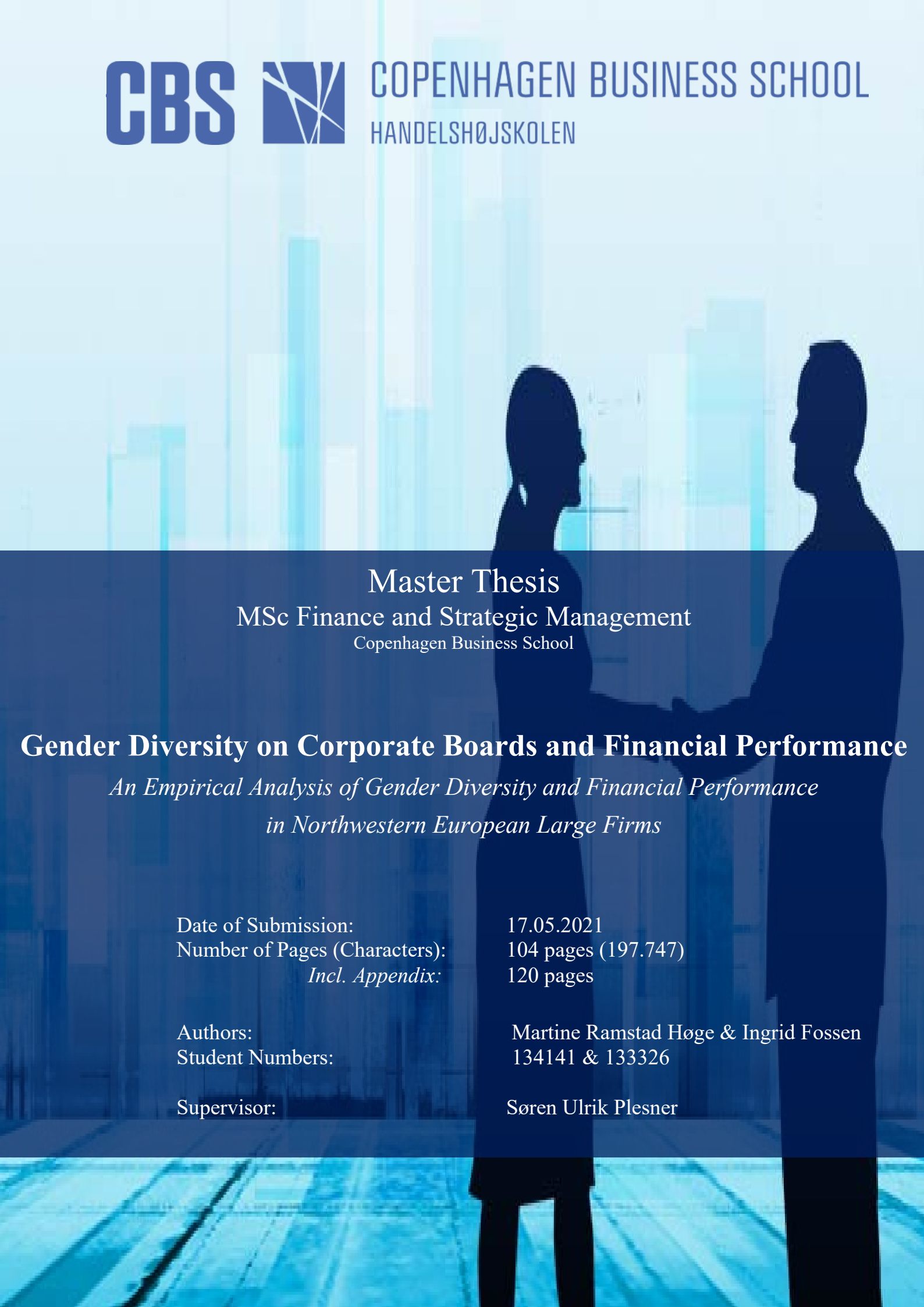


COPENHAGEN BUSINESS SCHOOL
HANDELSHØJSKOLEN

Master Thesis
MSc Finance and Strategic Management
Copenhagen Business School

Gender Diversity on Corporate Boards and Financial Performance

An Empirical Analysis of Gender Diversity and Financial Performance in Northwestern European Large Firms

