Master's Thesis

Evaluating the Impact of Earnings Calls on Stock Returns in Different Sectors in the Nordic Markets

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Abstract

Earnings announcements are key corporate events that convey new and often price-sensitive information to financial markets. The extent to which stock prices respond to such announcements has been extensively studied, but much of the literature remains centered on U.S. data or single-market analyses. This thesis contributes to the empirical literature by investigating the stock price reactions to quarterly earnings announcements across four Nordic equity markets: Denmark, Sweden, Finland, and Norway. The study aims to examine whether significant abnormal returns occur around the earnings disclosure date and whether these reactions vary across countries and sectors.

A long-form panel dataset was constructed using stock return data from publicly listed firms on the OMX Nordic Stockholm, OMX Nordic Helsinki, OMX Nordic Copenhagen, and Oslo Børs exchanges. The methodology is based on the classical event study framework, using the Capital Asset Pricing Model (CAPM) to estimate expected returns. Abnormal returns (ARs) were calculated as the difference between actual and expected returns, and cumulative abnormal returns (CARs) were computed across multiple event windows: [0, 0], [–1, +1], [–2, +2], [–3, +3], [–5, +5], and [–10, +10]. Estimation windows of 60 trading days were used to derive beta coefficients for each firm before the event date.

Empirical analysis was performed in two stages. First, CARs were aggregated by country and sector to explore patterns of market reactions. Cross-sectional ordinary least squares (OLS) regressions were conducted to identify differences in cumulative abnormal returns (CARs) between countries, using dummy variables with Finland as the reference group. Second, panel regressions with firm fixed effects were employed to account for unobserved heterogeneity across firms. Both regression models consistently found statistically significant negative cumulative abnormal returns (CARs) following earnings announcements, especially in Denmark, Finland, and Norway. In contrast, Swedish firms exhibited weaker (less adverse) reactions, and even positive reactions, particularly in comparison to the mean CAR of the full sample.

To further examine whether country-level differences were statistically significant, post hoc analyses using Tukey's Honestly Significant Difference (HSD) test were conducted. The test confirmed that specific country pairs—particularly those involving Finland and Sweden—exhibited significantly different mean CARs. This finding strengthens the argument that market efficiency and investor behavior vary across Nordic markets, even within a relatively integrated economic region.

The results suggest that investors in some Nordic markets may be slower to adjust prices in response to new earnings information, or that earnings announcements may systematically convey negative news. Industry-level regressions provided more nuanced insights, with sectors such as Energy and Consumer Non-Cyclicals showing heightened sensitivity to earnings news.

This study makes two key contributions. First, it provides updated empirical evidence of the earnings announcement effect in the Nordic region, using a comprehensive and consistent dataset. Second, it highlights the need to account for country- and industry-specific factors when evaluating abnormal returns, suggesting that market structure, investor composition, and disclosure practices may influence stock price responses.

Overall, the thesis provides new insights into regional differences in market efficiency and contributes to the understanding of how earnings announcements are incorporated into stock prices across different institutional contexts. The findings are relevant for investors, regulators, and academics seeking to understand price discovery in smaller yet sophisticated financial markets.

Keywords: abnormal returns, earnings announcements, event study, CAPM, panel regression, Nordic markets, cross-sectional analysis, market efficiency

Contents

1. Introduction

1.1. Background and Context

Earnings announcements are pivotal moments for publicly traded companies, often prompting heightened investor attention and speculation. These disclosures may either fall short of, meet, or exceed market expectations, and such deviations frequently raise questions about the corresponding stock price reactions. Given the scheduled nature and frequency of earnings announcements, they offer a rich context for empirical analysis. Unlike rare, unscheduled events, their recurrence provides a robust sample size, making it suitable for statistical inference.

From a market efficiency perspective, one might expect that the routine nature of these events would lead to their effects being fully and immediately incorporated into prices, thereby eliminating the possibility of abnormal returns. This assumption aligns with the semi-strong form of the Efficient Market Hypothesis (EMH), which posits that all publicly available information is instantaneously reflected in asset prices. However, empirical studies have consistently challenged this notion, particularly through the documentation of Post-Earnings Announcement Drift (PEAD), where returns continue to trend in the direction of the earnings surprise after the event.

These effects may not be uniform across markets or industries. Larger, more liquid markets, such as the S&P 500, may process earnings information more efficiently due to broader analyst coverage and higher investor participation. In contrast, smaller and less liquid markets, such as those in the Nordic region, may exhibit delayed reactions or greater variability in post-announcement returns. Moreover, sectoral differences could also influence the degree of market responsiveness. Growth-oriented sectors, such as technology or energy, are often more sensitive to earnings surprises due to heightened investor expectations and greater uncertainty. In

contrast, mature sectors, like consumer non-cyclicals or utilities, may respond more conservatively.

Despite the extensive literature on earnings reactions in major global markets, relatively little is known about how such dynamics unfold in the Nordic context. This raises important questions about the efficiency of these regional markets and the extent to which earnings announcements produce systematic abnormal returns. By analyzing industry-specific and country-specific responses to earnings announcements across Nordic exchanges, this study seeks to contribute to the broader discourse on market efficiency and investor behavior in less extensively studied financial environments.

1.2. Research Problem

While earnings announcements are among the most anticipated and frequent corporate disclosures, their impact on stock prices varies across markets and industries. Extensive research in large, well-developed markets such as the United States has documented patterns like the Post-Earnings Announcement Drift (PEAD), raising questions about the semi-strong form of the Efficient Market Hypothesis (EMH). However, much less is known about how these dynamics play out in smaller and potentially less efficient markets, such as those in the Nordic region.

Moreover, prior studies often focus on aggregate market reactions, neglecting potential heterogeneity in investor responses across sectors and national stock exchanges. This creates a gap in the literature regarding the extent to which earnings announcements generate abnormal returns in the Nordic context, and whether those reactions differ systematically by sector or country. Understanding these differences is crucial for assessing market efficiency, investor behavior, and information dissemination in smaller regional markets.

1.3. Research Questions and Objectives

This leads to the main research questions of this thesis. The purpose of this thesis is to examine how stock prices in Nordic markets react to quarterly earnings announcements, with a particular focus on sectoral and geographical differences. While prior research has extensively documented abnormal returns surrounding earnings announcements in large and liquid markets, limited attention has been paid to how these dynamics manifest in smaller markets such as those in Denmark, Sweden, Norway, and Finland.

To address this gap, the following research questions are posed:

- RQ1: Do earnings announcements generate statistically significant abnormal returns in Nordic stock markets?
- RQ2: Are there systematic differences in abnormal returns across sectors in response to earnings announcements?
- RQ3: Do stocks listed on different Nordic exchanges exhibit varying price reactions to earnings announcements?
- RQ4: To what extent do the observed patterns support or contradict the semi-strong form of the Efficient Market Hypothesis?

Based on these questions, the thesis aims to fulfill the following objectives:

- O1: Quantify cumulative abnormal returns (CARs) around earnings announcements using an event study framework.
- O2: Compare the magnitude and significance of CARs across sectors using cross-sectional OLS and post hoc tests.
- O3: Evaluate whether country-specific listing locations influence the strength or direction of market reactions.

- O4: Interpret the results in the context of market efficiency, specifically assessing the validity of the semi-strong Efficient Market Hypothesis (EMH) in Nordic markets.

1.4. Scope and Delimitations

This study investigates how stock prices across the Nordic countries—specifically Denmark, Sweden, Norway, and Finland—respond to quarterly earnings announcements, with a primary focus on identifying potential differences in market reactions across sectors and national stock exchanges. The analysis employs an event study methodology to estimate abnormal and cumulative abnormal returns (CARs), utilizing a panel dataset spanning a five-year period from December 30, 2019, to December 30, 2024. The sample consists exclusively of publicly listed firms across the major Nordic stock exchanges, selected based on market capitalization and sectoral representativeness.

To uncover patterns in stock price behavior, the study uses both cross-sectional ordinary least squares (OLS) regressions and panel data techniques. The event windows analyzed include multiple symmetrical intervals around the earnings call date (e.g., [0,0], [−1,+1], [−2,+2], [−3,+3] [−5,+5], [−10,+10]), allowing for the evaluation of immediate and delayed market reactions. The empirical framework enables comparisons across industries and countries while also capturing time-specific firm effects through the use of fixed-effects modeling.

However, several delimitations apply to the scope of this study. First, the analysis is confined to firms listed exclusively on Nordic exchanges, which may limit the generalizability of the findings to non-Nordic or emerging markets. The institutional, regulatory, and investor environments in these countries are relatively homogeneous and well-developed, which may not accurately reflect the dynamics in more heterogeneous or less mature financial systems.

Second, the study does not differentiate between positive and negative earnings surprises. It treats all earnings announcements as symmetric events, regardless of whether reported earnings

exceed, meet, or fall short of expectations. As such, the results reflect average market behavior rather than conditional reactions based on the direction or magnitude of the surprise.

Third, the model does not explicitly control for firm-specific characteristics such as size, leverage, prior performance, analyst coverage, or ownership structure. Nor does it incorporate market sentiment, media tone, or macroeconomic conditions, which may act as confounding variables in the pricing of earnings information.

Finally, the study assumes that the CAPM-based market model provides a valid and consistent benchmark for estimating expected returns across all firms and time periods (MacKinlay, 1997). This assumption simplifies the estimation of abnormal returns but may not fully capture the multifactor nature of risk in modern financial markets. As discussed in later chapters, this reliance on CAPM reflects a trade-off between theoretical consistency and empirical realism and represents a commonly acknowledged limitation in event study research.

Despite these delimitations, the study offers a robust and internally consistent framework for understanding cross-country and cross-sectoral differences in market reactions to earnings announcements within the Nordic region.

1.5. Significance of the Thesis

This research contributes to the growing body of literature on market efficiency and investor behavior in the context of earnings announcements. While much of the existing research has focused on U.S. markets or large global firms, this study sheds light on the Nordic region, which remains underexplored. By comparing the sensitivity of stock returns to earnings announcements across countries and industries, the study provides new insights into regional market dynamics, investor reactions, and potential inefficiencies.

The findings have practical implications for investors seeking to exploit short-term price reactions, policymakers interested in market transparency, and firms aiming to understand better how financial disclosures are received by the market. The use of both cross-sectional and panel approaches also highlights the methodological value of combining these perspectives when studying event-driven market behavior.

2. Theoretical Background

The reaction of stock prices to quarterly earnings announcements has been a central focus of financial economics and capital markets research for decades. This topic intersects theories of market efficiency, information asymmetry, asset pricing, and investor behavior. A rigorous understanding of these theoretical frameworks is essential for analyzing the impact of earnings announcements on abnormal stock returns, as well as the differential effects across sectors or industries. Moreover, the methodologies employed in such studies, notably event studies and Ordinary Least Squares (OLS) regression models, are grounded in well-established econometric theory and provide powerful tools for empirical investigation.

2.1. Efficient Market Hypothesis (EMH)

The foundational theory underlying stock price reactions to public announcements is the Efficient Market Hypothesis (EMH), articulated by Fama (1970). EMH posits that in an efficient market, security prices fully and instantaneously reflect all available information. Fama classifies market efficiency into three forms:

- Weak-form efficiency suggests that current prices reflect all historical prices.
- Semi-strong form efficiency posits that prices reflect all publicly available information, including earnings announcements.
- Strong-form efficiency asserts that prices reflect all information, public and private.

To analyze earnings announcements, the semi-strong form is most relevant. Under this framework, the release of new earnings information should be immediately incorporated into stock prices, implying that no abnormal returns should be consistently earned based on such public information.

However, numerous empirical studies challenge the strict interpretation of EMH. For example, Bernard and Thomas (1989) document the phenomenon of post-earnings announcement drift (PEAD), wherein stock prices continue to drift in the direction of the earnings surprise even after the announcement date. Such findings suggest delayed price adjustment and, hence, a degree of market inefficiency.

2.2. Information Asymmetry and Earnings Announcements

Earnings announcements are one of the primary means through which firms communicate financial performance to investors. According to the theory of information asymmetry, there exists an imbalance in information distribution between firm insiders (e.g., managers) and outside investors. This asymmetry can lead to adverse selection and suboptimal investment decisions (Akerlof, 1970).

By releasing earnings reports, firms reduce information asymmetry and align market participants' expectations with actual performance. Healy and Palepu (2001) argue that voluntary and mandatory disclosures, including earnings announcements, are mechanisms to mitigate information asymmetry and build investor confidence. The quality and timeliness of these disclosures are crucial in determining their informativeness and the subsequent stock price reaction.

2.3. Event Studies in Theory

To empirically measure how stock prices respond to earnings announcements, researchers widely employ the event study methodology. This technique isolates the effect of a specific event (in this case, the earnings announcement) on stock prices by analyzing returns over a short time window around the event date.

The basic steps in an event study include:

- Identification of the event date, usually the earnings announcement date.
- Estimation window, during which normal (expected) returns are calculated using a model such as the market model.
- Event window, which includes days surrounding the announcement (e.g., -1 to +1 days).
- Calculation of abnormal returns (ARs), defined as the difference between actual and expected returns.
- Aggregation into cumulative abnormal returns (CARs) over the event window.

The market model, given by: $R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$

It is typically estimated using Ordinary Least Squares (OLS) regression over the estimation window. Here, is the return of stock *i* on day *t*, is the return on the market portfolio, and is the error term (Fama et al., 1969; MacKinlay, 1997).

Once α_i and β_i The abnormal return on the event day is: $R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$

Furthermore, the cumulative abnormal return (CAR) over a window is: $CAR_i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it}$

By averaging across firms, researchers obtain the Average Abnormal Return (AAR) and Cumulative Average Abnormal Return (CAAR), which are then subjected to statistical tests to assess their significance.

Advanced versions of event studies incorporate models such as the Fama-French three-factor model and the Carhart four-factor model better to estimate expected returns and control for market anomalies. Additionally, bootstrapping and Monte Carlo simulations may be employed to generate more robust significance tests, especially in the presence of non-normal distributions or autocorrelated returns.

2.4. Ordinary Least Squares (OLS) in Event Studies

The OLS regression model is the workhorse of event study methodology. It is employed to estimate expected returns using historical data, typically with the market model or multi-factor models. The assumptions of the classical linear regression model—linearity, independence, homoscedasticity, and normality of errors—are critical for the validity of the OLS estimators.

In the context of event studies, OLS helps isolate the effect of market-wide movements from firm-specific news. For instance, without controlling market movements, a significant stock return on the earnings announcement day could be incorrectly attributed to the announcement itself rather than broader market trends.

Moreover, OLS can be extended to cross-sectional regressions in the post-event analysis phase. These regressions examine whether the magnitude of abnormal returns is systematically related to firm characteristics, such as size, book-to-market ratio, or industry classification (MacKinlay, 1997).

This framework enables researchers to test hypotheses about the determinants of market reactions to earnings announcements and to investigate how firm-specific factors affect investor responses.

