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Underrepresentation without underperformance?

Female CEOs firm performance during crises in the Nordic context

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Abstract

This thesis examines whether Nordic listed firms led by female CEOs differ in performance compared to male-led firms, with a particular focus on crisis periods. The analysis covers the period 2020-2025, focusing on the COVID-19 crisis and the 2025 Liberation Day tariff shock. The initial sample consists of all publicly listed firms on the Nordic stock markets, a total of 1,500 firms. Firm performance is evaluated using both accounting-based and market-based measures. Return on Assets (ROA) is analysed using pooled Ordinary Least Squares (OLS) regressions, while Buy-and-Hold Abnormal Returns (BHAR) are evaluated through cross-sectional regressions combined with Propensity Score Matching (PSM). ROA provides mixed findings regarding the relationship between CEO gender and firm performance, while BHAR yields more consistently positive estimates for female-led firms during crisis periods, particularly after matching. However, these effects remain statistically insignificant. Overall, the findings indicate no clear systematic differences in performance between female- and male-led firms, suggesting that the substantial underrepresentation of female CEOs in Nordic listed firms is unlikely to be motivated by performance differences.

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1. Introduction

1.1 Background

The Nordic region is widely regarded as an attractive environment for business development and public listing, characterised by well-developed capital markets and strong track record of firm growth and performance. Despite its relatively small population, the region has produced globally influential firms reflecting an efficient allocation of resources and a dynamic business environment. However, one area where this efficiency appears less evident is in corporate leadership, where only around 10% of publicly listed firms are led by female CEOs (Authors data collection, 2026). At the same time, the Nordic countries are often seen as leaders in gender equality globally. This makes the low representation of women in top executive positions particularly striking.

This raises the question of what drives the observed gender gap in corporate leadership, and whether differences in firm performance can explain the current distribution? This question can be particularly interesting during periods of economic crisis, when leadership decisions are critical and the firm performance is more sensitive to leadership actions. Analysing firm performance during periods of crisis may therefore provide a more informative setting for assessing potential differences related to gender.

If no clear evidence is found that female-led firms underperform male-led firms in the Nordic context, the underrepresentation of female CEOs may imply missed opportunities at firm level. It may also have implications for CEO-firm matching, as a narrower candidate pool could reduce the likelihood of identifying optimal matches between firms and executives, and therefore lead to lower aggregate efficiency.

1.2 Purpose of thesis

Existing literature provides mixed findings for the relationship between female leadership and firm outcome. Female executives seem to differ in their strategic choices compared to male executives, where females appear more conservative and long-term focused (Huang & Kisgen,

2013; Reguera-Alvarado et al., 2017). Some studies suggest that female-led firms are associated with better performance and lower risk (e.g. Faccio et al., 2016; Khan & Vieito, 2013). However, other findings point to negative outcomes in non-crisis periods (Tiscini et al., 2026), such as less efficient capital allocation (Faccio et al., 2016) and over monitoring (Adams & Ferreira, 2009).

These differences appear particularly relevant during periods of crises, a context in which female leadership is less studied (Bavik et al., 2021). Prior research document that female CEOs are linked to stronger performance and less pronounced risk in crises such as the financial crisis, Brexit and the COVID-19 pandemic (Morales-de-Vega et al. 2025; Palvia et al., 2014; Thornton & Vasilakis, 2024; Tiscini et al., 2026). However, the evidence is not conclusive, with some findings pointing to trade-offs in terms of profitability (Kang et al., 2024) or stock price recovery (Kaddoum & Proeless, 2025).

Despite this growing literature, evidence from the Nordic context remains limited, particularly in relation to crisis periods. Given the region's relatively high levels of gender equality, which are not reflected in the top executive positions in public companies, this is a notable gap. A marked increase in share of female CEOs can be observed over just a few recent years, partly reflecting growth from a low initial level. Over the same period, the economic conditions have been challenging and given rise to newer and less explored shocks. This thesis thereby aims to address these gaps by examining the relationship between CEO gender and firm outcomes in Nordic listed firms, with a particular focus on crisis periods. In addition to the COVID-19 pandemic, the thesis analyse the recent Liberation Day turbulence, allowing an analysis across different types of recent crises. Based on this, the research question this thesis aims to answer is:

Do Nordic listed firms led by female CEOs differ in performance compared to firms led by male CEOs, particularly during periods of crises?

1.3 Method and main results

This thesis adopts a quantitative, regression-based approach to examining whether firm performance during periods of crises differs depending on CEO gender. Firm performance is assessed using the accounting-based measure ROA and the market-based measure Buy-and-Hold Abnormal Returns (BHAR). ROA is analysed using the Pooled Ordinary Least Square (OLS)

method, while BHAR is analysed using cross-sectional regression and Propensity Score matching (PSM). The study covers all firms publicly listed in the Nordic region – Sweden, Norway, Denmark, Finland, and Iceland – and consist of 1,500 firms observed over the period 2020-2025.

While the results do not provide robust findings on the effect of female CEOs on firm performance, it implies that the underrepresentation of females in CEO positions in Nordic listed firms cannot be justified by systematic performance differences. If anything, there are some indications that female CEOs may perform relatively better during periods of crises, where executive decisions are particularly critical.

2. Literature Review

Existing literature has examined the relationship between gender of top executives and firm outcomes from several perspectives. Khan and Vieito (2013) find that U.S. firms led by female CEOs are associated with both better firm performance, in terms of higher ROA, and lower risk. Similar results are reported by Faccio et al. (2016), who document that European firms with female CEOs are associated with less risk in several aspects: they have lower leverage, more stable earnings and higher likelihood of survival. However, the analysis also implies that female CEOs allocate capital less efficiently than their male counterparts. Christiansen et al. (2016) found that females are particularly associated with higher firm performance in sectors where a larger share of the workforce consists of women, e.g. the service sector, and in sectors that demand critical thinking and complementarities in skills, e.g. high-technology and knowledge-intensive sectors.

In line with the findings that female CEOs differ in their strategic decisions, Huang and Kisgen (2013) find that female executives have a lower probability to issue debt and make acquisitions than male executives. Female-led firms are also associated with higher market returns in connection with public announcements of acquisitions or debt issuance (Huang & Kisgen, 2013), indicating that the market responds more favourably to decisions made by female executives.

Flabbi et al. (2019) emphasise the role of efficient matching between firms and executives, showing that restricting the pool of candidates may result in suboptimal matches and inefficient allocation of talent. Such inefficiencies may contribute to a less representative composition of management teams. In this context, Daily and Dalton (2003) argue that limited representation in management may lead to misalignment between managerial decisions and shareholder interests.

Other studies have focused on female leadership at the board level. Carter et al. (2003) find a positive relationship between an increased female board representation and firm value in U.S. firms. Similar results are found in Spanish public companies, where board gender diversity has a positive effect on firm value (Campbell & Mínguez-Vera, 2008). Further, Adams and Ferreira (2009) find that firms with greater female board representation exhibit stronger oversight. This

improves performance in poorly governed firms but have negative effects in already well-governed firms due to excessive monitoring.

There are also a growing body of literature studying female executives in the context of a crisis, with somewhat mixed findings. Studying female leaders of U.S. commercial banks during the financial crisis, Palvia et al. (2014) demonstrate that banks led by female CEOs had a more conservative approach and held higher levels of equity capital. In addition, they find that smaller banks with female CEOs and chairs were more likely to survive. On the same note, Kang et al. (2024) show that female CEOs are associated with higher quality of risk management in U.S. listed firms during the financial crisis. However, it seems to be at the expense of profitability, measured as ROA, suggesting a risk-return trade-off specifically related to the crisis.

The link between female executives and lower firm risk in crises has also been observed in a European context. Analysing U.K. and Swiss insurance companies during COVID-19 and Brexit, Morales-de-Vega et al. (2025) find that companies with female CEOs experienced a more moderate increase in volatility compared to those led by male CEOs. The role of female CEOs during the COVID-19 crisis have also been examined in a Malaysian context (Jiunn-Shyan & Swee-Sim, 2026), where female-led firms had better outcomes than male-led. Even though female CEOs held less cash than males, they seemed to use it more efficiently, resulting in higher ROA.