Date of Submission:	17.05.2021
Number of Pages (Characters):	104 pages (197.747)
Incl. Appendix:	120 pages

Authors:	Martine Ramstad Høge & Ingrid Fossen
Student Numbers:	134141 & 133326
Supervisor:	Søren Ulrik Plesner

Abstract

There has been an increased focus on environmental and societal concerns during recent years, and investors are raising attention to socially responsible investments. According to stakeholder theory, it is reasonable to assume that gender diversity on corporate boards and executive positions support better leadership and governance, as diversity contributes to enhanced performance. Consequently, the financial effects of gender diversity are relevant for a company and its shareholders.

The purpose of the thesis is to investigate the relationship between gender diversity and financial performance, with an empirical analysis of large companies in Northwestern Europe. This is done by analyzing the stock returns of companies applying gender diversity as a screen and constructing portfolios of high and low levels of gender diversity. The portfolios' risk-adjusted returns have been analyzed by applying three traditional asset pricing models, namely the CAPM, Fama & French three-factor model, and Carhart's four-factor model. Additionally, the stock returns are analyzed on an individual stock level to consider company-specific information. Further, this study considers the political landscape of the countries, as some require obligatory gender quota on corporate boards and others do not. Hence, this thesis analyze if such regulations lead to more gender diversity, and if the financial effect of gender diversity supports legislation of female quota. This study has also investigated if companies with a high degree of gender diversity are more likely to have women in executive positions, and if gender diversity leads to a higher ESG score.

The major findings show an indifferent relationship between gender diversity and stock performance. At the portfolio level, our study finds neither an advantage nor a disadvantage of gender diversity. On the individual stock level, the results show a negative but insignificant relationship. Additionally, the thesis finds that countries without legislation have a higher average female presence on corporate boards than those with legislation. Nevertheless, a high female share in both board of directors and management boards makes it more likely that high leadership positions are filled by women. The thesis does not find sufficient evidence to establish a connection between gender diversity and ESG score. From a shareholder perspective, our results do not find that an investor should invest in companies with great gender diversity instead of companies with low gender diversity, nor the opposite. However, in today's business world, the stakeholder view has settled as a vital perspective. From a stakeholder perspective, our results do not find any argument for not encouraging gender diversity.

Acknowledgement

This master thesis is written as the final process of the Master program Finance and Strategic Management at Copenhagen Business School. The thesis is a quantitative study on gender diversity, where the main focus is to investigate the relationship between the female presence in the board of directors and management board to the stock performance of a company.

The authors would like to give a special thanks to our supervisor, Søren Ulrik Plesner. During this process, he has been a great support and contributed with valuable supervising through discussion, suggestions, and comments.

Table of Contents

List of Tables

List of Figures

1. Introduction

This thesis investigates the relationship between gender diversity in corporate boards and the financial performance of large companies in Northwestern Europe. In the first part of the thesis, an introduction to the topic and motivation will be given. Following this, a problem statement is created. The delimitation section will define the scope of the research and a description of our contribution to the research area will be given. Finally, this chapter will present an overview of the structure of the thesis and the research design, before introducing the most relevant terms.

1.1 Motivation

Recently there has been an increased focus on gender diversity in corporate leadership due to the high focus on corporate social responsibility (CSR) and the stakeholder perspective. In a time where corporations no longer only have to satisfy the needs of shareholders but please several stakeholder groups such as customers, employees, the local and global society, and consider climate challenges, the need for proper corporate governance is essential. Additionally, a rising number of investors care about the social impact of their investment. As a part of this, firms are measured beyond financial performance, namely by measuring the environmental, social, and governance (ESG) performance of companies, a framework originating from the triple bottom line theory (Elkington, 1997). Hereunder, the considerable attention towards the ESG factors may be a reason for the increased focus on diversity in corporate governance.