2.5. Sectoral Differences in Earnings Reactions

There is growing empirical evidence that the impact of earnings announcements varies significantly across industries. The heterogeneous response is rooted in differences in growth expectations, information environments, regulatory structures, and investor bases.

Technology firms, often characterized by high growth potential and valuation multiples, tend to exhibit larger stock price reactions to earnings announcements. These reactions are magnified due to high uncertainty and the firm's reliance on intangible assets and future cash flows, which make earnings signals particularly informative (Francis et al., 2002).

In contrast, utilities and consumer staples, which operate in more stable and regulated environments, generally exhibit muted reactions. Their earnings are more predictable, and investors are less likely to revise their valuations significantly in response to quarterly results (La Porta et al., 1997).

Asymmetric information models and theories of investor attention can theoretically support these sectoral patterns. The former suggests that in sectors with high uncertainty, earnings releases are more effective in resolving information asymmetry, thereby eliciting stronger market reactions (Verrecchia, 2001). The latter implies that sectors frequently in the public eye attract more investor scrutiny, resulting in more rapid and pronounced price adjustments.

Furthermore, sector-specific dynamics such as innovation cycles, regulatory risk, and competitive intensity can influence how earnings news is interpreted. For instance, a positive earnings surprise in the tech sector may signal successful R&D efforts or product launches, whereas in utilities, it might reflect transitory factors such as weather conditions or regulatory changes.

2.6. Behavioral Finance and Investor Reaction

The theoretical framework of behavioral finance provides additional insight into market reactions to earnings announcements. Traditional finance assumes that investors are rational and process information efficiently. However, behavioral models incorporate psychological biases that affect decision-making.

One such model is the overreaction/underreaction hypothesis, which posits that investors may overreact to unexpected news (leading to price reversals) or underreact (leading to price drifts). This behavioral anomaly is consistent with the empirical findings on PEAD, as first documented by Bernard and Thomas (1989), and suggests that earnings surprises are not fully incorporated into prices immediately.

Moreover, limited investor attention can cause delayed reactions to information. Hirshleifer, Lim, and Teoh (2009) find that when multiple earnings announcements coincide, investors may not allocate attention evenly, leading to weaker or delayed price reactions in less prominent firms.

Behavioral finance also explores heuristics and biases such as representativeness, anchoring, and confirmation bias. These cognitive shortcuts can cause investors to misinterpret earnings news or fail to update their beliefs in a rational manner. For example, investors may overemphasize recent positive earnings trends while ignoring longer-term fundamentals, leading to mispricing.

2.7. Integration of Theories into Research Design

Combining these theoretical perspectives allows for a comprehensive understanding of stock price responses to earnings announcements. EMH provides a benchmark for the expected behavior of the market. Deviations from this benchmark, such as abnormal returns and PEAD, can be explained through information asymmetry, behavioral biases, and sectoral heterogeneity.

Methodologically, the integration of OLS regression into the event study framework provides a robust approach to quantify and analyze these reactions. The ability to estimate expected returns and isolate firm-specific effects ensures that the event study remains a powerful tool in empirical finance.

Furthermore, by incorporating sectoral analysis into the research design, one can explore whether the informativeness and impact of earnings announcements differ in predictable ways across industries. This multidimensional approach provides deeper insights into how information is processed in financial markets and whether market reactions are rational, efficient, or driven by behavioral biases.

3. Literature Review

3.1. Introduction

Earnings announcements are pivotal events that provide investors with critical information about a firm's financial performance. Under the Efficient Market Hypothesis (EMH), such disclosures should prompt immediate adjustments in stock prices, reflecting all publicly available information. This literature review examines market reactions to earnings announcements, with a focus on sector-specific dynamics within the Nordic region. It aims to establish a theoretical and empirical foundation for analyzing abnormal returns across industries in these markets.

3.2. Market Reactions to Earnings Announcements: A Global Perspective

Seminal studies have established that earnings announcements have a significant impact on stock prices. Ball and Brown (1968) demonstrated that stock prices react to earnings information, with notable adjustments occurring even before the announcement date. Bernard and Thomas (1989) identified the post-earnings announcement drift (PEAD), where stock prices

continue to move in the direction of the earnings surprise for an extended period, challenging the EMH's assertion of immediate price adjustment.

Subsequent research attributed PEAD to factors such as investor underreaction, behavioral biases, and information processing delays (Daniel, Hirshleifer, & Subrahmanyam, 1998). These findings underscore the complexity of market responses to earnings news, suggesting that various factors, including market conditions and investor behavior, influence the assimilation of new information into stock prices.

3.3. Evidence from the Nordic Markets

While much of the early literature focused on U.S. markets, recent studies have examined the Nordic region, comprising Denmark, Finland, Norway, and Sweden. High transparency, robust regulatory frameworks, and active investor participation characterize these markets.

A study by Nikkinen et al. (2006) on Finnish stock returns found that earnings announcements produced statistically significant abnormal returns, albeit less pronounced than in more volatile markets. Poulsen et al. (2017) analyzed earnings announcements in Denmark and Norway, reporting short-term cumulative abnormal returns (CARs) ranging from 2% to 4% over a [-1, +1] event window. The moderate reactions were attributed to strong analyst coverage and lower information asymmetry in Nordic firms.

Hjelström and Johansson (2016) focused on small-cap Swedish firms, finding larger abnormal returns compared to their large-cap counterparts, which implies that firm visibility and analyst coverage may mediate the price impact of earnings announcements. These studies collectively suggest that while Nordic markets react to earnings disclosures, the magnitude and persistence of these reactions vary across countries and firm types.

3.4. Sectoral Sensitivity and Industry-Specific Reactions

Industry characteristics have a significant influence on stock price reactions to earnings announcements. High-growth sectors, such as technology and biotechnology, often exhibit stronger reactions due to greater earnings uncertainty and reliance on future expectations (Kothari, 2001; Francis et al., 2002). Conversely, defensive sectors such as utilities and consumer staples typically exhibit muted responses, reflecting their stable cash flows and predictable earnings (Jegadeesh & Livnat, 2006).

Lahti and Suominen (2014) provided sector-specific evidence from Finland, finding that information technology and healthcare firms exhibited significantly higher abnormal returns around earnings announcements compared to firms in the industrial or financial sectors. They argued that forward-looking investors place more emphasis on firms in sectors where valuation heavily relies on earnings forecasts.

In the Nordic region, Sørensen and Skovgaard (2020) observed similar patterns, with cyclical sectors, including energy and discretionary consumer goods, showing greater price reactions, particularly in the presence of significant earnings surprises. These findings support the hypothesis that the magnitude of abnormal returns is conditional on sectoral characteristics.

3.5. The Role of Earnings Surprises and Analyst Expectations

Earnings surprises, defined as the difference between reported earnings and analyst forecasts, are crucial in determining market reactions. Studies have shown that positive surprises lead to immediate price increases, while negative surprises result in sharp declines (Skinner & Sloan, 2002). The impact of a surprise is more significant when investor uncertainty is higher, which is linked to sectoral differences.

Francis et al. (2002) emphasized that the effect of earnings surprises is amplified in sectors with higher uncertainty, such as the technology and pharmaceutical industries. In the Nordic context,

Hjelström and Johansson (2016) found that mid-cap firms in tech or biotech sectors experienced larger deviations from consensus estimates, resulting in more pronounced stock price movements.

3.6. Regulatory Environment and Market Microstructure in the Nordics

The Nordic countries adhere to stringent financial reporting standards aligned with International Financial Reporting Standards (IFRS), promoting transparency in earnings disclosures. Mandatory interim reporting, typically on a quarterly basis, ensures a consistent flow of financial information.

Despite this uniform regulatory framework, variations exist in investor behavior and market microstructure. For instance, the Oslo Børs (Norway) is dominated by energy firms and tends to exhibit higher volatility. At the same time, the Nasdaq Helsinki (Finland) has a strong representation of industrials and manufacturing firms. These structural differences contribute to sector-level variations in how earnings news is processed and reflected in stock prices.

3.7. Gaps in the Literature and Research Motivation

While existing literature confirms that earnings announcements generate abnormal returns in the Nordic region, there is a lack of studies that conduct direct sector-by-sector comparisons across all four countries. Moreover, the interaction between earnings calls and industry characteristics remains underexplored, particularly in Nordic exchanges.

This thesis aims to bridge this gap by conducting a comparative sector-level event study of the stock price reactions of Nordic firms to quarterly earnings announcements. By combining firm-level event windows with sectoral classification, the research seeks to uncover patterns that can aid investors, analysts, and policymakers in understanding the dynamics of earnings announcements in a Nordic context.

4. Data and Methodology

4.1 Data Description and Sample Selection

This study investigates the relationship between earnings calls and stock returns in the Nordic equity markets, focusing on a selection of companies listed across four major Nordic stock exchanges. The primary data source for this research was FactSet, a comprehensive financial database that provides institutional-grade data on global markets. FactSet was used to retrieve two key datasets: (1) daily return data for the selected companies and (2) timing information for corporate earnings calls.

The return data were collected in the form of simple returns, calculated as the daily percentage change in stock price. These returns were compiled over five years, spanning the trading days from December 30, 2019, to December 30, 2024. This timeframe was chosen to ensure a robust and representative data set encompassing multiple earnings cycles and macroeconomic phases. The use of daily returns allows for precise event-study analysis around earnings call dates.

In parallel, earnings call data were extracted from FactSet's event transcripts and metadata. For each selected company, the exact dates on which earnings calls occurred were recorded. These calls often coincide with earnings announcements and are widely followed by analysts, investors, and financial media. Their timing is crucial for identifying abnormal return patterns surrounding these events.

Given the focus on the Nordic market, the sample was limited to firms listed in Sweden, Denmark, Norway, and Finland. The corresponding stock exchanges included in the analysis are:

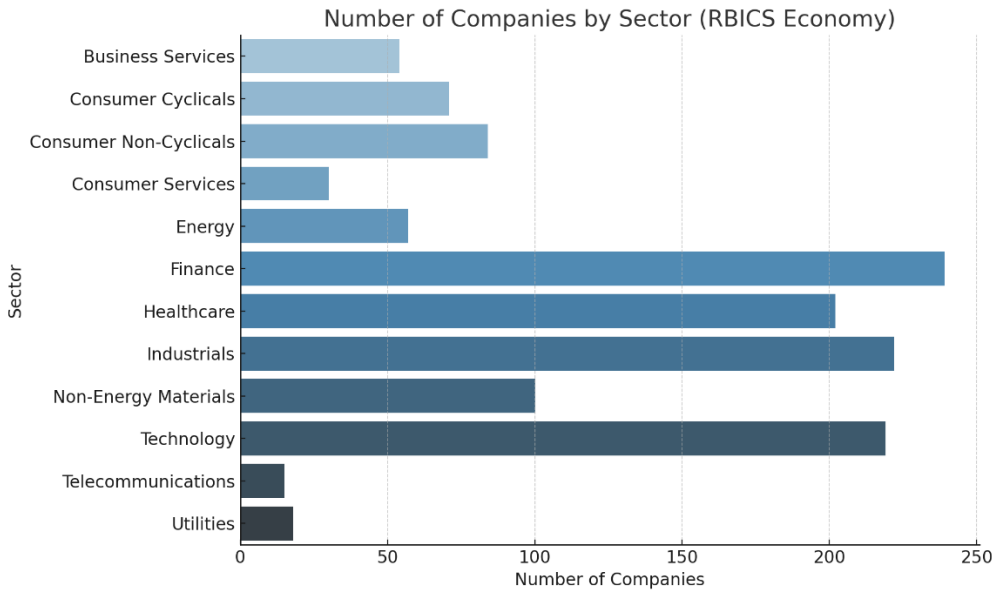
- Nasdaq Stockholm (formerly Stockholm Stock Exchange)
- Nasdaq Copenhagen (formerly Copenhagen Stock Exchange)
- Oslo Børs

- Nasdaq Helsinki (formerly Helsinki Stock Exchange)

An initial universe of 1,311 listed companies was identified across these exchanges. These firms were then classified using RBICS (Revere Business Industry Classification System), a detailed sector taxonomy widely used in financial analytics. The sectoral distribution is shown below in Figure 1:

Figure 1:

Total number of companies considered



Source: FactSet Database

The RBICS classification used in this study was based on the "Sector" level to allow for a balance between granularity and sample size. More detailed sub-sector or industry group levels were not considered, as some would contain too few firms to support analysis.

Several sectors—namely, Consumer Services, Telecommunications, and Utilities—were excluded from the analysis due to insufficient representation. These sectors each contained fewer than 40 companies and thus did not meet the inclusion criteria for statistical consistency.

Given the diverse structure of the Nordic economies, it was not feasible to construct a sample with equal representation across all countries and sectors. For example, Norway's equity market is heavily weighted toward energy firms, with 51 of the 57 energy companies originating from Norway alone. This imbalance is due to a combination of natural resource availability (particularly oil and gas), historical policy decisions that favored energy exports, and long-standing industrial specialization.

To address these disparities, an alternative sampling strategy was adopted. Rather than selecting an equal number of firms per country or exchange, the study opted for a market capitalization-based approach. Specifically, within each of the nine retained sectors, the 40 largest companies by market capitalization as of April 10, 2025, were selected. The cutoff date of April 10, 2025, was selected as it provided the most recent and complete snapshot of market capitalizations at the time of analysis. Market capitalization figures were reported in each company's local currency; however, for comparability, all figures were converted to EUR using the prevailing exchange rates on that date. This ensured that the sample captured the most economically significant and widely followed firms, increasing the reliability of both return data and earnings call availability.

As a result, the final sample comprised 360 companies distributed as follows:

- 169 companies listed on Nasdaq Stockholm
- 91 companies listed on Oslo Børs
- 57 companies listed on Nasdaq Helsinki
- 43 companies listed on Nasdaq Copenhagen

This selection methodology ensured that each sector was sufficiently represented while maintaining data quality and relevance. It also aligns with standard financial research practices that prioritize liquidity and data availability—attributes typically associated with large-cap firms. Moreover, larger companies are more likely to hold earnings calls, release detailed transcripts, and be followed by analysts, making them ideal candidates for this type of event study.

In summary, the final dataset provides a comprehensive yet focused view of the Nordic equity markets, encompassing a diverse range of sectors while maintaining methodological consistency. This design strikes a balance between sectoral coverage, geographic diversity, and data reliability, providing a solid empirical foundation for the analyses that follow. The final dataset is structured as long-form panel data, wherein each observation represents a daily return for a specific firm on a specific trading day. This format enables the tracking of stock performance over time for each firm individually, while also allowing for the alignment of observations across firms around key events such as earnings calls. Given that the sample includes 360 firms observed over five years, the dataset comprises a substantial number of firm-day combinations, providing a rich temporal and cross-sectional structure for analysis. This panel format is particularly well-suited for event study methodology, as it facilitates consistent measurement of abnormal returns before, during, and after earnings-related disclosures.

4.2. Earnings Announcement Dates and Return Data

This section outlines the construction of the two core datasets used in the empirical analysis: (1) earnings announcement dates, which anchor the event-study methodology, and (2) daily return data (and later calculated into log-returns), which serve as the dependent variable in measuring market response.

