listed in the United States during the COVID-19 pandemic. They use a Synthetic Difference-in-Differences approach and find that U.S.-listed companies experienced significantly smaller increases in systematic risk, with an estimated effect of $-0,195$. Although betas increased for both groups during the crisis, the rise was markedly lower for U.S.-listed companies (10,32 %) than for non-U.S.-listed companies (44,46 %). The authors find no statistically significant differences across U.S. listing types. This suggests that signaling through stricter disclosure requirements may be less relevant for companies from developed markets with strong existing governance. Overall, the results indicate that cross-listing benefits depend on home-market characteristics and contrast with findings for emerging-market companies.

Kimpimäki (2015) uses a qualitative, process-oriented research approach in his Master's Thesis to examine the motivations and challenges of cross-listing in the United States among Finnish companies. Based on the results, Kimpimäki (2015) concludes that Finnish companies list on U.S. exchanges primarily to access growth opportunities, reduce their cost of capital, and increase the transparency of financial information. The analysis notes that, in addition to potential benefits, the companies also face higher compliance

costs, increased performance expectations, and heightened market uncertainty, which should be considered. The study shows that Finnish companies view the U.S. cross-listings as the most beneficial. Cross-listing decisions are made under careful timing, thorough planning, and robust financial reporting systems, complementing Esqueda's (2017) findings on market timing in the Finnish context.

Despite extensive research on cross-listing, a notable gap remains in the literature. No peer-reviewed study was found that focuses exclusively on Nordic companies' cross-listing events or valuation effects as the primary sample. While some broader European and global studies include Nordic companies as parts of larger datasets, the region has not been studied on its own. This gap motivates this study, which aims to provide evidence specific to Nordic companies. The study examines whether the valuation effects documented in earlier research also apply to Nordic companies. The study adds to the cross-listing literature by providing insights into how market reactions and post-listing performance appear in a highly developed and integrated but relatively understudied regional environment.

4 Data and Methodology

This chapter presents the empirical approach used to examine how cross-listing affects the stock prices of Nordic companies. The chapter begins with describing the data collection process, including sample selection criteria and the construction of the final dataset. The analysis combines company-level stock return data together with market index returns to evaluate market reactions to cross-listing events. An event study methodology is then employed to measure stock price responses around the cross-listing date, covering both short-term event effects and longer-term post-event performance. Finally, the chapter describes the statistical methods used to assess the significance of the results, including the estimation of abnormal returns, cumulative abnormal returns (CARs), and buy-and-hold abnormal returns (BHAR). This methodological framework is designed to evaluate whether cross-listing events result in abnormal stock market performance in both the short and long-term.

4.1 Data Description

The empirical analysis is based on a sample of 25 Nordic companies, resulting in 28 cross-listing periods over the period 1985-2026. This timeframe was chosen to include a robust sample of cross-listing events while capturing changing market conditions over time. A Nordic cross-listing is defined as any cross-listing event in which either the home or host exchange is located in the Nordic region, which includes Finland, Sweden, Norway, and Denmark. This bidirectional definition encompasses both outward listings, where Nordic companies obtain a secondary listing on an international exchange, and inward listings, where non-Nordic companies list their shares on a Nordic exchange.

Daily stock price data and market index data are obtained from Bloomberg. Each company is matched to its home market index as reported at the time of cross-listing, and the primary market index is selected to capture overall domestic market movements. Broad market indices are chosen over narrow market (large-cap) indices as they capture

a broader cross-section of overall market movements and provide a better benchmark for separating company-specific abnormal returns in an event-study framework (MacKinlay, 1997). Companies with a primary listing outside the Nordic region are matched to their respective home-market indices accordingly. The indices employed for each country are summarized in Table 4.

Table 4. Sample Overview

#	Company	Home Exchange	Home Market Index	Industry	Cross-listing Method	Event Date	Host Exchange
1	ABB Ltd	SIX Swiss Exchange	SMI	Industrials	ADR (Level II)	6.4.2001	NYSE
2	AS Tallink Grupp	Nasdaq Tallinn	OMXT	Consumer Discretionary	FDR	3.12.2018	Nasdaq Helsinki
3	AstraZeneca Plc	London Stock Exchange	FTSE	Health Care	Direct Cross-Listing	2.2.2026	NYSE
4	Autoliv Inc.	NYSE	NYSE	Consumer Discretionary	SDR	8.10.2004	Nasdaq Stockholm
5	Better Collective A/S	Nasdaq Stockholm	OMXSPI	Communication Services	Direct Cross-Listing	17.11.2023	Nasdaq Copenhagen
6	Boozt AB	Nasdaq Stockholm	OMXSPI	Consumer Discretionary	Direct Cross-Listing	20.11.2020	Nasdaq Copenhagen
7	Cadeler A/S	Oslo Børs	OSEAX	Renewable Energy & Offshore	Direct Cross-Listing	15.12.2023	NYSE
8	CMB.TECH	Euronext Brussels	BELALLSHARE	Energy & Shipping	Direct Cross-Listing	20.8.2025	Oslo Børs
9	Equinor ASA	Oslo Børs	OSEAX	Energy	ADR (Level II)	18.6.2001	NYSE
10	Flex LNG Ltd	NYSE	NYSE	Energy & Shipping	Direct Cross-Listing	17.6.2019	Oslo Børs
11	Frontline Ltd.	Oslo Børs	OSEAX	Energy & Shipping	Direct Cross-Listing	6.8.2001	NYSE
12	Hafnia Ltd	Oslo Børs	OSEAX	Energy & Shipping	Direct Cross-Listing	9.4.2024	NYSE
13	Himalaya Shipping Ltd.	Oslo Børs	OSEAX	Energy & Shipping	Direct Cross-Listing	31.3.2023	NYSE
14	Lundin Mining Corporation	Toronto Stock Exchange	GSPTSE	Materials	Direct Cross-Listing	12.6.2017	Nasdaq Stockholm
15	NIBE Industrier AB	Stockholm	OMXSPI	Industrials	Direct Cross-Listing	1.1.2011	London
16	Nokia Oyj	Nasdaq Helsinki	OMXHPI	Information Technology	ADR (Level II)	1.7.1994	NYSE
17	Nokia Oyj	Nasdaq Helsinki	OMXHPI	Information Technology	Direct Cross-Listing	19.11.2015	Euronext Paris
18	Nordea Bank Abp	Nasdaq Stockholm	OMXSPI	Financials	Direct Cross-Listing	25.1.2000	Nasdaq Helsinki
19	Nordea Bank Abp	Nasdaq Stockholm	OMXSPI	Financials	Direct Cross-Listing	19.4.2000	Nasdaq Copenhagen
20	Okeanis Eco Tankers Corp.	Oslo Børs	OSEAX	Energy & Shipping	Direct Cross-Listing	11.12.2023	NYSE
21	Sampo Oyj	Nasdaq Helsinki	OMXHPI	Financials	SDR	22.11.2022	Nasdaq Stockholm
22	SSAB AB	Nasdaq Stockholm	OMXSPI	Materials	Direct Cross-Listing	1.8.2014	Nasdaq Helsinki
23	Stora Enso Oyj	Nasdaq Helsinki	OMXHPI	Materials	Direct Cross-Listing	8.10.2004	Nasdaq Stockholm
24	Telefonaktiebolaget L M Ericsson	Nasdaq Stockholm	OMXSPI	Information Technology	ADR (Level III)	1.1.1985	NASDAQ (US)
25	Telia Company AB	Nasdaq Stockholm	OMXSPI	Communication Services	Direct Cross-Listing	9.12.2002	Nasdaq Helsinki
26	TietoEVRY Oyj	Nasdaq Helsinki	OMXHPI	Information Technology	Direct Cross-Listing	9.7.1999	Nasdaq Stockholm
27	TietoEVRY Oyj	Nasdaq Helsinki	OMXHPI	Information Technology	Direct Cross-Listing	5.12.2019	Oslo Børs
28	TORM plc.	Nasdaq Copenhagen	OMXCPI	Energy & Shipping	Direct Cross-Listing	23.2.2018	NASDAQ (US)