The purpose of corporate governance is to make sure the management is creating value for the shareholders and stakeholders of the company. The board of directors aim to improve a firm's financial performance by providing the management with guidance through advising and decision-making. Hence, the composition of knowledgeable and experienced members of the board is essential. A reasonable assumption is that a diverse board will provide broader experience during decision-making. There is an increasing focus on gender diversity on boards. Even though the gender composition of the total number of employments in large firms has developed and equalized in general, this has not been the case for executive boards (Green & Homroy, 2018). This development has inspired the authors of this thesis to investigate the topic of gender diversity on corporate boards.

In times of crisis, corporate governance and leadership are topics of high interest. Although there might be several causes of a crisis, leadership is often heavily discussed and questioned in the

aftermath of the crisis. The topic of this paper is inspired by early reports of the Covid-19 pandemic, which suggested that countries with female leaders responded better during the outbreak of the pandemic than comparable countries with male leaders. This suggestion were supported by analyses in the beginning of the fall of 2020 (Wittenberg-Cox, 2020). Hence, the focus of the leaders' characteristics was dedicated to their gender, which illustrates the current interest from society and its importance. Further, a reason for the enhanced focus on gender diversity is the growing number of organizations, including Female Invest, SHE Community, and the Sustainable Development Goals by the United Nations, working on this matter.

Another explanation for the increased focus on gender diversity is the political focus on the area. Whether to require obligatory gender quotas on corporate boards or not has been up for discussion for a long time. Over 15 years ago, Norway became the first country to enforce mandatory requirements for all publicly listed companies. The law requires listed companies to maintain at least a 40% female presence on corporate boards (Lovdata, 2021**)**. However, there are still a low number of women in high leadership positions in Norway (Riise, 2018). Other Northwestern European countries like Denmark and the United Kingdom have not enforced corresponding legislation. Even though gender diversity may be considered obvious in some environments, 56% of all Danish companies do not have any women on the board (Female Invest, 2021). Today's unbalanced boards imply that important arguments for gender diversity like equality, attracting young women, and new ways of problem-solving are ignored in many of the large corporations.

As gender diversity becomes more relevant for both investors and corporations, due to the social impact of an investment and the political debate, the relevance of the financial effects of gender diversity as a research area is indispensable. Existing literature on the area produces different results on the subject, and in particular, the studies lack investigation on recent periods as many studies are analyzing relatively old periods.

1.2 Research Question

The purpose of the thesis is to contribute to a piece of evidence on how gender diversity in boards and female leadership affects the financial performance of large firms in Northwestern Europe. In addition, other factors like the ESG score will be utilized to see if this, unaccompanied, can provide arguments for supporting gender diversity. The financial performance will be investigated by

analyzing the stock development of a company. The stock price is a financial measure affected by both external and internal factors, and stock returns are often considered as a sign of the level of success for a company.

In chapter 2, the literature review will refer to previous studies that have contributed as inspiration and basis for the topic of this thesis. Previous literature shows that the empirical studies on the area have not been able to produce consistent results on the subject and that there is lacking evidence in the Northwestern European area, in addition to different analysis approaches. With inspiration from previous studies combined with new elements, the aim is to contribute to new and valuable insights on the subject.

Based on this, the following research question is created:

"How does gender diversity affect the stock returns of Northwestern European companies?"

1.2.1 Sub-questions

The thesis will focus on gender diversity and stock performance over five years, spanning from 2016 to 2020. In order to answer the complex research question created, the thesis will make use of sub-question. The sub-questions will be deliberated and answered throughout the thesis and is reflecting the research structure. The following sub-questions are asked:

(1). What is gender diversity?
(2). How does gender diversity affect the risk-adjusted returns?
(3). How do different approaches affect the result when investigating the relationship between gender diversity and stock performance?
(4). Can ESG score provide a financial argument for enhanced gender diversity?

1.3 Our Contribution

In writing this thesis, the authors seek to contribute to the existing literature. The literature has expanded over the recent years as the topic has been trending. However, there are still areas that have limited existing research. Hence, the need for further examination is present, and this thesis will mainly contribute in three ways.