4.2.1 Earnings Announcement and Call Dates

Earnings announcement dates were obtained through FactSet's event database, which provides structured metadata on corporate communications, including press releases, earnings reports, and earnings calls. For this study, the earnings call date, not the report release date, was used as the event date, based on the assumption that market reactions are most pronounced when management communicates directly with analysts and investors.

FactSet categorizes earnings call events with timestamped records, often including the exact start time of the call. However, because Nordic markets generally operate within a consistent

time zone and trading day structure, only the date (not time) was used for alignment with daily return data.

4.2.2 Return Data Construction

Daily return data were collected for all companies in the final sample using FactSet's Price Returns field, which reflects simple (non-logarithmic) returns based on adjusted closing prices. Returns were collected for each trading day from December 30, 2014, to December 30, 2019, providing a consistent pre-event, event, and post-event window for all firms. These simple returns were then calculated into daily log returns.

The return data was used to construct event windows centered around each earnings call. While the exact windows used for testing are described in later methodology sections, return sequences for each stock were aligned to the call date (day 0), as well as pre- and post-event periods (e.g., days -10 to +10).

To ensure the reliability of return calculations, companies with missing price data during the event window were excluded from that specific earnings call event. However, these firms remained in the panel if they met the overall inclusion criteria.

All returns were analyzed in local currency, with no conversion to a common currency. This decision was made to preserve the integrity of local market behavior and avoid distortions from exchange rate fluctuations, which could interfere with the precision of return-based inferences around earnings events. Although their market cap was converted to EUR on April 10th, as mentioned above.

4.3 Event Study Methodology

To measure the market's reaction to earnings calls, this study employs a standard event study methodology, a widely used empirical approach in finance to quantify the effect of firm-specific events on stock prices. The methodology was implemented using log daily return data,

Defining the Event and Timeline

The event of interest in this study is the date of the earnings call, as recorded from FactSet. For each firm, earnings call dates were identified over five years, and daily return data were aligned accordingly. An event window was defined, spanning from 10 days prior to the earnings call (day -10) to 10 days after (day +10), for a total of 21 trading days per event. Other event windows were also implemented, including (-1, +1), (-2, +2), (-3, +3), and (-5, +5).

Log Return Calculation and Abnormal Returns

Unlike some event studies that use simple percentage returns, this study used logarithmic returns, which are calculated as:

$$r_{i,t} = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right)$$

where $r_{i,t}$ Is the log return of firm i on day t, and $P_{i,t}$ Is the closing price. Log returns are commonly used due to their time-additive properties and improved statistical behavior, particularly when analyzing compound returns over multiple periods.

Market Model Implementation

To estimate abnormal returns (ARs) around earnings announcements, a CAPM-based market model was employed. This method isolates firm-specific abnormal performance by accounting for systematic market movements and the time value of money through the use of the risk-free rate.

Specifically, the excess return for each firm was calculated as the difference between the firm's daily log return and the corresponding risk-free rate:

$$\text{Excess Return}_{\text{i,t}} = \text{R}_{\text{i,t}} - \text{R}_{\text{f,t}}$$

The excess market return was similarly defined as:

$$\text{Excess Market}_{\text{t}} = \text{R}_{\text{m,t}} - \text{R}_{\text{f,t}}$$

where $R_{i,t}$ denotes the observed return of firm *i* on day *t*, $R_{m,t}$ the return of the market index (OMXN40HL), and $R_{f,t}$ The risk-free rate on the same day (10-year Euro area government benchmark bond yield).

The following data integrity constraints were applied to ensure robustness:

- The estimation window must contain a minimum of 60 valid trading days.
- No other earnings announcements may occur within the estimation window.
- All observations must be free from missing values (NaNs) in both firm and market excess returns.

The expected return on the event date was calculated using the estimated firm-specific beta coefficient:

$$R_{i,t}^{expected} = R_{f,t} + \widehat{\beta}_{\iota} \cdot (R_{m,t} - R_{f,t})$$

The corresponding abnormal return was then defined as the deviation between the observed and expected return:

$$AR_{i,t} = R_{i,t}^{observed} - R_{i,t}^{expected}$$

This procedure yielded a cross-sectional dataset of abnormal returns on the event day, denoted $AR_{t=0}$. To assess whether the average abnormal return was statistically significant, an intercept-only OLS regression was conducted:

$$AR_{t=0} = \gamma + \varepsilon$$

Statistical significance of the intercept γ This would indicate whether, on average, the market reacted abnormally to earnings announcements, after controlling for expected returns based on market risk.

Aggregation of Abnormal Returns

For interpretation and statistical testing, abnormal returns were aggregated into Cumulative Abnormal Returns (CARs) over selected windows, such as:

- [0,0]: event day reaction,
- [−1,+1]: capturing immediate reactions,
- [-2,+2]: for pre- and post-call adjustment,
- [-3,+3]: for short-term adjustments,
- [-5,+5]: for medium-term drift,
- [−10,+10]: complete market response.

These CARs were then averaged across firms to produce Cumulative Average Abnormal Returns (CAARs), which represent the market-wide reaction to earnings calls.

Statistical Testing

To evaluate whether the observed CAARs differed significantly from zero, t-tests were conducted. These tested the null hypothesis that earnings calls have no measurable impact on returns (i.e., CAAR = 0). Statistical significance was assessed at the 1%, 5%, and 10% levels.

Limitations related to event clustering, time zone effects, and announcement timing (before vs. after market close) were minimized by using daily returns and consistently aligned windows.

4.4 Statistical Tests: Significance of Abnormal Returns

To evaluate the significance of market reactions to earnings calls, this study applies several standard statistical tests to the computed abnormal return measures. These tests help determine whether the observed reactions deviate from normal market behavior in a statistically meaningful way.

The primary metric used to evaluate stock price performance in this study is **Cumulative Abnormal Returns (CAR)**. This is paired with hypothesis tests—primarily **t-tests**—to assess significance.

For each firm, daily **Abnormal Returns (AR)** were calculated across the event window using the Market Model (see Section 4.3). These ARs were then aggregated across the sample to compute **the Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR), also known as the mean Cumulative Abnormal Returns (CAR)**.

To test whether these average returns are significantly different from zero, **t-tests** were applied under the following null hypothesis:

$$H_0: CAAR = 0$$

The t-statistic was computed as:

$$t = \frac{\overline{CAR}}{s/\sqrt{n}}$$

Where:

- $\overline{CAR}$ The sample mean of cumulative abnormal returns
- s: the standard deviation of CAR across the sample
- n: the number of firms or events

These t-tests were applied to various time windows (e.g., [0,0], [-1,+1], [-2,+2], [-3,+3], [-5,+5], [-10,+10]) to detect immediate and delayed reactions to earnings calls. Statistical significance was evaluated at 1%, 5%, and 10% levels, using two-tailed tests.

To account for differences in cumulative abnormal returns (CARs) across countries and sectors, I applied both OLS regressions with dummy variables (to assess directional and magnitude differences relative to a baseline)

This same method was also used to determine whether the mean CAR of the sectors and countries was different from the mean CAR of the full sample:

$$H_0: CAAR_{Sector} = CAAR_{Full\ Sample}$$

And

$$H_0: CAAR_{Country} = CAAR_{Full\ Sample}$$

Tukey's HSD post-hoc test was used to identify statistically significant pairwise differences between all group combinations while controlling for family-wise error. This dual approach strengthens the robustness of the findings by addressing both hypothesis-driven and exploratory comparisons.

4.5. Limitations of the Methodology

While the event study methodology adopted in this thesis is widely recognized and methodologically appropriate for analyzing the market's response to earnings calls, it is important to acknowledge several limitations that may affect the interpretation and generalizability of the results. First, the methodology is grounded in the semi-strong form of the Efficient Market Hypothesis (EMH), which assumes that markets instantaneously and rationally incorporate all publicly available information into stock prices. In practice, however, investor behavior may be influenced by frictions, inattention, or psychological biases that deviate from this idealized framework. Second, the analysis relies exclusively on daily log return data, which, while convenient and widely used, lacks the granularity to capture intra-day trading activity. This limitation is particularly relevant in cases where earnings calls occur outside of regular trading hours, potentially leading to a misalignment between the information release and the return measurement. Additionally, all earnings calls are treated uniformly, with no differentiation based on content, sentiment, or delivery, which overlooks the potentially heterogeneous informational value of different calls. Furthermore, the sample includes a structural imbalance across sectors

and countries, as firms are distributed unevenly due to the industrial composition of the Nordic economies. For instance, energy firms are disproportionately concentrated in Norway. At the same time, sectors such as healthcare and technology are more prominent in Sweden and Finland, which may introduce a bias in the aggregated results. The methodology also assumes that the earnings call is the primary and isolated source of information influencing returns within the event window; in reality, overlapping announcements, macroeconomic news, or unrelated firm-specific events may contaminate the abnormal return estimates. Lastly, the study focuses solely on return-based measures. It does not incorporate complementary indicators such as abnormal trading volume or volatility, which can offer additional insight into investor attention and market sentiment. These limitations do not undermine the validity of the event study's approach but should be considered when interpreting the empirical findings and assessing their broader implications.

5. Empirical Results

This chapter presents the empirical findings derived from the implementation of an event study methodology applied to a comprehensive panel dataset of publicly listed firms across the four major Nordic equity markets: Denmark, Sweden, Norway, and Finland. The central objective is to evaluate how stock prices respond to quarterly earnings announcements, with a particular focus on the magnitude, direction, and statistical significance of cumulative abnormal returns (CARs) observed in various event windows. By combining cross-sectional OLS regressions, firm-level fixed effects panel models, and post hoc statistical tests, the analysis offers a multi-dimensional understanding of market reactions across both countries and sectors.

The empirical framework is designed to isolate firm-specific price movements that are attributable to earnings disclosures, while controlling for general market trends and systematic risk. The results are organized to first establish a contextual foundation through descriptive statistics, which summarize the distribution of firms by sector and exchange, as well as key

characteristics such as market capitalization and sectoral representation. This provides important context for interpreting the heterogeneity observed in later stages of the analysis.

The chapter then delves into the core of the event study results, reporting both daily abnormal returns (ARs) and cumulative abnormal returns (CARs) across a series of event windows. These include narrow windows (e.g., [0, 0] and [−1, +1]) capturing immediate market responses, as well as broader windows (e.g., [−5, +5] and [−10, +10]) that allow for delayed adjustments or drift effects. Sector-specific and country-specific analyses are performed to detect patterns of differential sensitivity, where the responsiveness of stock prices to earnings calls may vary due to factors such as industry volatility, investor expectations, and national market structures.

To assess the robustness and statistical reliability of these findings, the chapter incorporates fixed effects regression models that control for unobserved heterogeneity at the firm level, and Tukey's Honestly Significant Difference (HSD) test to detect statistically significant pairwise differences in cumulative abnormal returns (CARs) across groups. These tests help clarify whether observed variations in returns are systematic or merely driven by noise or sample composition.

Collectively, the results presented in this chapter aim to shed light on the extent to which institutional, structural, and informational differences across countries and industries influence the pricing of earnings-related information in the Nordic region. By doing so, this study contributes to a more nuanced understanding of market efficiency and investor behavior in relatively integrated but still distinct financial markets.

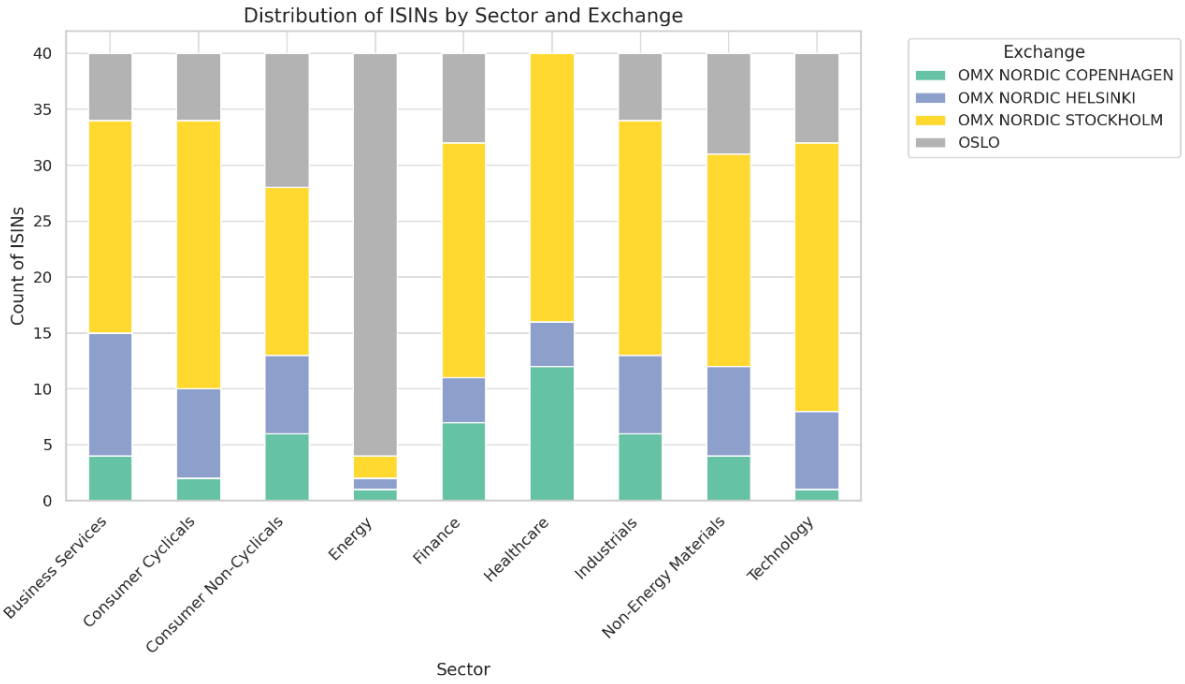
5.1. Descriptive Statistics

Before analyzing the abnormal return behavior surrounding earnings announcements, it is essential first to provide an overview of the dataset. This section presents the descriptive statistics that summarize the key structural characteristics of the sample, including the distribution of firms across sectors and stock exchanges, the average market capitalization, and the dispersion of returns. These statistics offer important context for interpreting the later event

study results by highlighting the sectoral composition, exchange-level imbalances, and economic weight of the firms included in the analysis. Understanding the underlying characteristics of the sample is crucial for assessing potential biases, ensuring representativeness, and framing the observed patterns in cumulative abnormal returns (CARs).

Figure 2:

Distribution of selected firms



Source: FactSet Database

Figure 2 provides a breakdown of the 360 firms by sector and exchange, demonstrating how sectoral representation varies across national markets. All nine RBICS sectors are evenly represented with 40 firms each, ensuring analytical balance across industries. However, within each sector, the exchange-level composition varies significantly. For example, the Energy sector is dominated by Norwegian firms, with 36 of the 40 companies listed on the Oslo exchange. This concentration reflects Norway's unique industrial structure and its specialization in resources.