Tiscini et al. (2026) examine Italian listed firms during the COVID-19 pandemic. They find that female CEOs were negatively associated with firm performance, operationalised as ROA, during normal periods, while they found a positive effect during the pandemic. These findings indicates that women may be more effective in handling unexpected shocks, due to a more conservative decision-making (Tiscini et al., 2026). Similarly, Thornton and Vasilakis (2024) find that firms ran by female CEOs outperformed those led by male CEOs during the pandemic among U.S. listed firms, while no difference were demonstrated in normal periods. The crisis outperformance was observed across multiple dimensions, with higher profitability (ROA), higher market value (Tobin’s Q) and lower risk. In contrast, Kaddoum and Proelss (2025) document that firms led by men outperformed firms led by women, in an event study of COVID-19 in U.S. small- and mid-

cap firms. They used a Buy-and-Hold Abnormal Returns (BHAR) approach and found that firms with female CEOs recovered slower than male-led firms.

In summary, several studies suggest that female-led and more gender diverse firms is associated with better firm performance (e.g. Campbell & Mínguez-Vera, 2008; Carter et al., 2003; Khan & Vieito, 2013) and lower risk (e.g. Faccio et al., 2016; Khan & Vieito, 2013). This difference seems to be more pronounced during crises (e.g. Morales-de-Vega et al., 2025; Thornton and Vasilakis, 2024; Tiscini et al., 2026). However, there is not full consensus regarding the effect of women in top positions, with some demonstrating mixed (Adams & Ferreira, 2009; Kang et al., 2024) or negative outcomes (Kaddoum & Proelss, 2025).

It is thus not straightforward what effects female CEOs have on firm performance. This further motivates the relevance to examine the relationship in a less studied context, the Nordic markets, and across two recent crises, the COVID-19 pandemic and the Liberation Day turbulence, to assess the direction and consistency of the effect.

3. Theoretical Background

This section outlines the theoretical framework underlying the study and discusses relevant theories that may explain potential differences in firm performance between female- and male-led firms. Together, these theoretical perspectives build the foundation for the two hypotheses examined in this study, which are presented at the end of the section.

3.1 Upper echelons theory

There are several aspects that influences the performance of a company. The upper echelons theory, developed by Hambrick and Mason (1984), predicts that one of these aspects are the managerial characteristics. Hambrick and Mason (1984) mean that managers will perceive situations subjectively, due to different cognitive bases and values. These subjective perceptions will in turn affect the decision-making and strategic choices of the managers, leading to different outcomes for the company. While cognitive bases and values are difficult to observe, they can be translated into more observable characteristics, such as age, education and socio-economic background.

Further, the upper echelons theory suggests that managerial influence becomes more pronounced in complex situations, where decision-making relies more heavily on individual experiences and values, such as during a crisis. In these situations, a company's performance is predicted to benefit from a greater diversity of perspectives (Hambrick & Mason, 1984).

3.2 Gender differences

While Hambrick and Mason (1984) not explicitly mentions gender as a characteristic where managers differ, it is reasonable to believe that gender is one aspect that contributes to different perspectives and experiences. Previous literature has identified several characteristics where women and men seem to differ in their behaviour, which may have an impact on strategy and decision-making.

One aspect that is likely to affect a firm's performance, especially in a crisis, is the risk the firm has taken upon. Women have been documented to be more risk averse then men in various

settings, one example is investment decisions (Charness & Gneezy, 2012). Women's lower risk tolerance can be linked both to greater sensitivity to potential losses and higher emotional costs associated with risky decisions (Croson & Gneezy, 2009). At the same time, the gender differences in risk preferences seem to diminish when looking at professional men and women in managerial positions (Croson & Gneezy, 2009). One possible explanation can be that women who has climbed to top positions may systematically differ from the general population (Johnson & Powell, 1994). Women in leadership roles have even been shown to be more risk loving compared to their male counterparts, in contrast to the broader population (Adams & Funk, 2012). On the other hand, Faccio et al. (2016) argues that female has lower risk preferences than males also among executives.

One plausible explanation to the difference in risk tolerance, may be that men are overconfident in their ability to evaluate the level of risk in a situation (Croson & Gneezy, 2009). Huang & Kisgen (2013) documented overconfidence among male executives which in turn affects corporate decisions. Men's overconfidence has also been recorded in financial settings (e.g. Barber & Odean, 2001; Brooks et al., 2019), where this overconfidence seems to cause men to behave financially irrational to a greater extent than women (Barber & Odean, 2001). Men are for example more likely to invest in projects with low probability of success or projects associated with high costs, which may lead to a worse outcome than expected (Heaton, 2002).

These characteristics are highly relevant when studying female and male CEOs in a period of crisis. Additional research suggests that female leaders are linked with greater resilience and stronger decision-making during periods of crisis (Acevedo-Duque et al., 2021) and tend to adopt a longer-term perspective in their decision-making (Reguera-Alvarado et al., 2017).

3.3 Glass ceiling and glass cliff

Another phenomenon that is mentioned in the gender literature is the so-called glass ceiling. The glass ceiling represents the structural barriers and challenges women face to reach top positions. It is defined as a specific form of discrimination where the entry barriers are more significant in the top hierarchy, despite females having the suitable qualifications (Cotter et al., 2001).

The glass ceiling effect has been demonstrated by Eagly and Carli (2003), who suggests that women often face higher entry barriers than men and therefore need to demonstrate a broader set of skills to reach comparable positions. As a result, women who overcome these barriers are likely to be highly qualified, suggesting that increased female representation should not come at the expense of performance. If anything, the glass ceiling may result in firms missing out on highly qualified women and their talent (Bertrand et al., 2019).

The glass ceiling framework has been further developed to the concept of the "glass cliff". While the glass ceiling is based on the idea that women face barriers to reach top positions, the glass cliff focuses on the conditions when women are able to reach these positions. The glass cliff theory predicts that women are more likely to be appointed to an executive role in firms that are in a crisis (Ryan & Haslam, 2007). These positions are typically associated with a higher risk of failure, meaning that the women's performance will be evaluated under difficult circumstances, which can reinforce negative stereotypes.

One possible explanation to why women are more likely to be appointed when a firm faces challenges can be that women is viewed to have characteristics, such as understanding and creative, that are useful during a crisis (Ryan & Haslam, 2007). Appointing a woman to a leadership role may also be used as a tool to signal change in the organisation (Ryan & Haslam, 2007). Another explanation could be that women may be more willing to accept a top position offer in a low performing firm out of fear that they will not get the same opportunity again (Glass & Cook, 2016).

3.4 Hypotheses

This section identifies several mechanisms that make it relevant to examine the relationship between CEO gender and firm performance, particularly in the context of a crisis. According to the upper echelons theory, firm performance is partly shaped by managerial characteristics (Hambrick & Mason, 1984). This is expected to become more pronounced in complex and uncertain environments, such as during periods of crisis, where decision-making relies more heavily on individual judgement. Gender can reasonably be viewed as a characteristic that contributes to differences in experiences and perspectives, which may influence strategic

choices. Prior literature suggests that men and women may differ in risk attitudes and overconfidence, although the somewhat mixed evidence, particularly among top executives. Additionally, the glass ceiling and glass cliff theories imply that female CEOs may systematically differ from their male counterparts, either due to selection effects or because they are more likely to be appointed under challenging circumstances.

Given this, there are several theoretical arguments to why female-led firms may have different outcomes compared to male-led firms. However, it is not as clear what direction of the relationship is to be expected. The first hypothesis is thus formulated as the following:

H_1: *Firms led by female CEOs differ in performance compared to firms led by male CEOs*

Taken together, literature also suggests that the impact of CEO gender on firm performance may vary depending on the external environment, leading to the expectation that the effect of CEO gender differs between crisis and non-crisis periods. Given greater risk aversion and less overconfidence among women, this potentially makes female-led firms more resilient in a crisis. Combined with characteristics such as creativity (Ryan & Haslam, 2007), long-term orientation (Reguera-Alvarado et al., 2017) and strong decision-making in crises (Acevedo-Duque et al., 2021), these mechanisms point to a potential relative advantage of female leaders during crises. We therefore formulate a second hypothesis:

H_2: *Firms led by female CEOs exhibit better performance than firms led by male CEOs during periods of crisis.*

4. Methodology

The methodology chapter presents the methodological framework used to address the research question. It is organised into four parts: the research design, the measures of firm performance, the independent and control variables, and the empirical methodology.