Table 4 summarizes the final sample, comprising 28 cross-listing events. Events were identified by manually reviewing exchange announcements, company press releases, and Bloomberg terminal data. The event date is defined as the first trading day of the cross-listed shares on the host exchange. This is common in event-study research when the focus is on realized trading effects instead of informational anticipation effects driven by announcements (Foerster & Karolyi, 1999). The definition of event windows is provided in the following section. Companies that cross-listed on multiple occasions are classified as separate observations, resulting in two events each for TietoEVRY, Nokia, and Nordea Bank. This method aligns with earlier research and is justified because each cross-listing represents a discrete company decision with potentially differing informational and signaling effects (Foerster & Karolyi, 1999).

Cross-listing events are not restricted by the type of listing instrument. As a result, the sample includes 22 direct cross-listings, with the remainder comprising four Level II ADRs, one SDR, and one FDR. This approach follows the earlier event-study literature on cross-listing, which typically does not limit analysis to a particular instrument type, and thus allows for a more complete picture of Nordic companies' international listing activity (Foerster & Karolyi, 1999; Karolyi, 1998; Miller, 1999). The NYSE is the most frequent host exchange (N=9), indicating that Nordic issuers continue to be interested in the U.S. capital markets. When classified by home market, Swedish (N=8) and Norwegian (N=7) companies account for the majority of observations. While cross-listings occur throughout the sample period, activity is particularly focused in the early 2000s and from 2015 onwards.

The long-term performance analysis is conducted on a reduced sample of 27 observations. AstraZeneca PLC is excluded from the long-term analysis because its cross-listing occurred in February 2026, leaving insufficient post-event trading days to compute 120-day abnormal returns.

4.2 Methodology

An event study methodology is employed to examine the stock market reaction to cross-listing events. The event study framework isolates abnormal returns associated with a specific corporate event by comparing realized returns to a benchmark of expected returns (MacKinlay, 1997). The event study approach is widely used to evaluate the effect of cross-listings on company value in the short- and medium-term (Brown & Warner, 1985), as cross-listings are discrete and well-defined corporate events.

The analysis of the study is conducted in two stages, consistent with prior event study literature (Foerster & Karolyi, 1999; Miller, 1999). First, an event study methodology is applied to assess short-term abnormal stock returns surrounding the cross-listing date. Second, the post-listing performance is evaluated using cumulative abnormal returns

(CAR) and buy-and-hold abnormal returns (BHAR). Together, these approaches provide a comprehensive assessment of whether cross-listing events generate abnormal stock market performance both immediately following the event and over an extended post-event horizon.

4.2.1 Event Study Methodology

This study examines both short- and long-term market reactions using differing event windows centered on the cross-listing date $T = 0$, defined as the first trading day of the cross-listed shares on the host exchange. Normal return parameters are estimated over a 100-day estimation window $[-120, -21]$. A ten-day buffer is maintained between the estimation and event windows to prevent event-related price movements from influencing the parameter estimates (MacKinlay, 1997).

For each company, returns are computed as simple daily returns, defined as:

$$R_{it} = \frac{P_{it}}{P_{it-1}} - 1 \quad (1)$$

where P_{it} denotes the closing price of the stock i on day t . Market returns are computed analogously using the relevant home market index.

The baseline specification calculates abnormal returns (AR) using a constant mean return model, which assumes that expected returns are equal to the average return over the estimation window. This model provides a straightforward and widely used benchmark for measuring abnormal performance around corporate events (MacKinlay, 1997). Abnormal returns are defined as:

$$AR_{it} = R_{it} - \bar{R}_i \quad (2)$$

where R_{it} denotes the return of company i on day t , and R_i represents the mean return of company i estimated over a 100-trading-day estimation window before the event. The estimation window is chosen to exclude the anticipation window in order to avoid contamination from event-related price movements.

Four windows are used to analyze short-term market reactions: an anticipation window $[-10, -1]$, the event day $[0]$, and an adjustment window $[+1, +10]$. In addition to event-day abnormal returns, cumulative abnormal returns (CARs) are calculated over a 21-day window $[-10, +10]$ to assess overall short-term price effects surrounding the event. The anticipation window captures potential information leakage, the event day measures the immediate market reaction, and the adjustment window captures delayed price responses. To complement the CAR analysis, short-term buy-and-hold abnormal returns (BHARs) are also reported for the same event window.

Long-term performance is evaluated over a post-event window of 120 trading days $[+1, +120]$ following the cross-listing, corresponding to approximately six calendar months. This horizon is consistent with medium-term cross-listing studies in the literature (Foerster & Karolyi, 1999; Miller, 1999). Both cumulative abnormal returns (CARs) and buy-and-hold abnormal returns (BHARs) are used to assess longer-term performance (Foerster & Karolyi, 1999; Miller, 1999).

For each company, cumulative abnormal returns (CARs) over the event window are computed as the sum of daily abnormal returns within the window. Accordingly, cumulative abnormal returns are defined as:

$$CAR_{i(T1,T2)} = \sum_{t=T1}^{T2} AR_{it} \quad (3)$$

The cross-sectional mean CAR across N events is defined as:

$$\overline{CAR} = \frac{1}{N} \sum_{i=1}^N CAR_i \quad (4)$$

where CAR_i denotes the cumulative abnormal return of company i over the relevant event window. Under the null hypothesis, abnormal returns are assumed to have a mean of zero and to be independent across companies, allowing cross-sectional aggregation and inference using standard test statistics.