In contrast, sectors such as Technology, Healthcare, and Finance are heavily represented in Sweden, with 24 out of 40 Technology firms and 24 Healthcare firms listed on the OMX Stockholm exchange. Other sectors, such as Business Services and Consumer Cyclicals, exhibit a more balanced distribution across the four exchanges, although OMX Stockholm remains the plurality in most categories.

This structure highlights the regional specialization of the Nordic economies: Norway focuses on energy, Sweden on high-tech and health innovation, and Denmark and Finland contribute meaningfully in financials and industrials. Despite variations in national representation within sectors, the sample design ensures that each sector contains sufficient cross-sectional variation to support comparative analysis across countries and industries.

Table 1:

Market Cap of different sectors by exchange (in million €)

Row Labels	Sum of Market Value		Average of Market Value	
Business Services	**€**	**23.066,8**	**€**	**576,7**
OMX NORDIC COPENHAGEN	€	6.304,0	€	1.576,0
OMX NORDIC HELSINKI	€	1.372,4	€	124,8
OMX NORDIC STOCKHOLM	€	14.817,7	€	779,9
OSLO	€	572,7	€	95,5
Consumer Cyclicals	**€**	**56.472,4**	**€**	**1.411,8**
OMX NORDIC COPENHAGEN	€	10.869,3	€	5.434,7
OMX NORDIC HELSINKI	€	4.117,3	€	514,7
OMX NORDIC STOCKHOLM	€	40.202,3	€	1.675,1
OSLO	€	1.283,5	€	213,9
Consumer Non-Cyclicals	**€**	**101.783,1**	**€**	**2.544,6**
OMX NORDIC COPENHAGEN	€	25.651,0	€	4.275,2
OMX NORDIC HELSINKI	€	11.765,6	€	1.680,8
OMX NORDIC STOCKHOLM	€	30.647,6	€	2.043,2
OSLO	€	33.718,9	€	2.809,9
Energy	**€**	**104.768,2**	**€**	**2.619,2**

OMX NORDIC COPENHAGEN	€	1.386,2	€	1.386,2
OMX NORDIC HELSINKI	€	5.977,6	€	5.977,6
OMX NORDIC STOCKHOLM	€	201,3	€	100,6
OSLO	€	97.203,1	€	2.700,1
Finance	**€**	**449.403,3**	**€**	**11.235,1**
OMX NORDIC COPENHAGEN	€	56.201,5	€	8.028,8
OMX NORDIC HELSINKI	€	68.383,1	€	17.095,8
OMX NORDIC STOCKHOLM	€	261.897,8	€	12.471,3
OSLO	€	62.920,9	€	7.865,1
Healthcare	**€**	**385.868,1**	**€**	**9.646,7**
OMX NORDIC COPENHAGEN	€	329.560,3	€	27.463,4
OMX NORDIC HELSINKI	€	9.777,7	€	2.444,4
OMX NORDIC STOCKHOLM	€	46.530,0	€	1.938,8
Industrials	**€**	**463.936,9**	**€**	**11.598,4**
OMX NORDIC COPENHAGEN	€	84.324,7	€	14.054,1
OMX NORDIC HELSINKI	€	56.789,9	€	8.112,8
OMX NORDIC STOCKHOLM	€	287.141,3	€	13.673,4
OSLO	€	35.681,0	€	5.946,8
Non-Energy Materials	**€**	**174.516,4**	**€**	**4.362,9**
OMX NORDIC COPENHAGEN	€	34.673,5	€	8.668,4
OMX NORDIC HELSINKI	€	29.576,6	€	3.697,1
OMX NORDIC STOCKHOLM	€	89.369,9	€	4.703,7
OSLO	€	20.896,5	€	2.321,8
Technology	**€**	**96.343,0**	**€**	**2.408,6**
OMX NORDIC COPENHAGEN	€	1.841,6	€	1.841,6
OMX NORDIC HELSINKI	€	31.737,1	€	4.533,9
OMX NORDIC STOCKHOLM	€	55.713,1	€	2.321,4
OSLO	€	7.051,2	€	881,4
Grand Total	**€**	**1.856.158,3**	**€**	**5.156,0**

Source: FactSet Database

In addition to summarizing the distribution of firms by exchange and sector, Table 1 presents the aggregated and average market capitalization across all combinations of sectors and stock exchanges. The data reflect market capitalizations as of April 10, 2025, and are expressed in

millions of euros (€). The total combined market value of the 360 firms in the sample amounts to approximately €1.86 trillion, confirming that the study focuses on the largest and most economically significant listed firms across the Nordic region. On average, each firm in the sample has a market capitalization of approximately €5.16 billion, although there is considerable variation across sectors and exchanges, as discussed below.

From a sectoral perspective, the Industrials sector contributes the highest total market capitalization, with an aggregate value of approximately €463.9 billion, accounting for roughly one quarter of the total sample value. This is followed closely by the Finance sector with €449.0 billion, and Healthcare, with €385.9 billion. These three sectors alone account for nearly 70% of the total market value in the sample, underscoring their dominant role in the Nordic capital markets. The average market capitalization per firm within these sectors is also among the highest, with Healthcare leading at €9.65 billion, followed by Industrials at €11.60 billion and Finance at €11.23 billion, respectively. This reflects the presence of several large multinational firms headquartered in the region that are active in these sectors, particularly in Sweden.

In contrast, sectors such as Business Services and Consumer Cyclicals contribute far less to total market capitalization, both in aggregate and on a per-firm basis. For example, the Business Services sector accounts for only €23.1 billion in total, with an average firm size of approximately €577 million. This pattern suggests that while the sample includes sectoral representation from across the economy, the distribution of economic weight is highly skewed toward a few capital-intensive or highly developed sectors.

From a geographic or exchange-level perspective, firms listed on OMX Nordic Stockholm (Sweden) overwhelmingly dominate in terms of both the number of firms and total market value. Stockholm-listed firms contribute the most significant share to nearly every sector. Notably, Stockholm accounts for €287.1 billion in the Industrials sector, €261.9 billion in Finance, and €55.7 billion in Technology. This reflects Sweden's position as the largest and most diversified equity market in the Nordic region, housing many of the region's most globally recognized firms.

Furthermore, Stockholm-listed firms also tend to show high average market capitalizations, indicating that not only are they numerous, but also consistently among the largest.

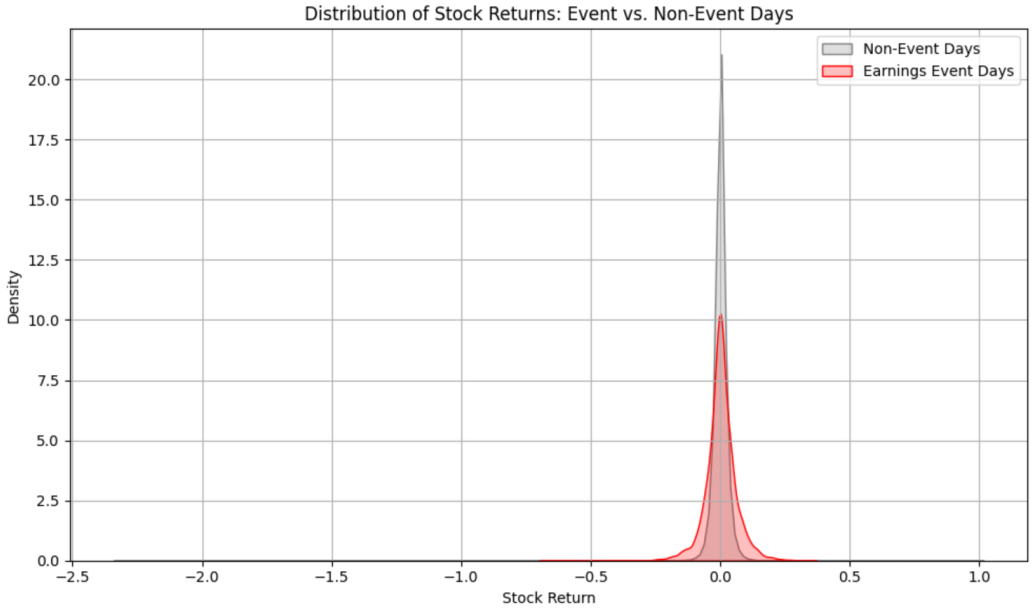
Conversely, Oslo Børs (Norway) exhibits a more concentrated market profile. While it contributes fewer firms overall, it dominates the Energy sector, contributing €97.2 billion, or over 92% of the sector's total market value in the sample. This aligns with Norway's economic specialization in oil, gas, and energy infrastructure. The dominance of Oslo in this sector results in the highest average firm size within Energy (€2.7 billion), despite only six firms being included from Norway in this sector. This concentration of large-cap energy firms is a defining characteristic of the Norwegian equity market and is likely to influence the results observed in the event study, particularly in sectoral breakdowns.

Other exchanges, such as OMX Nordic Helsinki (Finland) and OMX Nordic Copenhagen (Denmark), contribute more moderately. Helsinki's presence is most pronounced in the Technology and Healthcare sectors, where it includes firms with relatively high average market capitalizations (e.g., €4.53 billion in Technology). Copenhagen's most notable contributions are found in Healthcare and Finance, where it includes €329.6 billion and €56.2 billion in market value, respectively. The Healthcare figure is heavily skewed by the presence of a single dominant firm, Novo Nordisk, which alone represents a significant share of the entire sample's capitalization. This concentration within a few firms can introduce potential bias into sector-level averages and CAR calculations, particularly in sectors where one firm disproportionately affects the mean.

In summary, while the sample is sectorally balanced in terms of firm count (40 firms per sector), the distribution of market capitalization is highly uneven, both across sectors and exchanges. This reflects real-world disparities in economic structure, industrial specialization, and capital market development within the Nordic region. These differences are analytically significant, as they may explain cross-sectional variation in abnormal returns in later chapters. For example, larger firms may have greater analyst coverage, more liquid markets, and more transparent earnings disclosures, all of which can shape the magnitude and timing of investor reactions.

Likewise, sector-specific dynamics—such as the cyclicality of Industrials or the defensiveness of Healthcare—may produce structurally different return behaviors around earnings announcements. Understanding these underlying structures is thus essential for properly contextualizing the empirical results that follow.

Figure 3:



Source: FactSet Database

For the distribution of the returns of all 360 firms, the returns were plotted in Figure 3. This figure suggests that on most non-event days, stock returns tend to cluster tightly around zero, indicating relatively low volatility in the absence of earnings announcements. In contrast, during earnings event days, there is a visibly wider distribution of returns, implying that stock prices are more likely to experience significant movements, both positive and negative, when new financial information is released. This pattern holds when aggregating data across all firms, suggesting that earnings calls systematically increase return volatility. These findings are consistent with the Efficient Market Hypothesis, which posits that stock prices rapidly incorporate new information

(Fama, 1970). Furthermore, the observed increase in return dispersion during event days reflects the role of earnings announcements as information events that drive price adjustments (Ball & Brown, 1968; Fama, Fisher, Jensen, & Roll, 1969).

5.3. Full Sample Results

In this section, we begin with a broad overview of abnormal return behavior across the entire sample of firms and earnings announcement events. This full-sample analysis provides a foundational assessment of how stock prices typically respond to earnings disclosures in the Nordic region, regardless of sector or country classification. By examining aggregated AR patterns across all firms, we aim to detect any systematic market response that can be attributed to earnings announcements at a macro level.

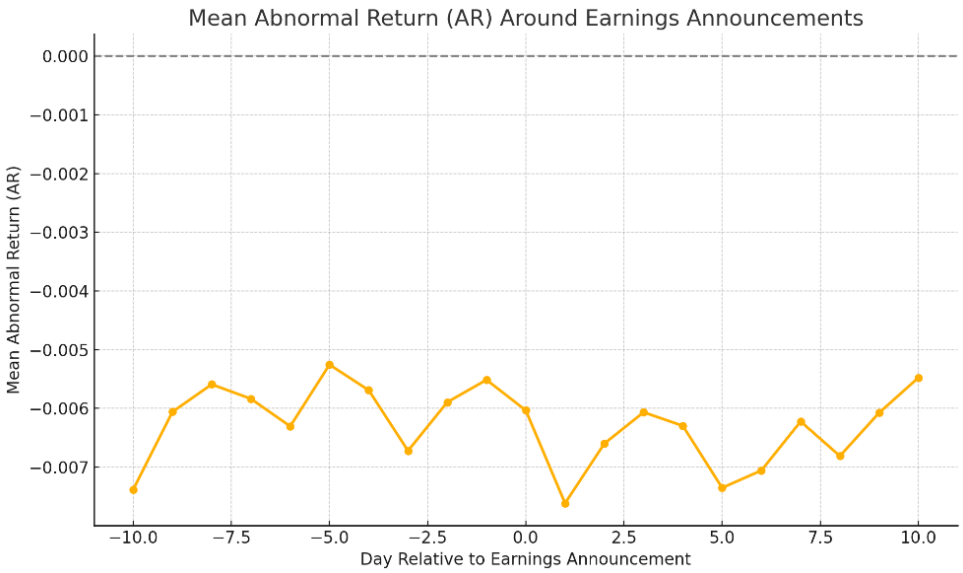
To measure these effects, daily abnormal returns are calculated for each firm using the market model within a Capital Asset Pricing Model framework. The model is estimated over a 60-day pre-event window, allowing for the calculation of firm-specific expected returns based on their historical relationship with the market index. This estimation window is chosen to ensure that beta coefficients are stable while minimizing the influence of unrelated events. The resulting abnormal return is defined as the difference between the actual observed return and the expected return on each trading day within the event window.

Once the abnormal returns have been estimated for each firm-event combination, they are aggregated across all firms to produce the average daily abnormal return (AAR) for each day in the event window ranging from day –10 to +10, where day 0 represents the earnings call date. This 21-day window is selected to capture both the anticipatory behavior leading up to the earnings announcement and the immediate and delayed responses that may follow.

This aggregation allows us to observe the temporal dynamics of market reactions, such as whether abnormal returns are concentrated around the announcement day or persist beyond it, as seen in post-earnings announcement drift (PEAD). The results from this section provide an

important benchmark against which industry- and country-specific deviations can be evaluated in subsequent analyses.

Figure 4:



Source: FactSet Database

Figure 4 above plots the mean AR for each day in the [-10, +10] window. The results indicate a consistent pattern of negative abnormal returns throughout the entire event window. Notably, the day of the announcement (day 0) and the immediate days following (days +1 and +2) also exhibit negative ARs, which suggests that, on average, earnings announcements are associated with negative market reactions.

To assess whether firms exhibit significant stock price reactions to earnings announcements, we test the statistical significance of the cumulative abnormal returns (CARs) using intercept-only regressions under the CAPM framework.