4.1 Research design and crisis definition

This thesis adopts a quantitative, regression-based approach to examining whether firm performance during periods of crisis differs depending on CEO gender. Firm performance is commonly assessed using either accounting-based measures or market-based measures (Renneboog & Vansteenkiste, 2019). Accounting-based measures capture a firm's underlying operational performance over time, whereas market-based measures reflect market reactions and investor expectations (Fama, 1991; Penman, 2013).

While prior studies often rely on a single performance measure, focusing either on accounting metrics or market effects, this paper examines firm performance across both dimensions: accounting performance and market performance. The dual-track approach allows the study to capture multiple dimensions relevant to the research question, incorporating both market-level and firm-level perspectives.

The Nordic countries are internationally recognised for their high levels of gender equality and consistently rank near the top of global equality indices. In the 2025 World Economic Forum's Global Gender Gap Report, Iceland, Finland, Norway and Sweden are all ranked among the top six globally, maintaining almost identical positions since the first report was published in 2006, while Denmark ranks just outside the top ten (Statista, 2025). Despite this, gender equality at the highest levels of corporate leadership remains limited. Within the finance industry, female CEOs account for, on average, only 10 per cent of listed firms. (Authors data collection, 2026).

The majority of published studies examining the impact of female CEOs during crises periods focus primarily on US firms or adopt a broader European approach. This motivates a dedicated analysis of Nordic firms. The sample period covers the years 2020 to 2025, a timeframe characterised by turbulent and difficult market conditions. Financial markets have exhibited

heightened volatility, driven by several major events that have affected both market performance and firm operations. As this period is relatively recent, it has been less extensively studied than, for example, the 2008 financial crisis. This renders the selected period both relevant and analytically suitable for the study of crisis dynamics. During this period, the proportion of female CEOs among Nordic listed companies increased significantly, by approximately 53 per cent over five years, which motivates further analysis (Authors data collection, 2026).

For this study, two global crises were selected: the COVID-19 pandemic and the Liberation Day shock that followed President Trump's announcement of tariffs. Both events had significant impact on the global equity markets, reflecting in declines in major indices. During the COVID-19 pandemic the S&P 500 fell by approximately 25% while the Nordic All-Share index declined by around 30%. Similarly, during the Liberation Day shock, the S&P 500 dropped by around 17% and the Nordic All-share index by approximately 22% (S&P Capital IQ, n.d; Nasdaq, n.d) These declines in indices provide a clear indication of crisis periods in financial markets.

During this timeframe, other major events also affected global markets, including the Russian invasion of Ukraine, high inflation and ongoing geopolitical uncertainty in the Middle East. However, these crises cannot be as clearly attributed to downturns on the global markets and therefore harder to isolate and analyse in this study.

The COVID-19 crisis was a global pandemic with significant impacts on public health as well as on companies, investors and consumers. It led to widespread quarantine and lockdown across many countries, resulting in decreased demand, consumption, and export, thereby affecting firms and global trade (International Monetary Fund, 2020). According to the World Health Organisation the COVID-19 virus was first detected in December 2019 in China and was declared a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 (World Health Organization, n.d.). Based on this, the start of the COVID-19 crisis in this study is set to 30 January 2020.

The crisis surrounding Liberation Day refers to President Donald Trump's implementation of global tariffs, a universal 10% tariff on all imported goods alongside additional country-specific measures. Europe, among other regions, was subject to a 20% rate, while countries such as China and Vietnam faced even higher levels (Center for Strategic and International Studies, 2025). The

announced tariffs were the highest since the Second World War and created massive stock drop, as well as uncertainty about the future of the global economy. (The Economist, 2025). Although Liberation Day is formally dated to 2 April 2025, the threats and announcement of tariffs prior to this date had already disrupted markets, suggesting that the onset of the crisis occurred earlier. The S&P 500 started to decline on 18 February and OMX Nordic on 26 February (S&P Capital IQ, n.d; Nasdaq, n.d). Based on this, the start date of Liberation Day turbulence in this study is set to 20 February 2025.

Previous studies have examined female leadership and firm performance during the COVID-19 crisis (Tiscini et al., 2026; Kaddoum & Juliane Proelss, 2025). Building on existing literature, this study includes the COVID-19 crisis and extends the analysis to examine the Liberation Day turbulence in the same context, thereby contributing to a broader scope of existing literature.

4.2 Firm performance measures

4.2.1 Accounting-based performance

Equivalent to Carter et al. (2003), Khan & Vieito (2013), Thornton & Vasilakis (2014), Sieweke et al. (2023), Jiunn-Shyan & Swee-Sim (2026), and Tiscini et al. (2026) Return on Assets (ROA) is selected as the accounting-based performance measure for the study. Annual ROA is used due to data availability. Monthly data would be preferable but would require extensive manual data collection, given the large dataset this is not feasible. However, using yearly data is common in earlier mentioned literature and is therefore the used approach. ROA is retrieved through S&P Capital IQ and calculated as EBIT after taxes (NOPAT) divided by the average of total assets:

$$ROA = \frac{EBIT \times (1 - tax\ rate)}{\frac{Total\ Assets_t + Total\ Assets_{t-1}}{2}} \times 100 \quad (1)$$

ROA reflects the firm's operational ability, capturing its capacity to generate returns from its asset base independent of its financing structure.

4.2.2 Market-based performance

The approach of Barber and Lyon is used to measure the market-based performance in this study. Barber and Lyon (1997) present Buy-and-Hold Abnormal Return (BHAR) which is a well-known method in finance where firm performance is evaluated relative to the market. This method is utilised in prior research to evaluate firm performance in times of crises, e.g. Kaddoum & Proelss (2025).

BHAR is calculated as the difference between a firm's compounded buy-and-hold return and the corresponding compounded benchmark return (Barber & Lyon, 1997). Returns are calculated monthly over the event window of each crisis in the thesis. BHAR is computed over two event windows, both starting at the onset of the crisis. The first spans four months and captures the short-term market reaction, while the second extends from the start of the crisis to the end of the same year and reflects the long-term assessment of performance.

$$BHAR_i = \prod_{t=1}^{T}[1 + R_{i,t}] - \prod_{t=1}^{T}[1 + R_{m,t}] \quad (2)$$

Where T denotes the length of the event window. For the short-term window, $T = 4$, while for the long-term window, T corresponds to the number of months from the start of the crisis to year-end. $R_{i,t}$ is the return of firm i in month t and $R_{m,t}$ is the return of the benchmark index in month t. BHAR is measured in percentage points and controls for general market fluctuations, allowing the analysis to focus on firm-level performance relative to overall market movements during periods of crisis.

Cumulative return over the crisis is calculated as:

$$Cumulative\ Return = \prod_{t=1}^{T}(1 + R_{i,t}) - 1 \quad (3)$$

Where $R_{i,t}$ is monthly return of firm i in month t. Monthly return calculations are based on adjusted close prices, which account for dividends, stock splits, and other corporate actions, thereby providing a more accurate measure of returns. The same method for calculating cumulative return is applied to the benchmark index, using monthly data over the same period.

The market index used for the study is the NASDAQ OMX Nordic All-Share Index, also known as OMX Nordic EUR GI. The index compromises all shares listed on NASDAQ OMX Stockholm, NASDAQ OMX Copenhagen, NASDAQ OMX Helsinki. It is a broad index, updated daily, consisting of 662 companies, (as of 2026-04-23), including small-, mid-, and large-cap companies across various industries (Nasdaq (n.d.)).

The choice of index affects the outcome of the study and must therefore be made carefully. The OMX Nordic All-Share Index is used as a proxy for regional market performance, although it excludes Norway and Iceland. Icelandic firms constitute only approximately 2% of the sample and are therefore unlikely to significantly influence the results, while Norwegian firms represent 14%, which may affect the precision of abnormal return estimates for Norwegian firms and introduce a potential source of measurement error. However, given the high degree of integration across Nordic equity markets, a broad regional index is expected to capture a substantial part of the systematic risk relevant for Norwegian firms. Compared to narrower alternatives such as the OMX Nordic 40, the chosen index provides broader market coverage and better reflects the overall sample. Additionally, the study examines relative performances differences across firms within the Nordic rather than country-specific stock performance and therefore a common Nordic benchmark index is seen as appropriate. Barber and Lyon (1997) argue that using a broad market index could lead to biases and advocate the use of a firm-matching approach. The firm-matching approach is not feasible within the time frame of the study. However, Brown and Warner (1985) demonstrate that a robust market index provides accurate results. Therefore, the OMX Nordic All-Share Index is used as a measurement proxy for the performance of the region.