Statistical significance of cumulative abnormal returns is evaluated using cross-sectional t-tests, which assess whether the mean CAR differs from zero under the assumption of cross-sectional independence. Under the null hypothesis of no abnormal returns, the test statistic is defined as:

$$t = \frac{\overline{CAR}_{(t1,t2)}}{s_{(t1,t2)}/\sqrt{N}} \quad (5)$$

where $s_{(t1,t2)}$ is the cross-sectional standard deviation of individual company CARs. This approach, recommended by Brown and Warner (1985), treats company-level CARs as independent cross-sectional observations and does not impose restrictive distributional assumptions on estimation-window residuals. As a result, the test is widely used and relatively robust to cross-sectional heteroskedasticity across companies. Statistical significance is assessed at the 1 %, 5 %, and 10 % levels, corresponding to conventional thresholds in the event-study literature.

Given that abnormal return distributions in event-study settings often deviate from normality, statistical significance is assessed using a non-parametric Wilcoxon signed-rank test. This method does not depend on distributional assumptions and is suitable when return distributions show skewness or high kurtosis. The test evaluates whether the median cumulative abnormal return differs from zero.

The robustness of the abnormal return results is evaluated using the same benchmark models and estimation methods for both short- and long-term analyses. Abnormal returns are re-estimated using alternative expected-return specifications to ensure that the findings are not sensitive to the choice of benchmark model. This also helps address concerns related to the joint hypothesis problem, in which abnormal return tests evaluate market efficiency and model specification together. As a robustness check, abnormal returns are alternatively estimated using a market-adjusted model and the capital asset pricing model (CAPM), where expected returns are adjusted for overall market movements and company-specific market risk. Using CAPM allows for accounting differences in systematic risk across companies and ensures that abnormal returns are not driven by market-wide fluctuations.

The market-adjusted model estimates abnormal returns by adjusting a company's returns directly for overall market movements. The market-adjusted returns are calculated as follows:

$$AR_{it} = R_{it} - R_{mt} \quad (6)$$

where R_{it} denotes the return of company i on day t , and R_{mt} represents the return of the market index on day t .

Under the CAPM specification, expected returns are estimated by adjusting company-specific alpha and beta parameters using ordinary least squares (OLS) regression over a 100-trading-day estimation window before the event date. Expected returns are then computed as follows:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (7)$$

where R_{it} is the return of company i on day t , R_{mt} denotes the market return on day t , α_i is the company-specific intercept, and β_i measures the company's sensitivity to market movements.

4.2.2 Buy-and-Hold Abnormal Returns

The event-study literature suggests reporting buy-and-hold abnormal returns alongside cumulative abnormal returns as these measures reflect differing aspects of performance. While CARs aggregate daily abnormal returns additively, BHAR reflects the compounded return an investor would realize over the holding period. Barber and Lyon (1997) demonstrate that BHAR can provide complementary evidence, particularly when return volatility and compounding effects are significant.

In this study, BHAR is calculated over two horizons: a short-term event window [-10, +10] and a post-listing period of [+1, +120] days. Buy-and-hold abnormal returns (BHAR) are computed as:

$$BHAR_i = \prod_{t=1}^T (1 + R_{it}) - \prod_{t=1}^T (1 + R_{mt}) \quad (8)$$

where R_{it} is the return of company i on day t , R_{mt} denotes the market return on day t , and T represents the length of the post-event horizon.

The joint use of cumulative abnormal returns (CARs) and buy-and-hold abnormal returns (BHARs) allows for a more comprehensive evaluation of post-event stock performance across both short- and long-term horizons. Accordingly, both measures are reported for the relevant samples described in Chapter 4.1 (Data Description) and tested for statistical significance at conventional significance levels. Statistical significance of BHAR is evaluated using the same cross-sectional t-test framework described in the previous chapter for CARS, testing whether the mean BHAR differs from zero.

5 Empirical Findings

This chapter presents the results of the empirical analysis studying the effects of cross-listing events on Nordic companies' stock performance. Two hypotheses are tested. The first evaluates whether cross-listing announcements result in statistically significant abnormal returns in the short-term. The second hypothesis evaluates whether cross-listing improves company value over the longer term. The results are based on cumulative abnormal returns (CARs), buy-and-hold abnormal returns (BHARs), and corresponding statistical tests across defined event windows. The findings are discussed in relation to the stated hypotheses and the existing literature on cross-listing effects, market integration, and company valuation.

5.1 Descriptive Statistics

Table 5 presents descriptive statistics for short-term abnormal returns across the four event windows. The sample includes 28 cross-listing events for the short-term windows.

Table 5. Descriptive Statistics of Short-Term Returns

	CAR [-10, -1]	CAR [0]	CAR [+1, +10]	Total CAR [-10, +10]	Total BHAR [-10, +10]
Mean	-0,76 %	-0,71 %	1,35 %	-0,12 %	0,94 %
Median	-0,09 %	-0,31 %	2,18 %	0,45 %	0,55 %
Standard Deviation	10,01 %	3,31 %	7,75 %	14,29 %	10,93 %
Kurtosis	1,24	8,36	0,94	0,94	3,18
Skewness	-0,73	-2,37	-0,71	-0,03	0,80
Minimum	-26,41 %	-13,79 %	-18,12 %	-31,98 %	-19,93 %
Maximum	16,99 %	3,05 %	17,05 %	36,51 %	36,13 %
Count	28	28	28	28	28

The short-term cumulative abnormal return (CAR) distributions are generally symmetric around zero. However, during the event-day window, there is a pronounced negative skewness of $-2,37$ and significant kurtosis of $8,36$, confirming that the distribution deviates from normality. This non-normality is driven by two outlier observations: Equinor and Okeanis Eco Tankers Corp., both of which show high negative abnormal returns on

the listing day (see Appendix 1). The distributions in the anticipation window $[-10, -1]$ and adjustment window $[+1, +10]$ are more consistent, with skewness and kurtosis below one in absolute value.

Table 6 shows descriptive statistics for long-term performance metrics defined in Chapter 4, during the 120-day post-event period. The analysis is based on 27 observations, with AstraZeneca excluded due to insufficient post-event return data available at the time of analysis.