In this specification, the dependent variable is the cumulative abnormal return (CAR) for each firm over a given event window. The regression includes only an intercept term, which estimates the average CAR across the sample. No independent variables or covariates are included. This setup is equivalent to testing whether the average CAR significantly differs from zero. We formally test the following null and alternative hypotheses:

- Null Hypothesis (H_0): The mean CAR is equal to zero (α=0)
- Alternative Hypothesis (H_1): The mean CAR is not equal to zero (α≠0)

This test is implemented for multiple event windows: (0, 0), (-1, +1), (-2, +2), (-3, +3), (-5, +5), and (-10, +10), capturing immediate to more persistent market responses.

The results reveal that all tested windows produce negative and statistically significant intercepts:

Table 2:

Summary of CAR regressions for several event windows

Event Window	Mean CAR (%)	p-value	Significance
(0, 0)	**-0.60**	**< 0.00001**	***
(-1, +1)	**-1.72**	**< 0.00000**	***
(-2, +2)	**-2.46**	**< 0.00000**	***
(-3, +3)	**-3.10**	**< 0.00000**	***
(-5, +5)	**-4.49**	**< 0.00000**	***
(-10, +10)	**-9.29**	**< 0.00000**	***

The consistently negative and statistically significant intercepts provide strong evidence to reject the null hypothesis across all event windows. This implies that, on average, firms experience

negative abnormal returns surrounding earnings announcements. The negative aspects of CARs observed suggest a systematic pattern of market underperformance during earnings announcements. Investor disappointment, earnings surprises, or broader market sentiment could drive this. Notably, the increasing magnitude of CARs in more expansive windows hints at a delayed market reaction, rather than an instantaneous adjustment.

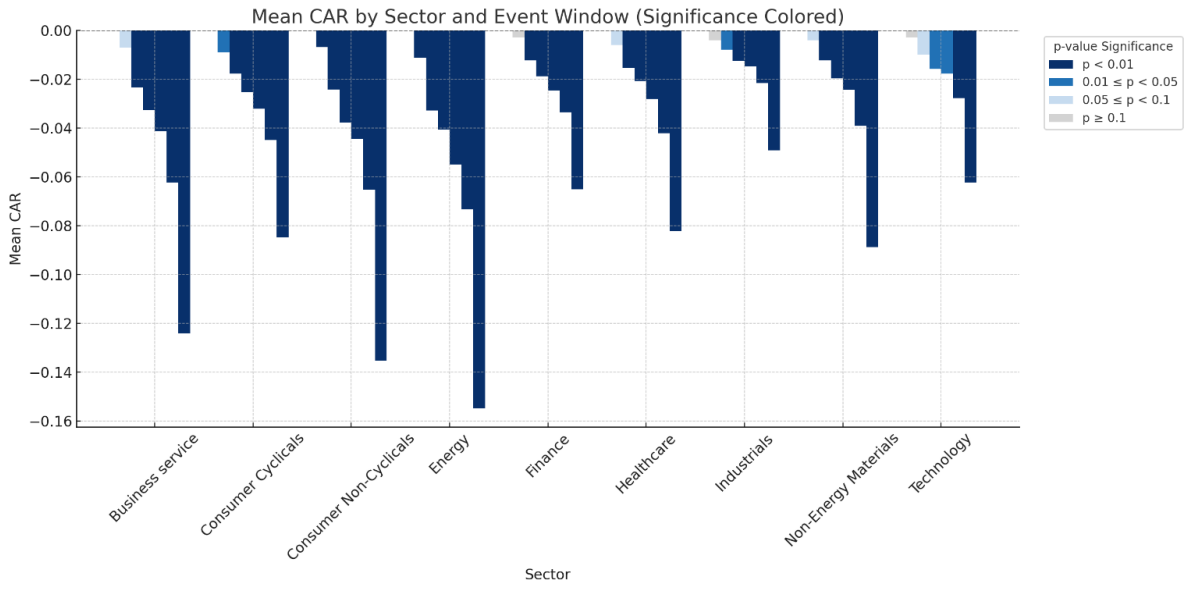
5.4 CARs Across Sectors and Countries

5.4.1 Sector CARs

Now that we have identified that stock returns during earnings calls are different from zero, this next section focuses on the differences between sectors and countries. Firstly, the sectors were divided and tested to determine if their abnormal returns differed from zero, just as the full sample.

Figure 5:

Mean CAR by Sector and event window from [0,0] (left) to [-10,10] (right)



Source: FacSet Database

The regression results across multiple event windows reveal a broadly consistent pattern of negative cumulative abnormal returns surrounding earnings announcements, suggesting that investors in the Nordic equity markets tend to respond unfavorably to the new financial information disclosed at the time of earnings releases. This trend is observable across almost all sectors and is particularly evident over longer event windows such as -5,+5 and -10,+10, where the effects are both statistically significant and economically meaningful. The persistence and significance of these negative CARs may reflect a range of factors, including earnings disappointments, downward revisions of future expectations, or a general market tendency to overreact or underreact to earnings news in specific sectors.

The Energy sector stands out as the most reactive, exhibiting the most significant negative abnormal returns across nearly every window, with a peak at −15.47% in the [-10, +10] window. This can be attributed to the high volatility and earnings uncertainty inherent in energy companies, which are often influenced by global commodity price fluctuations, geopolitical events, and sector-specific regulatory developments, such as emissions policies. Investors may be more sensitive to financial disclosures in this sector due to the complex external risk environment that makes accurate forecasting challenging.

Likewise, sectors such as Consumer Non-Cyclicals and Business Services also show strong adverse reactions to earnings announcements. The consistent statistical significance across all event windows in these sectors indicates a systematic downward adjustment in stock prices following earnings releases. One possible explanation is that these sectors, often perceived as stable or mature, are subject to high investor expectations when actual performance fails to meet these expectations, even if earnings are positive but below consensus, market participants may respond swiftly and negatively.

In contrast, the Technology and Finance sectors show a markedly different pattern. Although some CARs in these sectors are statistically significant, especially in the longer event windows, the magnitude of the abnormal returns is notably smaller. Moreover, the immediate reaction on the earnings announcement day (0, 0) is often statistically insignificant (e.g., Technology: p =

0.525, Finance: p = 0.101). This may indicate more efficient information processing, higher levels of pre-announcement guidance, or improved analyst coverage and market transparency in these sectors, which reduces surprises and dampens post-announcement volatility.

Interestingly, the Industrials and Non-Energy Materials sectors demonstrate a gradual increase in abnormal return magnitude as the event window lengthens. This may reflect delayed investor response or information drift, wherein the market takes time to fully digest and react to the details embedded in earnings announcements. This could be due to the complexity of earnings components or a lag in investor interpretation, consistent with theories of post-earnings announcement drift (Ball & Brown, 1968; Bernard & Thomas, 1989).

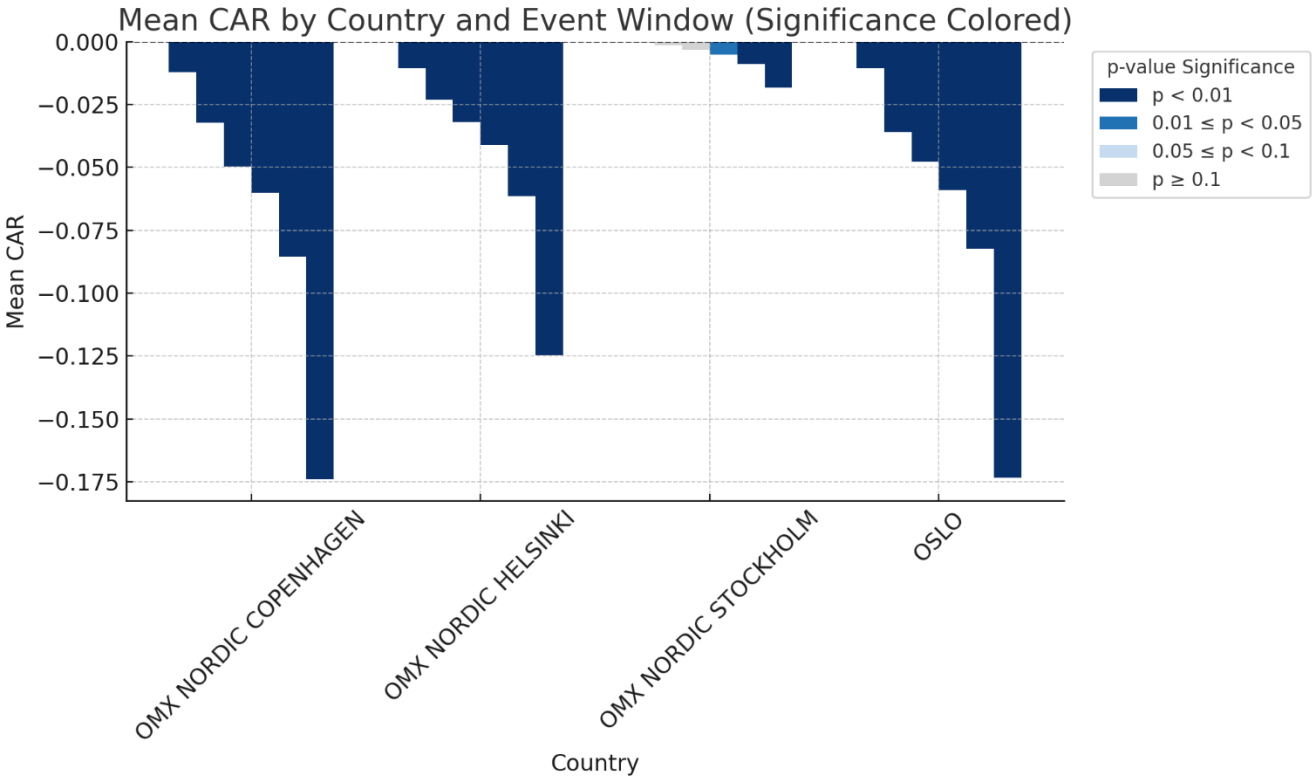
Finally, across nearly all sectors, it is noteworthy that the largest CARs do not typically occur on the exact day of the earnings announcement (event window 0, 0), but rather across multi-day windows, suggesting that market reactions are not instantaneous. This delayed price adjustment may indicate market inefficiencies or reflect the time investors and analysts need to process and evaluate the implications of earnings reports, particularly in cases where firms release lengthy and detailed disclosures.

Overall, the findings from this sector-level event study highlight the heterogeneous nature of market reactions to earnings news. While negative CARs dominate, the strength, speed, and significance of the reactions vary notably across sectors. These differences highlight the significance of sector-specific dynamics, including structural risk, investor expectations, information asymmetry, and transparency, in influencing how earnings announcements are perceived and priced by the market.

5.4.2 Country CARs

Figure 6:

Mean CAR by Country and event window from [0,0] (left) to [-10,10] (right)



Source: FacSet Database

The results reveal pronounced differences in how stock prices across Nordic countries respond to earnings announcements, as evidenced by cumulative abnormal returns (CARs) across multiple event windows. All four major exchanges—Copenhagen (OMX Nordic Copenhagen), Helsinki (OMX Nordic Helsinki), Stockholm (OMX Nordic Stockholm), and Oslo (Oslo Børs)—exhibit negative average cumulative abnormal returns (CARs) following earnings events; however, the magnitude and timing of these responses vary considerably across countries.

Among the Nordic exchanges, Oslo and Copenhagen demonstrate the most substantial post-announcement reactions. Over the [-10, +10] event window, the average CAR for firms listed in Oslo is −17.35%, while Copenhagen records a similarly steep drop of −17.39%. These figures

suggest that, in these markets, earnings announcements are associated with a sharp downward revision of firm value by investors. Moreover, the consistency of significant negative CARs across all event windows—from the event day itself (0,0) to the whole (-10, +10) period—implies that these announcements often fall short of market expectations or reveal information that negatively reshapes investor outlooks.

In contrast, Helsinki also shows uniformly significant negative CARs, but with a slightly more moderate impact. Over the full event window, firms on the Helsinki exchange experience a CAR of −12.46%, indicating a strong but less extreme reaction compared to Oslo and Copenhagen. These results suggest a consistently negative earnings response, but potentially within a market where volatility or investor sensitivity is lower, or where corporate communication around earnings may be more measured.

Stockholm stands out for having the weakest overall response. Although CARs over longer windows like (-10, +10) are still significantly negative, they are far smaller in magnitude (−1.83%), and short-term windows such as (−1, +1) or (0, 0) are statistically insignificant. This could reflect several possibilities: Swedish firms may have more predictable earnings, more transparent investor communication, or a market environment where prices incorporate expectations earlier, rendering the announcement itself less surprising. It may also reflect sectoral differences or broader investor behavior, such as greater institutional ownership or lower speculative trading.

A particularly important insight arises when linking the country-specific effects with sectoral composition. In the sector-level analysis, the Energy sector was identified as the most reactive to earnings announcements, showing the steepest declines in CARs across all event windows. Notably, Norway's stock market is heavily dominated by energy-related firms, especially in the oil and gas industries. This concentration amplifies Norway’s sensitivity to earnings news in this sector, potentially magnifying overall market-wide CARs. In other words, the high reactivity of the Norwegian market may be driven not only by investor behavior but also by the underlying sectoral exposure. The substantial price movements following earnings announcements could reflect the

combination of earnings volatility typical of energy firms and investor uncertainty tied to global energy markets.

These findings support the broader conclusion that abnormal returns around earnings announcements are not solely firm-specific phenomena, but are shaped by structural market characteristics. Country-level factors—including sector dominance, market regulation, investor composition, and information dissemination practices—play a significant role in moderating or amplifying the reaction to earnings news. For instance, markets with concentrated sectoral exposure (like Oslo) or those with historically high investor reactivity (like Copenhagen) tend to show more pronounced abnormal return patterns. Meanwhile, markets like Stockholm may benefit from greater earnings predictability or more efficient pricing, reducing the need for post-announcement adjustments.

In sum, the country-level analysis reveals that earnings announcement effects are highly context-dependent. Investors, analysts, and policymakers should be aware of the institutional, behavioral, and sectoral dynamics that influence how financial markets incorporate firm-level news. These differences underscore the value of conducting cross-country event studies, as aggregate patterns may mask important variation in market sensitivity and efficiency.