Firstly, the thesis contributes to expanding the existing literature by utilizing an atypical approach to the topic. To the best of our knowledge, the multi-factor models are a common approach within socially responsible investment (SRI) and ESG. However, the use of the models is limited in the research area on gender diversity. Secondly, by covering several countries with different economies and financial systems, the thesis takes a broad perspective, including countries with and without legislation on the subject. Following this, the thesis will help future research build a discussion around the role of regulation in controlling the diversity among management and boards. Finally, the study will contribute with updated information on the topic, which has increased its popularity and focus over the last couple of years, raising the relevance of the results of this thesis.

1.4 Delimitation

During the work with this thesis, several delimitations have been established. The term gender diversity speaks to an equitable or fair representation of people of a different gender. Hence, the definition is not clear, and there is room for interpretation. Consequently, there exist many angles and perspectives in the study of the topic. In order to answer the problem statement, the paper will take a narrow focus. This narrow focus has been consciously chosen, acknowledging that there exist other alternatives.

The thesis focus on ten specific countries and the geographical location of the countries assessed has been narrowed to Northwestern Europe. Hence, the ten chosen countries are Norway, Sweden, Denmark, Finland, United Kingdom, Germany, Austria, Switzerland, Netherland, and Belgium. The study is further limited by looking at the ten largest companies by market capitalization in the country. Based on the selection of 100 companies, several companies have not been assessed in this study. Therefore, the conclusion could have been different based on a selection of other companies, which makes the analysis of this thesis vulnerable to the selection of companies.

When collecting data for the thesis, the focus has been to collect articles, scientific journals, and other relevant publications to ensure quality and validity. The literature is collected mainly through CBS libsearch, Google Scholar, and Harvard Business Review. Among the search words used were: gender diversity, financial performance, stock performance, SRI, and ESG. Publication bias can occur as the likelihood of publication is higher of studies achieving significant results. The authors of this thesis

have been aware of the issue. Consequently, there has been a focus on finding literature with positive, negative, and neutral results.

For the financial analysis, the stock price is chosen to measure the effect on financial performance. The stock prices will be analyzed and examined over five years, and is chosen as the only variable as it is considered a capture-all measure. The data on the composition of the board of directors and management board is collected through the company's website and annual reports. The financial data is mainly collected from The Bloomberg Terminals, Refinitiv Eikon, and Yahoo Finance. The data collection has used data available as of 11th of January 2021, and data published after 30th of April 2021 have not been assessed. In doing this, the authors acknowledge that we might have overlooked recent information that could affect the result of this thesis.

Finally, the authors would like to acknowledge that the outbreak of the Covid-19 pandemic have to some degree affected the data. The year 2020 was filled with uncertainty, and the choice to exclude data from this period could have been justified. However, since market uncertainty is expected in a historical context, a choice was made not to exclude any data. The choice to keep the period as a part of our dataset was made while recognizing the possible effect this might have on our analysis.

1.5 Structure and Chapter Content

To answer the research question through a reliable and reasonable research process, the thesis will be structured in five sections.