Table 6. Descriptive Statistics of Long-Term Performance

	CAR[+1, +120]	BHAR[+1, +120]
Mean	-5,84 %	1,61 %
Median	-0,85 %	-1,17 %
Standard Deviation	40,74 %	25,17 %
Kurtosis	0,17	-0,35
Skewness	-0,33	0,31
Minimum	-100,92 %	-47,52 %
Maximum	80,54 %	52,73 %
Count	27	27

The long-term measures show wide cross-sectional heterogeneity in post-listing performance, with standard deviations of 40,74 % for CAR $[+1, +120]$ and 25,7 % for BHAR $[+1, +120]$. The wide range of outcomes, with CAR values ranging from -100,92 % to +80,54 %, indicates that company-level reactions to cross-listing vary widely. These patterns are discussed further in Chapter 5.5.

5.2 Short-Term Market Reaction to Cross-Listing Events

This section presents the short-term stock market reaction to Nordic cross-listing events using the event-study framework defined in the previous chapter. Table 7 reports the aggregate abnormal return results across the selected event windows.

On average, the abnormal return on the cross-listing event day [0] is negative, with a mean event-day cumulative abnormal return (CAR) of $-0,71\%$. The median event-day return is $-0,31\%$, showing that more than half of the sample companies experience a negative market reaction on the listing day. The associated t-statistic ($-1,136$) and p-value ($0,266$) suggest no consistent market response on the listing date.

Analysis of cumulative abnormal returns (CARs) over the full event window $[-10, +10]$ shows an average CAR of $-0,12\%$ and a median value of $0,44\%$. The variation of returns is notably wider over the full window, as demonstrated by a standard deviation of $14,3\%$. Statistical tests do not provide evidence of statistically significant abnormal performance. The t-statistic for the total CAR is $-0,045$, with a corresponding p-value of $0,96$, suggesting that the total CAR is not significantly different from zero.

Table 7. Aggregate Short-Term Abnormal Return Results

Aggregate Statistics (N=28)	CAR [-10, -1]	Event Day CAR [0]	CAR [+1, +10]	Total CAR [-10, +10]	Total BHAR [-10, +10]
Mean	$-0,76\%$	$-0,71\%$	$1,35\%$	$-0,12\%$	$0,94\%$
Median	$-0,09\%$	$-0,31\%$	$2,18\%$	$0,44\%$	$0,55\%$
Standard Deviation	$10,01\%$	$3,31\%$	$7,75\%$	$14,29\%$	$10,93\%$
t-statistic	$-0,402$	$-1,136$	$0,921$	$-0,045$	$0,458$
p-value	$0,691$	$0,266$	$0,365$	$0,960$	$0,651$

The CARs for the anticipation window $[-10, -1]$ and the adjustment window $[+1, +10]$ are also statistically insignificant, indicating no systematic information leakage before cross-listing or delayed price adjustment following the event.

Overall, the aggregate short-term results do not provide any evidence that Nordic cross-listing events generate statistically significant abnormal returns on the event day or over the total window. Therefore, the null hypothesis H_{01} is not rejected. This conclusion is further supported by a Wilcoxon signed-rank test ($W=175$, $p=0.537$), which shows that the median event-day cumulative abnormal return does not differ from zero.

While the average market reaction is statistically insignificant, the magnitude of abnormal returns varies considerably across companies. Several companies, such as ABB and AstraZeneca, show positive and statistically significant cumulative abnormal returns (CARs), indicating a favorable market reaction following the event. In contrast, companies such as Equinor and Nordea report negative abnormal returns, suggesting heterogeneous company-level effects. This company-level variation is consistent with Karolyi (1998), who notes that aggregate event study results in the cross-listing literature often hide considerable cross-sectional heterogeneity. Company-level CAR estimates for all 28 events are reported in Appendix 1.

5.3 Long-Term Post-Listing Stock Performance

Long-term post-listing stock performance of Nordic companies is evaluated over a 120-day period after the cross-listing date. Table 8 summarizes the aggregate long-term performance statistics.

Table 8. Aggregate Long-Term Abnormal Return Results

Aggregate Statistics (N=27)	CAR [+1, +120]	BHAR [+1, +120]
Mean	-5,84 %	1,61 %
Median	-0,85 %	-1,17 %
Standard Deviation	40,74 %	25,17 %
t-statistic	-0,745	0,332
p-value	0,463	0,743

At the aggregate level, the results indicate that long-term abnormal performance is modest. The mean CAR [+1, +120] is -5,84 %, with a t-statistic of -0.745 ($p=0.463$), indicating that the average post-listing cumulative abnormal return is not statistically significant at conventional levels. The median CAR of -0,85 % is considerably closer to zero than the mean. This suggests that the negative average is driven by a small number of companies experiencing large declines rather than reflecting a uniform negative adjustment across

the sample. This divergence between the mean and median is consistent with the wide standard deviation of 40,74 % and the minimum observed value of -100,92 %.

The average buy-and-hold abnormal return (BHAR) over the same horizon is 1,61 %, with a median of -1,17 %. The result is also statistically insignificant ($t=0.332$, $p=0.743$). The difference between CAR and BHAR estimates is consistent with Barber and Lyon (1997), who show that CARs may be negatively biased relative to BHARs over medium-term horizons due to compounding effects, particularly in samples comprising high return volatility. Considering the wide variation observed in the sample, BHARs provide a complementary perspective on investor-level performance.

Taken together, the aggregate long-term results provide no evidence of a systematic improvement in company value following cross-listing in the Nordic context. Both performance measures indicate that, on average, Nordic cross-listed companies do not experience consistent abnormal returns relative to the market benchmark. The null hypothesis H_{02} is therefore not rejected.

At the same time, the aggregate results hide notable company-level variation. While some companies experience large positive or negative returns after the cross-listing, these effects do not occur uniformly across the sample. Estimates at the company-level reveal considerable heterogeneity in long-term stock price behavior. Individual CAR [+1, +120] values range from -100,92 % to +80,54 %, and BHAR [+1, +120] shows a similar display of wide variation. Notable underperformers include Boozt, SSAB, and NIBE Industrier, all of which took part in intra-Nordic cross-listings. This pattern may indicate limited benefits from diversification and relatively modest improvements in the information environment when companies list on closely integrated neighbor exchanges.

In contrast, the strongest long-term outperformers are Cadeler, Ericsson, and TORM. All of these companies are cross-listed on major international exchanges, such as the NYSE or Nasdaq US. This contrast suggests that access to deeper and more liquid international

investor bases may generate more favorable long-term outcomes, consistent with the liquidity hypothesis of cross-listing (Hail & Leuz, 2009). Company-level CAR and BHAR estimates for the 120-day post-event period are reported in Appendix 2.