5.5. Cross-Sectional Analysis

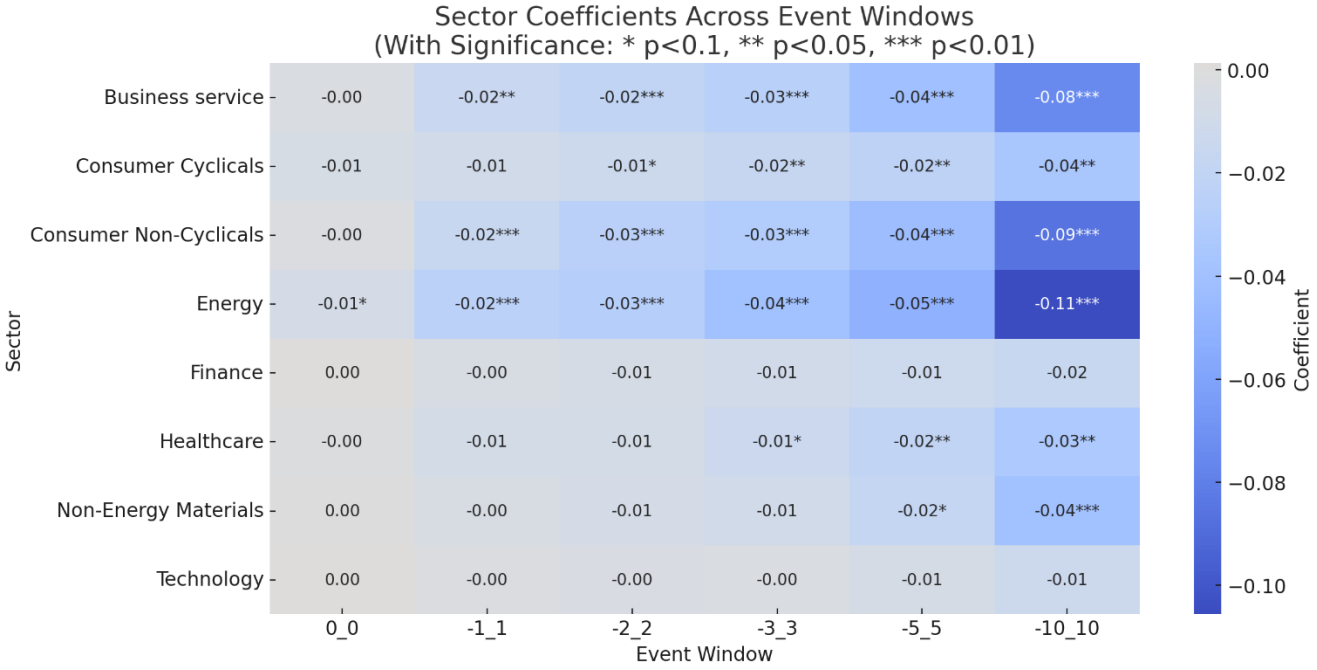
5.5.1 Sector

Having established that earnings announcements are associated with statistically significant abnormal returns, the subsequent step involves examining how these responses vary across sectors and countries. This cross-sectional analysis aims to identify which sectors exhibit the most pronounced reactions to earnings announcements. For this purpose, **Industrials** has been chosen as the reference category. This sector consistently demonstrates abnormal returns that are closest to zero across all event windows, suggesting a relatively muted response to earnings

disclosures. Its stability makes it a suitable and neutral baseline against which the reactivity of other sectors can be assessed, regardless of whether those reactions are positive or negative.

Figure 7:

Mean CAR by Sector and event window with Industrial as baseline



Source: FactSet Database

The cross-sectional regression results reveal that the magnitude and statistical significance of cumulative abnormal returns (CARs) vary considerably across sectors and event windows. Using Industrials as the baseline sector — chosen due to its relatively muted response — we can assess the relative reactivity of each sector to earnings announcements.

Across all event windows, Energy and Consumer Non-Cyclicals consistently exhibit the largest and most statistically significant negative deviations from Industrials. For instance, in the (-10, +10) window, the Energy sector shows a CAR approximately 10.56 percentage points lower than Industrials ($p < 0.01$). At the same time, Consumer Non-Cyclicals exhibit a similarly large and significant adverse reaction (−8.62 percentage points, $p < 0.01$). These findings suggest that firms

in these sectors are more sensitive to earnings disclosures, with market reactions that are not only stronger in magnitude but also highly statistically reliable.

The Business Services sector also demonstrates notable negative abnormal returns in broader windows, with a CAR difference of −7.51 percentage points relative to Industrials in the (-10, +10) window ($p < 0.01$). However, its significance is less consistent across shorter windows.

In contrast, Finance, Technology, and Non-Energy Materials tend to display more minor and less significant deviations from the baseline, indicating more subdued market reactions to earnings announcements. For example, Technology consistently shows coefficients that are close to zero and statistically insignificant, implying that investor responses to earnings in this sector are relatively restrained or already factored into prices.

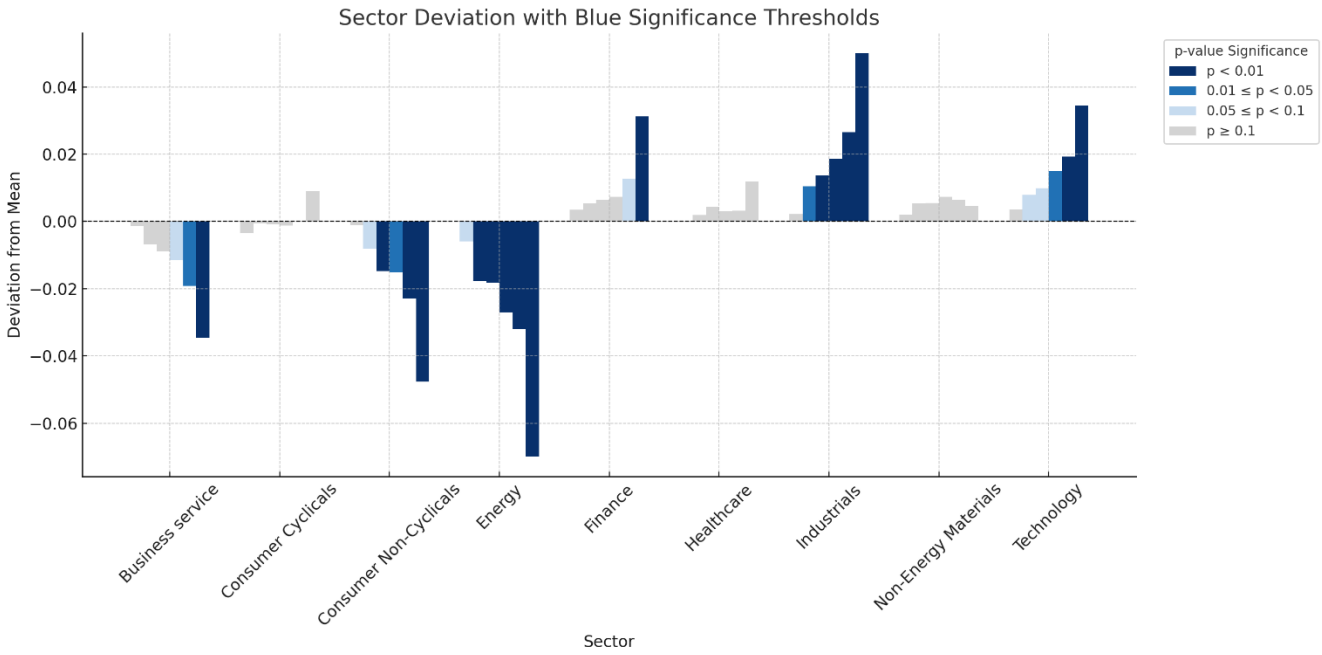
Interestingly, Consumer Cyclicals and Healthcare lie between these extremes. While not always significant, their CARs are often negative and reach statistical significance in specific windows (e.g., Healthcare in the (-5, +5) and (-10, +10) windows).

Taken together, these results suggest a sectoral hierarchy in responsiveness to earnings announcements, with Energy and Consumer Non-Cyclicals at the top in terms of reactivity and consistency, and Finance and Technology at the bottom. These insights are crucial for understanding how different industries absorb and reflect new financial information, which has implications for both investors and policymakers regarding market efficiency and information dissemination.

A different perspective emerges when, rather than assessing whether the mean CARs differ from zero, the analysis focuses on whether they deviate from the overall sample mean. This approach was adopted because the CAPM model consistently produced negative abnormal returns. Consequently, the aim was to contextualize sectoral responses by examining how each sector's abnormal returns diverge relative to the full sample average, thereby offering a more comparative evaluation of sector-specific sensitivity to earnings announcements.

Figure 8:

Mean CAR by Sector and event window with the mean CAR of the Full Sample as baseline



Source: FactSet Database

Nevertheless, here once more, it seems as though Energy and Consumer Non-Cyclicals have the strongest reaction against the mean. Where it differs in the sectors that show positive differences from the mean now, when compared to their negative returns when compared to zero, this indicates that when compared against the full sample mean, Consumer Cyclicals and Healthcare have means that are not significantly different from the full sample mean on any event window. It also highlights the positive deviation of the Industrials sector, as well as the Technology sector.

To further explore the observed industry-level differences in CARs, a Tukey HSD test was applied. This method allows for detailed pairwise comparisons between industries, highlighting where differences in abnormal returns are statistically significant. Whereas the regression model provides estimates relative to a chosen baseline industry/full sample, the Tukey HSD accounts for all possible comparisons and adjusts for multiple testing. This ensures a more nuanced

understanding of which industries react differently to earnings announcements. Here, the significant findings will be presented.

Figure 9:

Tukey HSD summary including only significant differences

Source: FactSet Database

The Tukey HSD analysis confirms several key findings from the regression model but also introduces some nuanced contrasts. Across all windows, **Energy** stands out with the highest number of significant pairwise differences, particularly when compared against Industrials, Finance, Technology, and other lower-reactivity sectors. For instance, in the (-10, +10) window, Energy has significantly higher negative CARs than Technology (mean difference = 9.25 percentage points, $p < 0.01$), Industrials (10.56 percentage points, $p < 0.01$), and Finance (8.96 percentage points, $p < 0.01$). These differences echo the regression-based evidence of heightened market sensitivity in the Energy sector.

Similarly, **Consumer Non-Cyclicals** also exhibit consistently significant differences, particularly in the broader windows. Notably, within the (-10, +10) window, Consumer Non-Cyclicals exhibit significantly lower CARs than Industrials (mean difference = 8.62 percentage points, $p < 0.01$), Technology (7.31 percentage points, $p < 0.01$), and Finance (7.02 percentage points, $p < 0.01$). These results reinforce the regression finding that Consumer Non-Cyclicals are among the most responsive sectors to earnings disclosures.

Business Services also emerges with noteworthy significant differences in more expansive windows. In the (-10, +10) window, Business Services differ significantly from Technology (6.19 percentage points, $p < 0.01$) and Industrials (7.51 percentage points, $p < 0.01$), aligning with the regression evidence of a pronounced but less consistent adverse reaction from this sector.

Interestingly, the Tukey HSD results provide additional granularity by revealing significant distinctions that the regression model does not highlight, such as Consumer Cyclicals showing a significantly lower CAR than Energy in the (-10, +10) window (mean diff = −7.00 percentage points, $p < 0.01$). Moreover, Healthcare and Finance display fewer significant pairwise differences, validating the regression's characterization of these sectors as relatively stable or muted in response.

While both methods generally agree on the most and least reactive sectors, the Tukey HSD test offers broader confirmatory evidence through multiple pairwise tests, without depending on a

single baseline. As such, it reinforces the sectoral hierarchy observed in the regression model but adds robustness by identifying significant differences across a more diverse set of comparisons.

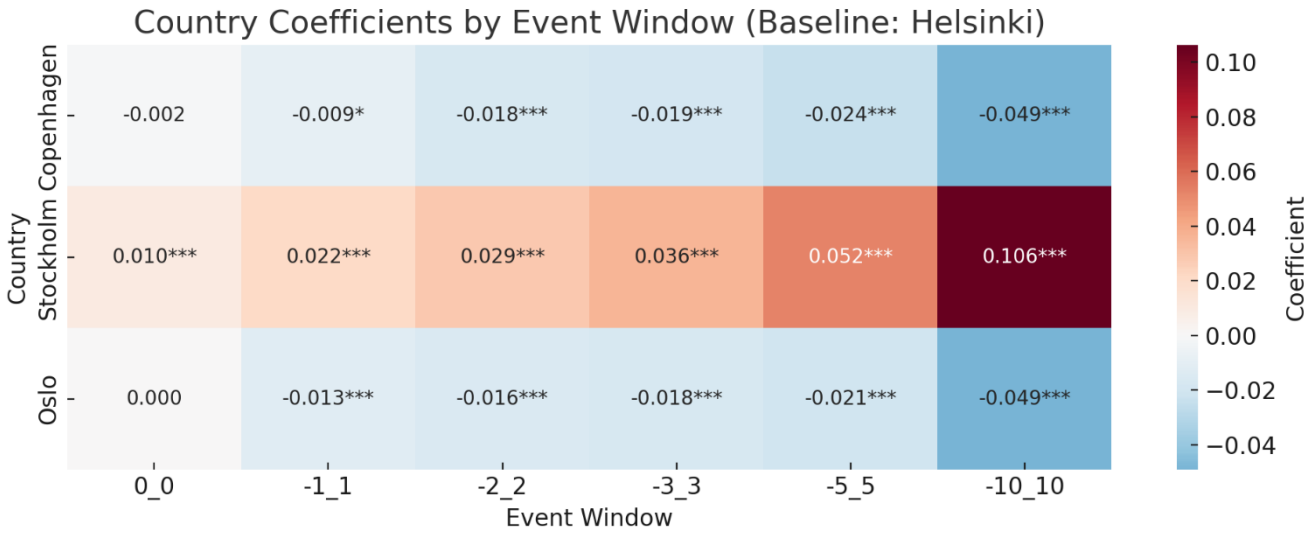
Taken together, the convergence of findings from both the regression model and the Tukey HSD test provides strong support for the conclusion that Energy and Consumer Non-Cyclicals are significantly more reactive to earnings announcements than other sectors. Conversely, Technology, Finance, and Healthcare remain consistently less responsive, with Industrials serving as a stable benchmark across methods.

5.5.2 Country

Having analyzed the sectoral differences in cumulative abnormal returns, the focus now shifts to country-level comparisons. As a starting point, the **Helsinki exchange** is used as the baseline for benchmarking, and a figure analogous to the one presented for sectors is introduced to illustrate the results.

Figure 10:

Mean CAR by Country and event window with Helsinki as baseline



Source: FactSet Database

The Swedish market (OMX Nordic Stockholm) consistently exhibits significantly higher CARs relative to Helsinki across all examined windows. Notably, the magnitude of this difference increases with the length of the event window. For instance, within the (-10, +10) window, Stockholm exhibits a CAR that is 10.63 percentage points higher than Helsinki ($p < 0.001$), indicating a more positive and robust investor response to earnings disclosures in Sweden.