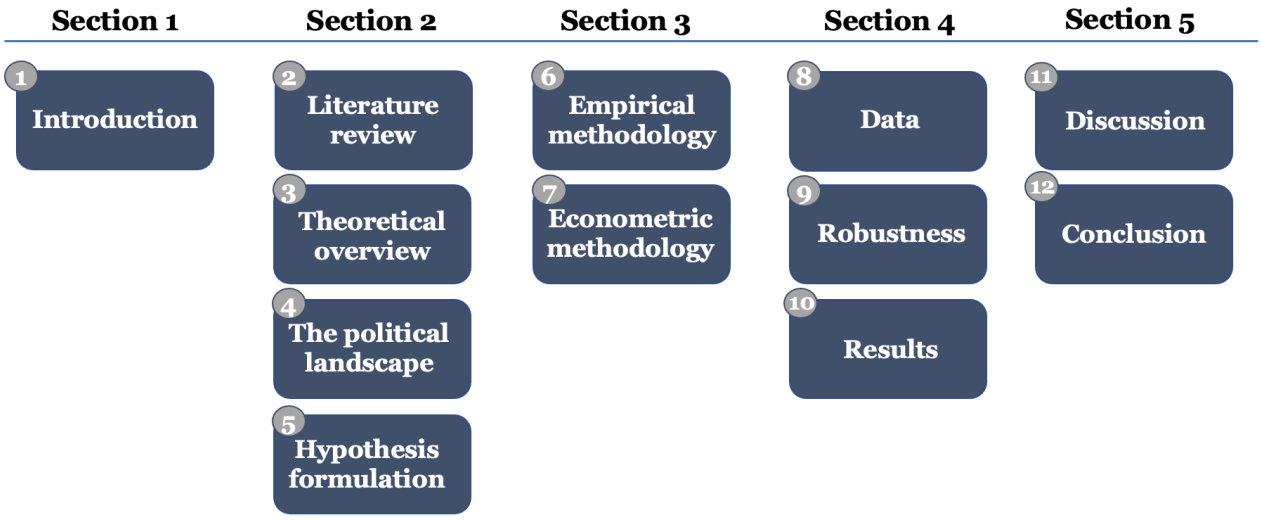


Figure 1: Overview of the structure of the thesis. **Source:** Own construction.

The first section consists of the introduction chapter, where the topic and motivation are presented. Following this, the research question is introduced. The aim of this section is to give an overview of how the research approach has been conducted, in addition to an introduction of the research contribution and delimitations. Lastly, the chapter describes the research design and essential terms.

The second section will present existing literature and give an overview of theory on the topic. Additionally, the political landscape is introduced to give an overview of the current political situation of the countries examined. Finally, the hypotheses are formulated and presented.

The third section includes the empirical and econometric methodology, where the theoretical aspect of the asset pricing models and assumptions for the regression models will be elaborated.

The fourth section is the analysis. This section starts to describe the data selection separated into six parts. Furthermore, the utilized robustness tests will be described. The relationship between gender diversity and stock performance will be analyzed both on a portfolio level and an individual stock level in the analysis to increase the robustness. Eventually, the results of the analysis will be presented.

Finally, the fifth section consists of the discussion and conclusion of the thesis. The hypotheses will be discussed and answered, and we aim to give a thorough answer to the research question presented in the introduction. Furthermore, suggestions for further research and evaluation of the research and the methods used for this paper will be presented.

1.6 Research Design

The philosophical framework applied in the research influences the entire process. This study's research design is based on Saunders, Lewis and, Thornhill´s (2019) framework, presented in figure 2 below.

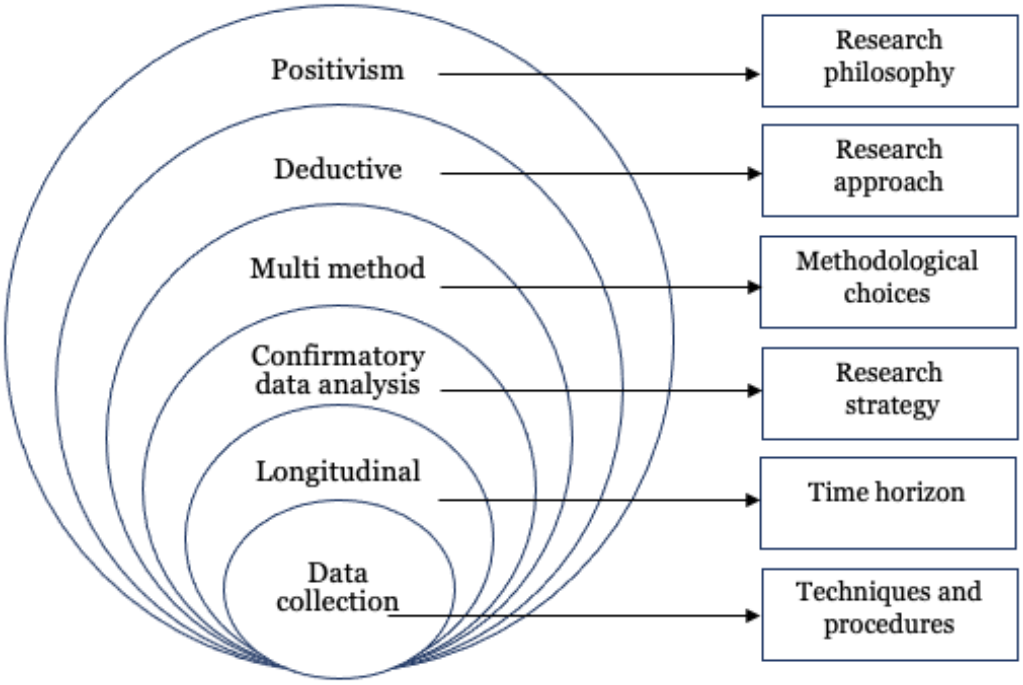


Figure 2: The research onion. **Source:** Saunders, Lewis & Thornhill (2019).

