Dividend Policy Relevance in Denmark: Market Reactions and Valuation Effects

MSc in Finance

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Abstract

This thesis empirically investigates the impact of corporate dividend policy on the stock prices of Danish firms listed on the Nasdaq Copenhagen, as well as Danish firms listed on other stock exchanges in the Nordics and the US. The primary objective is to provide clear, evidence-based insights into this relationship within the specific Danish market context, addressing a gap due to the prevalence of research on larger international markets and Denmark's unique financial environment characteristics. The study centrally examines the extent to which dividend announcements by Danish listed firms function as credible signals of future earnings and how this subsequently impacts their stock prices.

This study employs a dual empirical approach using data for Danish firms from 2000 to 2024, primarily sourced from FactSet and Nasdaq. An event study methodology, utilizing the market model, examines short-term abnormal stock returns over different event windows ranging from {-10, 10} down to {-1,1} centered on dividend declaration dates to capture immediate market reactions. Complementing this, fixed-effects panel regressions analyze the association between quarterly stock returns and various dividend policy states (paying, increasing, or decreasing dividends) and characteristics (such as size, ROA, leverage, and CapEx ratio), while incorporating firm, quarter, and specified industry fixed effects and utilizing firm-clustered robust standard errors for statistical inference.

The empirical analysis reveals distinct short-term market reactions to dividend announcements and nuanced associations with longer-term quarterly returns in the Danish market. Event study findings demonstrate that the Danish stock market indeed reacts to dividend announcements. Specifically, dividend increases are met with a statistically significant, albeit modest, positive abnormal return (mean CAR of +0.29% over {-1,+1} days), suggesting investors perceive them as mildly favorable news. Notably, dividend decrease announcements did not elicit the traditionally expected significant negative stock price reaction; the mean CAR was a non-significant +0,29%, indicating that Danish investors may not uniformly penalize cuts, possibly valuing the implied firm flexibility or reinvestment potential. Consistent with market efficiency for "no news" events, constant dividend announcements did not trigger statistically meaningful abnormal returns.
The fixed-effects panel regression analyses further indicate that firms paying dividends are associated with average quarterly stock returns that are approximately 0.026% higher than

non-paying firms, a finding significant at the 5% level in the primary model. However, when examining the additional impact of specific changes in the comprehensive model, neither dividend increases nor dividend decreases showed a statistically significant further association with quarterly returns beyond the baseline effect of a firm being a dividend payer.

Overall, this research concludes that while dividend announcements by Danish listed firms impact stock prices in the short term, their function as credible signals of future earnings is nuanced, particularly for dividend decreases which do not elicit a uniformly negative market response. The findings challenge strict dividend irrelevance in Denmark and suggest a context-specific interpretation of signaling theory, where investor reactions may also reflect considerations of firm flexibility. From a practical standpoint, Danish managers may find that maintaining a dividend-paying status is marginally associated with positive quarterly returns, and that dividend cuts are not necessarily met with severe, sustained market penalties, while investors should note the short-lived nature of announcement-specific return impacts beyond the general characteristic of a firm being a dividend payer.

1. Introduction

Dividend policy stands as a cornerstone of corporate finance, representing the strategic decisions made by companies regarding the distribution of profits to their shareholders versus the reinvestment of these earnings back into the business for future growth. These decisions are not merely accounting exercises; they carry profound implications for shareholder value, investor perception of the firm's financial health, and the overall efficiency of capital markets. Understanding the nuances of dividend policy and its impact on stock prices is therefore crucial for investors, corporate managers, and financial analysts alike. This report aims to delve into the intricate relationship between dividend policy and stock prices within the specific context of Danish companies listed on the Nasdaq Copenhagen, as well as other stock exchanges in the Nordics and the US.

The Danish stock market, operating under the framework of Nasdaq Copenhagen, offers a unique landscape for studying dividend policies. As part of the Nordic region, Denmark shares certain economic and cultural characteristics with its neighbors, yet it also possesses distinct regulatory, investor, and market features that can influence corporate dividend decisions and their subsequent impact on stock valuations. Examining this relationship within the Danish context can provide valuable insights that may differ from those observed in larger or more globally dominant markets. This study is contextualized within the pursuit of a Master's thesis in Finance, seeking to contribute to a deeper understanding of these dynamics. This central aim encompasses several key aspects, including characterizing the typical dividend policies and practices prevalent in this market, reviewing existing empirical studies that have explored this relationship (with a particular emphasis on Danish or similar European markets), analyzing the influence of various moderating variables such as firm size, interest rates, dividend payout ratio, and market volatility, exploring available data sources for relevant financial information, understanding investor sentiment and behavior concerning dividends, and finally, evaluating the applicability of seminal theoretical frameworks like the Modigliani-Miller Theorem and the Dividend Puzzle within the specific context of the Danish stock market.

1.1 Background for the study

Dividend policy, the set of principles guiding a company's decisions on profit distribution to shareholders, has been a central and enduring topic in corporate finance for decades. Its significance stems from the profound implications these decisions carry for shareholder wealth, firm valuation, corporate governance, and the overall efficiency of capital markets. The academic discourse surrounding dividend policy is rich and varied, marked by seminal theories that offer contrasting perspectives and a vast body of empirical research that continues to explore its nuances across different markets and economic conditions.

The foundational debate was famously shaped by Modigliani and Miller (1961) who, under assumptions of perfect capital markets, rational behavior, and perfect certainty, posited that a firm's dividend policy is irrelevant to its stock valuation. They argued that value is determined by a firm's earning power and investment policy, not by how these earnings are distributed. This "dividend irrelevance" proposition became a cornerstone, yet it also spurred what is often termed the "dividend puzzle"from Fisher Black in 1973: if dividends are irrelevant, why do firms pay them, and why do investors appear to care about them?

Empirical observations have frequently deviated from the strict conditions of the Modigliani-Miller theorem. Lintner's (1956) seminal work provided early behavioral insights, suggesting that firms often aim for a stable or gradually growing dividend per share and are reluctant to cut dividends, indicating that managers view dividend changes as significant signals to the market. This reluctance to cut dividends and the practice of "dividend smoothing" have been widely documented. Subsequent theories have sought to explain dividend relevance by relaxing Modigliani and Miller's assumptions. The "bird-in-the-hand" theory, often associated with Gordon (1963) and Lintner (1962), suggests that investors prefer the certainty of current dividends over uncertain future capital gains. Signaling theory, as explored by Bhattacharya (1979), proposes that dividends can convey credible information about a firm's future prospects, particularly when information asymmetry exists between managers and investors and when dividends are differentially taxed compared to capital gains. Agency costs also provide a rationale for dividend payments, suggesting they can mitigate conflicts of interest between managers and shareholders by reducing free cash flow available to managers. The landscape of payout policy has evolved, with share repurchases becoming an increasingly important alternative to dividends. Brav et al. (2005) provided insights into the payout policies of U.S. firms in the 21st century, highlighting managerial reluctance to cut dividends but also a diminished emphasis on target payout ratios compared to Lintner's earlier findings, with increasing flexibility offered by share repurchases. Simultaneously, observations such as those by DeAngelo, DeAngelo, and Skinner (2004) noted a decline in the number of U.S. firms paying dividends, yet an increase in the aggregate amount of real dividends paid, driven by a concentration of payouts among large, profitable firms. This further complicates the understanding of dividend motivations. International evidence adds another layer to this complexity. Denis and Osobov (2008) found consistent determinants of dividend policy across several developed countries, with larger, more profitable firms with substantial retained earnings being more likely to pay dividends, supporting a life-cycle theory where mature firms distribute excess cash. Michaely and Roberts (2012), comparing UK public and private firms, found that public firms smooth dividends more significantly, suggesting that public market scrutiny influences this behavior. The behavioral perspective, introduced by Baker and Wurgler (2004), suggests managers might "cater" to investor demand, paying dividends when investors place a premium on payers. Furthermore, research in specific regions, like the Nordic markets, offers additional context. Brunzell et al. (2014) found that a majority of Nordic firms have specified dividend policies, influenced by capital structure and future earnings outlooks, with ownership concentration playing a significant role. Liljeblom et al. (2015) investigated dividend signaling in Denmark, Norway, and Sweden, finding varying degrees of support for signaling across these markets, suggesting that even within similar institutional frameworks, local nuances can impact dividend policy's informational content. Given the extensive and sometimes conflicting theoretical propositions and empirical findings in the broader international context, a focused study on the impact of dividend policy on stock prices within the Danish market is pertinent. The Danish market, with its specific regulatory environment, corporate governance practices, and investor characteristics, provides a unique setting to test the applicability of established theories and to uncover context-specific dynamics that may differ from larger or more frequently studied markets like the U.S. or U.K. This thesis aims to contribute to this ongoing discussion by specifically examining Danish listed companies.

1.2 Statement of the problem

Despite extensive theoretical development and empirical investigation globally, the precise nature of the relationship between corporate dividend policy and stock prices remains an area of ongoing debate and constitutes a persistent "puzzle" in finance. While foundational theories like Modigliani and Miller's (1961) irrelevance proposition provide a benchmark, real-world market conditions and investor behaviors often suggest that dividend decisions do, in fact, influence shareholder value. However, the extent and direction of this influence, and the mechanisms through which it operates (e.g., signaling, catering to investor preferences, agency cost reduction), are not universally agreed upon and appear to vary across different

economic and institutional contexts. Much of the prominent empirical research focuses on larger markets such as the United States and the United Kingdom. While studies like those by Denis and Osobov (2008) provide broad international comparisons, and research by Brunzell et al. (2014) and Liljeblom et al. (2015) offers insights into the Nordic region, a dedicated and detailed analysis focusing specifically on the Danish market is less prevalent. Denmark possesses unique characteristics in its market structure, corporate governance norms, ownership concentration, and investor base that may lead to dividend policy dynamics and stock price reactions different from those observed elsewhere.
Therefore, the core problem is the existing gap in the literature concerning the empirical evidence of dividend policy's impact within the specific context of Danish listed firms. Without such focused research, Danish corporate managers lack tailored guidance for optimizing shareholder value through payout decisions, and investors in the Danish market may not fully understand the valuation implications of different dividend strategies. This study seeks to directly address this gap by empirically examining the relationship between dividend policy choices and stock price behavior for companies operating within the Danish financial environment.

1.3 Objective of the study

The primary objective of this thesis is to empirically investigate and analyze the impact of dividend policy on the stock prices of Danish firms listed on the Nasdaq Copenhagen, as well on other exchanges in the Nordics and the US. This study aims to provide clear, evidence-based insights into this relationship within the specific Danish market context. Specifically, this research seeks to:

1. Determine whether there is a statistically significant relationship between different aspects of dividend policy (such as the act of paying dividends) and the stock returns of Danish listed companies.
2. To examine the stock market's reaction to changes in dividend policies, specifically comparing the impact of dividend increases versus dividend decreases among Danish listed firms.

Ultimately, this research seeks to provide valuable findings for academics, investors, and corporate managers by clarifying the role and valuation consequences of dividend policy in the Danish stock market.

1.4 Research Question

To what extent do dividend announcements by Danish listed firms function as credible signals of future earnings, and how does it impact the stock returns?

1. Does the stock market react differently to dividend increases versus dividend decreases among Danish listed firms?
2. Do dividend-paying firms in Denmark outperform non-dividend-paying firms in terms of stock returns?

1.4.1 Motivation for Research Question

The rationale for this study lies in the recognition that while the interplay between dividend policy and stock valuation has been extensively examined in broader global contexts, the unique attributes of the Danish financial environment necessitate dedicated scholarly inquiry. Factors such as concentrated ownership structures, a specific investor base, established corporate governance practices, and its integration within the Nordic and European economic spheres create a compelling backdrop against which to test and refine existing financial theories. By focusing on the Danish market, we aim to generate context-specific insights that may diverge from findings observed in larger, more frequently analyzed markets, thereby enriching both academic discourse and practical applications within the Danish financial community. Furthermore, understanding dividend policy remains critical despite evolving market dynamics. Debates around long-term trends, such as the observed decline in the *number* of dividend-paying firms in major markets like the US towards the end of the 20th century, contrasted with the simultaneous *increase* in *aggregate* dividend payouts (DeAngelo, DeAngelo, and Skinner, 2004), highlight the complex forces influencing payout decisions and motivate further investigation into specific market contexts like Denmark. Research in other markets, such as the UK study by Michaely and Roberts (2012) demonstrating significant differences in dividend policies between public and private firms, underscores the importance of market structure and institutional context, further motivating a focused analysis within the specific Danish environment. Furthermore, this research endeavors to empirically assess the applicability and robustness of established theoretical frameworks, including the dividend irrelevance theory, signaling theory, and investor preference theories, within the Danish setting. By scrutinizing the dividend decisions of Danish listed firms and the corresponding reactions of their investors, we seek to determine the extent to which these theoretical constructs hold validity or require market-specific adaptation. Beyond theoretical considerations, this investigation carries practical implications for both investors and corporate management within the Danish market. A more precise understanding of the relationship between dividend policy and stock prices can inform investment strategies, risk assessment protocols, and corporate communication policies aimed at optimizing shareholder value and navigating the specific dynamics of the Danish equity market. Ultimately, this research aims to contribute meaningfully to the broader academic literature on dividend policy and market efficiency by providing a focused analysis of a developed yet regionally specific market. The findings are expected to offer valuable comparative insights, highlighting both universal principles and context-dependent nuances that shape the dividend-price relationship across diverse market landscapes.

1.5 Hypotheses of the study

$H1_0$ Stock prices do not react to dividend announcements in Denmark

$H1_a$ Stock prices react to dividend announcements in Denmark

$H2_0$ There is no abnormal return associated with dividend announcements in Denmark, $AAR = 0$

$H2_a$ There is an abnormal return associated with dividend announcements in Denmark, $AAR \neq 0$

$H3_0$ There is no significant relationship between dividend increase and stock price increase

$H3_a$ There is significant relationship between dividend increase and stock price increase

$H4_0$ There is no significant relationship between dividend decrease and stock price decrease

$H4_a$ There is significant relationship between dividend decrease and stock price decrease

$H5_0$ Dividend-paying companies do not outperform non-dividend-paying companies

$H5_a$ Dividend-paying companies do outperform non-dividend-paying companies

1.6 Significance of the study

This study holds significance on multiple fronts. Academically, it aims to contribute to the broader literature on dividend policy by providing fresh empirical evidence from the Danish market, a context that is relatively under-researched compared to larger economies. The findings can help in understanding whether established financial theories regarding dividend relevance and signaling hold true in a Nordic European setting, potentially highlighting context-specific factors that influence the dividend-valuation nexus. For corporate practitioners, specifically the management of Danish listed companies, this research offers potential insights into how their dividend decisions are perceived by the market and how these policies may impact shareholder wealth. This can inform more effective financial strategies and communication with investors. Furthermore, for investors and financial analysts operating in or considering the Danish market, the study can provide a clearer understanding of the valuation implications of different dividend policies, aiding in investment decision-making and risk assessment. Ultimately, by shedding light on the dynamics of dividend policy in Denmark, this thesis seeks to enhance the understanding of this critical aspect of corporate finance for both theoretical advancement and practical application.

1.7 Demarcation

In the preparation of this thesis, generative Artificial Intelligence (AI) tools were utilized as permitted aids to support the research and writing process. Specifically, OpenAi's ChatGPT and Google's Gemini were utilized for initial idea-generation, including brainstorming and potential research. Additionally, both ChatGPT and Gemini were used for grammatical review and text revision purposes, such as improving sentence clarity and ensuring linguistic accuracy in later drafts. The AI's suggestions were critically evaluated, and all final content, arguments, and conclusions presented in this thesis are the original work of the thesis group, who retain full responsibility for the academic integrity and scholarly content herein.

2. Literature Review

This literature review will explore the extensive body of research examining market responses to dividend announcements and the theoretical underpinnings of dividend policy. A significant portion of existing studies indicates a positive correlation between dividend change announcements and subsequent stock price movements. To understand these reactions, this review will delve into key theoretical frameworks. These include the agency cost theory, which posits that dividend payments can mitigate conflicts of interest between shareholders and management by reducing free cash flow available to managers.
We will also consider signaling theory, which suggests that dividend decisions convey valuable private information about a company's current performance and future prospects to the market. Furthermore, the efficient market hypothesis (EMH) will be discussed, which proposes that stock prices swiftly and fully reflect all available information, including that contained within dividend announcements. Building on these theoretical foundations, this chapter will then provide a comprehensive review of the empirical literature on market reactions to dividend announcements, drawing on evidence from studies conducted both within the United States and across various international markets. This will set the stage for analyzing the nuanced findings and managerial perspectives offered by key studies in the field, such as those by Brunzell et al. (2014) on Nordic firms, Brav et al. (2005) on US executive views, and Denis and Osobov (2008) with their international comparative analysis.

2.1 Conceptual Review and Definitions

This section is dedicated to establishing a clear and common understanding of the key terms and theoretical constructs that underpin this study of dividend policy and its market implications. Given the multifaceted nature of dividend research, which encompasses specific financial actions, diverse theoretical explanations, and nuanced market interpretations, precision in terminology is paramount. Therefore, before delving into the main analysis, we will define and explain essential concepts. These will include core terms related to dividend actions (dividends changes, dividend policy, and share repurchases), fundamental theories frequently invoked in dividend literature (dividend signaling, the efficient market hypothesis, and the life-cycle theory of dividends), and other relevant financial terminologies that are central to interpreting the empirical findings and managerial perspectives discussed throughout this project. This foundational review will ensure clarity and consistency in the subsequent sections.

2.1.1 Dividend

A dividend represents a distribution of a portion of a company's earnings to its shareholders, as determined by the company's board of directors. It is a direct mechanism through which a company shares its financial success with its owners. While dividends are most commonly paid in cash, they can also be issued in other forms, such as additional shares of stock (stock dividends) or other property (Black and Scholes, 1973). For shareholders, receiving dividends constitutes a tangible return on their investment in the company. The decision to pay a dividend, along with its size and frequency, is a critical aspect of corporate financial policy. This decision reflects the company's current financial health, its historical and projected profitability, the availability of profitable investment opportunities, and its overarching dividend policy (Lintner, 1956). As noted by Lintner (1956) and Brav et al. (2005), dividend payments are often linked to a company's long-term sustainable earnings, as managers tend to be conservative, preferring stable or gradually increasing dividends and are reluctant to cut them, as such actions can be interpreted negatively by the market. Consequently, dividends are often paid by more mature companies that generate consistent earnings and may have fewer high-growth investment opportunities requiring extensive reinvestment of profits (Denis and Osobov, 2008). The actual payment of a dividend reduces the firm's assets, and in the context of valuation models like Modigliani and Miller (1961), if a firm pays a dividend, it must either reduce its investment or acquire additional outside capital to maintain its investment plan.