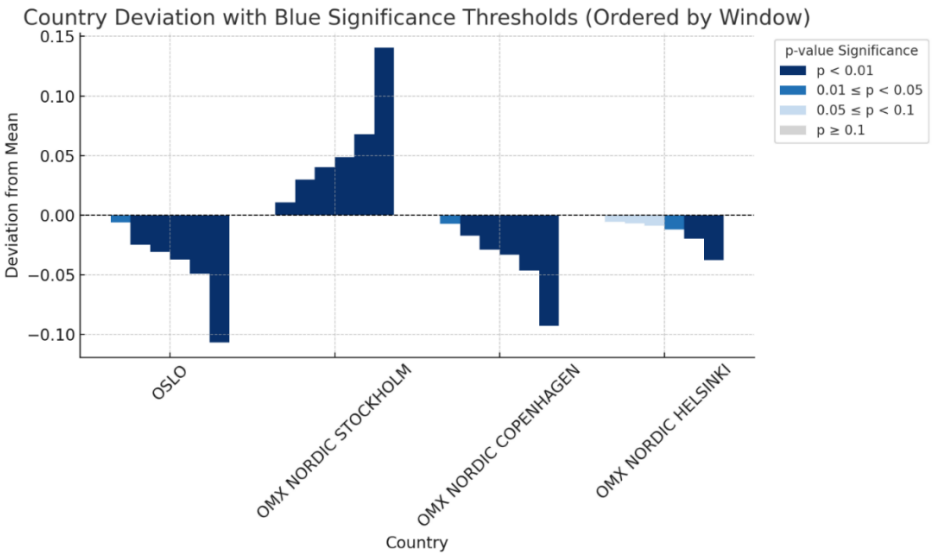
In contrast, both the Danish (OMX Nordic Copenhagen) and Norwegian (Oslo Børs) markets tend to exhibit more negative cumulative abnormal returns (CARs) compared to Helsinki, particularly in more expansive event windows. While the differences are not statistically significant in the narrowest window (0,0), they become significant from the (-2, +2) window onwards. Within the (-10, +10) window, Copenhagen and Oslo exhibit CARs that are 4.92 and 4.89 percentage points lower than those of Helsinki, respectively (both $p < 0.001$). These results suggest a relatively more muted or negative market response to earnings announcements in Denmark and Norway.

Taken together, the findings highlight significant cross-country variation in how financial markets respond to new earnings information. The Swedish market appears to respond more favorably, while the Danish and Norwegian markets exhibit comparatively weaker or adverse reactions. These differences may reflect varying degrees of market efficiency, investor behavior, or sectoral composition across the Nordic exchanges.

When comparing cumulative abnormal returns to the overall sample mean instead of using Helsinki as a baseline, the resulting structure of differences remains consistent across event windows. This alternative benchmarking approach serves to validate the robustness of the comparative framework by offering a reference point that is independent of any single country. Presenting results relative to both a country-specific and an overall mean allows for a broader perspective on variation in market responses, enabling multiple angles of cross-country comparison without relying solely on a single national reference group.

Figure 11:

Mean CAR by Country and event window with mean CAR of Full Sample as baseline



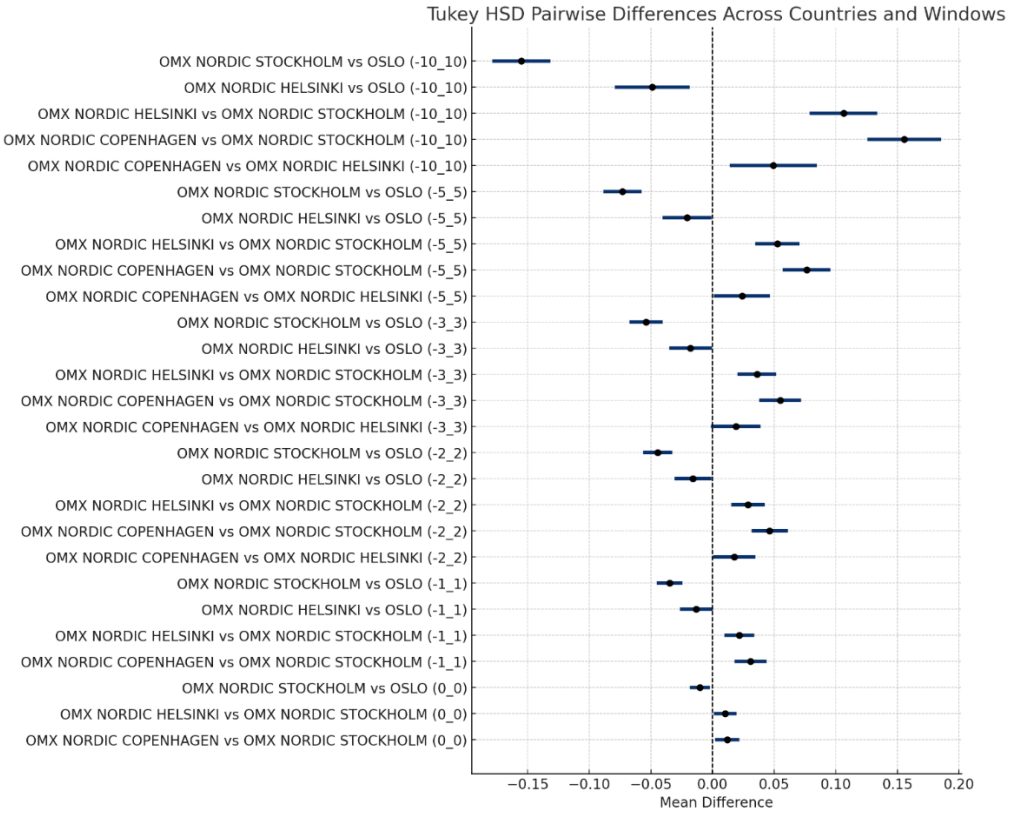
Source: FactSet Database

The figure above illustrates the cumulative abnormal return (CAR) differences for each country when benchmarked against the overall sample mean CAR across all event windows. This comparison reveals a consistent directional pattern. Sweden displays the most significant positive deviations from the sample mean in every window examined, suggesting that, on average, Swedish firms experience less negative—or even slightly positive—abnormal returns following earnings announcements relative to the broader sample. In contrast, Norway and Denmark exhibit the most pronounced negative deviations, indicating comparatively weaker stock price performance around earnings events. Finland, by comparison, shows more modest differences from the sample mean, with CARs that are closer to the average and less variable across event windows. These observations, when viewed collectively, indicate discernible cross-country differences in how market participants respond to earnings information in the Nordic region.

Again, to further explore the observed country-level differences in CARs, a Tukey HSD test was applied. This method allows for detailed pairwise comparisons between countries, highlighting where differences in abnormal returns are statistically significant. Whereas the regression model provides estimates relative to a chosen baseline country or full sample, the Tukey HSD accounts for all possible comparisons and adjusts for multiple testing. This ensures a more nuanced understanding of how different industries react to earnings announcements. The significant findings will be presented here.

Figure 12:

Tukey HSD summary including only significant differences



Source: FactSet Database

The Tukey results reveal Stockholm as the most reactive market, consistently exhibiting significantly higher CARs than the other exchanges. In the extended event window (−10, +10), Stockholm's mean CAR is 10.63 percentage points higher than Helsinki's ($p < 0.001$), 15.56

percentage points higher than Copenhagen's ($p < 0.001$), and 15.52 percentage points higher than Oslo's ($p < 0.001$). These differences are statistically significant across all event windows, confirming that investors in Stockholm respond more strongly and positively to earnings announcements.

Copenhagen's CARs were significantly lower than Helsinki's in most extended windows, including a −4.92 percentage point difference in the (−10, +10) window ($p = 0.0011$), and more minor but still significant differences in windows such as (−5, +5) and (−3, +3). Meanwhile, Oslo showed consistently more negative CARs than Helsinki, with statistically significant differences emerging from the (−1, +1) window onward. For example, in the (−2, +2) window, Oslo's CARs were 1.59 percentage points lower than Helsinki's ($p = 0.0139$), widening to 4.89 percentage points lower in the (−10, +10) window ($p = 0.0001$).

Interestingly, Copenhagen and Oslo did not differ significantly from each other in any window, suggesting relatively similar market reactions in terms of magnitude and variability. However, both exhibited substantially worse responses compared to Stockholm, with mean differences exceeding seven percentage points in every window.

These results reinforce the regression-based findings and reveal a clear cross-country hierarchy in CAR behavior:

- Stockholm consistently outperforms all other exchanges.
- Helsinki shows a middle ground between the exchanges, though more similar to the Danish and Norwegian
- Oslo and Copenhagen exhibit the most severe adverse market reactions, possibly reflecting lower market efficiency, differences in firm structure, or investor expectations.

This geographic dimension of abnormal returns offers critical insight into how financial information is absorbed in different Nordic markets, with implications for cross-border investment strategies and the interpretation of earnings-related signals in international contexts.

6. Discussion

6.1. Interpretation of Results

Now, it seems intuitive to think that less mature sectors would have stronger reactions to earnings calls than more mature ones, but the results of this study suggest a more nuanced reality. While sectors traditionally considered more volatile or growth-oriented, such as Technology and Consumer Cyclicals, do show some responsiveness, the most pronounced and statistically significant adverse reactions were observed in sectors typically deemed more mature, such as Energy and Consumer Non-Cyclicals. This may reflect the market's heightened sensitivity to earnings performance in sectors with tighter margins, higher regulatory exposure, or greater exposure to macroeconomic shocks.

In the **Energy sector**, elevated abnormal return volatility is consistent with the literature emphasizing the role of external risk factors. Firms in this sector are highly vulnerable to exogenous shocks, including fluctuations in global commodity prices, geopolitical instability, and regulatory developments related to environmental policy and emissions control. These factors increase the **uncertainty surrounding earnings outcomes**, thereby enhancing the informational value of earnings announcements (Francis, Schipper, & Vincent, 2002). Moreover, the capital-intensive nature of energy production means that slight deviations in output or input prices can exert disproportionately large effects on profitability, which investors interpret with heightened caution. This sensitivity aligns with the theoretical underpinnings of post-earnings announcement drift (PEAD), wherein information processing delays contribute to prolonged price adjustments following earnings disclosures (Bernard & Thomas, 1989).

The case of **Consumer Non-Cyclicals** is somewhat more nuanced. Although these firms typically operate in **defensive industries** with stable demand (e.g., food, household products, healthcare), they tend to maintain **tight profit margins** due to the price inelasticity of their products. As a result, small cost shocks or deviations from expected performance can materially affect bottom-line earnings. The consistent investor expectation of stability in these sectors

amplifies the market reaction when performance falls short, as investors may interpret even modest earnings shortfalls as signals of deeper structural issues or deteriorating efficiency. This phenomenon can be understood through the lens of behavioral finance, particularly the **anchoring and adjustment heuristic**, where investors anchor on prior stable performance and react disproportionately when confronted with negative deviations (Hirshleifer, Lim, & Teoh, 2009).

Alternatively, the strong reactions in these sectors may stem from a baseline expectation of stability, where any deviation from expected earnings is perceived as more consequential than in sectors where variability is already factored into earnings. This observation challenges the conventional assumption that market sensitivity is solely a function of sector maturity, suggesting that other structural or macroeconomic factors may play a decisive role in shaping investor reactions.

Oddly enough, I expected all the exchanges to show similar reactions to the earnings announcements. However, as evident in the study, Sweden exhibits a more muted reaction for the smaller windows compared to the three other exchanges. This can be attributed to Sweden being the largest of the exchanges and therefore would have the most analyst coverage

6.2. Comparison with Prior Studies

The empirical findings of this study align with and reinforce the well-documented phenomenon of Post-Earnings Announcement Drift (PEAD), as first identified by Bernard and Thomas (1989) and further elaborated by Jegadeesh and Livnat (2006). The presence of statistically significant and persistently negative cumulative abnormal returns (CARs) following earnings announcements—especially over longer event windows such as [–5, +5] and [–10, +10]—suggests that investors in the Nordic markets do not immediately and fully incorporate earnings-related information into stock prices. This pattern of delayed market adjustment implies that new earnings information is

only partially absorbed on the announcement day, with additional price correction unfolding over subsequent trading days.

Such findings stand in contrast to the semi-strong form of the Efficient Market Hypothesis (EMH), which posits that all publicly available information, including periodic financial disclosures like earnings announcements, is instantaneously reflected in market prices. Under the EMH framework, there should be no opportunity to systematically earn abnormal returns following a scheduled disclosure, as the market should have efficiently priced in all available information. However, the evidence from this study—showing abnormal returns that extend beyond the event date—suggests that the market exhibits informational frictions, such as underreaction, delayed processing, or limited investor attention, all of which have been proposed in the behavioral finance literature as alternatives to the rational expectations model.

These findings also align with those of prior international studies, which identify heterogeneity in market efficiency across regions and firm types. For instance, Jegadeesh and Livnat (2006) find that PEAD is more pronounced among firms with lower analyst coverage or less transparent disclosures—characteristics that may also apply to specific segments of the Nordic market, especially outside of large-cap, high-profile firms. Similarly, Bernard and Thomas (1989) argue that earnings surprises are not fully incorporated into prices immediately due to investor behavioral biases, such as conservatism or anchoring, which may be equally relevant in the Nordic context.

Furthermore, this study contributes new evidence to the literature by demonstrating that PEAD-like behavior is not confined to large, liquid, or U.S.-based capital markets but is also observable in smaller, well-regulated, and institutionally advanced economies. The presence of PEAD across Nordic exchanges suggests that even in environments characterized by strong legal frameworks and mandatory financial disclosure regimes, informational inefficiencies persist.

In summary, this study's results are consistent with prior empirical research that documents delayed price adjustments and contribute to the growing body of evidence questioning the empirical validity of the semi-strong form of the Efficient Market Hypothesis (EMH). By confirming

the persistence of abnormal returns beyond the event day across various sectors and countries, the findings underscore the need for ongoing refinement of market efficiency theory to account for real-world investor behavior and information processing constraints.

6.2.1 Contribution to Literature

This study makes a meaningful contribution to the growing body of research on stock market reactions to earnings announcements by focusing on a geographical and economic region that remains underrepresented in the literature—the Nordic countries. While the vast majority of prior empirical work has focused on the United States and other large European markets (Kothari, 2001), there is comparatively little understanding of how investor behavior and market dynamics operate in smaller but highly developed economies such as Denmark, Sweden, Norway, and Finland. These markets share strong institutional frameworks, high levels of transparency, and technological sophistication, yet differ in industrial composition, regulatory emphasis, and investor structure, making them ideal for comparative analysis.

By examining cumulative abnormal returns (CARs) surrounding earnings announcements in a regionally diverse and sectorally balanced sample, this thesis offers new empirical insights into how stock prices incorporate new information under varying structural conditions. The finding that abnormal returns are not uniform across countries or sectors indicates that informational efficiency is context-dependent, shaped by factors such as investor expectations, sectoral volatility, and exchange-specific characteristics. These nuances extend the applicability of global finance theory and challenge the universality of market reactions often assumed in the literature.

Methodologically, the use of cross-sectional ordinary least squares (OLS) regressions, fixed-effects panel models, and post hoc testing (Tukey HSD) enables a robust analysis of heterogeneity in market responses. The integration of both cross-sectional and time-series variation enables the isolation of firm-specific effects from broader market trends and institutional differences, enhancing the interpretive value of the results. In particular, the identification of persistent negative abnormal returns across multiple event windows suggests a

deviation from the semi-strong form of the Efficient Market Hypothesis (EMH), reinforcing findings from other regional studies and validating the presence of post-earnings announcement drift (PEAD) in Nordic equity markets.

In addition, by offering a granular breakdown of market reactions by sector and exchange, the study generates practical benchmarks for institutional investors and portfolio managers operating in or targeting Nordic equities. For academics, it establishes a replicable framework for conducting event studies in smaller regional markets. It invites future work to incorporate firm-level characteristics such as analyst coverage, liquidity, or earnings forecast dispersion.