1.6.1 Research Philosophy

In this dissertation, a positivistic and epistemological research philosophy is applied in the process of answering the research question. Positivism focuses on scientific empiricist methods to yield the obtained data uninfluenced by the researchers' subjective values or biases. The analysis will be based on observable and measurable facts to provide credibility (Saunders et al., 2019).

1.6.2 Research Approach

A deductive approach is applied in this study, where the hypothesis asked are developed based on existing theory (Saunders et al., 2019). In the chapters of literature review and theoretical background, the theoretical relationship between gender diversity in corporate boards, stock performance, and ESG performance, is established. The quantitative data collected will be used in the data analysis process to evaluate the hypotheses built upon the existing theory.

1.6.3 Methodological Choices

In this study, a multi-method quantitative research method has been used to answer the research question. The quantitative data collection has been combined with quantitative data analysis procedures.

1.6.4 Research Strategy

The research strategy will be described in section 1.7 as a general plan of how our research will proceed to answer the research question (Saunders et al., 2019). The collected data will be analyzed through a confirmatory data analysis, where it will be analyzed through regression analyses on both portfolio and asset level, combined with a quantitative and qualitative discussion.

1.6.5 Time Horizon

The time horizon of this study is longitudinal, where its strength is the capacity to study change and development over a period (Saunders et al., 2019). The development of the data is observed over the time frame from 2016 until 2020 to capture and measure the influence of the variables over an extended period.

1.6.6 Techniques and Procedures

The data collection comprises a structured sample of quantitative data on gender composition, stock prices, ESG score, and factor data. The data collection process is described in chapter 8.

1.7 Research Strategy and Reliability

A positivistic and epistemological philosophy is applied when processing information and knowledge. This means that the data applied is considered reliable because it is obtained through objective observation. The role of the investigator (the authors) in this sense is limited to an objective approach when collecting data and interpreting this, and the investigator and the investigated object (female proposition and stock performance) are assumed as independent entities (Guba and Lincoln, 1994). This independence is vital as the investigator can study the object and process data with an objective approach. Various sources have been observed, and these sources have been applied in confirmatory data analysis.

Based on the positivistic and epistemological approach, the aim is that the authors' work or views are independent of the results, so a similar result would occur if other investigators perform the same analysis as in this thesis (Guba and Lincoln, 1994). The primary source of the data is conducted as second-hand data, as the thesis is written from an external perspective. Hence, these primary sources only include publicly available information in the form of annual reports, the companies' webpages, official government webpages, stock market information obtained from The Bloomberg Terminal and Yahoo Finance, ESG data from Refinitiv Eikon, analytical reports, academic papers, and articles. The quantitative secondary data is chosen from a critical and careful perspective. This because the companies in our selection are required to publish accurate information, and information from other sources such as analytical reports and websites are carefully selected. In addition, a variety of sources are used to verify, criticize, and increase the reliability of the data collection. Hence, the authors of this thesis assume that the obtained data is reliable. However, we acknowledge that it is possible that additional relevant information may have been overseen and that the obtained data could contain biases and errors, which will affect the results. The weaknesses of the thesis will be presented as an own part of the conclusion.

1.8 Terms

1.8.1 Gender Diversity

Diversity refers to including several types in a selection. Hence, gender diversity refers to an equal or fair representation between people of a different gender. Gender diversity often speaks to the ratio between men and women. However, this may also include non-binary genders. In this thesis, for simplicity reasons, the focus will be on the ratio between men and women. As the definition speaks of equal or fair representation, to some extent, there is room for interpretation within the definition. Following this, determining what is equal or fair can be hard to assess and, in the cases where there is a lack of guidelines or legislation, it is more or less up to the individual to determine. The gender diversity of this thesis will mainly be measured by the female share in the board of directors and management board. In addition, the female share of the Chairman of the board, the chief executive officer (CEO) and the chief financial officer (CFO) is included. When investigating the relationship between female share and stock performance in Northwestern European companies, the analysis will look at both companies that operate in countries with legislation, companies that operate in countries without legislation, and companies with guidelines.