4.3 Regression variables

4.3.1 Dependent variable

The study consists of a dual-track approach using two different measurements for firm performance. *ROA* och *BHAR* are used for this purpose and serve as dependent variables through the research. They are explained in detail in chapter 4.2.

4.3.2 Independent variable

The primary independent variable is *Female CEO*. The variable takes the value 1 if the CEO is female and value 0 if the CEO is male and shows the effect on firm performance if the CEO appointed to the firm is a female. It is measured annually and in cases where there has been a change during the year, the CEO that held the position through most of the year is classified as CEO.

For the accounting-based performance measure, a second dummy variable, *Crisis*, is defined such that it equals 1 during the years 2020 and 2025, which are classified as crisis periods, and 0 otherwise. Given the inclusion of year fixed effects, the main effect of the crisis variable is absorbed and is therefore primarily included to construct an interaction term, *Female CEO x Crisis,* in line with Tiscini et al. (2026). This interaction term allows the analysis to capture whether the relationship between CEO gender and firm performance differs during crisis periods compared to non-crisis periods.

4.3.3 Control variables

To isolate the effect of the independent variables on firm performance, a set of control variables is included. The regression incorporates firm-specific controls: firm age, firm size, leverage, and cash, along with controls for industry, country and year, adjusting for fixed effects.

Firm age is defined as the number of years between each year observed in the study and the firm's founding year. Firms with a longer track record are generally expected to be more resilient during periods of crisis, as they are more likely to have experience of earlier crises and generally possess more stable operations. Younger firms tend to be more vulnerable to uncertainty.

Firm size is the natural logarithm of the firm's total assets, stated in thousands of EUR. Firm size is measured at the end of every full year of the study, 2020-2025. The logarithmic transformation accounts for differences in scale and allows better comparability across firms of different sizes. Firm size is a relevant control variable because of the nature of smaller versus larger firms. Larger firms often have more financial stability and more extensive operations, indicating that they may be less vulnerable to crises. In contrast, smaller firms are more sensitive to movements in the market and therefore more vulnerable in times of crises.

Leverage ratio is calculated as Net debt / EBITDA, measured at the end of each full year the thesis covers. The leverage ratio shows how heavily the firm relies on debt financing. Debt financing means exposure to fixed interest payments which reduce flexibility when revenue declines. This makes firms with higher leverage more sensitive to shocks than firms with lower leverage. Net debt / EBITDA may generate extreme values when EBITDA is negative or close to zero, which can reduce interpretability and lead to unusually large positive or negative leverage ratios. To limit the impact of extreme values, the data have been winsorised at the top and bottom 1 per cent of the distribution. Although there are alternative leverage measures, Net debt / EBITDA was retained as it captures leverage relative to firm's earnings capacity rather than balance sheet structure alone.

Cash consists of cash and cash equivalents, defined as highly liquid funds in the form of cash, readily convertible deposits, and securities that matures in less than three months. Cash and cash equivalents are calculated at the end of each year the thesis covers. The data for the control variable cash were collected in the reported currency and converted to thousands of EUR as of 2026-04-16. Although amount of cash may be dependent on firm size, the correlation is moderate (see Table 3), and is therefore controlled for separately. A cash buffer can be beneficial during times of economic distress, as firms with a higher cash holding generally are more prepared for market fluctuations. To limit the impact of extreme values the data have been winsorised at top and bottom 1 per cent of the distribution.

Industry controls are classified using the highest level of the Global Industry Classification Standard (GICS). The firms are classified into 11 different sectors: Energy, Materials, Industrials, Consumer Discretionary, Consumer Staples, Health Care, Financials, Information Technology, Communication Services, Utilities, and Real Estate. Industry controls are included, as the impact of crises varies across sectors depending on firm characteristics and the nature of the crisis. While some sectors are more heavily affected, others may be resilient or even benefit from it.

Country controls are defined based on the firm's filing country, that is the country in which the company is legally registered and files its financial statements. Country controls are included to account for potential differences in regulatory frameworks, macroeconomic conditions, and policy responses during crises, which may influence firm performance.

Year fixed effects are included in the ROA analysis to control for time-specific factors that affect all firms in a given year, such as macroeconomic conditions and other events beyond the crisis defined in the model.

4.4 Empirical Methodology

The analysis of firm performance in relation to gender is conducted using two performance measures which corresponds to two empirical approaches. Accounting-based firm performance Return-on-assets (ROA) is analysed using Pooled Ordinary Least Squared (OLS), with the interaction term *Female x Crisis* as main variable of interest. Market-based performance measure, Buy-and-Hold Abnormal Returns (BHAR) is examined using cross-sectional regressions and Propensity Score Matching model (PSM). The PSM model is a valuable complement, as it helps to reduce bias in the cross-sectional regressions.

4.4.1 Pooled Ordinary Least Squared (OLS) regression

To examine how CEO gender affects firm performance, measured by ROA, a regression analysis is performed. The same model is estimated for two crisis periods, capturing the COVID-19 crisis and the Liberation Day shock, respectively. Consistent with prior literature, (Faccio et al., 2016; Khatri, 2022), this study uses a panel data approach with firm-year observations over multiple years, including times classified as crisis periods. The panel data are analysed using Pooled Ordinary Least Squares (OLS), focusing on cross-sectional variation across firms in the dataset, with ROA as the dependent variable. The model follows the general form:

$$ROA_{it} = \beta_0 + \beta_1 FemaleCEO_{it} + \beta_2 Crisis_t + \beta_3 (Female\ CEO_{it} \times Crisis_t) + X_{it} + \delta_t + \gamma_j + \theta_c + \epsilon_{it} \quad (4)$$

The regression model includes year-fixed effects δ_t, industry fixed effects γ_j and country fixed effect θ_c to control for unobserved heterogeneity. The variables are further described in section 4.3.3. While other studies have chosen to include firm fixed effects in some of their regressions (Faccio et al., 2016), this study focuses on cross-sectional differences across firms rather than within-firm CEO transitions and firm fixed effects are therefore excluded. In addition to fixed effects, the regression also includes the control variables firm age, firm size, leverage, and cash denoted X_{it}.

The method includes clustering of standard errors on the firm level to account for potential serial correlation within firms over time. The main variable of interest in these regressions is the interaction term, *Female CEO x Crisis,* which captures the differential effect of female CEO on firm performance during crisis periods compared to a male CEO.

4.4.2 Cross-sectional analysis and Propensity Score Matching

This section examines the effect of CEO gender on Buy-and-Hold Abnormal Returns (BHAR) during crisis periods. Two complementary empirical approaches are used: cross-sectional regression and Propensity Score Matching (PSM). This dual approach follows prior studies by Kaddoum & Proelss (2025) and Jiunn-Shyan & Swee-Sim (2026).

BHAR is calculated over two event windows within each crisis period. The first window spans four months from the initial crisis date and measures the market's short-term reaction, while the second window covers the date from the start of crisis until the end of the same year, and captures long-term assessment of performance. BHAR is computed over each event window, resulting in one observation per firm, the analysis is therefore performed in a cross-sectional setting and is expressed in percentage points. The cross-sectional regressions are performed with BHAR as the dependent variable and include a set of control variables: firm age, firm size, leverage and cash, and follows the general form:

$$BHAR_i = \beta_0 + \beta_1 Female\ CEO_i + X_i + \gamma_j + \theta_c + \epsilon_i \quad (5)$$

The variable of interest is the dummy indicating whether the CEO is female. This coefficient measures the difference in abnormal returns during crisis period between female and male CEOs.