2.1.2 Share Repurchases

Share repurchases, also known as stock buybacks, represent an alternative method for a company to return capital to its shareholders. Instead of distributing cash directly as dividends, the company buys back its own shares from the open market or through a tender offer. This action reduces the number of outstanding shares, potentially increasing earnings per share and the stock price. The study by Brav et al. (2005) provides significant insights into how financial executives in the U.S. view and utilize share repurchases in conjunction with, or as an alternative to, dividends. A key finding is that managers perceive share repurchases as a significantly more flexible instrument for cash distribution compared to dividends. (Brav et al., 2005, pp. 486, 505-506). Executives favor repurchases for several reasons, including this flexibility, the ability to time the market (i.e., buying back shares when they are perceived as undervalued), the potential to manage earnings per share, and the capacity to offset the dilutive effects of employee stock option programs (Brav et al., 2005, p. 486). Importantly, Brav et al. (2005, p. 509) note that managers generally do not view dividends and repurchases as perfect substitutes. There is a reluctance to substitute from flexible repurchases towards rigid dividend commitments, with many executives indicating a preference for repurchases if unconstrained by historical dividend patterns. While tax considerations can also play a role, with repurchases historically sometimes offering a tax advantage over dividends for shareholders. The rise in share repurchases as a payout method is a significant trend in corporate finance, and understanding their distinct characteristics and managerial motivations is crucial when analyzing a firm's overall payout policy.

2.1.3 Dividend Policy

Dividend policy encompasses the strategic framework and decisions made by a company's management and board of directors regarding the distribution of profits to its shareholders versus the retention of those earnings for reinvestment within the business. It is a critical component of corporate financial strategy that addresses not only whether to pay dividends but also how much to pay, the form of payment (cash, stock), and the pattern or stability of these payments over time. Lintner found that companies generally aim for a target payout ratio of current earnings but adjust to this target gradually, a practice known as dividend smoothing, due to a strong reluctance to cut dividends once a certain level is established (Lintner, 1956, pp. 99-103). This implies that the previous period's dividend is a key benchmark. Modigliani and Miller (1961, p. 413) frame dividend policy as the choice in "how the fruits of the earning power are 'packaged' for distribution," specifically the division of earnings between cash dividends and retained earnings, assuming the firm's investment policy is held constant. More contemporary research by Brav et al. (2005, p. 486) confirms the enduring conservatism in dividend policy, with managers expressing a strong reluctance to cut dividends. However, their survey of U.S. executives suggests a diminished emphasis on a specific target payout ratio as the primary decision variable, with many firms instead targeting a specific level of dividends per share (DPS) or the growth rate of DPS.
Brunzell et al. (2014, p. 125) in their study of Nordic firms, note that a significant majority of companies report having a "specified, or defined, dividend policy," which is most influenced

by capital structure considerations and the outlook for future earnings. This suggests that for many firms, dividend policy is not an ad-hoc decision but a structured approach. Baker and Wurgler (2004a, p. 1125) introduce a behavioral dimension, proposing that dividend policy might also involve managers "catering" to prevailing investor demand for dividend-paying stocks, suggesting that policy can be dynamic and responsive to market sentiment. In essence, a firm's dividend policy reflects its approach to balancing the return of capital to shareholders with the funding needs for future growth, shaped by managerial philosophies, market expectations, firm characteristics, and the broader economic and institutional environment.

2.1.4 Life-Cycle of Dividends

The life-cycle theory of dividends proposes that a firm's dividend policy is not static but evolves systematically as the firm matures. This perspective suggests that the stage of a company's development—from a young, high-growth entity to a mature, stable enterprise—plays a crucial role in its decisions regarding profit distribution. Early-stage, high-growth firms typically face abundant profitable investment opportunities. To fund these growth prospects, they are more likely to retain a significant portion, if not all, of their earnings for reinvestment. Consequently, such firms often pay little to no dividends. Their focus is on internal financing to fuel expansion, and shareholders in these firms generally expect returns to come primarily from capital appreciation driven by this growth. As firms mature, their growth opportunities may become less abundant or offer lower rates of return. Concurrently, these established companies often generate more substantial and stable cash flows. With fewer high-return investment projects requiring internal financing, mature firms are more likely to have surplus cash. According to the life-cycle theory, these firms will then be more inclined to initiate dividend payments or increase existing ones as a means of distributing this free cash flow to shareholders (Denis and Osobov, 2008). Denis and Osobov found strong international support for this theory, observing that the propensity to pay dividends is significantly higher among firms that are larger, more profitable, and for which retained earnings constitute a substantial fraction of total equity—characteristics typically associated with mature firms.

2.1.5 Efficient Market Hypothesis

The Efficient Market Hypothesis (EMH) is a cornerstone theory in finance which posits that asset prices fully reflect all available information. This implies that it is impossible to consistently achieve returns in excess of average market returns on a risk-adjusted basis, given the information available at the time the investment is made. The EMH is often discussed in three forms: weak-form efficiency (prices reflect all past market data such as prices and trading volumes), semi-strong-form efficiency (prices reflect all publicly available information), and strong-form efficiency (prices reflect all information, both public and private). (Malkiel, 1989) The concept of "perfect capital markets," as assumed by Modigliani and Miller (1961) in their dividend irrelevance proposition, aligns closely with the tenets of the EMH. Their assumptions include rational behavior, costless access to information for all traders, no transaction costs, and no tax differentials, creating an environment where financial illusions cannot persist and where prices are determined by "real" considerations such as earning power and investment policy. Similarly, the option pricing model developed by Black and Scholes (1973) is derived under "ideal conditions," including the notion that option prices should not allow for sure profits from hedged portfolios, a direct consequence of market efficiency. In the context of dividend policy, the EMH, particularly in its semi-strong form, suggests that a firm's dividend announcement, in and of itself, should not cause a change in its stock price if the announcement does not convey new, unexpected information about the firm's future earnings or investment opportunities. This is because all existing public information about the firm's prospects would already be incorporated into the stock price. (Malkiel, 1989) Therefore, under strict EMH, the act of paying a dividend or the specific dividend policy chosen (given the firm's investment policy is known) would be irrelevant to valuation, supporting the Modigliani-Miller irrelevance theorem. Miller and Modigliani (1961, p. 429) extend this to uncertainty by invoking "symmetric market rationality," where investors expect others to value firms rationally based on future prospects, again implying efficient information incorporation. However, many theories of dividend relevance arise precisely when the strict assumptions of the EMH or perfect capital markets are relaxed. For instance, signaling theory (Bhattacharya, 1979) suggests dividends can be relevant in markets with "imperfect information," where dividend changes convey new information from better-informed managers to less-informed investors. Similarly, the catering theory of dividends proposed by Baker and Wurgler (2004a) explicitly "relaxes the market efficiency assumption," suggesting that managers might adjust dividend policies in response to investor sentiment or mispricing, which can only occur if markets are not perfectly efficient and arbitrage is limited. Thus, the EMH provides a critical theoretical benchmark for understanding when and why dividend policy might, or might not, affect firm value.

2.2 Theoretical Review

2.2.1 Dividend Irrelevance Theory

The Dividend Irrelevance Theorem, introduced by Modigliani and Miller in 1961, is a foundational concept in corporate finance that examines the relationship between a firm's dividend policy and its valuation. It revolutionized the understanding of dividend policy by introducing the concept of dividend irrelevance. (Modigliani and Miller, 1961) The dividend irrelevance theorem is predicated on a set of highly restrictive assumptions, collectively describing what is often termed a "perfect capital market." These assumptions include the absence of taxes, meaning no personal or corporate income taxes, or no differential tax treatment between dividends and capital gains that would make one form of return more attractive than the other. Secondly, the theory assumes no transaction costs, allowing investors to buy and sell shares without incurring brokerage fees or other impediments. Thirdly, investors are assumed to be rational, consistently preferring more wealth to less and making decisions accordingly. A crucial assumption is that of perfect information, implying no information asymmetry. Under these assumptions, the Modigliani-Miller theorem argues that a firm's dividend policy does not affect the current market value of the firm. (Modigliani and Miller, 1961)

A cornerstone of their reasoning is the concept of "homemade dividends." This idea suggests that if an investor desires a different pattern of cash flows than what the company's dividend policy provides, they can independently create their preferred cash flow stream. The theorem posits that dividend policy is one of the financial policies, and financial policies are irrelevant in a perfect economy. Value is determined by the earning power of the firm's assets and its investment policy, not by how the earnings are distributed. (Modigliani and Miller, 1961) The dividend irrelevance theorem holds critical importance for our study, even though our research will predominantly analyze real-world scenarios where the stringent M&M assumptions are not fully met. It serves as the theoretical benchmark or null hypothesis against which all other theories of dividend policy are evaluated. When our study discusses signaling theory, the bird-in-the-hand theory, or any other framework explaining why dividends might be relevant, it is essentially detailing deviations from the M&M irrelevance proposition that arise from the relaxation of one or more of its perfect market assumptions. Empirical research highlights how real-world factors, particularly those related to a firm's public or private status, lead to deviations from the strict MM irrelevance proposition. For instance, Michaely and Roberts (2012), comparing UK public and private firms, found significant differences in dividend behavior linked to ownership structure and market scrutiny. They observed that public firms tend to pay relatively higher dividends than matched private firms, suggesting that factors beyond the perfect market assumptions of MM, such as agency costs or information asymmetries intensified by public markets, play a crucial role in shaping payout policies. Furthermore, the degree to which firms smooth dividends appears strongly related to their public status.

2.2.2 The Dividend Puzzle

The dividend puzzle centers on the seemingly straightforward question of why corporations distribute dividends to shareholders when, theoretically, a firm's value should be unaffected by its dividend policy. In essence, the puzzle explores the difference between the theoretical assumption of dividend irrelevance and the observed reality of investor preferences for dividend-paying stocks. Fischer Black (1976) famously named The Dividend Puzzle, concluding that: *"The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just do not fit together"*

The core of the dividend puzzle lies in the contradiction between the Modigliani-Miller theorem and real-world observations. The MM theorem, under a set of assumptions, posits that in a perfect market, a firm's dividend policy is irrelevant to its market value. If there are no taxes, transaction costs, or information asymmetries, shareholders can replicate any dividend by selling a portion of their shares. Therefore, a company's decision to pay or withhold dividends should have no impact on its stock price. However, in practice, investors display a clear preference for companies that pay dividends. This preference is often strong enough to influence investment decisions, even when alternative investment strategies might offer higher returns. This divergence between the theoretical prediction of dividend irrelevance and the empirical evidence of investor preferences creates the puzzle.

Investigating the specific behaviors that contribute to this puzzle, Michaely and Roberts (2012) compared public and private firms in the UK. Their finding that public firms engage in significantly more dividend smoothing – being reluctant to cut dividends and adjusting payouts more slowly to earnings shocks compared to private firms – provides concrete evidence of this puzzle in action. Even when matched for characteristics like size and profitability, public firms behaved differently, suggesting that the pressures and information environment of public markets, perhaps tied to agency conflicts or signaling concerns, lead managers to prioritize dividend stability over the theoretical irrelevance suggested by MM. Why do investors seem to value dividends when, according to established theory, they should not?

2.2.3 Bird-in-the-hand theory

The "Bird-in-the-Hand" theory is one of the traditional arguments in finance attempting to explain why firms opt to pay dividends and why investors might assign a higher value to stocks that offer such payouts. At its core, the theory posits that investors exhibit a preference for the certainty associated with receiving a current cash dividend—likened to a "bird in the hand"—over the more uncertain prospect of future capital gains that could arise if a company chooses to retain and reinvest its earnings, representing potential "birds in the bush." This preference is rooted in the general risk aversion of investors; a cash dividend paid today is a tangible and guaranteed return, whereas future capital gains are contingent upon the success of the company's reinvestment strategies, prevailing market conditions, and the eventual sale of the stock, making them inherently riskier. Gordon (1963), in arguing against the dividend irrelevance proposition under uncertainty, suggested that "investors have an aversion to risk or uncertainty" and that "the uncertainty of a dividend it is expected to pay increases with the time in the future of the dividend." It follows that investors may discount distant (and thus more uncertain) cash flows at a higher rate than near-term, more certain cash flows like current dividends. Proponents argue that because current dividends are perceived as less risky, investors will apply a lower discount rate to the dividend component of their expected returns. This could lead to the conclusion that firms with higher dividend payouts would be valued more highly, thereby maximizing the firm's stock price. Lintner (1956) aligns with the sentiment that investors value the predictability and relative certainty of dividends. However, this theory has faced substantial criticism, most notably from Modigliani and Miller (1961). They famously described the bird-in-the-hand reasoning as a "fallacy" (as referenced by Bhattacharya, 1979, in the title of his paper). Despite these criticisms, the bird-in-the-hand theory remains a relevant concept in the study of dividend policy because it directly addresses investor psychology and risk aversion, factors that are not fully captured in models assuming perfect markets. For this thesis, the bird-in-the-hand theory provides a potential explanation for why dividend policy might matter to Danish investors and consequently impact stock prices. If investors in the Danish market indeed prioritize the certainty of current dividend income over the potential for future capital gains due to risk aversion, then firms with generous and stable dividend policies could command a premium. This offers a contrasting viewpoint to the irrelevance theory and a behavioral rationale that could help explain any observed relationship between dividend policy and stock valuation in the Danish context.

2.2.4 Signaling Theory

Signaling theory, in the context of corporate finance, posits that a firm's financial decisions, including its dividend policy, can convey credible information from insiders (managers) to less-informed outsiders (investors). This is particularly relevant in situations of information asymmetry, where managers possess private information about the firm's current performance and, more importantly, its future earnings prospects (Bhattacharya, 1979; Miller and Rock, 1985; Liljeblom et al., 2015). Dividend announcements, especially changes in dividend payouts, are viewed as signals because only firms confident in their future financial health and sustainable earnings can afford the costly commitment of initiating or increasing dividend payments. Bhattacharya (1979) developed a formal model where cash dividends function as signals of expected cash flows, particularly when outside investors have imperfect information and dividends are taxed at a higher rate than capital gains. The tax disadvantage of dividends, or other forms of cost associated with paying them (such as transaction costs or the opportunity cost of forgoing profitable investments if external financing is expensive), makes the signal credible. Only firms with genuinely strong prospects would be willing to incur these costs. Miller and Modigliani (1961, p. 430), despite their overall irrelevance proposition, acknowledged the potential "informational content" of dividends, suggesting that a change in dividend rate, especially from a firm with an established policy of dividend stabilization, might lead investors to revise their expectations of future profits.
Lintner's (1956) early empirical work supports the signaling perspective. He found that managers are reluctant to cut dividends and typically only increase them when they believe future earnings can sustain the higher payout level, implying that dividend changes reflect management's confidence. This careful management of dividend changes, often resulting in dividend smoothing, aligns with the signaling hypothesis. Michaely and Roberts (2012, p. 715) found that publicly listed UK firms smooth dividends significantly more than their private counterparts, showing a strong reluctance to cut or omit dividends. This behavior is consistent with managers of public firms using a stable or gradually increasing dividend stream to signal confidence and avoid the negative market reactions associated with cuts, a

pressure less acute for private firms not subject to constant public market valuation. However, the managerial perspective on signaling is nuanced. Brav et al. (2005, p. 515) found in their survey of U.S. executives that while managers widely believed their payout actions (both dividends and repurchases) conveyed information to investors about the firm's future confidence, they largely rejected the academic notion of using dividends as a costly signal specifically designed to differentiate their firm from competitors. This suggests that while an informational role is acknowledged, the precise mechanisms of costly signaling as theorized may not fully align with managerial intent. The empirical evidence for dividend signaling is mixed. For instance, Liljeblom et al. (2015) investigated whether dividends signal future earnings in the Nordic stock markets (Denmark, Norway, and Sweden). Using aggregate data and time-series methodologies, they found strong support for dividend signaling in Sweden, weaker support in Norway, and no significant evidence in Denmark that the dividend payout ratio Granger-caused future earnings per share (Liljeblom et al., 2015, p. 505). These varying results, even among relatively similar Nordic economies, suggest that institutional context, market structure, or other local factors can significantly influence the signaling efficacy of dividends. Furthermore, the practical relevance of signaling as a primary driver for the majority of dividend payments has been questioned. DeAngelo, DeAngelo, and Skinner (2004, p. 425) pointed out the extreme concentration of dividend payouts among a small number of large, highly visible U.S. corporations. They argued that such prominent firms, already subject to intense scrutiny, likely have less need to rely on dividends as a primary signaling mechanism compared to smaller firms, yet they dominate aggregate dividend supply. This suggests that while signaling might influence decisions at the margin or for certain types of firms, other factors like earnings capacity and stability may be more fundamental drivers for the largest payers. For this thesis, signaling theory is highly relevant. If Danish investors interpret dividend announcements, particularly changes, as signals of future profitability, then dividend policy will directly impact stock prices. The mixed evidence from the broader Nordic region (Liljeblom et al., 2015) makes a specific examination of the Danish market particularly pertinent to determine if, and to what extent, dividend signaling influences valuation in this specific context. The reluctance of managers to cut dividends (Lintner, 1956; Brav et al., 2005) further supports the potential for dividend changes to carry significant informational weight.