5.4 Robustness Checks

This section assesses the robustness of the short-term event-study results to alternative expected return models. In addition to the constant mean return model, which is used as the primary benchmark, abnormal returns are re-estimated using a market-adjusted model and the Capital Asset Pricing Model (CAPM). These alternative specifications account for market-wide movements and company-specific systematic risk, respectively, and are commonly employed in event-study analyses to ensure that results are not driven by the choice of benchmark.

Buy-and-hold abnormal returns (BHARs) are reported as a complementary performance measure. Since BHAR captures compounded investor returns rather than model-based cumulative abnormal performance, robustness checks focus on CAR estimates, while BHAR results should be interpreted with caution (Barber & Lyon, 1997).

Table 9 reports event-day abnormal returns and cumulative abnormal returns over the full event window $[-10, +10]$ under all three specifications. The aggregate short-term results remain qualitatively unchanged across all models. The mean event-day abnormal returns are small and statistically insignificant under each specification, and cumulative abnormal returns (CARs) over the full event window do not differ significantly from zero regardless of the benchmark model employed.

Table 9. Robustness Checks for Short-Term Abnormal Return Results

Aggregate Statistics (N=28)						
	Event Day CAR [0]			Total CAR [-10,+10]		
	Constant Return	Market Adjusted	CAPM	Constant Return	Market Adjusted	CAPM
Mean	-0,71 %	-0,66 %	-0,57 %	-0,12 %	-0,38 %	-0,91 %
Median	-0,31 %	-0,05 %	-0,17 %	0,44 %	0,00 %	-1,10 %
Standard Dev	3,31 %	3,33 %	3,27 %	14,29 %	11,03 %	14,34 %
t-statistic	-1,135	-1,048	-0,918	-0,045	-0,182	-0,335
p-value	0,266	0,304	0,367	0,960	0,857	0,740

At the company-level, the set of companies showing statistically significant event-day reactions is mostly stable across different model specifications (See Appendix 3). Companies that show significant positive or negative abnormal returns using the constant-return model tend to exhibit similar patterns under both the market-adjusted and CAPM benchmarks. However, these company-level significances do not aggregate into a statistically significant average effect in any of the benchmark models, further supporting the main results.

The robustness of long-term results is evaluated using the same alternative benchmark models employed for the short-term analysis. Abnormal returns are re-estimated over the [+1, +120] window under both the market-adjusted and CAPM specifications. Across all models, the average long-term CAR estimates remain statistically insignificant. Their direction and magnitude are consistent with the primary results. This indicates that the absence of a significant aggregate long-term effect is not driven by the choice of benchmark model.

Table 10. Robustness Checks for Long-Term Abnormal Return Results

Aggregate Statistics (N=27)			
	Adjustment Window CAR [+1, +120]		
	Constant Return	Market Adjusted	CAPM
Mean	-5,84 %	1,04 %	-6,39 %
Median	-0,85 %	-0,26 %	-4,75 %
Standard Deviation	40,74 %	24,07 %	40,68 %
t-statistic	-0,745	0,224	-0,816
p-value	0,463	0,825	0,422

Overall, the consistency of results across alternative expected-return models indicates that the lack of statistically significant abnormal returns is robust despite variations in benchmark specification. Whether estimating abnormal returns with constant returns, market-adjusted returns, or CAPM-adjusted returns, cross-listing events by Nordic companies do not generate statistically significant abnormal returns on average. These robustness checks strengthen the conclusion that cross-listing does not cause a systematic short- or long-term market reaction in the Nordic context.

5.5 Discussion of Results

This section discusses the findings presented in Chapter 5 and interprets them within the theoretical framework and prior research on cross-listing. The focus is on explaining the absence of significant aggregate effects, the observed company-level heterogeneity, and what the findings may indicate related to cross-listing theories and market efficiency in the Nordic context.

The short-term results do not support the hypothesis that Nordic cross-listings generate significant abnormal returns around the listing date. The aggregate cumulative abnormal returns (CARs) are both close to zero on the event day and over the 21-day total window. The absence of statistically significant anticipation or adjustment window effects further suggests that cross-listing events are neither systematically anticipated nor followed by delayed market reactions. This finding, however, contrasts with the positive pre-listing abnormal returns documented in previous cross-listing literature. Foerster and Karolyi (1999) report cumulative abnormal returns of approximately 19 % in the year before cross-listing. Miller (1999) documents short-term returns of around 1,15 % over a three-day event window. The lack of comparable effects in this sample deserves careful consideration.

While the aggregate effects are insignificant, the direction and size of company-level market reactions are largely consistent with the theories discussed in Chapter 2. Several

factors may explain the difference between these findings and earlier evidence of positive short-term cross-listing effects. Much of the previous research documents positive abnormal announcement-period returns for companies that cross-listed on major U.S. exchanges during the 1980s and 1990s. This period is characterized by relatively high international market segmentation and stronger informational and reputational benefits associated with foreign listings. By contrast, this sample extends until 2026. During this period, global capital markets have become substantially more integrated, and disclosure standards have aligned. This may impact the additional valuation effect of cross-listing, especially for companies originating from highly transparent Nordic markets (Doidge et al., 2004).

From a behavioral perspective, increased market integration may also reduce the salience of cross-listing announcements. As foreign cross-listings appear more often and are less unique, investors may not pay as much attention to these events. This may lead to decreased investor sentiment and weaker short-term market reactions. Considering the study's findings, the absence of aggregate abnormal returns does not necessarily mean that investors are underreacting to fundamental information. Instead, it suggests that cross-listing provides only limited new, valuable fundamental information beyond what the market already anticipates.

Finally, in addition to variations in company-level returns, significant negative skewness and high kurtosis are observed in aggregate event-day returns. This indicates that company-specific factors are more important than the common short-term cross-listing effect when interpreting the findings. The significant reactions observed for individual companies further support company-specific heterogeneity, ongoing corporate developments, or market-timing considerations, rather than valuation effects tied to cross-listing itself. This finding is consistent with Karolyi (1998), who highlights that aggregate event-study results often hide significant company-level heterogeneity.

The long-term post-performance analysis also shows no evidence of a systematic improvement in company value after cross-listing. Aggregate CAR and BHAR over the 120-day post-listing period are statistically insignificant. This means that Nordic cross-listed companies do not, on average, outperform the market benchmark after listing. This finding aligns with studies that suggest the valuation effects of cross-listing are often temporary and tend to fade over time (Sarkissian & Schill, 2009). Overall, the long-term results complement the short-term event study findings by showing that the immediate price reaction does not consistently lead to a systematic post-event drift. The difference between mean and median cumulative abnormal return (CAR) values, along with the wide variation in returns, shows that long-term outcomes depend heavily on company-specific factors.