Building on the cross-sectional regression, Propensity Score Matching (PSM) is applied as a complementary method, in line with Kaddoum and Proelss (2025). PSM is used to improve comparability between firms by accounting for observable firm characteristics that may influence firm performance. The PSM method in this study uses nearest neighbour matching with one match per treated observation (1:1 matching). The matching is performed with replacement, and caliper 0.1 is used. Propensity scores are estimated based on firm size, leverage, firm age, cash, as well as industry and country indicators. Each female-led firm is then matched with a similar male-led firm based on these estimated propensity scores (balance

diagnostics are reported in Appendix A). The variable cash is excluded from the PSM model for the COVID-19 crisis, as its inclusion led to covariates imbalance and reduced quality of the matches. Balance diagnostics test showed no support in including cash as a variable. However, to account for its potential effect on firm performance, cash is included as a control variable in the regression analysis. In contrast, cash is included in the PSM model for the Liberation Day turbulence, as it improved the balance diagnostics in this setting.

By constructing matched pairs of firms, the impact of systematic differences between the groups is reduced. The challenges faced by firms during crises and their ability to respond to them become more comparable, allowing a greater share of observed performance differences to be attributed to CEO performance (Rosenbaum & Rubin, 1983). After constructing matched pairs, the analysis evaluates the BHAR of female-led firms and their matched male-led counterparts. The estimated average treatment effect on the treated (female) captures the difference in performance between otherwise comparable firms.

The use of Propensity Score Matching is particularly important in this context, as female CEOs are underrepresented in the dataset. Consequently, firms with female leaders may differ systematically from those with male leadership, which can bias the estimated relationship between female CEOs and firm performance. Propensity score matching is an effective method to mitigate this selection bias and a valuable complement to the cross-sectional regression.

5. Data

This chapter provides an overview of the data underlying the empirical analysis, including data sources, sample selection process, limitations and descriptive statistics.

The data sample covers the Nordic region - Sweden, Norway, Finland, Denmark and Iceland - over the time period 2020-2025. The data is primarily sourced from S&P Capital IQ Pro, with CEO data partly obtained through manual data collection.

The initial screening for firms was conducting using the S&P Capital IQ Pro company screener, based on the following criteria: *1) Geography in Denmark; Finland; Iceland; Norway; Sweden. 2) Company in Public Company. 3) Company Status in Operating; Operating Subsidiary*. The universe of firms was collected on the 23 of March 2026 and includes companies that were publicly listed prior to this date.

The initial sample, based on the criteria listed above, consists of 1,500 firms. Firms with a filing country within the Nordic region but publicly listed on a non-Nordic market are excluded from the sample. Financial institutions engaging in deposit-taking activities have been excluded from the sample due to different standards in reporting and financial structure, since it reduces comparability to other firms included the sample. Sample construction are presented in Table 1.

Table 1: Sample Construction

Step	Filter applied	Observations	Firms
1	Initial Capital IQ screening	9,000	1,500
2	Exclude Nordic firms listed on non-Nordic markets	8,868	1,478
3	Exclude deposit-taking financial institutions	8,328	1,388

All firms are not publicly listed for all six executive years and therefore the sample size is smaller in 2020 than 2025. Due to missing data for some firm observations, both values for dependent variables and control variables, observations from the sample are dropped. The final samples are presented in Table 2. Additional descriptive statistics can be found in Appendix B.

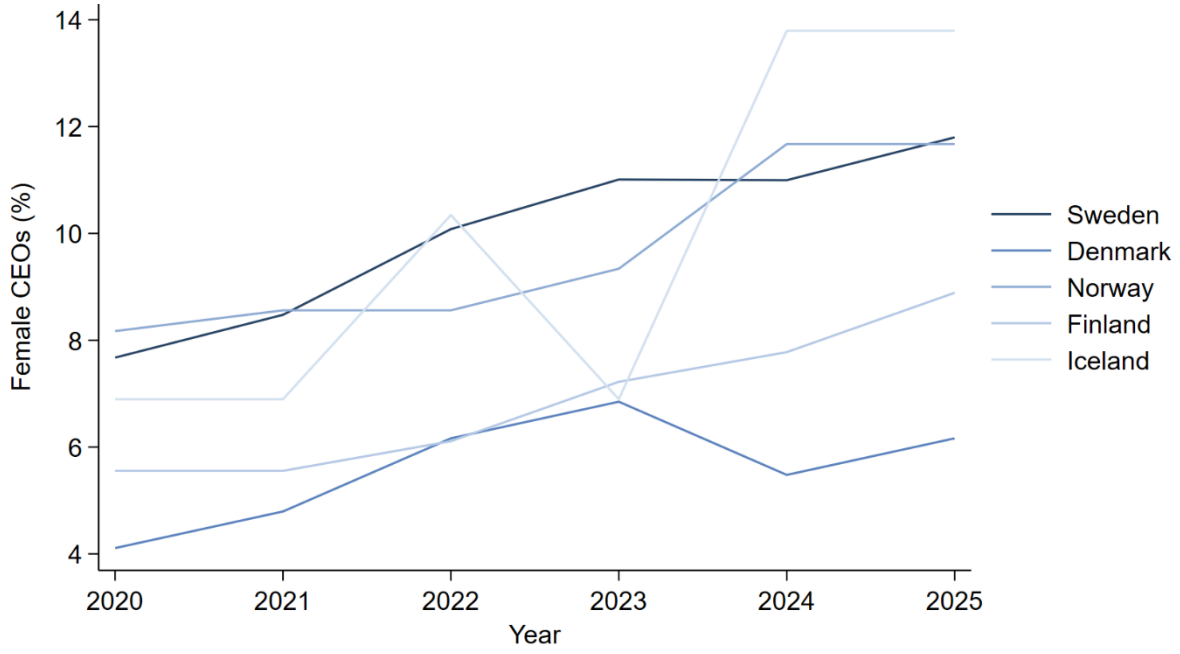
Table 2: Final Sample

Dependent variable	Observations	Firms
ROA	7,028*	1,272
BHAR 2020 unmatched	895	895
BHAR 2020 matched	126	126
BHAR 2025 unmatched	1,168	1,168
BHAR 2025 matched	251	251

*Note: ROA is measured annually over the period 2020–2025. As some firms were listed during the observation period, the panel is unbalanced and not all firms are observed for the full six-year period.

CEO data available on S&P Capital IQ Pro is registered at the end of each year, and this information was collected for each firm in the sample. However, there are limitations associated with this data source, as the database only provide information on the most recent CEO and the period during which the position was held. This results in manual collection of all CEOs for firms that have changed CEO once or more than once during the last six years. This information is retrieved from annual reports, firm official statements or official company websites. In cases where there has been a change during the year, the CEO that held the position through most of the year is classified as CEO.

Figure 1: Female CEOs (%) 2020-2025



S&P Capital IQ Pro serves as the primary source of company-level data, providing information on firm performance measures, including ROA, closing prices, and market indices, as well as data on control variables.

S&P Capital IQ pro is a widely used platform that provides extensive financial data, analytics, and research tools across a broad range of sectors. The platform contains financial and operational data for 58 million private- and 109 000 public companies. (S&P Capital IQ, 2026). The S&P Capital IQ Pro company screener was used to identify the sample and the Excel plugin was used to retrieve the additional data. The choice of data source is motivated by its broad coverage, accessibility and suitability for firm level financial analysis. Access to the database is provided by The University of Gothenburg and is considered a reliable and accurate source of data for academic research. However, as with all large databases, there is no guarantee that all data points are free from error, potential errors cannot be ruled out. For the manual collection human error is a potential risk factor, and some observations may therefore be subject to inaccuracies.

6. Result

This section presents the results of the study, including descriptive statistics, the correlation matrix, and regression results across different model specifications.

Table 3: Descriptive Statistics (Panel Dataset)

	Obs	Mean	Std. Dev.	Min	Max
ROA	8063	-4.826	21.097	-325.111	139.086
Female CEO	8464	0.096	0.295	0	1
Leverage	7512	1.899	9.105	-42.719	44.622
Cash	8147	118.504	453.635	0.018	3772.000
Firm size	8240	4.543	2.686	-8.614	13.391
Firm age	8507	44.706	52.283	0	416

Table 3 presents descriptive statistics for the panel dataset with dependent variable ROA, independent variable Female CEO and the control variables. The mean for female CEO is 0.096, meaning the share of firms led by a female CEO is 9.6% in this sample. ROA is reported in percentage terms, meaning that all values are expressed in percent rather than decimal form. The negative minimum value of firm size is due to some firms having lower total assets than 1 (in thousands EUR), which yielded negative values when transformed using the natural logarithm.