2.3 Empirical Review

2.3.1 Empirical Evidence in favor of the Irrelevance Theory

The cornerstone of the dividend irrelevance theory is the seminal work of Modigliani and Miller (1961). They demonstrated that, under a specific set of idealized assumptions—perfect capital markets, no taxes, no transaction costs, rational investors, and perfect certainty where investment policy is held constant—a firm's choice of dividend policy has no impact on its current market value or its cost of capital. The value of the firm, they argued, is determined solely by its earning power and investment decisions, not by how these earnings are divided between dividends and retained earnings. Investors can create their own desired cash flow patterns through "homemade dividends" by selling shares if they require more current income than the firm provides, or by reinvesting dividends if they desire less. (Modigliani and Miller, 1961, p. 414). While direct empirical validation of pure irrelevance in real-world markets is challenging due to the stringent nature of its assumptions, some empirical findings can be interpreted as being broadly consistent with the spirit of the irrelevance proposition, or at least as questioning the universal strength of theories of dividend relevance. For example, DeAngelo, DeAngelo, and Skinner (2004, p. 426) found that in the U.S., dividends are highly concentrated among a small number of large, highly profitable, and visible firms. They argued that such firms are arguably least in need of using dividends for signaling purposes and that their dividend policies are more likely driven by their substantial earnings capacity. This observation potentially diminishes the general applicability of signaling theory as a primary driver for a large portion of aggregate dividends, thereby leaving more room for irrelevance or other explanations. Similarly, Denis and Osobov (2008, p. 63), in their international study across six developed countries, found that the propensity to pay dividends is consistently linked to firm size, profitability, and the proportion of retained earnings in total equity. They concluded that these findings "cast considerable doubt on signaling, investor clientele, and dividend catering explanations as primary drivers of dividend policy" and are more aligned with life-cycle theories where mature firms distribute excess cash. By questioning the dominance of these traditional relevance theories, their findings indirectly suggest that the factors making dividends relevant might not be as pervasive or as powerful as often assumed, which could be seen as providing some space for the M&M irrelevance argument to hold, at least under certain conditions or for certain firms. Furthermore, the survey by Brav et al. (2005, p. 515) indicated that while U.S. financial executives believe their payout actions convey information, they largely rejected the academic notion of using dividends as a costly signal in the way theorized by some models. If managers themselves do not primarily use dividends for such strategic signaling, one of the key mechanisms for dividend relevance is weakened. It is crucial to note, however, that these studies do not claim that dividends are entirely irrelevant in practice. Instead, they often highlight that some of the prominent theoretical reasons for why dividends should be relevant (like signaling or clientele effects) might not be as universally applicable or as strong as other factors, such as the firm's stage in its life cycle or its overall profitability. The M&M irrelevance proposition remains a vital theoretical benchmark, and evidence that weakens specific theories of relevance can be seen as indirectly bolstering the conditions under which irrelevance might more closely approximate reality.

2.3.2 Empirical Evidence against the Irrelevance Theory

Despite the theoretical elegance of the Modigliani-Miller (M&M) dividend irrelevance proposition, a substantial body of empirical research and theoretical arguments suggests that, in the real world, dividend policy does matter and can significantly impact firm value. These arguments typically arise from the relaxation of M&M's strict assumptions, such as perfect capital markets, no taxes, and perfect information. One of the earliest and most influential empirical studies challenging the practical applicability of irrelevance was conducted by Lintner (1956). Through interviews with corporate managers, Lintner found that firms smooth dividends, are reluctant to cut them, and that changes in dividends are primarily driven by sustainable changes in earnings. This behavior implies that dividend changes convey information to the market about management's assessment of future prospects, a notion inconsistent with irrelevance. Brav et al. (2005, p. 486), in a more recent survey, confirmed this managerial reluctance to cut dividends and the belief that payout actions convey information, even if managers do not explicitly frame these actions as "costly signals" in the academic sense. The "bird-in-the-hand" theory, advocated by researchers like Gordon (1963), posits that investors prefer the certainty of current dividends to the uncertainty of future capital gains. Gordon (1963, p. 268) argued that under uncertainty, the discount rate applied to future dividends increases with futurity, making nearer dividends more valuable. This preference for current income due to risk aversion directly contradicts the M&M assertion that investors are indifferent between dividends and capital gains created through retained earnings. Signaling theory provides a robust framework for dividend relevance in the presence of information asymmetry. Bhattacharya (1979) formally modeled dividends as

costly signals of firm quality, where the cost (e.g., due to differential taxation of dividends versus capital gains) makes the signal credible. If dividend changes convey new information about a firm's profitability or risk that was not previously incorporated into the stock price, then dividend policy clearly affects valuation. Empirical studies on market reactions to dividend announcements often find significant stock price responses, particularly to dividend initiations, omissions, increases, and decreases, which is consistent with the market interpreting these as new information (as cited in Liljeblom et al., 2015, p. 496). For example, Liljeblom et al. (2015) themselves found evidence of dividend signaling in Sweden and, to a lesser extent, Norway, indicating that in these Nordic markets, dividends do appear to convey information about future earnings. Market imperfections, such as taxes and transaction costs, which are assumed away by M&M, also contribute to dividend relevance. Lintner (1962) argued that market imperfections, including differential personal income tax rates on dividends versus capital gains, would cause the M&M conclusion of dividend irrelevance to break down. If dividends are taxed at a higher rate than capital gains, investors might prefer lower payouts, making dividend policy relevant to after-tax shareholder wealth. The Black-Scholes (1973) option pricing model, while not directly a dividend theory, acknowledges the impact of dividends on derivative pricing; changes in dividend policy affect option values, demonstrating that dividend decisions have tangible valuation consequences for related financial instruments (Black and Scholes, 1973, p. 648).
Behavioral finance offers further arguments against irrelevance. Baker and Wurgler (2004a) proposed the "catering theory of dividends," suggesting that managers adjust dividend policies to cater to time-varying investor sentiment or demand for dividend-paying stocks. If investors, for psychological or other reasons, place a premium on dividend payers at certain times, firms might initiate or increase dividends to boost their stock price, implying that dividend policy is relevant because it responds to (and potentially exploits) market inefficiencies. Finally, differences in corporate governance and ownership structures across markets can also lead to dividend relevance. Michaely and Roberts (2012) found that public UK firms smooth dividends more and pay higher dividends than comparable private firms, attributing this to the scrutiny of public capital markets and potentially different agency costs or information environments. Brunzell et al. (2014) noted that in Nordic firms, defined dividend policies were often linked to ownership concentration and could serve agency or monitoring purposes, again suggesting a role for dividends beyond simple irrelevance.
In summary, a wide array of empirical evidence and theoretical developments focusing on market imperfections, information asymmetries, investor preferences, behavioral biases, and

governance mechanisms provides substantial arguments and findings against the universal applicability of the dividend irrelevance theory. These studies collectively suggest that dividend policy is often a significant consideration for both firms and investors, with tangible impacts on stock prices.

2.3.3 Empirical Evidence on the Nordic markets

The paper "Dividend policy in Nordic listed firms," authored by Tor Brunzell, Eva Liljeblom, Anders Löflund, and Mika Vaihekoski, and published in the Global Finance Journal in 2014, offers a focused investigation into the dividend payout policies of companies listed in the Nordic region. A key finding of the Brunzell et al. (2014) study is that a significant majority—72%—of the responding Nordic companies reported having a specified, or defined, dividend policy in place. The research identified that the formulation of these dividend policies was most significantly influenced by considerations related to the company's capital structure and the outlook for future earnings. This aligns with some traditional views on dividend determinants. Furthermore, the study found that larger and more profitable companies were more likely to have a defined dividend policy, a characteristic often observed in dividend-paying firms globally. The authors found that the likelihood of a firm having a defined dividend policy was positively related to the level of ownership concentration. Specifically, the presence of large, long-term private or industrial owners significantly increased the probability of a firm adhering to an explicit dividend policy. The paper "Do dividends signal future earnings in the Nordic stock markets?" by Eva Liljeblom, Sabur Mollah, and Patrik Rotter, published in the Review of Quantitative Finance and Accounting in 2015, presents a focused empirical investigation into the information content of dividends, specifically within the context of three Nordic stock markets: Denmark, Norway, and Sweden. The central research question addressed by the authors is whether dividend payments in these particular markets serve as credible signals of firms' future earnings, a core tenet of the well-established dividend signaling hypothesis. The study found strong support for dividend signaling in the Swedish market. In the case of Norway, the evidence for dividend signaling was weaker; the hypothesis that dividends do not Granger-cause earnings could only be rejected at the 10% significance level. Conversely, for Denmark, the study did not find any significant evidence to support the dividend signaling hypothesis, as the dividend payout ratio did not demonstrate Granger causality for future EPS.

3 Data & Sample Construction

The upcoming section describes how the thesis group collected, organized and operated the data. It highlights the databases used and discusses potential risks related to the collected data.

3.1 Financial Data

To analyze how firms' dividend policies affect the stock return for publicly listed Danish firms, data has been gathered from FactSet, a global financial database. Data is retrieved for firms that match the following criteria: Firstly firms that were either listed on Nasdaq OMX Copenhagen, or secondly firms who have their headquarters in the Kingdom of Denmark, meaning that firms that may be listed on a foreign exchange but still have their headquarters in either Denmark, Greenland or the Faroe Islands, for the third and final point the data only includes firms that still exist as of April 2025. Firms that previously have been on the Danish exchange or have headquarters in the kingdom of Denmark but have since then been delisted, have been removed from the data.

The thesis' time period is from January 1st, 2000 to December 31st, 2024 and covers 154 different stocks quarterly. The dataset comprises 18 financial and firm-specific variables relevant to our analysis of dividend policies. All financial data is from the firm's fiscal year, and not from calendar years and all the financial data is in thousands DKK except for variables that are in per share.

Due to the size of the data gathered, the thesis group can not manually check for errors for the full sample. However, a small sample of the firms have been picked out and then checked their respective annual report in order to validate the correctness given to the thesis group by FactSet. It should be noted that the thesis group recognizes 0 values in FactSet the same as missing values.

3.2 Stock Data

In order for the thesis group to answer the research question, then to supplement the financial data the stock prices and returns have been found. The data is again gathered from FactSets database. From the database the thesis group has gathered daily prices and returns from the same time period as the financial data, the returns have been formulated to the logarithmic

value. The daily prices and log return has then been compromised from daily to quarterly by using a basic average formula.
Again given the large amount of data gathered then the thesis group is unable to check for errors for every single firm. However, the group has double checked with Nasdaq with a sample size of 5-6 firms that the stock prices are in fact the same, and therefore will conclude that there aren't any major deviants in the dataset.
The potential risks of missing errors or values are present , but due to the size of the dataset, potential deviations risks like these are unlikely to impact the results of the study.

3.3 Final Dataset

After finding the financial data for all the firms, and finding the average for the quarterly stock prices and stock returns, the thesis group merged the two datasets together, to form one singular dataset. Firms belonging to the financial sector, including banking were excluded due to their difference in reporting financial data, with banking most of the times in FactSet having severe missing values. It should be noted that the thesis group has chosen to not exclude firms whose dividend payout ratio exceeds 100% as according to Litner in 1956 could possibly reflect firms' wish to avoid cutting dividends even though earnings or other financial data seems to be low for a certain period. The final product is panel data, where the firmst financial data can be seen through the different quarters. The panel data will be used later on in the paper on fixed effects regression model. When data is set up into panel data, then that means that the data requires replication of the same unit, due to the given timeframe.

4 Methodology

4.1 Fixed Effects Model

The thesis group sees a fixed effects regression model the best fit in order to answer the research question. The reason for choosing a fixed effects model is that the thesis data, as mentioned in chapter 3 of this thesis, is a long data format panel data. The panel data is currently unbalanced due to the time period that has been given, meaning that there is not data for every single firm in the 24 year period, but it is fixed.

The equation for a fixed effects regression model is the following:

$$y_{it} = \beta_1 x_{it1} + ... + \alpha_k x_{itk} + \alpha_i + u_{it}, t = 1, ... , T,$$

The above given formula should be seen as the beta (β), are the parameters to estimate, and alfa (α) are the unobserved effects. Lastly u should be seen as the error term given in the regression model. (Wooldridge, 2019 p. 469)

The thesis group have a desire in extension of the fixed effect model to exhibit homoscedastic or heteroscedastic characteristics, If the regression's mean of the error is constant along all values, then it could be an indication of the given data being homoscedastic, on the other hand if the variance of the residuals are even, then it could mean the data being heteroscedastic. (Wooldridge, 2015 p. 262)

4.1.1 Dependent Variable

The thesis group has chosen that our dependent variables in all the regressions models will be stock return. As mentioned earlier in this thesis, then the stock return in the panel data is the daily log return in the time period from January 2000 to December 2024, averaged out so it fits the quarterly financial data. The stock return has been chosen as the dependent variable due to its predictable nature. Eugene Fama and Kenneth French published a paper in 1988 called "Dividend Yields and Expected Stock Return", where they explored the nature of stock returns. Their findings were that stock returns were in fact predictable and and for periods consisting for more than a year in regards to portfolio returns have a strong negative autocorrelation, and makes the stock return an obvious choice for the thesis group. (Fama and French, 1988)

4.1.2 Independent Variables

The independent variables used will primarily exist from dummy variables.

1. *Paid Dividends* - Paid dividends will be a dummy variable that is equal to 1 if the firm is paying dividends, and otherwise 0 if the firm does not offer dividend payments. The logic behind this dummy is to see whether or not firms have different financial gains or losses dependent on whether or not firms pay dividends.
2. Dividend Increase - Dividend Increase dummy variable, is based on the fact that if there has happened an increase in dividend, then there would be a notation of 1, but otherwise 0 if the dividend hasn't increased. The logic behind when the notion of 1 is from an absolute change point of view. In regards to when something is an increase or decrease, then what is actually being compared is the previous quarters dividend. Another way this could have been computed would be to compute the last year but same quarter, which would have been controlled for seasonality in regards of dividend payment, whereas the previous quarters dividend as the thesis group is computing, has a more an immediate response, as that is looking at the preceding quarters result. In regards to stock splits, then FactSet already have taken it into account on their DPS, and therefore the thesis group has not regarded stock splits on their own.
3. *Dividend Decrease* - The dividend decrease dummy works in a similar way to the dividend increase dummy, in that it takes its logic from an absolute change point of view, but this time it takes if there is a decrease in the dividend per share compared to the previous dividend per share. Just like the dividend increase, the decrease dummy is also taking the previous quarter's dividend.

4.1.3 Control Variables

1. *Firm Size (Ln Assets)* - Firm size is a rather common control factor in most studies, when it comes to analyzing corporate finance. As in most studies, the thesis group ought to use the logarithm of the total assets as a proxy for firm size. There exists a previous study that as a conclusion suggested that a firm's dividend payout ratio has a certain relation to the firm's size (total assets).

2. *Return on Assets (ROA)* - The second control variable used will be the Return on Assets, and will be referred to as ROA. The ROA is a financial ratio that indicates how profitable a company is in relation to its total assets. The ROA is calculated by the following formula: $Net\ Income\ /\ Total\ Assets$.
3. *Leverage (Leverage)* - Leverages measure the extent to which a firm's assets are financed by debt. The leverage ratio therefore indicates how much the firm relies on borrowed capital, increasing the financial risk. Leverage is calculated by the following formula: $Total\ Debt\ /\ Total\ Assets$
4. *Capex Ratio (Capex_ratio)* - The CapEx ratio represents the firm's capital expenditures relative to its total assets. The ratio reflects how much the firm is investing in long-term growth. The Capex ratio is calculated by the following formula: $CapEx\ /\ Total\ Assets$

4.1.4 Correlation Matrix

Table 2: Correlation Matrix between all variables in the regression

	Stock Return	Dividend dummy	Dividend Increase	Dividend Decrease	Size	ROA	Leverage	CapEx Ratio
Stock Return	**1,0000**							
Dividend dummy	0,0466	**1,0000**						
Dividend Increase	0,0468	0,6636	**1,0000**					
Dividend Decrease	-0,0081	0,4308	-0,0539	**1,0000**				
Size	0,1204	0,2102	0,1798	0,1076	**1,0000**			
ROA	0,1916	0,1497	0,1010	0,0527	0,3589	**1,0000**		
Leverage	-0,0639	-0,0742	-0,0738	-0,0224	-0,0371	-0,0937	**1,0000**	
CapEx Ratio	-0,8480	0,0273	0,0193	-0,0078	-0,1539	-0,0546	0,0146	**1,0000**

Table 2 presents the Pearson pairwise correlation matrix for the key variables utilized in the regression analyses, based on 4374 firm-quarter observations, offering initial insights into their linear interrelationships.

Stock returns exhibit small positive correlations with DivPaid (+0,0451), DivIncrease (+0,0461), Size (+0,1253), and ROA (+0,1928). It shows a very small negative correlation with DivDecrease (-0,0075), a small negative correlation with leverage (-0,0330), and a small positive correlation with CapEx ratio (+0,0244).

The DivPaid dummy variable displays a strong positive correlation with DivIncrease (+0,6662) and a notable positive correlation with DivDecrease (+0,4155). DivPaid is also positively correlated with Size (+0,1988) and ROA (+0,1512). Its correlation with leverage is small and negative (-0,0723), while its correlation with CapEx ratio (+0,0351) is small and positive.

The DivIncrease dummy is, as mentioned, strongly correlated with DivPaid. It also shows a positive correlation with Size (+0,1798) and ROA (+0,1010). Its correlation with DivDecrease is small and negative (-0,0499).
Similarly, the DivDecrease dummy, apart from its correlation with DivPaid, is positively correlated with Size (+0,0845) and has a very small positive correlation with ROA (+0,0349). Among the control variables, Size (log of total assets) displays a notable positive correlation with ROA (+0,3640) and a negative correlation with CapEx_ratio (-0,1141). ROA is negatively correlated with leverage (-0,0447). Other correlations between control variables, such as leverage with CapEx_ratio (+0,0340), are generally modest.

4.1.5 Summary Statistics Table

Table 3: Summary statistics table

Variable	N	Mean	p50	SD	Min	Max	p25	p75
Stock Return	7286	0,000	0,000	0,003	-0,012	0,010	-0,002	0,002
Dividend Dummy	7727	0,130	0,000	0,336	0,000	1,000	0,000	0,000
Dividend Increase	7727	0,059	0,000	0,236	0,000	1,000	0,000	0,000
Dividend Decrease	7727	0,026	0,000	0,160	0,000	1,000	0,000	0,000
Size	7297	6,261	6,333	1,046	1,708	8,830	5,534	7,036
ROA	7211	-0,013	0,008	0,169	-8,914	3,057	-0,009	0,022
Leverage	6297	0,259	0,225	0,198	0,001	0,890	0,097	0,383
CapEx Ratio	5526	0,019	0,011	0,038	0,000	0,951	0,004	0,022

This summary statistics table offers a descriptive overview of the key variables employed in the regression analyses. For StockReturn, the mean is -0,000, and the median (p50) is 0,000, indicating that log quarterly stock returns are, on average, centered around zero. The standard deviation for Stock return is 0,003, with values ranging from a minimum of -0,012 to a maximum of 0,010; the 25th and 75th percentiles are -0,002 and 0,002, respectively.
The dummy variable DivPaid, has a mean of 0,130, which signifies that approximately 13% of these observations correspond to firms paying dividends. Its standard deviation is 0,336, and as a binary variable, it ranges from 0 to 1, with both the 25th and 75th percentiles being 0.
The DivIncrease dummy, presents a mean of 0,059, indicating that dividend increases are recorded in about 5,9% of the firm-quarter observations. For DivDecrease, the mean is 0,026, suggesting dividend decreases are present in roughly 2,6% of instances. Both DivIncrease and DivDecrease are binary, with minimums and maximums of 0 and 1, and p25 and p75 values of 0.