The difference between cumulative abnormal return (CAR) and buy-and-hold return (BHAR) estimates aligns with the findings of Barber and Lyon (1997). They demonstrate that CAR may be biased downward relative to BHAR over medium-term horizons due to compounding effects. In this study, BHAR provides an additional perspective on investor-level performance but does not alter the overall conclusion that aggregate effects are statistically insignificant.

Aggregate effects may further be weakened by the bidirectional nature of the sample. Outward listings of Nordic companies on major international exchanges and inward listings on Nordic exchanges differ in how they signal information and in how they expand the investor base. The contrast between the strong outperformance of companies that cross-listed onto major international exchanges in the U.S., such as Cadeler, Ericsson, and TORM, and the pronounced underperformance of intra-Nordic cross-listings, such as Boozt, SSAB, and NIBE Industrier, is the most economically meaningful pattern observed in the long-term results (see Appendix 2 for further details). This contrast is broadly consistent with the liquidity and market segmentation hypothesis, which posits that listing on a larger, more liquid exchange should lead to a lasting decrease in the company's cost of equity capital (Hail & Leuz, 2009).

By contrast, as shown in the intra-Nordic cases, cross-listing does not significantly improve liquidity or reduce segmentation. For companies that cross-list in the well-integrated Nordic region, where information availability and investor access are relatively high, the additional liquidity and recognition benefits from cross-listing may be insufficient to generate consistent abnormal returns. Differences in long-term post-listing performance may also reflect variations in industry exposure, international operations, and company-specific sensitivity to the listing event. Overall, the results are consistent with Karolyi's (1998) evidence of post-listing return declines, although this study shows greater company-level heterogeneity and a shorter evaluation horizon.

Taken together, the findings of this study provide limited support for the bonding hypothesis in the Nordic context. Nordic companies already operate under strong legal, regulatory, and governance frameworks, which reduces consistent valuation premiums through enhanced investor protection. This aligns with Doidge et al. (2004), who show that the cross-listing premium is smaller for companies from countries with stronger legal and institutional environments. It also complements Høie and Andersson (2024), who similarly find that signaling through stricter disclosure requirements is less significant for companies from developed markets with strong existing governance.

The findings provide partial support for liquidity and market segmentation mechanisms. Valuation effects are more pronounced when cross-listing significantly expands access to a larger and more liquid international investor base, while intra-Nordic cross-listings offer more limited additional benefits. Overall, the absence of statistically significant aggregate effects is consistent with semi-strong market efficiency. Publicly available information about cross-listing events appears to be quickly reflected in prices on average. However, strong cross-sectional deviation indicates that notable price deviations may arise at the company level, reflecting company-specific frictions and differences in investor sentiment.

6 Conclusions

This thesis examines how cross-listing events affect the stock market performance of Nordic companies. The study was inspired by the limited region-specific evidence on cross-listing effects and by the question of whether valuation patterns documented in earlier international research also apply to companies operating in highly developed, transparent, and integrated Nordic capital markets. Using an event-study approach and a sample of 28 cross-listing events from 1985 to 2026, the analysis evaluated short-term market reactions around the listing date and post-listing performance over a 120-day period.

The study tests two hypotheses. The first evaluates whether cross-listing generates significant short-term abnormal returns. The second hypothesis estimates whether cross-listing leads to long-term improvements in the stock value of Nordic companies. At the aggregate level, cross-listing events do not generate statistically significant abnormal returns in the short or long term. Thus, the study's empirical findings provide statistical support for either null hypothesis. Cumulative abnormal returns (CAR) or buy-and-hold abnormal returns (BHAR) do not indicate a consistent event effect or a lasting improvement in company value after cross-listing. In addition, the Wilcoxon signed-rank test confirms that the median event-day return is not different from zero.

Despite the absence of significant aggregate effects, the results reveal wide company-level heterogeneity. Some companies display strong positive price reactions, while others experience sharp declines, especially in the short-term. The long-term performance also varies notably among companies. Notably, companies that cross-list on major international exchanges, such as the NYSE in the U.S., tend to experience more favorable long-term outcomes than companies that cross-list on Nordic exchanges. This suggests that cross-listing effects are context-dependent, not consistent across all companies.

The study's findings align most closely with liquidity and market segmentation theories. The results suggest that cross-listing creates financial benefits mainly by providing access to larger, more liquid international capital markets. This improves the company's trading conditions and expands the investor base. Since Nordic companies already operate within strong legal and regulatory systems, support for the bonding hypothesis is only partial. Cross-listing does not appear to consistently generate a valuation premium through enhanced governance commitments, as the markets are highly regulated.

Behavioral insights further help explain the absence of systematic short-term effects. Cross-listing events may have lost some of their salience, as global capital markets have become increasingly integrated. Foreign listings have become more common and less unique, leading to weaker market reactions and reduced investor sentiment. In this study, the absence of aggregate abnormal returns does not necessarily refer to underreaction to fundamental information. Instead, it suggests that cross-listing provides limited signaling effects and does not provide new, strong value-relevant information beyond what the market already expects.

The findings also have implications for market efficiency. The lack of statistically significant returns supports the idea of a semi-strong informational level, that markets quickly reflect public information. However, the large company-level deviations suggest that markets are not perfectly efficient, and efficiency may be conditional rather than absolute. Differences in investor attention, liquidity conditions, and company-specific circumstances can lead to heterogeneous outcomes that are not captured by aggregate measures.

From a practical perspective, the findings are useful for both companies and investors. The results suggest that the choice of cross-listing destination market matters significantly. When Nordic companies consider their cross-listing decisions, they may benefit more from listing on larger international exchanges with deeper liquidity and broader investor bases than from listing within the Nordic countries. For investors, the wide

heterogeneity in post-listing returns across companies highlights the importance of evaluating individual company circumstances rather than depending on average cross-listing effects.

Several limitations should be considered when interpreting the results. The study's statistical power and generalizability may be limited by the relatively small sample of Nordic cross-listings. This study focuses on stock returns and does not account for liquidity measures, trading volume, or changes in analyst coverage. These factors could offer additional insight into how cross-listing creates company value. Additionally, cross-listing decisions are made alongside other corporate actions, which makes it difficult to fully isolate the initial effects. The results are also affected by the joint-hypothesis problem, as the findings depend on both the assumptions of the event-study framework and the expected-return models chosen.

Future research could extend this study in several ways. Increasing the sample size by including a larger set of Nordic companies or by covering longer time periods could improve the statistical power and generalizability of the results. Including measures of liquidity and indicators of investor sentiment may help clarify the mechanisms underlying heterogeneity in cross-listing outcomes at the company level. Further research could also limit the focus on specific listing mechanisms, such as American Depositary Receipts (ADRs), or examine price differences and arbitrage possibilities in cross-listed securities.