Ultimately, this research broadens the geographic scope of event study applications and deepens our understanding of how regional context mediates investor reactions, contributing to both the external validity of global financial models and the refinement of sector-specific investment strategies.

6.3. Limitations

While this study offers valuable insights into how Nordic stock prices respond to earnings announcements across industries and countries, several limitations must be acknowledged.

First, the analysis is limited to publicly listed companies within Denmark, Sweden, Norway, and Finland, potentially omitting relevant patterns present in other Nordic or European markets. The sample size within some industries and countries is also unbalanced, which may have introduced bias or reduced the statistical power of subgroup comparisons, especially in sectors or regions with relatively few earnings events.

Second, the estimation of expected returns using the Capital Asset Pricing Model (CAPM) with a fixed 60-day estimation window introduces several important limitations. Most notably, this approach assumes that a firm's beta remains constant over time, an assumption that may not hold in practice—particularly in periods of market volatility, during macroeconomic shocks, or

when firms undergo structural or strategic changes (e.g., M&A, changes in capital structure, or business model transformations). When betas vary significantly over time or across sub-periods, the CAPM-derived expected returns may become misaligned with actual investor expectations, thereby introducing bias into the calculation of abnormal returns.

Moreover, CAPM is often regarded as a theoretically elegant but empirically limited model, particularly in the context of event studies. Its simplicity—relying solely on market risk (beta) and the risk-free rate—means that it may fail to capture other important firm-specific risk factors or sector-level dynamics, such as size effects, momentum, liquidity constraints, or exposure to regulatory or technological shifts. In this sense, CAPM functions more as a benchmark assumption than a fully descriptive model of investor behavior. While it provides a valuable baseline for identifying deviations in returns around events, it may understate or misattribute the magnitude of those deviations when real-world pricing mechanisms involve multiple risk dimensions.

Furthermore, relying on a single market index to proxy for the market portfolio can also be problematic, particularly in geographically segmented or sectorally imbalanced markets, such as the Nordic region. For example, using a broad Nordic index may obscure significant variation in sector composition or liquidity profiles between exchanges. In such contexts, multi-factor models—such as the Fama-French three- or five-factor models—or industry-adjusted benchmarks may offer more accurate and nuanced estimates of expected returns. These models incorporate additional explanatory variables such as size, value, and profitability, thereby aligning more closely with the empirical behavior of stock returns.

Overall, while CAPM remains widely used in event studies due to its simplicity and interpretability, its application should be viewed with caution, particularly when interpreting results in more complex or structurally heterogeneous markets. Future research could enhance robustness by comparing results across alternative expected return models or by employing time-varying beta estimations and rolling windows to better reflect changing risk dynamics.

Third, although fixed effects were incorporated in the panel regression models to control for firm-level heterogeneity, the models did not include continuous explanatory variables such as firm size, trading volume, or prior earnings surprises. The absence of these controls limits the ability to explain *why* certain firms or sectors react more strongly to earnings announcements.

Fourth, the use of daily stock returns and calendar-based event windows may mask intraday price movements or delayed market reactions, particularly in less liquid stocks. Furthermore, differences in trading hours and announcement timings across countries were not accounted for, which could potentially introduce noise into the estimation of cumulative abnormal returns.

Finally, the classification of industries and countries relied on dummy variables, which simplify complex economic realities into discrete categories. Sector definitions may differ across exchanges, and regional effects might interact with other firm characteristics in ways not captured by the models employed.

Despite these limitations, the study provides a robust foundation for understanding cross-country and cross-sectoral market reactions in the Nordic region. Nonetheless, future research should address these constraints to improve generalizability and explanatory power.

7. Conclusion

7.1. Summary of Findings

This thesis examined how stock prices in the Nordic markets respond to quarterly earnings announcements, with a particular focus on cross-country and cross-sectoral differences. Using a CAPM-based event study methodology applied to a panel of 360 large-cap firms from Denmark, Sweden, Norway, and Finland over the 2019–2024 period, the study computed cumulative abnormal returns (CARs) across multiple event windows. These findings were further analyzed using cross-sectional regressions, firm-fixed effects panel models, and Tukey HSD post hoc tests.

The results consistently reveal that earnings announcements are associated with statistically significant negative cumulative abnormal returns across the Nordic region. This is particularly evident in extended windows such as (−10, +10), suggesting that the market does not fully and instantaneously adjust to new earnings information, thereby challenging the semi-strong form of the Efficient Market Hypothesis (EMH). These findings are also consistent with prior literature documenting the phenomenon of post-earnings announcement drift (PEAD), where stock prices continue to move in the direction of the earnings surprise after the announcement date.

At the sectoral level, the Energy and Consumer Non-Cyclicals sectors exhibited the strongest adverse reactions, likely due to their exposure to earnings volatility, macroeconomic risk, and high investor expectations of stability. In contrast, the Technology and Finance sectors displayed relatively muted responses, possibly due to higher transparency, greater analyst coverage, or more predictable earnings patterns. These findings were supported by both regression analyses and multiple pairwise comparisons via Tukey HSD testing.

At the country level, results indicated that the Swedish market (OMX Stockholm) showed the least negative and occasionally insignificant reactions to earnings disclosures. In contrast, the Norwegian and Danish markets exhibited the most pronounced negative cumulative abnormal returns (CARs). Finland generally showed intermediate reactions. These differences were found to be statistically significant, indicating that institutional factors, such as investor structure, sector concentration, and market maturity, influence the speed and magnitude of price adjustments.

Collectively, the findings highlight that abnormal returns around earnings announcements are not homogeneous across the Nordic region and are instead shaped by both sector-specific dynamics and national market characteristics. These insights have implications for investors, policymakers, and researchers seeking to better understand informational efficiency and market behavior in smaller but sophisticated financial markets.

7.2. Suggestions for Future Research

This study offers an empirical contribution to the understanding of how stock prices in Nordic countries react to earnings announcements. However, the scope and structure of the analysis present several opportunities for deeper inquiry that could advance the literature on market efficiency and event studies in regional equity markets.

First, future research could expand the analysis by incorporating a broader set of explanatory variables. While this study focuses on abnormal returns and applies firm fixed effects, adding variables such as firm size (measured by market capitalization), trading volume, analyst coverage, earnings surprise magnitude, and valuation metrics (e.g., P/E ratios or price-to-book ratios) would enable a more granular examination of the factors driving stock price reactions. These variables could help explain the heterogeneity in reactions both across and within sectors.

Second, the use of alternative asset pricing models could provide more robust estimates of expected returns. The current study uses the CAPM framework, but future work could explore multi-factor models such as the Fama-French three- or five-factor models, or models that incorporate momentum and liquidity risk. These approaches may better capture risk-adjusted performance and address potential model misspecification.

Third, there is an opportunity to extend the time frame of the dataset to include more recent years or crises, such as the COVID-19 pandemic or periods of monetary tightening. These events provide natural experiments to test whether market efficiency or investor behavior differs under conditions of uncertainty and macroeconomic stress.

Fourth, future studies could refine the current methodology by using intraday data to capture more immediate market responses to earnings announcements. This would enable the identification of price drift, post-announcement reversals, or delayed reactions, which are often obscured in daily return data.

Finally, future research could extend the analysis by adopting longer and potentially asymmetric post-event windows to capture the medium-term implications of earnings announcements. While traditional event studies commonly use symmetrical windows around the event date (e.g., [–5, +5]), there is growing interest in exploring alternative windows such as [0, +10] or [0, +20], which focus more precisely on post-announcement effects while avoiding the contamination of returns from pre-event market speculation. This approach may provide a clearer picture of delayed investor reactions, price drift, and information assimilation, particularly in less liquid or less efficient markets. It would also help determine whether post-announcement reactions continue to evolve over longer horizons, thereby contributing to the literature on post-earnings announcement drift (PEAD) and the limits of market efficiency.

Moreover, incorporating volatility analysis and return autocorrelation into the post-event period could shed light on the persistence of uncertainty or investor disagreement following earnings disclosures. For example, higher post-event volatility may suggest a divergence in investor interpretation of earnings quality, management guidance, or forward-looking sentiment.

Additionally, future studies could enhance the practical relevance of these findings by coupling the event study methodology with portfolio simulation techniques. Constructing long-short portfolios based on earnings announcements (e.g., buying firms with positive cumulative abnormal returns (CARs) and shorting firms with negative CARs) and tracking their performance over various post-event windows would enable researchers to assess the economic significance and implementability of trading strategies based on earnings signals. This would also help determine whether abnormal returns persist in ways that are exploitable after transaction costs, thus providing a bridge between academic theory and real-world investment applications.

Finally, extending the scope to include cross-listings, foreign ownership levels, or ESG disclosure practices could offer additional dimensions to explain the heterogeneity in post-event behavior, especially as Nordic firms become increasingly integrated into global capital markets.

In sum, while this thesis has provided initial insights into the market reaction to earnings announcements in Nordic countries, several methodological and thematic extensions remain.

These would not only deepen the academic understanding of capital market behavior but also offer practical implications for investors, policymakers, and corporate managers in an increasingly data-driven and interconnected global economy.

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9. Appendix

Appendix 1: Summary of OLS regression by Sector

Sector	Event Window	Mean CAR (with significance level)	P-Value
Business service	0_0	-0.0071 *	5.69e-02
Business service	-1_1	-0.0234 ***	5.49e-06
Business service	-2_2	-0.0327 ***	5.02e-09
Business service	-3_3	-0.0413 ***	2.21e-11
Business service	-5_5	-0.0623 ***	4.39e-16
Business service	-10_10	-0.1241 ***	1.29e-19
Consumer Cyclicals	0_0	-0.009 **	2.71e-02
Consumer Cyclicals	-1_1	-0.0177 ***	2.93e-03
Consumer Cyclicals	-2_2	-0.0253 ***	1.83e-04
Consumer Cyclicals	-3_3	-0.0321 ***	9.70e-06
Consumer Cyclicals	-5_5	-0.0449 ***	3.08e-08
Consumer Cyclicals	-10_10	-0.0848 ***	4.72e-13
Consumer Non-Cyclicals	0_0	-0.0069 ***	7.54e-03
Consumer Non-Cyclicals	-1_1	-0.0243 ***	2.35e-11

Consumer Non-Cyclicals	-2_2	-0.0378 ***	8.07e-18
Consumer Non-Cyclicals	-3_3	-0.0445 ***	1.85e-19
Consumer Non-Cyclicals	-5_5	-0.0653 ***	1.83e-26
Consumer Non-Cyclicals	-10_10	-0.1353 ***	1.53e-33
Energy	0_0	-0.0112 ***	1.07e-06
Energy	-1_1	-0.0329 ***	2.27e-15
Energy	-2_2	-0.0408 ***	7.91e-17
Energy	-3_3	-0.0549 ***	7.30e-11
Energy	-5_5	-0.0733 ***	2.99e-15
Energy	-10_10	-0.1547 ***	2.17e-26
Finance	0_0	-0.0029	1.01e-01
Finance	-1_1	-0.0124 ***	5.39e-06
Finance	-2_2	-0.0189 ***	1.44e-08
Finance	-3_3	-0.0246 ***	3.06e-10
Finance	-5_5	-0.0336 ***	3.66e-11
Finance	-10_10	-0.0651 ***	4.73e-12
Healthcare	0_0	-0.006 *	9.10e-02
Healthcare	-1_1	-0.0155 ***	1.23e-03
Healthcare	-2_2	-0.0208 ***	1.11e-04
Healthcare	-3_3	-0.0282 ***	1.13e-06
Healthcare	-5_5	-0.0421 ***	1.96e-09
Healthcare	-10_10	-0.0823 ***	2.27e-12
Industrials	0_0	-0.0041	1.02e-01

Industrials	-1_1	-0.008 **	1.50e-02
Industrials	-2_2	-0.0126 ***	1.15e-03
Industrials	-3_3	-0.0148 ***	5.46e-04
Industrials	-5_5	-0.0216 ***	5.68e-05
Industrials	-10_10	-0.0491 ***	3.35e-07
Non-Energy Materials	0_0	-0.0041 *	7.91e-02
Non-Energy Materials	-1_1	-0.0123 ***	2.28e-04
Non-Energy Materials	-2_2	-0.0197 ***	2.29e-07
Non-Energy Materials	-3_3	-0.0244 ***	1.72e-08
Non-Energy Materials	-5_5	-0.0392 ***	1.25e-12
Non-Energy Materials	-10_10	-0.0888 ***	1.16e-19
Technology	0_0	-0.0028	5.25e-01
Technology	-1_1	-0.0101 *	6.87e-02
Technology	-2_2	-0.0158 **	1.78e-02
Technology	-3_3	-0.0177 **	1.38e-02
Technology	-5_5	-0.0278 ***	6.20e-04
Technology	-10_10	-0.0623 ***	4.24e-08

Appendix 2: Summary of OLS regression by Sector

Country	Event Window	Mean CAR (with significance level)	P-Value
OMX NORDIC COPENHAGEN	0_0	-0.0122 ***	6.51e-18
OMX NORDIC COPENHAGEN	-1_1	-0.0322 ***	7.66e-26
OMX NORDIC COPENHAGEN	-2_2	-0.0497 ***	2.05e-32
OMX NORDIC COPENHAGEN	-3_3	-0.0600 ***	4.04e-36
OMX NORDIC COPENHAGEN	-5_5	-0.0855 ***	1.92e-38
OMX NORDIC COPENHAGEN	-10_10	-0.1739 ***	1.03e-41
OMX NORDIC HELSINKI	0_0	-0.0106 ***	4.04e-06
OMX NORDIC HELSINKI	-1_1	-0.0230 ***	5.75e-13
OMX NORDIC HELSINKI	-2_2	-0.0320 ***	1.68e-19
OMX NORDIC HELSINKI	-3_3	-0.0411 ***	6.29e-24
OMX NORDIC HELSINKI	-5_5	-0.0615 ***	3.97e-35

OMX NORDIC HELSINKI	-10_10	-0.1246 ***	1.93e-50
OMX NORDIC STOCKHOLM	0_0	-0.0004	8.47e-01
OMX NORDIC STOCKHOLM	-1_1	-0.0013	5.39e-01
OMX NORDIC STOCKHOLM	-2_2	-0.0033	1.70e-01
OMX NORDIC STOCKHOLM	-3_3	-0.0051 **	4.73e-02
OMX NORDIC STOCKHOLM	-5_5	-0.0090 ***	1.76e-03
OMX NORDIC STOCKHOLM	-10_10	-0.0183 ***	1.17e-05
OSLO	0_0	-0.0105 ***	1.76e-11
OSLO	-1_1	-0.0360 ***	3.44e-28
OSLO	-2_2	-0.0479 ***	5.67e-34
OSLO	-3_3	-0.0591 ***	1.35e-29
OSLO	-5_5	-0.0822 ***	2.99e-42
OSLO	-10_10	-0.1735 ***	2.26e-70