Regarding the control variables, Size (log of total assets) has a mean of 6,261 and a median of 6,333. The standard deviation is 1,046, with values ranging from 1,708 to 8,830; the 25th percentile stands at 5,534 and the 75th percentile at 7,036.
The ROA (Return on Assets) shows a mean of -0,013 and a median of 0,008. Its standard deviation is 0,169, with a notable range from a minimum of -8,914 to a maximum of 3,057; the interquartile range for ROA is from -0,009 to 0,022.
The leverage variable has a mean of 0,387 and a median of 0,331. The standard deviation is 0,222, with a range from 0,115 to 0,992; the 25th percentile is 0,215 and the 75th percentile is 0,519.
Finally, CapEx ratio displays a mean of 0,358 and a median of 0,288. The standard deviation is 0,290, and the values range from -0,997 to 0,999; the 25th and 75th percentiles are 0,172 and 0,542, respectively.

4.2 Regressions

To further investigate the relationship between dividend policy and stock returns for Danish listed firms, and to specifically address hypotheses H3, H4, and H5, this study employs fixed-effects regression models as outlined in the methodology (Section 4.1). By performing a series of regressions, we aim to examine [1] whether the status of being a dividend-paying firm is associated with different quarterly stock returns compared to non-paying firms, controlling for various firm characteristics, and [2] how specific changes in dividend payments—namely dividend increases and dividend decreases relative to the previously paid dividend—incrementally affect quarterly stock returns, beyond the general effect of paying a dividend.
The initial regression model, Regression 1, focuses on the overall impact of a firm's decision to pay dividends. Regression 2 will then explore the nuanced effects of dividend changes. These models incorporate firm-specific fixed effects to control for unobserved time-invariant heterogeneity and quarter fixed effects to account for common time trends. These models also include industry fixed effects (specified using i.GICS_Code). All variables used in the regression analyses are precisely defined below in *Table 1: Variable definitions*. The results from these regressions will be presented (section 5.2) and discussed (section 6.2).

Table 1: Variable definitions

Variable	Symbol in Model	Description
Dependent Variable		
Stock Return	StockReturn	Quarterly logarithmic stock return for firm i in quarter t.
Independent Variables		
Dividend Dummy	DivPaid	Equal to 1 if firm i paid any cash dividend per share (DPS) greater than zero in quarter t; 0 otherwise.
Dividend Increase	DivIncrease	Equal to 1 if DPSit>0 AND DPSit is strictly greater than prev_paid_dividendit; 0 otherwise.
Dividend Decrease	DivDecrease	Equal to 1 if DPSit>0 AND DPSit is strictly less than prev_paid_dividendit; 0 otherwise.
Control Variables		
Size	Size	Natural logarithm of total assets for firm i at the end of quarter t.
ROA	ROA	Return on Assets. Net Income of firm i for the fiscal year corresponding to quarter t, divided by its total assets at the end of quarter t.
Leverage	Leverage	Total Debt of firm i at the end of quarter t, divided by its total assets at the end of quarter t.
Capex Ratio	CapEx_ratio	Capital Expenditures of firm i for the fiscal year corresponding to quarter t, divided by its total assets at the end of quarter t.
Fixed Effect Variables (Categorical)		
GICS Code	GICS_Code	Numeric code representing the GICS industry classification for firm i.
Quarter	qdate	Quarterly time identifier.
Firm Identifier	ID	Unique identifier for each firm.

The table shows all of the variables used in the regression models, sorted by Dependent Variable, Independent Variables, Control Variables and lastly Fixed Effect Variables. The table includes the name of the variable (e.g. Dividend Increase) as well as how it is presented in the regression models and Stata (e.g. DivIncrease) and lastly a description of what the variable actually is and how it is presented in the regressions.

4.2.1 Regression 1

$$StockReturn = \beta_0 + \beta_1 DivPaid_{it} + \beta_2 Size_{it} + \beta_3 ROA_{it} + \beta_4 Leverage_{it} + \beta_5 CapExRatio + \alpha_i + \gamma_t + \epsilon_{it},$$

where i = firm and t = year

4.2.2 Regression 2

$$StockReturn = \beta_0 + \beta_1 DivPaid_{it} + \beta_2 DivIncrease_{it} + \beta_3 DivDecrease_{it} + \beta_4 Size_{it} + \beta_5 ROA_{it} + \beta_6 Leverage_{it} + \beta_7 CapExRatio_{it} + \alpha_i + \gamma_t + \epsilon_{it},$$

where i = firm and t = year

4.2.3 Regression 3

$StockReturn = \beta_0 + \beta_1 DivPaid_{it} + \beta_2 DivIncrease_{it} + \beta_3 Size_{it} + \beta_4 ROA_{it}$
$+ \beta_5 CapExRatio + \beta_6 Leverage_{it} + \alpha_i + \gamma_t + \epsilon_{it}$,

where i = firm and t = year

4.2.4 Regression 4

$StockReturn = \beta_0 + \beta_1 DivPaid_{it} + \beta_2 DivDecrease_{it} + \beta_3 Size_{it} + \beta_4 ROA_{it}$
$+ \beta_5 CapExRatio + \beta_6 Leverage_{it} + \alpha_i + \gamma_t + \epsilon_{it}$,

where i = firm and t = year

4.3 Robustness Test

4.3.1 Multicollinearity

Multicollinearity occurs when independent variables in the model are highly correlated with each other. It doesn't bias the coefficient estimates themselves, but it inflates their standard errors, making it harder to determine the individual statistical significance of the correlated predictors.

Variance Inflation Factor (VIF) is a measure used to detect the severity of multicollinearity in a regression analysis. Essentially, VIF quantifies how much the variance of an estimated regression coefficient is inflated because of its linear relationship with the other predictor variables in the model.

VIFs were calculated from an auxiliary OLS regression to assess multicollinearity. The VIF for the key independent variable DivPaid was 1,54, indicating that multicollinearity is not a significant concern for this variable (Appendix Table 4). However, the Size variable exhibited a high VIF of 34,11, suggesting its coefficient may be imprecisely estimated due to collinearity with other regressors. Several GICS industry code categorical variables also showed high VIFs, which is common when including a full set of categorical dummies that may correlate with other predictors like Size. Given that our primary models use firm fixed effects, which absorb time-invariant industry characteristics, the high VIFs for industry dummies in the OLS context are noted but the firm fixed effects address the underlying heterogeneity.

In our regression model 2, the VIFs were calculated for all independent variables. The VIFs for the dividend policy variables DivPaid, DivIncrease, and DivDecrease were 3,69; 2,80; and 1.90, respectively, all within acceptable ranges, suggesting multicollinearity is not a major concern for these key variables in this specification (Appendix Table 5). However, similar to the regression model 1, the Size variable exhibited a high VIF of 34,13. Also, several GICS industry code dummies also showed high VIFs.

4.3.2 Heteroscedasticity

Heteroscedasticity means that the variance of the error terms (ϵit) in the regression model is not constant across all the observations. In simpler terms, the spread or variability of the residuals around the regression line is different for different levels of our independent variables or for different observations/groups. Different firms in our panel are likely to have different underlying levels of volatility or be subject to idiosyncratic shocks of varying magnitudes. For example, larger firms might have more stable earnings (and thus smaller error variances when predicting returns) compared to smaller, more volatile firms.
To test the data for groupwise heteroskedasticity, we utilized the Wald test, as it is used to check if the variance of the error terms (residuals) is the same across all groups (e.g., across all firms in our dataset).

For our Regression Model 1, since the p-value is extremely small (0,0000), we reject the null hypothesis of homoscedasticity (Appendix Table 8). This provides strong evidence that groupwise heteroskedasticity is present in our Regression Model 1. This means the variance of the errors differs across the firms in our sample.
Similar to our Regression Model 1, the p-value is extremely small (0,0000) for Regression Model 2. (Appendix Table 9) Therefore, we reject the null hypothesis of homoscedasticity. This provides strong evidence that groupwise heteroscedasticity is also present in our Regression Model 2. This result for Model 2, like for Model 1, confirms that the assumption of constant error variances across firms is violated.
For Regression Model 3, given that the p-value is extremely small (0,0000), which is far below conventional significance levels, we would reject the null hypothesis of homoscedasticity, indicating that there is strong statistical evidence of groupwise heteroskedasticity in Regression Model 3. (Appendix Table 10) Just like the Model 1 and Model 2.

For Model 4, just like the previous models, the extremely small p-value (0,0000), which is well below any conventional significance level, means that we reject the null hypothesis of homoscedasticity. (Appendix Table 11) This means that just like the rest of the regression models, groupwise heteroskedasticity is present in our regression model.

4.3.3 Autocorrelation

Autocorrelation means that the error terms (ϵit) in the regression model are correlated with each other across observations. In panel data, this most commonly refers to serial correlation, where the error term for a specific firm in one time period is correlated with its own error terms in other time periods. For instance, if a firm had an unusually good (unexplained by our model) quarter, there's a higher chance the next quarter might also be somewhat better than average due to these lingering unobserved effects. This is a very common feature of economic and financial panel data.

To detect serial correlation we used the Wooldrigde test to specifically test for first-order autocorrelation (AR(1)), meaning it checks if the error term for a firm in one period is correlated with its error term in the immediately preceding period.

For Regression Model 1, the Wooldridge test for first-order autocorrelation (xtserial) was conducted. The test yielded an F-statistic of 1,732 with a p-value of 0,1910, providing no statistically significant evidence of first-order serial correlation in the residuals for this model. (Appendix Table 12)

For Regression Model 2, the Wooldridge test did not find statistically significant evidence of first-order serial correlation in the residuals (p-value = 0,2012). This suggests that, based on this specific test, AR(1) serial correlation is not a major concern for this particular model either. (Appendix Table 13)

In Model 3, since the p-value (0,1951) is greater than conventional significance levels, we fail to reject the null hypothesis of no first-order autocorrelation. This suggests that, based on this specific test, AR(1) serial correlation may not be a significant concern for this model. (Appendix Table 14)

Given that the p-value (0,2012) in Model 4 is also greater than the significance levels, we fail to reject the null hypothesis of no first-order autocorrelation.

Therefore, this test does not provide statistically significant evidence of first-order serial correlation in the idiosyncratic errors of our Regression Model 4. (Appendix Table 15)

To address potential heteroskedasticity and within-firm serial correlation of the error terms, which can lead to biased standard errors and incorrect statistical inference, all fixed-effects regression models were estimated using cluster-robust standard errors. Standard errors were clustered at the firm (ID) level using the vce(cluster ID) option in Stata. This approach provides standard errors that are robust to arbitrary forms of heteroscedasticity and intra-group (within-firm) correlation.

4.3 Event Study

Event-studies is a common practice amongst researchers in finance and econometrics. The practice is done to assess the impact of a given event and its influence on outcome. It is done by having focus on the behaviour of e.g. share prices and to test their stochastic behaviour and how it is affected by firm-specific events. In this thesis the event-study evaluates dividend announcements' impact on the Danish market. It is done so by examining stock and market return fluctuations.
MacKinlay in his study "Event Studies in Economics and Finance" describes event-studies as the opportunity for researchers to test the effects of an event on a firm's stock prices. Additionally, event-studies can also be used to evaluate the efficiency of the stock market as the stock market normally exhibits abnormal reactions before the given event date. (MacKinlay, 1997)

4.3.1 Event window

This thesis' event-study is based on the market model, which will divide the given timeline into three crucial points. The three points are: the estimation window, the event window and the post-event window. MacKinlay illustrated the window in figure 1
The given figure works in a way that the estimation window does not overlap with the event window, which otherwise if the estimation and event window did overlap, then the parameters such as alpha en beta get distorted. During the event window, then according to MacKinlay, it is important to not set the event window to a specific day but rather to a that is set in a period if possible. (MacKinlay, 1997)

4.3.2 Estimation Window

The given estimation window in regards to this thesis is from -250 to -30 relative to the given declaration date. What the estimation window does is in order to calculate the parameters of alpha and beta within the estimation window alongside the ordinary least square. It should be noted that the event window is not included in the estimation window. The estimation window is important in the considerations with the null hypothesis. (MacKinlay, 1997)

4.3.3 Event-study & market model

The thesis group uses abnormal returns in order to conduct the event study. In order to estimate the abnormal returns, are there several models that can be used. Most commonly are there two types of models: statistical and economic. The statistical model presupposes that values such as assets returns are jointly multivariate and independently distributed over time. This allows the estimation of normal returns through the constant mean returns model and the market model. As stated previously the thesis group ought to use the market model, and the way the market model works is by connecting the stock returns of the market portfolio. In this instance it is through the stock return of 150+ danish firms. The market model is special and according to empirical evidence one of the most popular models to model abnormal returns, due to having no explicit assumption about how equilibrium prices are established. When it comes to the economic model, then the model creates more constrained normal returns. The assumption when it comes to this model is that the behaviour of investors evolves over time. Under the category economic model, are there two types that go under it. The first is the Capital Asset Pricing Model, which will be referenced as the CAPM for the remainder of this thesis, and the Arbitrage Pricing Model, which will be referenced as the APT. (MacKinlay, 1997)
CAPM is a model which states that the expected returns usually depend on how sensitive it is relative to the broad market, whereas the APT is about how sensitive the expected return is relative to multiple systematic risk factors, and not just the market as the CAPM is.

As mentioned previously the thesis group ought to use the market model, which falls under the category of statistical model, which takes returns of specific firms stock in regards to the overall market portfolio. The market model is also a single-factor model, which assumes that stock prices are influenced by both market and firm specific factors. (MacKinlay, 1997). The formula given below is the first step in order to calculate abnormal returns through expected returns:

$$R_{i,t} = a_i + \beta_i R_{m,t} + \varepsilon_{i,t}$$

$$E(\varepsilon_{i,t} = 0) \qquad var(\varepsilon_{i,t}) = \sigma^2_{\varepsilon_i}$$

The formula should be read as the $R_{i,t}$ is the return on firm *i* for the given 24 year period, whereas $R_{m,t}$ is the return of the market portfolio on a given day *t* where the zero mean disturbance term is $\varepsilon_{i,t}$. a_i, β_i and $\sigma^2_{\varepsilon_i}$ are the parameters of the used market model.

The parameters in the regression has in our thesis been given the estimation window

$$t \epsilon \{-250, -249, \ldots, -30\}$$

Keeping at least 200 trading days in the thesis ensures a stable coefficient estimate, and excludes any return that might already reflect on the upcoming dividend. The given event window is

$$t \epsilon \{-1, 0, +1\}$$

This event window captures the immediate market reaction that the thesis group measures abnormal returns from one day before to one day after the declaration date.

For the thesis the omxc20 market returns is used as the index for the danish market returns. MacKinlay argues that the market model has potential improvements over the constant mean return model that he also introduced in his paper. By capturing ones event-study in the market model and its effect depends on the R^2 of the market model regression. MacKinlay says the higher the R^2 the greater is the variance reduction of abnormal returns, which will lead to larger the gain of the event-study. (MacKinlay, 1997)

4.3.4 Abnormal returns (AR)

When calculating the abnormal returns in regards of the market model, the measure can be found in the formula:

$$AR_{it} = R_{it} - \widehat{a}_i - \widehat{\beta}_i R_{mt}$$

Where the abnormal return is the disturbance term. The abnormal return will be jointly normally distributed with a zero conditional mean and conditional variance. The zero conditional mean guarantees that the model is not systematically predicting positive or negatives abnormal returns, whereas the conditional variance for each abnormal return on past events will be the estimated error variance otherwise known as $\sigma^2_{\varepsilon_i}$.

This results in the formula being changed due to having the market model as a benchmark resulting in the following formula:

$$\sigma^2(AR_{it}) = \sigma^2_{\varepsilon_i} + \frac{1}{L_1}\left[1 + \frac{(R_{mt} - \widehat{\mu_m})^2}{\widehat{\sigma^2_m}}\right]$$

Abnormal returns according to MacKinlay express properties of normal distribution due to the thesis' group null hypothesis stating that dividends declaration dates have no impact on a firm's stock prices. This notation will have the following formula (MacKinlay, 1997):

$$AR_{it} \sim N(0, \sigma^2(AR_{it}))$$

4.3.5 Cumulative Abnormal Returns (CAR)

The thesis group ought to use cumulative abnormal returns, as abnormal returns are only a general reaction of how the market reacts to a set event. Here is CAR better in order to deduce a meaningful conclusion, and is therefore necessary in order to accommodate a multiple event window. This is done for trying to accomodate uncertainty over the exact date of a given event.

Under the null hypothesis the distribution of cumulative abnormal returns will be given for the following formula:

$$CAR_i(t_1, t_2) \sim N(0, \sigma^2_i(t_1, t_2))$$

It should be noted that tests with merely one event observation are not considered useful and therefore should the abnormal returns aggregated for the event window and across observations.

The average abnormal returns are given by the formula:

$$\overline{AR}_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it}$$

Where the N events of the sample are aggregated returns during their period t.

If the event-study has a very large L_1, then the variance is

$$\overline{AR}_t = \frac{1}{N^2}\sum_{i=1}^{N} \sigma^2_{\varepsilon_i}$$

These estimates for any event period in the event-study can be analyzed. The same method can also be used for the CAR with the following formula

$$\overline{CAR}(t_1, t_2) = \sum_{t=t_1}^{t_2} \overline{AR}_t$$

Like for the abnormal returns there is also a formula if the event-study have a large L_1

$$var(\overline{CAR}(t_1, t_2)) = \sum_{t=t_1}^{t_2} var(\overline{AR}_t)$$

For observing a CAR's firm by firm and then aggregate through time can be noted as:

$$\overline{CAR}(t_1, t_2) = \sum_{t=t_1}^{t_2} CAR_i(t_1, t_2)$$

When the cumulative average abnormal return has been estimated, the researcher can test whether or not the result from CAR is significant by the notation (MacKinlay, 1997):

$$(\overline{CAR}((t_1, t_2)) = \sum_{t=t_1}^{t_2} var(\overline{AR}_t)$$

4.3.5 Event-study Data Description

The thesis group ought to investigate which reaction the Danish firms have on dividend announcements. The data in question spans from January 1st, 2000 to December 31st, 2024. The data that is being used in the analysis has been downloaded from FactSet and Nasdaq. A dividends announcement date is the declaration day, and within the event-study the dividend announcement date has been increased to three days, which is {-1,0,+1}.