In conclusion, this study finds that cross-listing does not generate systematic abnormal stock returns for Nordic companies. The effects vary depending on company-specific characteristics, destination of listing, and the level of market integration. The study's findings provide region-specific evidence from highly developed Nordic capital markets and highlight the importance of market integration and investor sentiment in shaping stock market reactions to cross-listings.

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Appendices

Appendix 1. Short-Term Company-Level Performance

#	Company	Event Day CAR[0]	Sig	Total CAR [-10,+10]	Sig	Total BHAR [-10,+10]
1	ABB Ltd	1,91 %		11,78 %		-5,15 %
2	AS Tallink Grupp	-3,89 %	***	7,39 %		5,76 %
3	Autoliv Inc.	-1,48 %		1,25 %		0,76 %
4	Better Collective A/S	-0,69 %		-12,83 %		-18,16 %
5	TietoEVERY Oyj	-0,40 %		-2,39 %		0,33 %
6	TietoEVERY Oyj	0,62 %		7,38 %		3,20 %
7	Nordea Bank Abp	-1,15 %		-0,02 %		-0,13 %
8	Nordea Bank Abp	-2,92 %		13,56 %		9,96 %
9	Nokia Oyj	-0,21 %		-1,70 %		-2,17 %
10	Nokia Oyj	-0,95 %		13,17 %		14,98 %
11	Nokia Oyj	0,96 %		1,52 %		-0,52 %
12	StoraEnso Oyj	1,11 %		7,70 %		1,66 %
13	Telia Company AB	-0,59 %		-19,65 %		-1,92 %
14	SSAB AB	-1,79 %		-10,27 %		-2,83 %
15	Lundin Mining Corporatio	-2,81 %		-9,32 %		-6,29 %
16	Boozt AB	2,30 %		-31,98 %		-15,68 %
17	NIBE Industrier AB	0,58 %		0,70 %		7,29 %
18	Equinor ASA	-13,79 %	***	-13,41 %		-7,86 %
19	CMB.TECH NV	-1,22 %		-6,63 %		-9,12 %
20	Frontline Ltd.	-3,14 %		-27,54 %		-19,93 %
21	TORM plc	1,51 %		15,42 %	*	3,59 %
22	Cadeler A/S	2,98 %	*	36,51 %	***	36,13 %
23	Flex LNG Ltd.	2,21 %		-12,49 %		5,79 %
24	Hafnia Ltd.	2,27 %		7,59 %		7,65 %
25	Himalaya Shipping Ltd,	0,47 %		0,19 %		-3,84 %
26	Okeanis Eco Tankers Corç	-5,12 %	**	-0,43 %		5,50 %
27	Telefonaktiebolaget LM Ei	0,27 %		17,00 %	*	11,66 %
28	AstraZeneca PLC	3,05 %	*	4,06 %		5,79 %

Appendix 2. Long-Term Company-Level Performance

#	Company	CAR[+1,+120]	Sig	BHAR[+1,+120]
1	ABB Ltd	-42,37 %		-30,53 %
2	AS Tallink Grupp	5,58 %		-5,06 %
3	Autoliv Inc.	21,38 %		9,08 %
4	Better Collective A/S	6,17 %		15,94 %
5	TietoEVRY Oyj	23,75 %		-26,32 %
6	TietoEVRY Oyj	-3,73 %		-12,01 %
7	Nordea Bank Abp	17,54 %		23,32 %
8	Nordea Bank Abp	19,64 %		27,35 %
9	Nokia Oyj	-52,90 %	**	-21,43 %
10	Nokia Oyj	18,37 %		52,73 %
11	Nokia Oyj	-20,35 %		-0,42 %
12	StoraEnso Oyj	-0,85 %		-16,38 %
13	Telia Company AB	-54,06 %		-4,45 %
14	SSAB AB	-76,65 %	***	-47,52 %
15	Lundin Mining Corporation	6,51 %		16,69 %
16	Boozt AB	-100,92 %	***	-1,17 %
17	NIBE Industrier AB	-46,47 %	***	10,13 %
18	Equinor ASA	-16,88 %		2,21 %
19	CMB.TECH NV	45,37 %		32,39 %
20	Frontline Ltd.	-50,13 %		-23,87 %
21	TORM plc	40,08 %	**	-6,90 %
22	Cadeler A/S	80,54 %	***	50,09 %
23	Flex LNG Ltd.	-2,71 %		-15,44 %
24	Hafnia Ltd.	-11,25 %		-9,17 %
25	Himalaya Shipping Ltd,	-22,17 %		-27,94 %
26	Okeanis Eco Tankers Corp.	14,42 %		38,58 %
27	Telefonaktiebolaget LM Ericsson	44,31 %	**	13,58 %