Table 4: Correlation Matrix (Panel Dataset)

	ROA	Female CEO	Leverage	Cash	Firm size	Firm age	COVID-19	Liberation Day
ROA	1.000							
Female CEO	-0.023**	1.000						
Leverage	0.047***	0.018	1.000					
Cash	0.117***	0.017	-0.001	1.000				
Firm size	0.484***	0.020*	0.165***	0.484***	1.000			
Firm age	0.239***	0.063***	0.006	0.284***	0.534***	1.000		
COVID-19	0.005	-0.021*	0.012	-0.003	-0.046***	-0.016	1.000	
Liberation Day	-0.003	0.022**	-0.005	0.001	0.023**	0.018*	-0.200***	1.000

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The correlation matrix shows a weak negative correlation between ROA and female CEO. Some expected relationships are observed, such as positive correlations between firm size, cash holdings, and firm age. Overall, the results suggest that multicollinearity is unlikely to be a concern in the regression analysis, as no variables are highly correlated.

Table 5: Pooled regression results Return on Assets 2020-2025

	(1) COVID-19	(2) Liberation Day	(3) Joint Model
Female CEO	-1.242	-0.831	-1.219
	(1.529)	(1.571)	(1.666)
COVID-19	1.029		1.256**
	(0.687)		(0.566)
COVID-19 x Female CEO	2.638		2.616
	(1.669)		(1.687)
Liberation Day		-1.179*	0.236
		(0.709)	(0.464)
Liberation Day x Female CEO		-0.490	-0.101
		(1.943)	(1.971)
Leverage	-0.0805***	-0.0802***	-0.0805***
	(0.0170)	(0.0170)	(0.0170)
Cash	-0.00706***	-0.00705***	-0.00706***
	(0.000795)	(0.000793)	(0.000795)
Firm size	4.480***	4.478***	4.480***
	(0.241)	(0.241)	(0.241)
Firm age	-0.0190***	-0.0189***	-0.0190***
	(0.00604)	(0.00605)	(0.00605)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Constant	-21.59***	-20.38***	-21.82***
	(2.126)	(2.087)	(2.101)
Observations	7028	7028	7028
R-squared	0.319	0.319	0.319

Robust standard errors clustered at the firm level are reported in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 presents the results from the regression analysis with ROA as the dependent variable for the period 2020-2025. Model (1) focuses on the COVID-19 crisis, model (2) on the Liberation Day turbulence, while model (3) includes both crises simultaneously to account for potential joint effects.

Focusing on model (3), the coefficient on Female CEO (-1.219) is negative but not statistically significant, suggesting no systematic difference in firm performance between female- and male-

led firms during normal periods. The interaction term between COVID-19 and Female CEO is positive (2.616), although not statistically significant, indicating a tendency for female-led firms to perform relatively better during the pandemic. In contrast, the interaction between Liberation Day and Female CEO is negative but close to zero (-0.101), the figure is not statistically significant, suggesting no systematic difference in firm performance between female- and male-led firms in this context.

Models (1) and (2) show broadly similar patterns, supporting the overall interpretation that the relationship between CEO gender and firm performance varies across crisis contexts, although the effects are not statistically robust. Regarding the controls, the coefficients stay consistent and significant throughout the analysis, with firm size having the largest impact on ROA. These results suggest that other aspects than CEO gender are larger drivers in performance.

Table 6: Cross-sectional regression and PSM results BHAR during COVID-19 crisis

	(1) Short	(2) Long	(3) Short Matched	(4) Long Matched
Female CEO	-0.0687	17.60	5.790	22.48
	(3.960)	(15.20)	(4.825)	(17.47)
Leverage	-0.0405	-0.0327	0.0966	-0.598
	(0.122)	(0.277)	(0.344)	(0.733)
Cash	0.00414*	0.00108	-0.0131	-0.0139
	(0.00227)	(0.00520)	(0.00803)	(0.0183)
Firm size	-0.0919	-0.490	2.648*	-1.534
	(0.727)	(1.658)	(1.392)	(4.115)
Firm age	-0.0566**	-0.197***	-0.0608	-0.0585
	(0.0236)	(0.0593)	(0.0426)	(0.101)
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Constant	32.89*	52.19**	-12.96	1.493
	(18.97)	(21.58)	(9.823)	(38.32)
Observations	896	895	126	126
R-squared	0.0958	0.0419	0.134	0.151

Robust standard errors clustered at the firm level are reported in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 presents the results of four regressions examining the relationship between firm performance and CEO gender, measured using Buy-and-Hold Abnormal Returns (BHAR), during the COVID-19 crisis in 2020. Short term performance (four month-window) is analysed in model (1) and (3), while long-term performance (eleven month-window) is examined in model (2) and (4). All numbers are presented in percentage points. Model (1) and (2) are estimated using the cross-sectional method, whereas model (3) and (4) use Propensity Score Matching (PSM). Prior to matching, the sample consisted of 65 female-led and 831 male-led observations. After matching, 65 female observations and 61 matched control observations remain in the matched sample. The number of male observations is lower than the number of female observations because matching was performed with replacement, allowing the same control firm to be matched to multiple treated firms. For short-term performance, the coefficient on Female CEO is negative in the cross-sectional regression (−0.0687) and positive in the matched sample (5.790). In the long run, the coefficient Female CEO is positive for both methods (17.60 and

22.48, respectively). However, neither estimate is statistically significant, indicating no statistically significant difference in firm performance between female and male CEOs.

Table 7: Cross-sectional regression and PSM results BHAR during Liberation Day turbulence

	(1) Short	(2) Long	(3) Short Matched	(4) Long Matched
Female CEO	0.204	15.76	5.471	19.13
	(4.398)	(13.77)	(4.207)	(14.47)
Leverage	0.0188	0.0368	-0.207	-0.0885
	(0.126)	(0.201)	(0.264)	(0.494)
Cash	0.00440	0.0100*	-0.00784	0.0251
	(0.00488)	(0.00584)	(0.00749)	(0.0373)
Firm size	-2.815	-2.504	-0.778	-12.23
	(2.216)	(2.785)	(1.203)	(11.32)
Firm age	-0.0207	0.0101	0.0262	0.386
	(0.0218)	(0.0546)	(0.0419)	(0.299)
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Constant	16.51**	5.336	7.706	-26.31
	(8.366)	(10.87)	(11.71)	(28.06)
Observations	1168	1168	251	251
R-squared	0.0152	0.0269	0.0365	0.0852

Robust standard errors clustered at the firm level are reported in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The results in Table 7 mirror those in Table 6, presenting four regressions examining the relationship between firm performance and CEO gender, measured using Buy-and-Hold Abnormal Returns (BHAR) during the Liberation Day turbulence. Prior to matching, the sample consists of 131 female-led observations and 1,037 male-led observations, while the matched sample consists of 131 treated observations and 120 control observations. Since matching was performed with replacement, some control firms were matched multiple times. The coefficient on Female CEO is positive in the short run for both the cross-sectional regression (0.204) and the matched sample (5.471). In the long run, the coefficient remains positive across both methods (15.76 and 19.13, respectively). However, none of the estimates are statistically significant, indicating no statistically significant difference in firm performance between female and male CEOs in either the short or long run.

7. Discussion

This section discusses the regression results on CEO gender and firm performance during crises. It also outlines the implications of the findings, including potential economic and organisational risks, as well as the limitations of the study.

7.1 Interpretation of results on CEO gender and performance

Analysing firm performance in terms of Return on Assets (ROA) with respect to CEO gender, the result is mixed. For normal periods, it indicates a lower ROA for firms with a female CEO. During the COVID-19 crisis, the direction is positive, while ROA again is negatively associated with a female CEO during the Liberation Day turbulence. However, no significant relationship is found, meaning it cannot be established that there is a systematic difference between female and male CEOs in accounting-based performance, neither in normal nor crisis periods. In other words, hypothesis 1 and hypothesis 2 cannot be confirmed.