The estimation window in the analysis is {-250, -30}, this has purposefully been done so there is a long stretch of pre-event data that does not "touch" the days immediately around the declaration date. This has been done to keep our estimates such as the alpha and beta "clean", i.e. abnormal moves would eventually get folded into our estimates. A second reason as to why this large event window has been chosen is to get a tight standard error on our alpha and beta. The estimation window gives the thesis group 220 trading days worth of return for each firm.

5. Descriptive Statistics and Results

This chapter aims to present results from the event study and regression model made and to draw results from them and how their reactions are to the market and stock prices of public listed firms in Denmark. Regarding the event study conducted this chapter presents that there do happen to respond to dividend announcements. The event study comes from a perspective of 1001 declaration dates from a list of 83 firm declaration days.

5.1 Descriptive Statistics

Table 16: Industry appearance

GICS Code	Given Number	Frequency	Percentage	Cummulative
Communication Services	1	452	5,85%	5,85
Consumer Discretionary	2	327	4,23%	10,08
Consumer Staples	3	580	7,51%	17,59
Energy	4	79	1,02%	18,61
Financials	5	494	6,39%	25
Healthcare	6	1587	20,54%	45,54
Industrials	7	2134	27,62%	73,16
Information Technology	8	983	12,72%	85,88
Materials	9	344	4,45%	90,33
Real Estate	10	668	8,65%	98,98
Utilities	11	79	1,02%	100
Total		7727	100%	

This table presents the 11 different GICS industries that are present in the dataset. The table shows what categorical value is related to which industry, and also how many observations are from each unique industry. The percentage column shows how much the observations from a single industry make up in the entire data.

5.2 Results of Regressions

Table 17: Regression Models Results

Regressions models	Reg 1	Reg 2	Reg 3	Reg 4
Stock Return				
Independent Variables				
Dividend Dummy	0,0002642**	0,0003815**	0,0001384*	0,0003226**
Dividend Increase		-0,000100	0,000169	
Dividend Decrease		-0,000319		-0,000255
ControlVariables				
Size	-0,0011***	0,0003374***	0,0003374***	-0,00111***
ROA	0,0055941***	0,0055744***	0,0011414***	0,0055805***
Leverage	-0,0011557**	0,0005442**	0,0005453**	-0,00115**
CapEx ratio	-0,002773	0,001851	0,001850	-0,002792

(*, **, *** significantly different from zero at 90%, 95% and 99% respectively)

All fixed-effects regression models were estimated using cluster-robust standard errors.

The table shows the coefficients of each of the variables within each of the four regression models. As shown in the table, not all of the four regression models include the same independent variables. However, all four include the same control variables. The significance level is marked with an asterisk, and is made so that (***) is significant at 1%, (**) is significant at 5% and (*) is significant at 10%.

5.2.1 Regression 1 Results

Regression Model 1 was specified to examine the association between a firm's dividend-paying status (DivPaid) and its quarterly stock returns (StockReturn), employing a fixed-effects approach. This model controlled for firm-specific time-invariant characteristics and common quarter-specific shocks through firm and quarter fixed effects, respectively. Industry fixed effects were also specified, and standard errors were clustered at the firm level (ID) to ensure robustness. The analysis was based on 4529 firm-quarter observations across 136 firms.

The primary variable of interest, DivPaid, exhibits a positive coefficient of +0,000256, which is statistically significant at the 5% level (p-value = 0,044). This suggests that, after accounting for other factors, Danish firms paying dividends are associated with approximately 0,026% higher quarterly stock returns compared to non-paying firms. The reliability of this finding is considered in light of several diagnostic and robustness checks.

Firstly, a Variance Inflation Factor (VIF) test for multicollinearity indicated a VIF of 1.54 for DivPaid in a comparable OLS specification, suggesting that multicollinearity is not a significant concern for this specific key variable in that diagnostic setup. Secondly, while a Modified Wald test indicated the presence of groupwise heteroskedasticity in this model ($p < 0.001$), the use of cluster-robust standard errors (vce(cluster ID)) in this regression appropriately addresses this issue, providing more reliable statistical inferences. Furthermore, a Wooldridge test (xtserial) for first-order autocorrelation on a similar specification did not find significant evidence of serial correlation ($p = 0{,}191$), though the clustered standard errors also account for general within-group error correlation.
Regarding the control variables in the primary specification of Model 1, Size (log of total assets) shows a coefficient of -0.0015994 ($p < 0{,}001$), indicating that larger firms are associated with lower quarterly returns. However, it's worth noting that the VIF for Size in the auxiliary OLS regression was high (34,11), suggesting its coefficient may be imprecisely estimated due to multicollinearity, likely with the set of fixed effects and other controls. ROA (profitability) has a significant positive coefficient of +0,0067081 ($p < 0{,}001$), aligning with expectations that more profitable firms yield higher returns. Leverage is negatively associated with returns (coefficient -0,0010562, $p = 0{,}003$). The CapEx ratio did not show a statistically significant relationship with stock returns in this model (coefficient -0,003056, $p = 0{,}197$). The model's R-squared is 0,2360.

5.2.2 Regression 2 Results

Regression Model 2 expands on the initial analysis by examining the distinct associations of being a dividend payer (DivPaid), increasing dividends (DivIncrease), and decreasing dividends (DivDecrease) with quarterly stock returns (StockReturn). This fixed-effects model controls for firm-specific and quarter-specific effects, specifies industry fixed effects, and employs robust standard errors clustered by firm (ID). The estimation is also based on 4529 firm-quarter observations from 136 firms.
The DivPaid variable, representing firms paying a constant dividend relative to their last actual payment or initiating a dividend (compared to non-payers), has a coefficient of +0,0003611. This result is marginally statistically significant at the 10% level (p-value = 0,057). This suggests a modest positive association with quarterly stock returns of approximately 0,036% for this category of dividend payers. The robustness of this specific coefficient is considered in light of its Variance Inflation Factor (VIF) of 3,69 (from the VIF

test for Model 2), which is within acceptable limits and alleviates concerns about severe multicollinearity for DivPaid in this particular specification.

The coefficient for DivIncrease, which captures the additional effect of a dividend increase relative to paying a constant or initiated dividend, is -0,0000903. This is not statistically significant (p-value = 0,685). Thus, this model does not find evidence that increasing a dividend has a statistically significant additional impact on quarterly returns beyond the baseline effect associated with DivPaid. (Table 17) The VIF for DivIncrease in this model was 2,80, indicating low multicollinearity.

Similarly, the DivDecrease variable, representing the additional effect of a dividend decrease, has a coefficient of -0,000283 and is also not statistically significant (p-value = 0,233). This suggests that, within this quarterly regression framework, decreasing a dividend does not have a statistically distinguishable additional effect on returns compared to paying a constant or initiated dividend. The VIF for DivDecrease was low at 1,90.

The control variables in Regression Model 2 exhibit results consistent with those in Model 1. Size has a coefficient of -0,0015945 (p < 0,001). ROA (profitability) remains positively and significantly associated with returns (coefficient +0,0066904, p < 0,001). Leverage shows a significant negative coefficient of -0,001055 (p = 0,003). The CapEx ratio remains statistically insignificant (coefficient -0,0030676, p = 0,195). (Table 17)

Diagnostic tests for this model specification provide further context. The Modified Wald test for groupwise heteroskedasticity indicated its presence (p < 0.001), while the Wooldridge test for first-order autocorrelation did not find significant serial correlation (p = 0.201). The use of cluster-robust standard errors effectively addresses the heteroskedasticity and potential within-group correlations. Just like in Model 1, the winsorizing of the dependent variable (StockReturn) also contributes to the stability of the estimates against outliers. Again like Model 1, the specified industry fixed effects were largely absorbed by the firm-specific fixed effects, as is typical for time-invariant industry classifications in such models. The R-squared for Regression Model 2 is 0,2361.

5.2.3 Regression 3 Results

This fixed-effects model examines the impact of DivPaid and DivIncrease on StockReturn, controlling for Size, ROA, leverage, CapEx_ratio, industry fixed effects, and quarter fixed

effects, with standard errors clustered by ID. The analysis used 4529 observations from 136 firms.
The coefficient for DivPaid is +0,0002413, with a p-value of 0.097. This suggests that paying a dividend that is not an increase (i.e., constant, decrease, or initiation) is associated with approximately 0,024% higher quarterly stock returns compared to non-payers, and this effect is statistically significant at the 10% level. (Table 17)
The coefficient for DivIncrease is +0.000033, with a p-value of 0.847. This indicates that the additional effect of a dividend increase, when compared to paying a dividend that was not an increase, is not statistically significant.
Control variables Size -0,0015987 (p=0,000), ROA +0,0067088 (p=0,000), and leverage -0,0010549 (p=0,003) are statistically significant. CapEx ratio is not significant (p=0,196). (Table 17) Industry codes were omitted due to collinearity with firm fixed effects. The model's R-squared is 0,2360. Diagnostic tests were performed to assess key assumptions. The Modified Wald test for groupwise heteroskedasticity yielded a Chi-squared statistic of 237,21 with a p-value of 0,0000, indicating the presence of heteroskedasticity. Subsequently, the Wooldridge test for first-order autocorrelation in panel data resulted in an F-statistic of 1,638 with a p-value of 0,2035, providing no statistically significant evidence of serial correlation. Given the detected heteroskedasticity, the use of cluster-robust standard errors at the firm level in Regression Model 3 is justified to ensure valid statistical inference.

5.2.4 Regression 4 Results

This fixed-effects model assesses the impact of DivPaid and DivDecrease on StockReturn, while controlling for Size, ROA, leverage, CapEx ratio, GICS industry codes, and quarter fixed effects. Standard errors are clustered by firm (ID). The analysis is based on 4,529 firm-quarter observations from 136 firms.
In this model, the DivPaid variable has a positive coefficient of +0,0003076. This effect is statistically significant at the 5% level (p-value = 0,024), suggesting that firms in this category are associated with approximately 0,031% higher quarterly stock returns compared to firms that paid no dividend.
The DivDecrease variable, which captures the additional effect if a dividend payment was specifically a decrease compared to paying a non-decreasing dividend, shows a coefficient of -0,0002252. This coefficient is not statistically significant (p-value = 0,201). Therefore, this model does not find statistically reliable evidence that specifically decreasing a dividend has

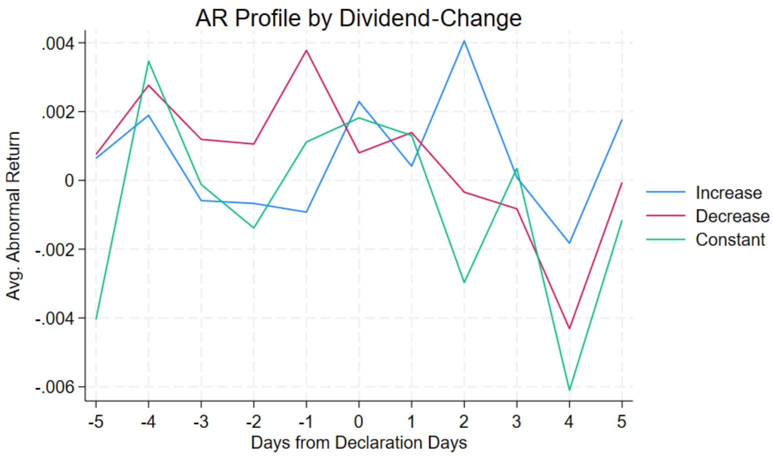
an additional impact on quarterly returns relative to the baseline effect of DivPaid in this specification.

The control variables Size -0,0015939 (p=0,000), ROA +0,0066955 (p=0,000), and leverage -0,0010524 (p=0,003) are statistically significant. CapEx_ratio is not statistically significant (p=0,195). The model's R-squared is 0,2361. For Regression Model 4, Diagnostic tests were conducted to evaluate underlying model assumptions. The Modified Wald test for groupwise heteroskedasticity resulted in a Chi-squared statistic of 236,43 with a p-value of 0,0000, indicating the presence of heteroskedasticity in the model. To assess serial correlation, the Wooldridge test for first-order autocorrelation was performed, yielding an F-statistic of 1,711 and a p-value of 0,1937, which suggests no statistically significant evidence of first-order serial correlation in the residuals. Given the confirmed heteroskedasticity, the application of cluster-robust standard errors at the firm level in Regression Model 4 is appropriate to ensure valid statistical inference.

5.3 Results of Event Study

This chapter is introduced to present the following results from the event study. This chapter presents the daily average abnormal returns (AAR), and whether they do or do not respond to dividend announcements. Coincidentally the cumulative abnormal return (CAAR) is also highlighted in the results in order to examine the aggregated effects of the abnormal returns. With the AAR and CAAR a ΘAAR and ΘCAAR is also introduced. These show their related t-statistics for the event days.

Graph 1: AR Profile by Dividend Change



The shown graph plots the AR profile for each dividend change there is. The x-axis shows the declaration day window, which in this case is {-5, +5}, with the y-axis showing the average abnormal return. The graph shows how the stock returns, on average, move for each dividend announcement type.

5.3.1 Dividend increases

Table 18: AAR, CAAR, and t-Statistics for Dividend Increases

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% conf. Interval]	
CAR	1001	0,0029	0,001555	0,049197	-0,00014	0,005959
mean =	mean(CAR)				t =	1,8698
H0: mean	0					

Event	AAR	ΘAAR	CAAR	ΘCAAR	N
-10	-0,0004	-0,4090	0,0045	1,8070	323
-9	0,0023	**2,515****	0,0020	0,8180	399
-8	-0,0004	-0,3950	0,0009	0,3980	490
-7	0,0008	0,8810	0,0018	0,8910	542
-6	-0,0001	-0,0830	0,0011	0,4470	375
-5	0,0006	0,4880	0,0006	0,2370	259
-4	0,0019	1,7030	0,0003	0,1420	301
-3	-0,0006	-0,5160	0,0047	1,9170	327
-2	-0,0007	-0,7920	0,0018	0,7250	400
-1	-0,0009	-0,6200	0,0008	0,3820	506
0	0,0023	**1,981***	0,0017	0,8880	559
1	0,0004	0,3810	0,0021	0,8500	387
2	0,0041	**2,416****	0,0011	0,3830	262
3	0,0001	0,0650	0,0016	0,7790	308
4	-0,0018	-1,7000	0,0047	1,9170	329
5	0,0018	**2,011***	0,0018	0,7390	402
6	0,0004	0,4910	0,0010	0,4850	489
7	0,0008	0,9670	0,0025	1,2300	527
8	-0,0002	-0,2240	0,0033	1,2780	370
9	-0,0010	-0,7210	0,0005	0,1830	255
10	-0,0020	-1,3010	0,0005	0,2350	289

(, **, *** significantly different from zero at 90%, 95% and 99% respectively)*

The thesis group can conclude that the key finding in regards to dividend increase announcement from the event study is that the mean CAR is about +0,29%, with a one-tailed p-value of 0.03. This means that on average, investors in the Danish stock market reward firms that raise their dividends.

Most of the reaction in regards to dividend increases happens of course on day 0, with an AAR of +0,23% with a t-value of 1,98. This is statistically significant. On the event-days after the event day, specifically on event day +2 has an AAR of +0,41% and a t-value of 2,42, which is also significant. Also on event day +5 is there a statistically significant event day with an AAR of +0,18% and a t-value of 2,01. Although on event day 5 is smaller but still significant. The other event days hover close around the zero marks, and are mostly insignificant.

It is observed that the CAAR rises roughly between 0,45 and 0,50% in the first week of the given event, but there is no sustained drift after that. It should be noted that already by event day +10 the CAAR is back to a 0,05%.

This supports the signaling theory as Danish investors treat a higher dividend as good news about future cash-flows, albeit that the signal in this instance is rather mild.
It can also be observed that the market reacts fastest to the news, as the value effect is mostly embedded within two event days.
Overall it can be concluded that the dividend increase announcement in Denmark is appearing to generate a statistically reliable, but small, bump in the light of increases.

5.3.2 Dividend decreases

Table 19: AAR, CAAR, and t-Statistics for Dividend Decreases

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% conf. Interval]	
CAR	1001	0,0029	0,001555	0,491968	-0,00014	0,005959
mean =	mean(CAR)				t =	1,8698
H0: mean	0					

Event	AAR	ΘAAR	CAAR	ΘCAAR	N
-10	-0,0006	-0,2190	0,0050	0,9350	116
-9	-0,0018	-0,9790	0,0043	0,8760	138
-8	-0,0009	-0,5060	0,0047	1,0390	171
-7	0,0010	0,6660	0,0068	1,6750	185
-6	-0,0017	-0,8610	0,0083	1,5870	135
-5	0,0007	0,3430	0,0074	1,2140	87
-4	0,0028	1,0780	0,0071	1,4270	93
-3	0,0012	0,5920	0,0076	1,5610	115
-2	0,0011	0,4860	0,0046	0,9370	139
-1	0,0038	1,8690	0,0046	1,0510	178
0	0,0008	0,3590	0,0052	1,2910	197
1	0,0014	0,4330	0,0053	0,9770	141
2	-0,0003	-0,1530	0,0088	1,4950	81
3	-0,0008	-0,3840	0,0073	1,6070	97
4	-0,0043	-1,5980	0,0066	1,2430	116
5	-0,0001	-0,0240	0,0047	0,9540	138
6	-0,0001	-0,0970	0,0040	0,8900	168
7	0,0002	0,1520	0,0056	1,3250	184
8	-0,0001	-0,0930	0,0067	1,2270	137
9	0,0019	0,8060	0,0085	1,3930	86
10	0,0009	0,3570	0,0038	0,9590	93

(, **, *** significantly different from zero at 90%, 95% and 99% respectively)*

When it comes to decreases in dividends announcements, the thesis group can conclude that there is no evidence of the expected negative reaction. The mean CAR is, actually, +0,29%, which means that it is not significant at 5%. In other words it can be said that statistically the thesis group can't deduct that the Danish firms are penalized for cutting dividends.
Otherwise the event day -1 AAR is +0,38% with a t-value of 1,87, which is just under the 5% significance. On event day 0, there is a small 0,08%, with a t-value of 0,36, which means on

the event day itself, there is no fresh shock. This could be due to traders already anticipating the cut, so the price moved beforehand.
On the post-announcement part of the event study, the AAR is from event day +1 through +10, are there small and alternate signs, none of them are statistically significant. The CAAR only has a top of about 0,9% by event day +3, and then slips back to about 0,4% by event day +10. This is an indication that the market does not keep re-pricing after the first couple of days compared to the dividend increase table.
On events days -10 to -2, the abnormal return is roughly around zero and just as the post event window is not significant.