Appendix 3. Robustness Checks

#	Company	Constant Return (CR)			Market Adjusted (MA)			CAPM			Total CAR [-10,+10]		
		Event Day CAR[0]	t-statistic	Sig	Event Day CAR[0]	t-statistic	Sig	Event Day CAR[0]	t-statistic	Sig	CR Total	MA Total	CAPM Total
1	ABB Ltd	1,91 %	0,707		1,96 %	0,796		2,03 %	0,825		11,78 %	-3,09 %	-0,90 %
2	AS Tallink Grupp	-3,89 %	-3,056	***	-3,16 %	-3,324	***	-2,64 %	-3,201	***	7,39 %	5,96 %	5,32 %
3	Autoliv Inc.	-1,48 %	-1,238		-0,80 %	-0,838		-0,67 %	-0,705		1,25 %	0,88 %	2,31 %
4	Better Collective A/S	-0,69 %	-0,218		-1,70 %	-0,580		-2,21 %	-0,757		-12,83 %	-15,70 %	-23,39 %
5	TietoEVRY Oyj	-0,40 %	-0,136		-0,21 %	-0,060		-0,45 %	-0,151		-2,39 %	0,44 %	-3,13 %
6	TietoEVRY Oyj	0,62 %	0,521		0,75 %	0,532		0,62 %	0,523		7,38 %	3,13 %	7,33 %
7	Nordea Bank Abp	-1,15 %	-0,686		0,27 %	0,143		-0,56 %	-0,342		-0,02 %	-12,07 %	-2,72 %
8	Nordea Bank Abp	-2,92 %	-1,315		-5,83 %	-2,098	**	-3,47 %	-1,550		13,56 %	9,62 %	14,03 %
9	Nokia Oyj	-0,21 %	-0,088		-0,11 %	-0,071		-0,19 %	-0,135		-1,70 %	-2,03 %	-4,64 %
10	Nokia Oyj	-0,95 %	-0,415		0,11 %	0,047		-0,73 %	-0,324		13,17 %	13,64 %	10,95 %
11	Nokia Oyj	0,96 %	0,749		0,49 %	0,432		0,58 %	0,549		1,52 %	-0,44 %	-1,29 %
12	StoraEnso Oyj	1,11 %	0,763		1,84 %	1,236		1,43 %	1,036		7,70 %	1,68 %	5,57 %
13	Telia Company AB	-0,59 %	-0,135		1,15 %	0,351		1,15 %	0,361		-19,65 %	-1,63 %	-7,82 %
14	SSAB AB	-1,79 %	-1,039		-0,22 %	-0,135		-1,06 %	-0,657		-10,27 %	-2,68 %	-8,77 %
15	Lundin Mining Corporation	-2,81 %	-1,046		-2,10 %	-0,854		-1,31 %	-0,563		-9,32 %	-5,99 %	-7,52 %
16	Boozt AB	2,30 %	0,559		2,81 %	0,685		1,98 %	0,484		-31,98 %	-14,26 %	-33,10 %
17	NIBE Industrier AB	0,58 %	0,390		-0,99 %	-0,642		-0,12 %	-0,080		0,70 %	6,98 %	0,62 %
18	Equinor ASA	-13,79 %	-8,007	***	-13,34 %	-7,919	***	-13,59 %	-8,349	***	-13,41 %	-7,49 %	-10,83 %
19	CMB.TECH NV	-1,22 %	-0,421		-1,71 %	-0,523		-0,94 %	-0,332		-6,63 %	-8,53 %	-5,70 %
20	Frontline Ltd.	-3,14 %	-0,887		-2,87 %	-0,795		-3,14 %	-0,888		-27,54 %	-21,64 %	-27,38 %
21	TORM plc	1,51 %	0,937		0,40 %	0,233		1,53 %	0,948		15,42 %	3,68 %	15,55 %
22	Cadeler A/S	2,98 %	1,678	*	3,39 %	2,009	**	3,60 %	2,154	**	36,51 %	31,46 %	38,66 %
23	AstraZeneca PLC	3,05 %	1,857	*	2,14 %	1,306		2,89 %	1,774	*	4,06 %	5,83 %	4,05 %
24	Flex LNG Ltd.	2,21 %	0,652		2,28 %	0,671		2,28 %	0,675		-12,49 %	-19,72 %	-15,79 %
25	Hafnia Ltd.	2,27 %	1,034		2,26 %	1,016		2,26 %	1,035		7,59 %	7,45 %	7,39 %
26	Himalaya Shipping Ltd,	0,47 %	0,222		-0,17 %	-0,087		-0,16 %	-0,080		0,19 %	-3,58 %	-4,90 %
27	Okeanis Eco Tankers Corp.	-5,12 %	-2,152	**	-5,09 %	-2,356	**	-5,22 %	-2,423	**	-0,43 %	6,32 %	4,64 %
28	Telefonaktiebolaget LM Ericsson	0,27 %	0,153		0,00 %	0,000		0,22 %	0,129		17,00 %	11,14 %	16,00 %

#	Company	Constant Return (CR)			Market Adjusted (MA)			CAPM		
		CAR [+1,+120]	t-stat	Sig	CAR [+1,+120]	t-stat	Sig	CAR [+1,+120]	t-stat	Sig
1	ABB Ltd	-42,37 %	-1,254		-46,44 %	-1,814	*	-37,34 %	-1,449	
2	AS Tallink Grupp	5,58 %	1,088		-4,62 %	0,232		-9,65 %	-0,472	
3	Autoliv Inc.	21,38 %	1,456		8,81 %	0,488		15,72 %	1,176	
4	Better Collective A/S	6,17 %	-0,409		15,71 %	-0,235		-24,02 %	-1,549	
5	TietoEVRY Oyj	23,75 %	0,572		-18,64 %	-0,691		15,64 %	0,349	
6	TietoEVRY Oyj	-3,73 %	0,076		-12,22 %	-0,407		-3,80 %	0,073	
7	Nordea Bank Abp	17,54 %	0,810		20,76 %	0,744		28,04 %	1,384	
8	Nordea Bank Abp	19,64 %	1,326		26,91 %	1,298		28,57 %	1,694	*
9	Nokia Oyj	-52,90 %	-2,120	**	-25,98 %	-1,716	*	-30,93 %	-2,189	**
10	Nokia Oyj	18,37 %	0,888		41,60 %	1,839	*	12,16 %	0,650	
11	Nokia Oyj	-20,35 %	-1,258		-0,26 %	0,093		-15,68 %	-1,233	
12	StoraEnso Oyj	-0,85 %	0,262		-15,41 %	-0,797		-4,75 %	-0,046	
13	Telia Company AB	-54,06 %	-1,159		-0,57 %	0,110		-52,67 %	-1,408	
14	SSAB AB	-76,65 %	-4,020	***	-55,55 %	-2,936	***	-80,18 %	-4,415	***
15	Lundin Mining Corporation	6,51 %	0,114		17,67 %	0,578		-3,45 %	-0,218	
16	Boozt AB	-100,92 %	-2,656	***	4,25 %	-0,265		-104,18 %	-2,791	***
17	NIBE Industrier AB	-46,47 %	-2,766	***	11,91 %	0,730		-38,60 %	-2,410	**
18	Equinor ASA	-16,88 %	-1,447		5,58 %	-0,065		-7,29 %	-0,902	
19	CMB.TECH NV	45,37 %	1,024		30,26 %	0,390		53,19 %	1,367	
20	Frontline Ltd.	-50,13 %	-1,470		-18,43 %	-0,660		-49,80 %	-1,481	
21	TORM plc	40,08 %	2,559	**	-5,25 %	-0,391		40,27 %	2,574	**
22	Cadeler A/S	80,54 %	4,921	***	39,64 %	2,982	***	83,23 %	5,471	***
23	Flex LNG Ltd.	-2,71 %	-0,556		-10,37 %	-0,861		-3,00 %	-0,617	
24	Hafnia Ltd.	-11,25 %	-0,237		-7,00 %	-0,126		-11,06 %	-0,250	
25	Himalaya Shipping Ltd,	-22,17 %	-0,223		-20,77 %	-0,247		-32,16 %	-0,417	
26	Okeanis Eco Tankers Corp.	14,42 %	0,163		32,76 %	1,100		19,65 %	0,542	
27	Telefonaktiebolaget LM Ericsson	44,31 %	2,560	**	13,66 %	0,851		39,61 %	2,314	**