Although the results are not statistically significant, the direction of the coefficients is partly in line with the findings of Tiscini et al. (2026), who document that female-led firms are negatively associated with performance during normal times, but positive in crisis. This may in turn be consistent with women having characteristics like lower risk preferences (e.g. Faccio et al., 2016) or greater creativity (Ryan & Haslam, 2007), potentially making them better suited for crisis situations.

Further, the estimates differ across crises, being positive during COVID-19 and negative during the Liberation Day shock. While these patterns are insignificant, they may indicate that the relationship between CEO gender and firm performance is context-dependent and influenced by the nature of the crisis. Perhaps, the COVID-19 pandemic required more strategic decisions, while Liberation Day was a more external shock with less scope of action, which is reflected in the results.

The cross-sectional regression results for BHAR during the COVID-19 crises indicate that, in the short term, firms led by male CEOs may exhibit higher abnormal returns than female-led firms.

Although the effect is relatively small, it may suggest a modest negative association between female leadership and short-term abnormal returns. Given the lack of statistical significance, the results do not provide sufficient evidence to support hypothesis 1 of a performance difference. When applying propensity score matching (PSM), we observe a different pattern. The matched analysis indicates that female-led firms may exhibit higher abnormal returns than male-led firms in the short term. The coefficient is not statistically significant and therefore does not provide sufficient evidence to support hypothesis 2. These patterns are broadly consistent with previous studies (e.g. Thornton & Vasilakis, 2024; Tiscini et al., 2026), which suggest that female leadership may enhance firm performance during periods of crises, although the lack of statistical significance limits the strength of this comparison.

The divergence in the short term BHAR results where the coefficient is positive after matching, may be consistent with the glass cliff phenomenon. The phenomenon where women are more likely to be appointed leadership positions in firms facing difficult conditions, roles that are associated with higher risk and higher failure (Ryan & Haslam, 2007). Propensity score matching improves comparability between firms and allows a more balanced assessment of CEO performance. The difference in coefficients may suggest that female CEOs are more likely to lead firms in more challenging situations, which is consistent with the glass cliff theory.

Analysing the long run regression for the COVID-19 crisis, a similar pattern emerges. Applying propensity score matching, the results indicate stronger performance for female-led firms compared to the unmatched regression. However, even without PSM, the coefficient for female CEO remains positive. Although the variables are not significant and do not clearly support hypothesis 2, it suggests a positive relationship between female leadership and firm performance during crisis. These patterns are also in line with Khan & Vieito (2013) and Faccio et al. (2016) suggesting that female CEO contribute to improved performance and higher earnings. The gap between the unmatched and matched outcome in the long run, consistent with the short run, may indicate the presence of the glass cliff phenomenon also in this context.

Moving on to the Liberation Day shock using the BHAR method, the overall pattern is similar to the one observed during the COVID-19 crisis. Hypothesis 2 cannot be confirmed as the results are not significant, but suggest that female leadership may be associated with improved firm

performance in both the short and long term. Notably, the coefficient is positive already for the unmatched in the short term BHAR.

One observation is that the gap between the unmatched and matched long-term estimates is smaller than during the COVID-19 crisis in 2020. This may indicate that the differences in firm characteristics between female-led and male-led firms has decreased over time. One possible interpretation is that female CEOs are less frequently appointed to firms facing more challenging conditions, which may be consistent with a reduced presence of the glass cliff phenomenon. Another observation is that the proportion of female CEOs has increased by 53 per cent among publicly listed firms in the Nordic region from 2020 to 2025 (Authors data collection, 2026). This pattern may reflect a potential weakening of the glass ceiling effect, whereby women are often found to face higher entry barriers to top executive positions than men (Eagly & Carli, 2003).

A common pattern across both crises is that the results based on BHAR suggest that the difference in performance increases when moving from short to long run. One possible explanation is that firms require time to adjust their strategies and implement actions to mitigate the effect of the crisis, or depending on the context, to benefit from it. In the short run, it may be more difficult for investors to assess which strategies are most effective and to incorporate this information into prices, leading to more similar firm performance across gender. In the long run, the market may be able to evaluate firm's response to crisis better, allowing performance differences to become more apparent. One possible interpretation is that female CEOs may adopt strategies that are more effective, which may contribute to improved performance. This is in line with Huang & Kisgen (2013), who suggest that the market responds favourably to decisions made by female executives. The long-term BHAR results should be interpreted with caution, as cumulative returns may overstate differences over time and longer periods make it harder to isolate the effect of gender. The result suggests a positive relationship. However, the magnitude of the estimation should not be interpreted as an exact estimate.

Linking these findings to the upper echelons theory, it can be argued that it is not the gender of the CEOs alone that drives performance differences. The upper echelons theory suggests that managerial influence becomes more pronounced in complex situations, as a crisis, and that the

firm performance may increases with a greater diversity in perspectives (Hambrick & Mason, 1984). From this perspective, firms with female CEOs may also reflect a broader diversity in management and board overall, which could contribute to improved performance during periods of uncertainty.

Why do we find that the method using BHAR indicates a more consistent association between female CEOs and firm performance than ROA? BHAR is a market-based, forward-looking and expectations driven measure. While ROA is accounting-based, backward-looking and measures realised performance. The market reacts to signals about future performance, not just current results, such as leadership style, governance, risk appetite and strategic responses to new market conditions. The more pronounced association in BHAR may suggest that effect is first reflected in market expectations, while the absence of similar pattern in ROA may indicate that such effects are not yet observable in the realised performance. ROA may reflect firm fundamentals better and therefore may be more suitable during stable periods, while BHAR captures changes in expectations and therefore may provide be a better reflection of firm performance during crisis periods.

7.2 Implications of the findings

Examining firm performance in the context of two different crises makes it possible to analyse performance in periods with larger challenges, where the CEO faces larger pressure to act and their strategy may be more important.

Overall, the results provide mixed findings on the relationship between CEO gender and firm performance in the Nordic region. The ROA analysis does not reveal any statistically significant differences between female- and male-led firms, although the direction of the estimates varies across the periods. The BHAR results, particularly when matching is applied, show positive market outcomes among firms led by females, although this pattern is not statistically significant. Taken together, the findings suggest that the relationship between CEO gender and firm performance is context-dependent and sensitive to both period and the operationalisation of performance.

Although most of the results indicates a positive association between female-led firms and firm performance during crises, in line with prior studies (e.g. Thornton & Vasilakis, 2024; Tiscini et al., 2026), the lack of statistical significance limits the strength of this conclusion. While the findings are broadly consistent with the two hypotheses, they cannot be fully confirmed, and it remains unclear whether there is a systematic difference between female and male CEOs in terms of firm performance. A possible explanation may be the reasoning of Johnson and Powell (1994), that top managers do not exhibit the same gender differences observed in the larger population.

Taken together, the "non-result" is also a result in itself. Firms led by females do not underperform male-led firms, which does not motivate the large gap between the number of female CEOs compared to male CEOs currently observed in the Nordic market.

It should also be noted that the Nordic markets have remained fairly unexplored in prior studies, which this study has aimed to address. Thus, the weaker findings may also reflect that gender differences in leadership are less pronounced in the Nordic context, that in many ways are considered to be progressive in gender equality.

7.3 The risks of systematic underrepresentation

The result of this study finds no clear evidence that the underrepresentation of female CEOs in Nordic publicly listed firms can be explained by firm performance. If anything, the results may suggest a positive association between female CEOs and firm performance. This may raise concerns about the potential risks associated with the systematic underrepresentation.

One potential risk with excluding women from top executive positions is that the firm management does not reflect their shareholder base. The management is not a representation of the investors in the firm, and this could create a misaligning in decision-making where management do not understand its shareholders (Daily & Dalton, 2003).

In this context, and consistent with observed patterns, the underrepresentation of women may be even more relevant in periods of uncertainty, where literature suggests that diversity improves decision-making and firm performance (Hambrick & Mason, 1984). This may imply that lack of

diversity in top management can constitute a risk, as firms may miss out on potential benefits in terms of performance and resilience. A female CEO may also reflect broader diversity in management and the board, which, implicated in the results, may contribute to improved firm performance.