A reason as to why there may be small positive CAR when there are dividend cuts, my be due to the fact that the market views cut as good news, as they can mean internal reinvestments, leverage reduction, which means that the danish market may in fact weigh flexibility over signalling when there are dividend cuts.
How the dividend cuts differ from dividend increase is that although the magnitudes are similar, the timing is different. Increases get rewarded right on the news, decreases see a small upside arrive the day before.

5.3.3 Dividend constants

Table 20: AAR, CAAR, and t-Statistics for Dividend Constants

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% conf. Interval]	
CAR	1001	0,0029	0,001555	0,491968	-0,00014	0,005959
mean =	mean(CAR)			t =		1,8698
H0: mean	0					

Event	AAR	ΘAAR	CAAR	ΘCAAR	N
-10	0,0042	**2,042***	0,0055	1,1190	130
-9	0,0006	0,2800	0,0020	0,6340	160
-8	-0,0031	-1,9080	0,0016	0,5570	210
-7	0,0016	1,2650	0,0039	1,1950	238
-6	-0,0018	-0,9910	0,0033	0,7660	172
-5	-0,0040	**-2,1060***	0,0052	0,9680	121
-4	0,0035	1,4710	0,0056	1,1590	130
-3	-0,0001	-0,0570	0,0060	1,2470	132
-2	-0,0014	-0,7290	0,0016	0,4940	162
-1	0,0011	0,6530	0,0017	0,5900	217
0	0,0018	0,8990	0,0037	1,1770	245
1	0,0013	0,5670	0,0040	0,9370	175
2	-0,0030	-1,7570	0,0066	1,3420	130
3	0,0004	0,2970	0,0023	0,7850	137
4	-0,0061	-1,9560	0,0028	0,8050	127
5	-0,0012	-0,9750	0,0030	0,9510	164
6	0,0000	0,0170	0,0024	0,8320	208
7	-0,0004	-0,3280	0,0015	0,5550	232
8	-0,0005	-0,3410	0,0037	0,8520	172
9	-0,0007	-0,3010	0,0051	0,9760	125
10	-0,0032	-1,6210	0,0049	1,0350	230

(, **, *** significantly different from zero at 90%, 95% and 99% respectively)*

Looking at the table for constant dividends it can be concluded that there are no economically or statistically meaningful market reactions. Maintaining the dividend does not move Danish stock prices in a material way. The tiny 0.29% CAR is only slightly significant. The only significant AAR is on event day -10, which is likely noise or clustering of many events on certain calendar days, and the actual declaration day, event day 0, is virtually zero when it comes to abnormal return.

The CAAR is flat and never exceeds a 1,96 threshold after the event window opens, and there is no post-announcement drift.

The thesis group interprets this due to no real information has been given, and unlike increases or cuts, keeping dividends unchanged sends no signal about future cash flows. The only effect is minuscule. The only changes in payout (both increases and decreases) trigger a meaningful stock-price response, which reaffirms with our literature.

Table 21: Event Horizons Windows

Window	Increase CAR	Obs	Increase T	Decrease CAR	Obs	Decrease T	Constant CAR	Obs	Constant T
[-1,1]	0,0037	245	1,1773428	0,0052	197	1,2907055	0,0017	559	0,88820931
[-3,3]	0,0014	245	0,39068632	0,0061	197	1,3905574	0,0029	559	1,2916792
[-5,5]	-0,0027	245	-0,64896847	0,0052	197	1,0087813	0,0044	559	1,7374909
[0,1]	0,0027	245	0,9633645	0,0018	197	0,51423274	0,0026	559	1,8190878

Presented in the table above is the CAAR for different event horizons.

In terms of the dividend increase window, it can be concluded that the point estimate range from +0,14% on horizon [-3, +3] down to -0,27% in horizon [-5, +5], but it should be noted that the t-stats are well below 2 in every window, which is an indication that there are no reliable price reaction once the focus are on a narrow or medium sized window. The same goes for the dividend decrease CAAR, where all are uniformly positive, ranging from +0,18% to +0,61%, but just as the dividend increase horizon, no t-stats are able to pass 2, and in specifically in the case of dividend increase, not even exceeding 1,4. Constant dividends did not show anything significant in the initial analysis, and the same goes for the event horizon, with only small CAR's running from +0,17% to about +0,44% with t-stats hovering under the 1,8% range.

What this highlights to the thesis group is that the window length matters, where the original window, being [-10, +10], gave a significant effect, but shorter event windows do not replicate this given effect, meaning that the news that could be seen sometimes in the event windows +-10 trading days, tend to disappear as the event window "zooms" into the core announcement period.

6. Discussion

6.1 Main Purpose of the Study

This thesis set out to investigate the complex relationship between corporate dividend policy and stock price movements within the specific context of firms listed on the Nasdaq Copenhagen. Understanding this dynamic is crucial, as dividend decisions carry significant implications for shareholder value, investor perception, and overall market efficiency. The Danish market, with its unique regulatory and institutional features, presents an interesting setting to examine the applicability of established financial theories and to potentially uncover context-specific nuances that may differ from larger, more frequently studied markets.

The primary objective was to empirically analyze the impact of dividend policy on the stock prices of these Danish companies. This involved exploring several key facets: firstly, to determine if a statistically significant relationship exists between aspects of dividend policy, such as the act of paying dividends or changes in dividend payouts, and stock returns; and secondly, to examine the stock market's immediate reaction to dividend announcements, particularly comparing the impact of dividend increases versus decreases. Ultimately, the study aimed to provide evidence-based insights into the role and valuation consequences of dividend policy in Denmark, contributing to both academic discourse and practical considerations for corporate managers and investors operating within this Nordic market. The central research question guiding this endeavor was: "To what extent do dividend announcements by Danish listed firms function as credible signals of future earnings, and how does it impact the stock prices?".

6.2 Key Findings Compared to Litterature

The key to the event study was to explore the market reactions when dividend announcements among Danish listed firms, whereafter the thesis group sought to assess whether dividend increases, decreases or constants would yield a statistically significant price response.

Amongst dividend increases the thesis group could reveal that dividend increases do in fact have a modest statistical significance with a positive abnormal returns with a CAR of +0,29% and a p-value of 0,03 within the {-1,1} window. Other notable windows with a significant abnormal returns were also on event day 0 with a CAR of +0,23% and a t-value of 1,98 an event day +2 with a CAR of +0,41% and a t-value of 2,42 and lastly on event day +5 with a CAR of +0,18% and a t-value being 2,01. These findings align with the literature review in regards to signaling theory, which postist that dividend increases do in fact carry some amount of information about firms' future earnings as stated by both Bhattacharya and Litner. It also aligns with Brav et al. (2005), who stated that managers generally increase dividends only when future earnings are to be expected.

When it comes to dividend decreases, the study found that it does not follow a traditional signaling theory, as the dividend decreases in regards to the Danish market did not have a significant negative reaction. On event window {-1,1} it had an statistically indication of an insignificant mean of CAR on around +0,29% and only a slight positive abnormal return of +0,38% and a t-value of 1,87, which were found on the day prior to the announcement day, with no shock on the announcement day itself.
This result is a stark contrast to the signaling theory, which has an assumption that dividend cuts do typically entail future financial troubles or an indication of poor future earnings. The thesis group do argue that the reason as to why investors might not have a strong reaction to dividend cuts may be due to firms proving that they are flexible and rigid in their dividend policies. This aligns with both Brav, Denis and Aosobov, who highlighted that markets tend to have trust in boards who have caution and flexibility when there is a capital allocation.

In terms of constant dividends, the thesis group reveals that resulted in a rather retaining effect in terms of dividends which didn't yield any economical or statistically significant market reaction, with little to no abnormal returns on declaration dates. According to the hypothesis about efficient markets, this indicates that investors typically expect the already unchanged dividends and therefore do not not have any information to adjust their positions in the market.

While the event study presented in the preceding sections illuminated the immediate market reactions to dividend announcements, this section delves into the relationship between various dividend policy stances and average quarterly stock returns for Danish listed firms. To achieve this, fixed-effects panel regression models were employed as detailed in Chapter 4 and presented in Section 5.2. These models allow for an examination of the association between different dividend policy states (such as being a dividend payer) or changes in dividend payments and firms' stock performance over a quarterly horizon, crucially controlling for observable firm-specific characteristics and unobserved time-invariant firm heterogeneity as well as common time-specific shocks. The following discussion will interpret the key findings from these regression analyses, compare them with existing literature, and consider their implications.

One of the central inquiries of this thesis concerned whether dividend-paying firms in Denmark outperform their non-dividend-paying counterparts in terms of stock returns. To address this, Regression Model 1, as detailed in Section 5.2.1, utilized a fixed-effects specification to analyze the association between a firm's status as a dividend payer (DivPaid) and its quarterly stock returns, while controlling for firm size, ROA, leverage, CapEx ratio, as well as unobserved firm and time effects.

The fixed-effects regression analysis (Model 1) indicated that firms paying dividends (DivPaid) were associated with quarterly stock returns that were approximately 0,026% higher (coefficient +0,0002560) than non-paying firms, a finding reported as statistically significant at the 5% level (p-value = 0,044). This suggests that, on average during a quarter, a modest positive premium is associated with being a dividend-paying firm in the Danish market, after accounting for other factors included in the model. The model's within R-squared was 0,2360, and industry fixed effects were noted as being largely absorbed by the firm-specific fixed effects.

This primary finding from Regression Model 1 directly challenges the foundational Modigliani-Miller (1961) dividend irrelevance proposition, which, under ideal market conditions, posits no relationship between a firm's dividend policy and its value or stock returns. The statistically significant positive coefficient for DivPaid implies that dividend policy, particularly the act of distributing dividends, is not perceived as irrelevant by the Danish market, suggesting a deviation from perfect market assumptions. This aligns with a significant body of empirical literature, as reviewed in Section 2.3.2, which often finds dividend policy to be relevant due to real-world factors such as information asymmetries and investor preferences.

The observed positive association between DivPaid and stock returns could lend support to several theories of dividend relevance. For instance, it is consistent with the Bird-in-the-Hand theory, which suggests that investors may value the relative certainty of current dividend income over uncertain future capital gains, thereby potentially increasing demand and returns for dividend-paying stocks. Similarly, this finding may reflect clientele effects, where certain investor groups with a preference for dividend income are drawn to such stocks. While this study does not directly test for these specific mechanisms, the observed premium is consistent with their potential influence.

The empirical evidence regarding a systematic outperformance of dividend-paying stocks is varied across international markets. The finding of a modest positive premium for Danish dividend-paying firms contributes a specific insight from the Nordic region. It suggests that, within the Danish market context and during the sample period, the act of paying a dividend is, on average, positively valued by investors. The robustness of this particular finding, considering diagnostic checks for multicollinearity (VIF tests discussed in Section 4.3.1), heteroskedasticity (Section 4.3.2), and autocorrelation (Section 4.3.3), along with the use of cluster-robust standard errors and winsorizing of the dependent variable (as detailed in Chapter 3 and 4), supports the reliability of the inferences drawn.

Beyond the general status of being a dividend payer, this research also investigated how specific changes in dividend distributions—namely increases and decreases—are associated with average quarterly stock returns. This was primarily explored through Regression Model 2 (as detailed in Section 5.2.2), which simultaneously considered DivPaid, DivIncrease, and DivDecrease. This model found that while DivPaid (representing constant or initiated dividends relative to non-payers) retained a marginally significant positive association with returns (coefficient +0,0003611, p-value = 0,057), the additional coefficients for DivIncrease (-0,0000903, p-value = 0.685) and DivDecrease (-0.000283, p-value = 0,233) were not statistically significant. Similar non-significance for the incremental effect of DivIncrease (coefficient +0,000033, p-value = 0,847) was observed in Model 3 (Section 5.2.3), and for DivDecrease (coefficient -0,0002252, p-value = 0,201) in Model 4 (Section 5.2.4), when these change dummies were modeled with DivPaid but without their counterpart change dummy.

The general non-significance of DivIncrease and DivDecrease as additional factors influencing average quarterly returns in these regression models presents an interesting contrast to the event study findings (Section 5.3), where dividend increase announcements, for example, did elicit a statistically significant, albeit small, positive short-term market reaction. Several reasons could explain why these dividend changes might not show a significant additional effect on average quarterly returns in the regression framework. Firstly, the immediate informational impact of a dividend change, captured by the event study around the announcement, may be efficiently incorporated into prices very quickly. Consequently, this short-term announcement effect might not persist strongly enough throughout the entire subsequent quarter to result in a significantly different average quarterly return for firms that changed their dividends compared to those that paid a constant or initiated dividend (which forms the baseline for the DivPaid coefficient in Model 2). The aggregation of returns to a quarterly frequency could naturally average out these more immediate, short-lived announcement effects.

In relation to Signaling Theory (Section 2.2.4), the event study finding of a positive reaction to dividend increase announcements offers some support for the idea that such announcements can act as positive signals in the Danish market, conveying favorable information which the market reacts to. The lack of a significant additional effect for DivIncrease in the quarterly regression (Model 2) does not necessarily nullify this short-term signaling interpretation; rather, it may suggest that this specific signal's impact on sustained average returns over the entire quarter, beyond the general effect of being a consistent or initiating payer, is not strongly discernible within this longer-term panel regression model.

Regarding dividend decreases, the event study (Section 5.3.2) revealed a nuanced outcome for the Danish market, specifically "no evidence of the expected negative reaction," with the discussion suggesting investors might weigh firm flexibility or reinvestment opportunities more heavily. The non-significant coefficient for DivDecrease in Regression Model 2 (and Model 4) aligns with this event study finding. If the market does not consistently penalize dividend decreases in the short term around the announcement, it is plausible that this lack of a strong negative signal (or even a neutral/mixed one) would also result in no significant negative additional impact on average stock returns over the subsequent quarter when compared to firms paying constant or initiated dividends. This indicates a degree of consistency between the short-term market interpretation of dividend decrease announcements and their lack of a distinct adverse association with average returns over the following quarter in this Danish sample, as analyzed through the regression models.

The regression models also accounted for standard firm-specific control variables, and their effects were largely consistent across the different specifications and generally aligned with expectations from financial literature.

Firm Size, consistently demonstrated a negative and highly statistically significant relationship with quarterly stock returns. This finding is in line with the "size effect" documented in some financial studies, where smaller firms have historically, at times, shown higher returns than larger firms, though the persistence and reasons for this anomaly are subjects of ongoing debate.

ROA, serving as a proxy for firm profitability, exhibited a strong, positive, and highly statistically significant association with stock returns in all models. This result is intuitively consistent with financial theory and broad empirical evidence, which suggests that more profitable companies are generally valued more highly by the market and tend to yield better stock performance.

Firm leverage consistently showed a negative and statistically significant coefficient. This finding aligns with financial literature that associates higher leverage with increased financial risk, potential distress costs, or agency costs, which can negatively impact stock returns or increase the required rate of return.

Finally, the CapEx ratio typically presented a negative coefficient, but this relationship was consistently found to be not statistically significant across the models. The literature on the relationship between capital expenditures and stock returns is somewhat mixed; while CapEx can signal growth opportunities, it also represents cash outflows that might not immediately translate into higher returns, or could be viewed as risky.

6.3 Practical implications

The results from the fixed-effects regression analyses offer several practical implications for corporate managers of Danish listed firms and for investors.

For corporate managers it highlights the value of maintaining a dividend-paying status. On average over a quarter, there appears to be a modest positive association between the act of paying a dividend (whether constant, initiated, or even when considered as a general state encompassing changes) and stock returns in the Danish market, after controlling for various firm characteristics and fixed effects. For managers, this could imply that maintaining a status as a dividend-paying firm is generally viewed favorably by the market or is characteristic of firms that tend to generate slightly higher returns over a quarterly horizon. While the economic magnitude of this effect is small, it points towards a potential benefit or positive attribute associated with the distribution of dividends.

For investors, the idea is practically the same as the managers, just from the opposite side of the table. Given that the results suggest that Danish dividend-paying firms, on average, may offer a slight return premium over a quarterly period compared to non-payers, after accounting for other factors, investors might be more inclined to invest in said company.

investors might interpret the act of paying a dividend as a positive characteristic, potentially reflecting financial health, commitment to shareholder returns, which could be factored into their valuation or investment screening processes.

6.4 Limitations of the study

The financial data was sourced from FactSet, and as noted in Section 3.1, due to the sample size, not all data points could be manually cross-verified against annual reports. While a sample check was performed, the potential for data errors in large databases remains a general limitation. The interpretation of zero values from FactSet as missing values could also have implications if these zeros represented actual economic values rather than missing data for certain variables. The number of observations for specific sub-samples within the event study, particularly for dividend decreases, while substantial, might still be smaller than for increases or constant dividends. The robustness of the somewhat unconventional finding of no significant negative market reaction to dividend cuts might be further explored with larger samples of such events if available.

By its nature, the event study captures short-term market reactions around the declaration date. It does not necessarily reflect the long-term valuation implications of a sustained dividend policy or how such policies affect firm value over extended horizons. The planned regression analysis aims to address longer-term associations, but the event study itself is limited to immediate impacts.

This study focuses exclusively on firms listed on Nasdaq Copenhagen. While this provides valuable specific insights into the Danish market, the findings may not be directly generalizable to firms in other countries with different institutional environments, corporate governance structures, tax systems, or investor clientele.

7. Conclusion

This master's thesis embarked on an empirical investigation into the multifaceted impact of corporate dividend policy on the stock prices of Danish firms listed on the Nasdaq Copenhagen, as well as Danish firms listed on other stock exchanges in the Nordics and the US. The primary objective was to provide clear, evidence-based insights into this relationship within the specific context of the Danish market, an area that, while part of the developed Nordic financial landscape, has distinct characteristics warranting focused study. The research aimed to bridge an existing gap in the literature concerning the empirical effects of dividend policy choices for Danish listed firms.
To achieve this, the study was guided by a central research question: "To what extent do dividend announcements by Danish listed firms function as credible signals of future earnings, and how does it impact the stock prices?". This overarching inquiry was further supported by specific sub-questions examining whether the Danish stock market reacts differently to dividend increases versus decreases, and whether dividend-paying firms in Denmark exhibit different stock return performance compared to their non-dividend-paying counterparts. The following sections will summarize the principal findings derived from the empirical analyses and their implications.

The empirical investigation into the Danish stock market's reaction to dividend policy announcements yielded several noteworthy findings. The event study analysis demonstrated that, overall, stock prices in Denmark do react to dividend announcements, providing evidence against the hypotheses of market indifference (H1 and H2). This suggests that dividend announcements are perceived as significant informational events by Danish investors. Specifically, for dividend increases (H3), the event study revealed a statistically reliable, albeit modest, positive market reaction. Firms announcing an increase in their dividends experienced a mean Cumulative Abnormal Return (CAR) of approximately +0,29% over the {-1,+1} event window, suggesting that Danish investors generally interpret such news favorably, consistent with a mild positive signal about future cash flows (Section 5.3.1). In contrast, and perhaps most notably, the reaction to dividend decreases (H4) did not align with the traditionally expected strong negative response. The analysis found no statistically significant evidence that the Danish market penalizes firms for cutting dividends; in fact, the mean CAR for decreases was a non-significant +0,29% (Section 5.3.2). This nuanced finding suggests that Danish investors might weigh factors such as enhanced firm

flexibility for reinvestment or leverage reduction more heavily than the negative signal typically associated with dividend cuts in other markets.
Furthermore, the study found that constant dividend announcements—representing no change in dividend per share—did not elicit any economically or statistically meaningful market reactions (Section 5.3.3). The observed CAR was very small (+0,29%, p-value = 0,07) and not considered indicative of a substantive market revaluation. This aligns with the Efficient Market Hypothesis and Signaling Theory, where an absence of new information, as conveyed by a constant dividend, should not trigger significant abnormal returns beyond any mechanical adjustments.

Regarding the association between ongoing dividend policies and quarterly stock returns, the fixed-effects regression analyses (Section 5.2) provided further insights. Regression Model 1, which directly examined the impact of being a dividend-paying firm (DivPaid), indicated a positive and statistically significant association with quarterly stock returns; specifically, dividend-paying firms were associated with returns approximately 0,026% higher than non-paying firms. This finding suggests that, on average and after controlling for various factors, the status of being a dividend payer is positively valued in the Danish market over a quarterly horizon, lending support to hypothesis $H5_a$.
When the models were expanded to explore the additional impact of specific dividend changes (Regression Models 2, 3, and 4), the results were nuanced. While the general effect of DivPaid (representing constant or initiated dividends in Model 2, or the baseline payer status in Models 3 and 4) often remained marginally positive and sometimes significant, the coefficients for the DivIncrease and DivDecrease dummy variables were consistently not statistically significant across these specifications.
For instance, in the full model (Regression Model 2), neither DivIncrease nor DivDecrease showed a significant additional effect on quarterly returns beyond the baseline DivPaid effect. This suggests that while the act of being a dividend payer has a discernible positive association with quarterly returns, the specific events of increasing or decreasing a dividend from its previously paid level do not appear to translate into a statistically significant additional sustained impact on average quarterly returns within this regression framework.

The empirical findings of this thesis carry several noteworthy implications for both financial theory and practice within the Danish market. Theoretically, the results consistently challenge the strict interpretation of the Modigliani-Miller dividend irrelevance proposition in Denmark, as evidence from both the event study (Section 5.3) and regression analyses (Section 5.2) indicates that dividend announcements and policies are associated with stock price movements and returns. Signaling theory receives nuanced support; while dividend increase announcements appear to convey modestly positive information in the short term, the Danish market's atypical, non-negative reaction to dividend decrease announcements suggests a unique investor interpretation, possibly prioritizing firm flexibility. Furthermore, the lack of significant additional impact from dividend changes on average quarterly returns in the regression models implies that while announcements are noted, their distinct effect beyond the status of being a payer might be short-lived or averaged out over longer periods. The efficient market hypothesis is also supported by the lack of reaction to constant dividend announcements.

From a practical standpoint, the findings offer valuable insights for corporate managers and investors in Denmark. For managers, the modest positive association found between dividend-paying status and quarterly stock returns in the regression analysis may suggest some market appreciation for firms distributing dividends. The nuanced market reaction to dividend decreases could imply greater managerial flexibility in adjusting payouts without necessarily incurring severe stock price penalties, though short-term announcement effects still warrant careful communication. For investors, the results highlight that while dividend announcements, particularly increases, can provide short-term trading signals, the sustained quarterly return implications appear more closely tied to a firm's ongoing status as a dividend payer rather than discrete changes.

This thesis contributes to the broader understanding of corporate finance by providing focused, contemporary empirical evidence on the impact of dividend policy on stock prices within the Danish listed market, a context that often receives less attention than larger global markets. By employing both event study methodology to capture immediate market reactions and fixed-effects regression analysis to assess associations with quarterly returns, the study offers a nuanced perspective on how Danish investors perceive and value dividend announcements and policies. The findings highlight that while established financial theories provide a foundational framework, their applicability and the resultant market dynamics can exhibit context-specific variations, as evidenced particularly by the Danish market's atypical reaction to dividend decrease announcements. Ultimately, this research underscores the continued relevance of dividend policy as a significant corporate decision and reiterates the importance of considering local market characteristics when analyzing its impact on shareholder value.

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9. Appendix

9.1 Tables

Table 1: Variable definitions

Variable	Symbol in Model	Description
Dependent Variable		
Stock Return	StockReturn	Quarterly logarithmic stock return for firm i in quarter t.
Independent Variables		
Dividend Dummy	DivPaid	Equal to 1 if firm i paid any cash dividend per share (DPS) greater than zero in quarter t; 0 otherwise.
Dividend Increase	DivIncrease	Equal to 1 if DPSit>0 AND DPSit is strictly greater than prev_paid_dividendit; 0 otherwise.
Dividend Decrease	DivDecrease	Equal to 1 if DPSit>0 AND DPSit is strictly less than prev_paid_dividendit; 0 otherwise.
Control Variables		
Size	Size	Natural logarithm of total assets for firm i at the end of quarter t.
ROA	ROA	Return on Assets. Net Income of firm i for the fiscal year corresponding to quarter t, divided by its total assets at the end of quarter t.
Leverage	Leverage	Total Debt of firm i at the end of quarter t, divided by its total assets at the end of quarter t.
Capex Ratio	CapEx_ratio	Capital Expenditures of firm i for the fiscal year corresponding to quarter t, divided by its total assets at the end of quarter t.
Fixed Effect Variables (Categorical)		
GICS Code	GICS_Code	Numeric code representing the GICS industry classification for firm i.
Quarter	qdate	Quarterly time identifier.
Firm Identifier	ID	Unique identifier for each firm.

Table 2: Correlation Matrix between all variables in the regression

	Stock Return	Dividend dummy	Dividend Increase	Dividend Decrease	Size	ROA	Leverage	CapEx Ratio
Stock Return	**1,0000**							
Dividend dummy	0,0466	**1,0000**						
Dividend Increase	0,0468	0,6636	**1,0000**					
Dividend Decrease	-0,0081	0,4308	-0,0539	**1,0000**				
Size	0,1204	0,2102	0,1798	0,1076	**1,0000**			
ROA	0,1916	0,1497	0,1010	0,0527	0,3589	**1,0000**		
Leverage	-0,0639	-0,0742	-0,0738	-0,0224	-0,0371	-0,0937	**1,0000**	
CapEx Ratio	-0,8480	0,0273	0,0193	-0,0078	-0,1539	-0,0546	0,0146	**1,0000**

Table 3: Summary statistics table

Variable	N	Mean	p50	SD	Min	Max	p25	p75
Stock Return	7286	0,000	0,000	0,003	-0,012	0,010	-0,002	0,002
Dividend Dummy	7727	0,130	0,000	0,336	0,000	1,000	0,000	0,000
Dividend Increase	7727	0,059	0,000	0,236	0,000	1,000	0,000	0,000
Dividend Decrease	7727	0,026	0,000	0,160	0,000	1,000	0,000	0,000
Size	7297	6,261	6,333	1,046	1,708	8,830	5,534	7,036
ROA	7211	-0,013	0,008	0,169	-8,914	3,057	-0,009	0,022
Leverage	6297	0,259	0,225	0,198	0,001	0,890	0,097	0,383
CapEx Ratio	5526	0,019	0,011	0,038	0,000	0,951	0,004	0,022

Table 4: VIF Regression Model 1

Variable	VIF	1/VIF
Divided Paid	1,54	0,64759
Size	34,11	0,029314
ROA	2,06	0,484806
Leverage	3,25	0,307394
CapEx Ratio	1,38	0,722443
GICS Code		
2	15,34	0,065196
3	36,06	0,027729
4	2,82	0,355144
5	22,52	0,04441
6	60,53	0,01652
7	134,33	0,007444
8	152,06	0,006576
9	13,3	0,075213
10	33,43	0,029914
11	3,81	0,262633

Table 5: VIF Regression Model 2

Variable	VIF	1/VIF
Dividend Paid	3,69	0,271096
Dividend Increase	2,8	0,357068
Dividend Decrease	1,9	0,527269
Size	34,13	0,029297
ROA	2,06	0,484402
Leverage	3,26	0,30698
CapEx Ratio	1,38	0,72221
GICS Code		
2	15,46	0,064684
3	36,35	0,027513
4	2,85	0,351195
5	22,66	0,044123
6	61,39	0,016289
7	136,74	0,007313
8	152,32	0,006565
9	13,3	0,075166
10	33,58	0,029782
11	3,84	0,260713

Table 6: VIF Regression Model 3

Variable	VIF	1/VIF
Dividend Paid	2,3	0,434856
Dividend Increase	2,02	0,495128
Size	34,12	0,029308
ROA	2,06	0,484775
Leverage	3,26	0,30698
CapEx Ratio	1,38	0,72224
GICS Code		
2	15,37	0,065041
3	36,27	0,027573
4	2,83	0,353644
5	22,56	0,044321
6	60,97	0,016401
7	136,4	0,007331
8	152,16	0,006572
9	13,3	0,075191
10	33,5	0,029848
11	3,83	0,261117

Table 7: VIF Regression Model 4

Variable	VIF	1/VIF
Dividend Paid	1,84	0,544105
Dividend Decrease	1,37	0,731138
Size	34,13	0,029297
ROA	2,06	0,484624
Leverage	3,25	0,307286
CapEx Ratio	1,38	0,722294
GICS Code		
2	15,36	0,065105
3	36,06	0,027729
4	2,82	0,354667
5	22,54	0,04436
6	60,57	0,016509
7	134,4	0,00744
8	152,09	0,006575
9	13,3	0,07521
10	33,44	0,029908
11	3,81	0,262622

Table 8: Wald test Regression Model 1

H0: sigma(i)^2 = sigma^2 for all i
chi2 (136) = 235,55
Prob > chi2 = 0,0000

Table 9: Wald test Regression Model 2

H0: sigma(i)^2 = sigma^2 for all i
chi2 (136) = 237,37
Prob > chi2 = 0,0000

Table 10: Wald test Regression Model 3

H0: sigma(i)^2 = sigma^2 for all i
chi2 (136) = 235,47
Prob > chi2 = 0,0000

Table 11: Wald test Regression Model 4

H0: sigma(i)^2 = sigma^2 for all i
chi2 (136) = 236,81
Prob > chi2 = 0,0000

Table 12: Wooldridge test Regression Model 1

Woolridge test for autocorrelation in panel data
H0: no first order autocorrelation
F(1,103) = 1,732
Prob > F = 0,1910

Table 13: Wooldridge test Regression Model 2

Woolridge test for autocorrelation in panel data
H0: no first order autocorrelation
F(1,103) = 1,655
Prob > F = 0,2012

Table 14: Wooldridge test Regression Model 3

Woolridge test for autocorrelation in panel data
H0: no first order autocorrelation
F(1,103) = 1,701
Prob > F = 0,1951

Table 15: Wooldridge test Regression Model 4

Woolridge test for autocorrelation in panel data
H0: no first order autocorrelation
F(1,103) = 1,655
Prob > F = 0,2012

Table 16: Industry appearance

GICS Code	Given Number	Frequency	Percentage	Cummulative
Communication Services	1	452	5,85%	5,85
Consumer Discretionary	2	327	4,23%	10,08
Consumer Staples	3	580	7,51%	17,59
Energy	4	79	1,02%	18,61
Financials	5	494	6,39%	25
Healthcare	6	1587	20,54%	45,54
Industrials	7	2134	27,62%	73,16
Information Technology	8	983	12,72%	85,88
Materials	9	344	4,45%	90,33
Real Estate	10	668	8,65%	98,98
Utilities	11	79	1,02%	100
Total		7727	100%	

Table 17: Regression Models Results

Regressions models	Reg 1	Reg 2	Reg 3	Reg 4
Stock Return				
Independent Variables				
Dividend Dummy	0,0002642**	0,0003815**	0,0001384*	0,0003226**
Dividend Increase		-0,000100	0,000169	
Dividend Decrease		-0,000319		-0,000255
ControlVariables				
Size	-0,0011***	0,0003374***	0,0003374***	-0,00111***
ROA	0,0055941***	0,0055744***	0,0011414***	0,0055805***
Leverage	-0,0011557**	0,0005442**	0,0005453**	-0,00115**
CapEx ratio	-0,002773	0,001851	0,001850	-0,002792

(*, **, *** significantly different from zero at 90%, 95% and 99% respectively)

Table 18: AAR, CAAR, and t-Statistics for Dividend Increases

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% conf. Interval]	
CAR	1001	0,0029	0,001555	0,049197	-0,00014	0,005959

mean =	mean(CAR)	t =	1,8698
H0: mean	0		

Event	AAR	ΘAAR	CAAR	ΘCAAR	N
-10	-0,0004	-0,4090	0,0045	1,8070	323
-9	0,0023	**2,515****	0,0020	0,8180	399
-8	-0,0004	-0,3950	0,0009	0,3980	490
-7	0,0008	0,8810	0,0018	0,8910	542
-6	-0,0001	-0,0830	0,0011	0,4470	375
-5	0,0006	0,4880	0,0006	0,2370	259
-4	0,0019	1,7030	0,0003	0,1420	301
-3	-0,0006	-0,5160	0,0047	1,9170	327
-2	-0,0007	-0,7920	0,0018	0,7250	400
-1	-0,0009	-0,6200	0,0008	0,3820	506
0	0,0023	**1,981***	0,0017	0,8880	559
1	0,0004	0,3810	0,0021	0,8500	387
2	0,0041	**2,416****	0,0011	0,3830	262
3	0,0001	0,0650	0,0016	0,7790	308
4	-0,0018	-1,7000	0,0047	1,9170	329
5	0,0018	**2,011***	0,0018	0,7390	402
6	0,0004	0,4910	0,0010	0,4850	489
7	0,0008	0,9670	0,0025	1,2300	527
8	-0,0002	-0,2240	0,0033	1,2780	370
9	-0,0010	-0,7210	0,0005	0,1830	255
10	-0,0020	-1,3010	0,0005	0,2350	289

(, **, *** significantly different from zero at 90%, 95% and 99% respectively)*

Table 19: AAR, CAAR, and t-Statistics for Dividend Decreases

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% conf. Interval]	
CAR	1001	0,0029	0,001555	0,491968	-0,00014	0,005959

mean =	mean(CAR)	t =	1,8698
H0: mean	0		

Event	AAR	ΘAAR	CAAR	ΘCAAR	N
-10	-0,0006	-0,2190	0,0050	0,9350	116
-9	-0,0018	-0,9790	0,0043	0,8760	138
-8	-0,0009	-0,5060	0,0047	1,0390	171
-7	0,0010	0,6660	0,0068	1,6750	185
-6	-0,0017	-0,8610	0,0083	1,5870	135
-5	0,0007	0,3430	0,0074	1,2140	87
-4	0,0028	1,0780	0,0071	1,4270	93
-3	0,0012	0,5920	0,0076	1,5610	115
-2	0,0011	0,4860	0,0046	0,9370	139
-1	0,0038	1,8690	0,0046	1,0510	178
0	0,0008	0,3590	0,0052	1,2910	197
1	0,0014	0,4330	0,0053	0,9770	141
2	-0,0003	-0,1530	0,0088	1,4950	81
3	-0,0008	-0,3840	0,0073	1,6070	97
4	-0,0043	-1,5980	0,0066	1,2430	116
5	-0,0001	-0,0240	0,0047	0,9540	138
6	-0,0001	-0,0970	0,0040	0,8900	168
7	0,0002	0,1520	0,0056	1,3250	184
8	-0,0001	-0,0930	0,0067	1,2270	137
9	0,0019	0,8060	0,0085	1,3930	86
10	0,0009	0,3570	0,0038	0,9590	93

(, **, *** significantly different from zero at 90%, 95% and 99% respectively)*

Table 20: AAR, CAAR, and t-Statistics for Dividend Constants

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% conf. Interval]	
CAR	1001	0,0029	0,001555	0,491968	-0,00014	0,005959

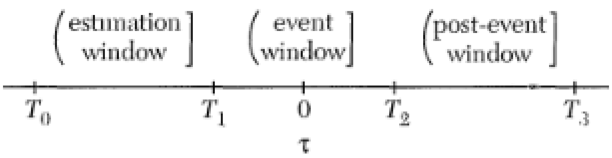
mean =	mean(CAR)	t =	1,8698
H0: mean	0		

Event	AAR	ΘAAR	CAAR	ΘCAAR	N
-10	0,0042	**2,042***	0,0055	1,1190	130
-9	0,0006	0,2800	0,0020	0,6340	160
-8	-0,0031	-1,9080	0,0016	0,5570	210
-7	0,0016	1,2650	0,0039	1,1950	238
-6	-0,0018	-0,9910	0,0033	0,7660	172
-5	-0,0040	**-2,1060***	0,0052	0,9680	121
-4	0,0035	1,4710	0,0056	1,1590	130
-3	-0,0001	-0,0570	0,0060	1,2470	132
-2	-0,0014	-0,7290	0,0016	0,4940	162
-1	0,0011	0,6530	0,0017	0,5900	217
0	0,0018	0,8990	0,0037	1,1770	245
1	0,0013	0,5670	0,0040	0,9370	175
2	-0,0030	-1,7570	0,0066	1,3420	130
3	0,0004	0,2970	0,0023	0,7850	137
4	-0,0061	-1,9560	0,0028	0,8050	127
5	-0,0012	-0,9750	0,0030	0,9510	164
6	0,0000	0,0170	0,0024	0,8320	208
7	-0,0004	-0,3280	0,0015	0,5550	232
8	-0,0005	-0,3410	0,0037	0,8520	172
9	-0,0007	-0,3010	0,0051	0,9760	125
10	-0,0032	-1,6210	0,0049	1,0350	230