Another implication relates to the potential inefficiencies in CEO-firm matching. By systematically excluding women from the pool of candidates, the available talent pool decreases, reducing the possibility of finding the optimal match between CEO and firm. Such exclusion can also imply an inefficient allocation of human capital and lead to a lower aggregate efficiency (Flabbi et al., 2019). This may be increasingly relevant in sectors where strategic decisions, innovation and complex problems play a central role. Previous literature finds that a higher share of women in senior positions is associated with better firm performance, especially in sectors where women constitute a larger share of the workforce, as well as in sectors requiring critical thinking and complementary skills, such as high-technology and knowledge-intensive industries (Christiansen et al., 2016). Consequently, systematic underrepresentation may constitute a potential risk as firms may miss potential benefit related to innovation and long-term performance.

7.4 Limitations of the study

While this study has aimed to further understand the relationship between CEO gender and firm performance, it is subject to potential limitations. These should be acknowledged, as they may influence the interpretation of the findings and point to potential areas for improvement.

Firstly, a methodological challenge is how to account for the fact that strategic decisions may not have an immediate effect on firm performance. One approach is to introduce a time lag between CEO characteristics and performance outcomes. At the same time, it is difficult to find the optimal timing for this lag. This also involves a trade-off, since the executive reasonably should be evaluated and held accountable for the firm's performance during their tenure. The choice to include a market-based performance measure in this study may also partly address this issue, since financial markets are forward-looking and may incorporate expectations about strategy more rapidly.

While we have included several relevant control variables, additional controls could have been included to further isolate the true effect of CEO gender. Desirable variables to include would be CEO characteristics, for example age, education or social background, that also may shape an individual's decision-making (Hambrick & Mason, 1984). However, there was no accessible data for this, making it not feasible to account for in this analysis. Another methodological consideration relates to the benchmark used when computing BHAR. Ideally, country-specific benchmarks corresponding to each firm's listing country would be applied. However, as discussed in 4.2.2, NASDAQ OMX Nordic All-Share Index is considered a reasonable proxy for the Nordic region as a whole.

One concern is the relatively low number of female CEOs in the sample. Beyond being a societal issue, this may also be a statistical issue, as it may limit the precision of the estimates and contribute to the lack of statistically significant results.

A potential limitation of the study concerns the matching procedure. The cash variable was excluded from the COVID-19 model due to imbalance issues but included in the Liberation Day model. This decision was based on balance diagnostics and match quality, however it may affect the comparability of the matched sample across crises. It would be interesting to use PSM in the ROA analysis as well, but matching is less straightforward in a panel setup. We therefore followed the more common approach in the literature, applying matching to the BHAR analysis but not to ROA.

Another important aspect to address is the chosen time period. An extended time period would have increased the number of observations and allowed for a more comprehensive analysis. It could also have allowed for the inclusion of additional crisis episodes, thereby strengthening the external validity of the findings. However, as already mentioned, the data availability for historical CEOs was limited and additional manual data collection was considered to be too time consuming for the scope of this thesis.

8. Conclusion

This study investigates if Nordic listed firms led by female CEOs differ in performance compared to firms led by male CEOs, with a particular focus on periods of crisis. The analysis covers firms listed on Nordic markets over the period 2020-2025. Performance is evaluated using two complementary measures, accounting-based Return on Assets (ROA) and market-based Buy-and-Hold Abnormal Returns (BHAR), across two crises: the COVID-19 pandemic and the Liberation Day shock.

The results from the accounting-based measure ROA provide weak mixed findings on the relationship between CEO gender and firm performance, and the direction of the estimates varies across time periods. Market based measure BHAR exhibits more consistently positive estimates for female-led firms during crisis periods, particularly after matching. However, neither of these coefficients are statistically significant and does not provide sufficient evidence to clearly support hypothesis 1 and 2.

Although the results indicate a positive association for female CEOs during crises, no clear evidence of a systematic difference in firm performance between female and male CEOs of listed firms in the Nordic region can be established. However, this is still an informative result. Firms led by females do not underperform male-led firms, which does not motivate the large gap between the number of female CEOs and the number of male CEOs observed in the Nordic markets. This may raise concerns about the potential risks and inefficiencies associated with the systematic underrepresentation.

The thesis aims to contribute to the existing literature on female leadership by focusing on the Nordic region and examining both accounting- and market-based measures. The paper also adds new perspective with focus on a more recent crisis, Liberation Day. However, the findings should be interpreted with caution. The limited number of female CEOs and the relatively short time period (2020-2025) may contribute to the lack of statistically significance and limit the generalisability of the results. Future research could therefore extend this study by examining a longer time horizon and by introducing a third performance measure focusing on risk, given that gender differences in risk appetite are widely discussed in the literature. An extension of the

study could also improve by collecting more detailed information on the CEOs, enabling a clearer identification of effects attributable to gender.

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10. Appendices

Appendix A: Propensity Score Matching balance diagnostics

Table 8: Balance Diagnostics matched sample COVID-19 crisis

	Before			After			
	Treated	**Control**	**Bias (%)**	**Treated**	**Control**	**Bias (%)**	**% Reduction**
Firm size	4.1857	4.2105	-0.9	4.1857	4.3904	-7.6	-725.6
Leverage	3.5109	1.9502	18.3	3.5109	3.3341	2.1	88.7
Firm age	53.446	42.704	19.1	53.446	59.988	-11.6	39.1

Sample	**Pseudo R^2**	**LR chi^2**	**p>chi^2**	**Mean Bias**	**Median Bias**	**B**	**R**	**%Var**
Unmatched	0.055	32.30	0.006	13.5	13.2	64.6	0.99	33
Matched	0.011	2.58	1.000	4.9	3.7	24.8	0.65	33

Although the bias for firm size increased slightly after matching in the 2020 sample, the overall balance diagnostics improved, reflected in lower mean and median bias as well as a reduced pseudo R^2.

Table 9: Balance Diagnostics matched sample Liberation Day turbulence

	Before			After			
	Treated	**Control**	**Bias (%)**	**Treated**	**Control**	**Bias (%)**	**% Reduction**
Firm size	4.2687	4.5803	-12.2	4.2687	4.0759	7.5	38.1
Leverage	2.3846	1.6514	9.6	2.3846	1.8885	6.5	32.3
Cash	59.871	105.39	-14.2	59.871	58.028	0.6	96.0
Firm age	49.908	45.905	8.1	49.908	49.244	1.3	83.4

Sample	**Pseudo R^2**	**LR chi^2**	**p>chi^2**	**Mean Bias**	**Median Bias**	**B**	**R**	**%Var**
Unmatched	0.042	34.42	0.007	10.2	6.4	57.5	0.46	50
Matched	0.017	6.22	0.992	4.4	4.7	22.8	0.74	25

Note: Matching was also performed on country and industry variables for both 2020 and 2025 but are not reported in the tables due to the large number of categories.

Overall, the balance diagnostics indicate improved covariate balance after matching, reflected in reduced bias across all variables**, together with lower mean and median bias and reduced pseudo R^2 values.**

Appendix B: Descriptive statistic over the dataset

Table 10: Descriptive statistics distribution of firms by CEO gender

Year	**Number of firms**	**Female CEO**	**Male CEO**	**% split**
2020	1,059	76	983	7%
2021	1,151	88	1,063	8%
2022	1,190	109	1,081	9%
2023	1,209	119	1,090	10%
2024	1,227	128	1,099	10%
2025	1,192	131	1,061	11%
Total	***7,028***	***651***	***6,377***	

Table 11: Descriptive statistics distribution of firms by country

Country	**Number of firms**	**% of total**
Sweden	733	62%
Norway	170	14%
Finland	158	13%
Denmark	110	9%
Iceland	21	2%
Total	***1,192***	

Figures in Table 10 and Table 11 are based on the ROA dataset. The number of firms reported for each year represents unique firms observed in that year. As some firms entered or exited the sample during the period 2020–2025, not all firms are observed across the full time period. Consequently, the total number of observations reported in Table 2 differs from number of firms in Table 10 since it presents the cumulative number of observations across the full sample period.

AI Declaration

We have read and followed the School of Business, Economics, and Law's guidance on using generative AI in higher education. Generative AI (ChatGPT) has been used to improve sentences and assist when programming error codes occurred. We declare that this thesis represents our own work and take full responsibility for the produced content.

1st of June 2026, Gothenburg

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