(, **, *** significantly different from zero at 90%, 95% and 99% respectively)*

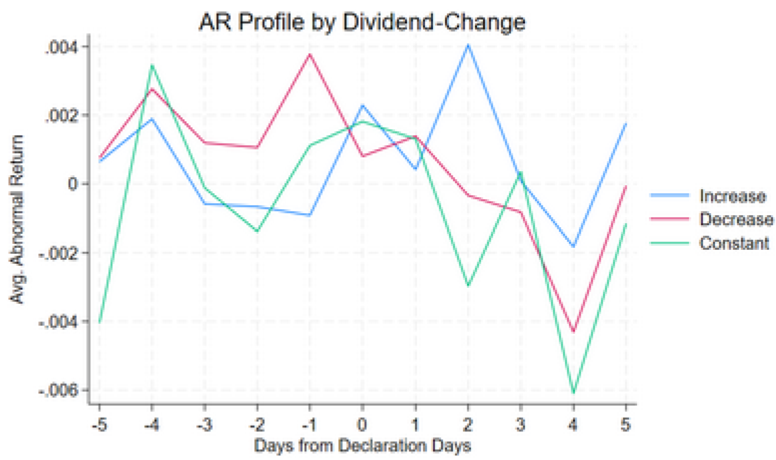
9.2 Figures

Figure 1



9.3 Graphs

Graph 1: AR Profile by Dividend Change



9.4 Coding in Stata

9.4.1 Regression Code

```
// Importing the Excel file
import excel "ThesisData.xlsx", sheet("Data") firstrow clear

// Creating panel identifiers
gen qdate = yq(YearDate, QuarterDate)
format qdate %tq

// Format to panel
xtset ID qdate

//////////////////////////// CONTROL VARIABLES ///////////////////////////////

// Creating Control variables
gen double Size = (ln_assets)
gen double ROA = NetIncome/Total_Assets
gen double leverage = Total_Debt / Total_Assets
gen double CapEx_ratio = abs(CapEx) / Total_Assets

// WINSORISE the log stock returns
gen double StockReturn = (ln_return)
```

```
ssc install winsor2, replace
winsor2 StockReturn, cuts(1 99) replace

// WINSORISE the leverage
winsor2 leverage, cuts(1 99) replace

//////////////////////////////////// LABELS ////////////////////////////////////

// Labeling the different GICS industries
label define gics_label 1 "Communication Services" 2 "Consumer Discretionary" 3
"Consumer Staples" ///
                  4 "Energy" 5 "Financials" 6 "Healthcare" ///
                  7 "Industrials" 8 "Information Technology" 9 "Materials" ///
                  10 "Real Estate" 11 "Utilities" //

label values GICS_Code gics_label // Apply these labels to our GICS_Code variable

//////////////////// Key Independent Variable: DivPaid /////////////////////////

// This dummy is 1 if the firm paid dividends in that quarter, 0 otherwise.
gen byte DivPaid = (DPS > 0 & DPS != .)

// Ensure missings on DPS don't make DivPaid missing if DPS is 0
replace DivPaid = 0 if DivPaid == . & DPS !=.

////////////////////////// CREATING HELPING VARIABLES ////////////////////////////

// Ensure data is sorted by firm identifier (ID) and time (qdate)
sort ID qdate

// Create a helper variable that only contains the DPS value if a dividend was actually paid
(DPS > 0)
gen dps_if_actually_paid = DPS if DPS > 0 & DPS != .
```

```
// Create a variable that carries forward the last known *actual positive* DPS value.
gen last_known_positive_dps = dps_if_actually_paid
by ID (qdate): replace last_known_positive_dps = last_known_positive_dps[_n-1] if
missing(last_known_positive_dps) & _n > 1

// Loop to repeat the last_known_positive_dps variable to account for missing quarters
forvalues i = 1/20 {
    by ID (qdate): replace last_known_positive_dps = last_known_positive_dps[_n-1] if
missing(last_known_positive_dps) & _n > 1
}

// Create the 'prev_paid_dividend' variable.
by ID (qdate): gen prev_paid_dividend = L.last_known_positive_dps

////////////////// DIVIDEND INCREASE AND DECREASE DUMMYS //////////////////////
// Creating the DivIncrease dummy variable
gen DivIncrease = 0 // Initialize to 0 (no increase)

// Dividend increase restrictions:
//   a) A dividend is paid in the current quarter (DPS > 0)
//   b) There was a previously paid dividend to compare against (prev_paid_dividend is not
missing)
//   c) The current DPS is strictly greater than that previous paid dividend
replace DivIncrease = 1 if DPS > 0 & DPS != . & ///
                        !missing(prev_paid_dividend) & ///
                        DPS > prev_paid_dividend

// Creating the DivDecrease dummy variable
gen DivDecrease = 0 // Initialize to 0 (no decrease)

// Dividend decrease restrictions:
// a) A dividend is paid in the current quarter (DPS > 0 and not missing)
// b) There was a previously paid dividend to compare against (prev_paid_dividend is not
missing)
```

```
// c) The current DPS is strictly less than that previous paid dividend
replace DivDecrease = 1 if DPS > 0 & DPS != . & ///
                        !missing(prev_paid_dividend) & ///
                        DPS < prev_paid_dividend

//////////////////////// DESCRIPTIVE STATISTICS /////////////////////////////

// Summary Statistics Table
tabstat StockReturn DivPaid DivIncrease DivDecrease Size ROA leverage CapEx_ratio, ///
statistics(n mean median sd min max p25 p75) columns(statistics) format(%9.3f)

// Correlation matrix with all independent variables as well as control variables
correlate StockReturn DivPaid DivIncrease DivDecrease Size ROA leverage CapEx_ratio


// Distribution of observations between industries
tab GICS_Code

////////////////////////// ROBUSTNESS TEST ///////////////////////////////////

// For VIF, run an OLS equivalent with firm and quarter dummies
reg StockReturn DivPaid Size ROA leverage CapEx_ratio i.GICS_Code i.qdate i.ID
vif
// DivPaid VIF 1,54

reg StockReturn DivPaid DivIncrease DivDecrease Size ROA leverage CapEx_ratio
i.GICS_Code i.qdate i.ID
vif
// DivPaid VIF 3,69
// DivIncrease VIF 2,80
// DivDecrease VIF 1,90

reg StockReturn DivPaid DivIncrease Size ROA leverage CapEx_ratio i.GICS_Code i.qdate
i.ID
```

```
vif
// DivPaid VIF 2,30
// DivIncrease VIF 2,02

reg StockReturn DivPaid DivDecrease Size ROA leverage CapEx_ratio i.GICS_Code i.qdate
i.ID
vif
// DivPaid VIF 1,84
// DivIncrease VIF 1,37

// Specific Heteroscedasticity test xttest3
ssc install xttest3

// Testing for Heteroscedasticity in fixed effects via Wald test in model 1
xtreg StockReturn DivPaid Size ROA leverage CapEx_ratio i.GICS_Code i.qdate, fe
xttest3

// Testing for Heteroscedasticity in fixed effects via Wald test in model 2
xtreg StockReturn DivPaid DivIncrease DivDecrease Size ROA leverage CapEx_ratio
i.GICS_Code i.qdate, fe
xttest3

// Testing for Heteroscedasticity in fixed effects via Wald test in model 3
xtreg StockReturn DivPaid DivIncrease Size ROA leverage CapEx_ratio i.GICS_Code
i.qdate, fe
xttest3

// Testing for Heteroscedasticity in fixed effects via Wald test in model 4
xtreg StockReturn DivPaid DivDecrease Size ROA leverage CapEx_ratio i.GICS_Code
i.qdate, fe
xttest3

// Specific Autocorrelation test xtserial
ssc install xtserial
```

// Testing for Autocorrelation in fixed effects via Wooldrigde test in model 1
xtreg StockReturn DivPaid Size ROA leverage CapEx_ratio i.GICS_Code i.qdate, fe
xtserial StockReturn DivPaid Size ROA leverage CapEx_ratio

// Testing for Autocorrelation in fixed effects via Wooldrigde test in model 2
xtreg StockReturn DivPaid DivIncrease DivDecrease Size ROA leverage CapEx_ratio i.GICS_Code i.qdate, fe
xtserial StockReturn DivPaid DivIncrease DivDecrease Size ROA leverage CapEx_ratio

// Testing for Autocorrelation in fixed effects via Wooldrigde test in model 3
xtreg StockReturn DivPaid DivIncrease Size ROA leverage CapEx_ratio i.GICS_Code i.qdate, fe
xtserial StockReturn DivPaid DivIncrease Size ROA leverage CapEx_ratio

// Testing for Autocorrelation in fixed effects via Wooldrigde test in model 4
xtreg StockReturn DivPaid DivDecrease Size ROA leverage CapEx_ratio i.GICS_Code i.qdate, fe
xtserial StockReturn DivPaid DivDecrease Size ROA leverage CapEx_ratio

////////////////////////////// REGRESSIONS ///////////////////////////////////

// Regression 1 examining whether or not dividend-paying companies outperform non-dividend-paying companies
xtreg StockReturn DivPaid Size ROA leverage CapEx_ratio i.GICS_Code i.qdate, fe vce(cluster ID) esttab

// Regression 2 focusing on all our dummy variables and control variables
xtreg StockReturn DivPaid DivIncrease DivDecrease Size ROA leverage CapEx_ratio i.GICS_Code i.qdate, fe vce(cluster ID)

// Regression 3 focusing on dividend increase relative to baseline (paying a dividend)
xtreg StockReturn DivPaid DivIncrease Size ROA leverage CapEx_ratio i.GICS_Code i.qdate, fe vce(cluster ID)

```
// Regression 4 focusing on dividend decrease relative to baseline (paying a dividend)
xtreg StockReturn DivPaid DivDecrease Size ROA leverage CapEx_ratio i.GICS_Code
i.qdate, fe vce(cluster ID)
```

9.4.2 Event study code

```
* 0. Setup
cd "C:\Users\Rasmus\Desktop\Speciale"
clear all
set more off

* 1. Import
import excel using "EventStudy3.xlsx", sheet("EventStudy4") firstrow clear case(lower)

* Rename xdate → exdate
capture confirm variable declarationday
if !_rc rename declarationday decdate

* Convert dates
capture confirm numeric variable date
if _rc  gen double date   = daily(trim(date),   "YMD")
format date %td

* Convert event‑day exdate
capture confirm numeric variable decdate
if _rc  gen double decdate = daily(trim(exdate), "DMY")
format decdate %td
describe

* 2. Save out the three building‑blocks

* 2a. returns.dta
preserve
```

```
    keep id date ln_ret ln_mktret
    save "returns.dta", replace
restore

* 2b. factors.dta
preserve
    keep date ln_mktret
    duplicates drop
    save "factors.dta", replace
restore

* 2c. events.dta
preserve
    keep id decdate dividend
    keep if !missing(dividend)

    * Check duplicates
    duplicates report id decdate

    * drop duplicates
    duplicates drop id decdate, force

    * compute DPS increase, decrease, constant
    sort id decdate
    by id: gen double prev_div = dividend[_n-1]
    gen double change   = dividend - prev_div
    gen str8 div_change = cond(change>0, "increase", ///
                     cond(change<0, "decrease", "constant"))
    drop prev_div change

    save "events.dta", replace
restore

* 3. Build empty event_panel skeleton
```

```
use "returns.dta", clear
keep id date ln_ret ln_mktret
keep if _n==0              // zero obs, keep vars
gen double decdate    = .    // placeholder
gen str8   div_change = ""  // placeholder
save "event_panel.dta", replace

* 4. Create window append ±250/+30 windows
use "events.dta", clear
levelsof id, local(firms)

foreach f of local firms {
    preserve
        keep if id==`f'
        levelsof decdate, local(edates)
    restore

    foreach d of local edates {
        use "returns.dta", clear
        keep if id==`f' & inrange(date, `d'-250, `d'+30)
        gen double decdate = `d'
        merge m:1 id decdate using "events.dta", ///
            keepusing(div_change) nogenerate
        append using "event_panel.dta"
        save   "event_panel.dta", replace
    }
}

* 5. Load the completed panel and compute evt_time
use "event_panel.dta", clear
gen long evt_time = date - decdate

* 6. Estimate market‑model α,β on [–250,–30]
preserve
```

```
    keep id decdate ln_ret ln_mktret evt_time
    keep if inrange(evt_time, -250, -30)
    statsby alpha=_b[_cons] beta=_b[ln_mktret], ///
        by(id decdate) saving("firm_params.dta", replace): ///
        regress ln_ret ln_mktret
restore

* Merge back and compute AR & CAR
merge m:1 id decdate using "firm_params.dta", nogenerate
gen double exp_ret = alpha + beta*ln_mktret
gen double abret   = ln_ret   - exp_ret
gen byte   in_evt  = inrange(evt_time, -1, 1)
bys id decdate: egen CAR = total(abret * in_evt)

* === NEW: overwrite event_panel.dta so it now contains evt_time, abret & CAR ===
save "event_panel.dta", replace

* 7. Test mean(CAR) = 0
use "event_panel.dta", clear
bys id decdate: keep if _n==1
keep id decdate div_change CAR
ttest CAR == 0

* 8. Plot AR profiles by dividend‑change
use "event_panel.dta", clear
preserve
    keep evt_time div_change abret
    keep if inrange(evt_time, -5, 5)
    collapse (mean) mAR=abret, by(evt_time div_change)

    twoway ///
      (line mAR evt_time if div_change=="increase") ///
      (line mAR evt_time if div_change=="decrease") ///
      (line mAR evt_time if div_change=="constant"), ///
```

```
    xlabel(-5(1)5) ///
    xtitle("Days from Declaration Days") ///
    ytitle("Avg. Abnormal Return") ///
    legend(order(1 "Increase" 2 "Decrease" 3 "Constant")) ///
    title("AR Profile by Dividend‑Change")
restore

* 10. CATEGORY‑BY‑CATEGORY AAR/CAAR & T‑TESTS
local cats "increase decrease constant"

foreach cat of local cats {
  di as txt _newline "=============================================="
  di as txt "Results for div_change == `cat'" _newline

  // 10.1 t‑test on CAR
  use "event_panel.dta", clear
  sort id decdate
  by id decdate: keep if _n==1
  ttest CAR == 0

  // 10.2 Build AAR/CAAR table for t = -10..+10
  use "event_panel.dta", clear
  keep if div_change=="`cat'"
  keep if inrange(evt_time, -10, 10)
  keep id evt_time abret CAR

  // cross‑sectional moments at each t
  collapse ///
    (mean)  AAR=abret    (sd) sdAR=abret    ///
    (mean)  CAARm=CAR    (sd) sdCAAR=CAR    ///
    (count) N=id, by(evt_time)

  // standard errors & t‑stats
  gen seAAR     = sdAR   / sqrt(N)
```

```
    gen thetaAAR  = AAR    / seAAR
    gen seCAAR    = sdCAAR / sqrt(N)
    gen thetaCAAR = CAARm  / seCAAR

    format AAR CAARm %8.4f
    format thetaAAR thetaCAAR %8.3f
    format N %6.0f

    list evt_time AAR thetaAAR CAARm thetaCAAR N, clean noobs
}


*======================================================================
=
* 11–12: Generate robustness CARs & build comparison table in one go
*======================================================================
=

* 11.0  Load our fully prepared event_panel (abret, evt_time, CAR etc.)
use "event_panel.dta", clear

* 11.1  Define the windows (baseline + three alternatives)
local w0s  -1   -3    0   -5
local w1s   1    3    1    5

* 11.2  Generate CAR variables for each alt window
quietly forvalues i = 1/4 {
    local w0 = word("`w0s'", `i')
    local w1 = word("`w1s'", `i')

    * skip the baseline (we already have CAR for -1,1)
    if `w0' == -1 & `w1' == 1 continue

    * build a legal suffix
```

```
   local suffix = strtoname("`w0'_`w1'")
   local carvar  = "CAR`suffix'"

   * flag & sum up abret inside that window
   quietly gen byte  in_evt`suffix' = inrange(evt_time, `w0', `w1')
   quietly gen double _tmp`suffix'   = abret * in_evt`suffix'
   by id decdate: egen `carvar'      = total(_tmp`suffix')
   quietly drop _tmp`suffix'
}

* one obs per event
bys id decdate: keep if _n==1

*========================================================================
=
* 12.  Build the 4×9 summary table
*========================================================================
=

tempfile tall
save "`tall'", emptyok replace      // start a blank .dta stack

* loop over the four windows
forvalues i = 1/4 {
   local w0 = word("`w0s'", `i')
   local w1 = word("`w1s'", `i')

   * pick the correct CAR var
   if `w0'== -1 & `w1'== 1 {
      local carvar = "CAR"
   }
   else {
      local suffix = strtoname("`w0'_`w1'")
      local carvar = "CAR`suffix'"
```

```
    }

    preserve
        * get mean, sd, N by dividend-change
        collapse  ///
          (mean)  meanCAR = `carvar'   ///
          (sd)    sdCAR   = `carvar'   ///
          (count) N       = `carvar', by(div_change)

        gen double tstat  = meanCAR / (sdCAR / sqrt(N))
        gen str12  window = "[`w0',`w1']"

        * keep only the table vars
        keep window div_change meanCAR tstat N

        append using "`tall'", force
        save   "`tall'", replace
    restore
}

* now reshape into wide form
use "`tall'", clear
duplicates drop window div_change, force

capture drop dcat
encode div_change, gen(dcat)        // 1=Increase 2=Decrease 3=Constant

keep window dcat meanCAR tstat N

reshape wide meanCAR tstat N, i(window) j(dcat)

format meanCAR* %9.4f   tstat* %8.2f   N* %8.0fc
list, sep(0)
```