1.8.2 Stock Prices

The term stock price refers to the current price a share of stock is traded for on the market. The market is highly affected by supply and demand. It is common to believe that the stock price should represent the value of the company. However, the price does not necessarily reflect the financial state of a company, as the stock price is affected by a wide range of internal and external factors. The market is preoccupied with stock prices or stock performance. In this thesis stock returns are calculated to percentages to be able to measure the performance of a company. The performance of a stock makes it possible to compare different companies with different currencies, yet, the question of good or bad performance has no definition. However, the comparison of stock returns can be used to some degree to justify the assessment.

1.8.3 Environmental, Social and Corporate Governance (ESG)

ESG is often used in connection with the theme sustainability and has had enormous growth in popularity in recent years. The definition is broad, and the complexity is enough for a study of its own, and therefore, the authors acknowledge that there might be areas of ESG that will not be covered in this study. ESG is measured in an ESG score available through several sources and databases for all listed companies. As the topic is complex, the providers have different scores due to the emphasis on the various factors. Hence, there is no agreement on one standard score method. Following this, estimating a good ESG score will be an individual assessment based on several specific measurements.

2. Literature Review

There are various studies about gender diversity and corporate performance, and hereunder their relationship is up for discussion in the literature as the topic is complex and broad. Previous studies have been an inspiration for the research presented and examined in this thesis.

In 1992, Wiersema & Bantel discovered a correlation between CEO demography and firm performance (Wiersema & Bantel, 1992). The demography variables varied from age, organizational, and top management team tenure to educational level. Further, Powell & Ansic (1997) found that females are less risk-seeking than males, and that females and males apply different strategies when making financial decisions. Further, they contended that the different strategizing strengthens

stereotypical assumptions that females are less fit financial managers and decision-makers. The stereotypes of female leadership have been written about in different studies. Oakley (2000) argued that one way of explaining the low numbers of female CEOs in large corporations is gender-based stereotypes. Based on this, we have found that existing literature agrees that females and males are experiencing different paths when climbing the corporate ladders.

More recently, the board structure has been a topic of different studies. Board diversity has changed radically over the last years due to, among other, government regulations in some countries and a higher focus on corporate governance after the financial crisis in 2008. Relatively recent studies have commonly been inspired by how such crisis and corporate governance scandals have led to greater importance of corporate governance (Terjesen, Sealy & Singh, 2009; Boulouta, 2013). Terjesen et al. (2009) describe how women obtain an influential role on corporate boards while facing the various barriers to entering high-level positions. Such entry barriers will be discussed as the glass ceiling concept in chapter 3.

The above introduction of previous studies is far from exhausting in the large area of study on gender diversity and corporate governance. Due to the main target of this thesis being to quantify the financial effect of gender diversity, many studies about organizational psychology and behavior have not been examined. The further focus of this literature review will be narrowed to previous studies of the quantitative impact on corporate performance of gender diversity, hereunder board and management diversity. Previous studies covered further in this thesis is presented below in table 1 and 2, where the explored studies will not have been published further back in time than the year 2003. This elimination is based on the fact that older studies have already been given significant attention in other academic publications, and it is considered more important to focus on newer studies. Followingly, the research area on this topic is considered dynamic and the attention on gender diversity have exceeded especially during the last years. It is also found more relevant to concentrate on newer studies as this thesis focuses on relatively new corporate management issues of corporate governance and gender diversity today.

Study	Region	Period	Name of study	Dataset
Carter, Simkins & Simpson (2003)	US	1997-1999	Corporate Governance, Board Diversity and Firm Value	797 publicly traded Fortune 1000 firms.
Bauer, Koedijk & Otten (2004)	Germany, UK and US	1990-2001	International evidence on ethical mutual fund performance and investment style	103 German, UK and US ethical mutual funds
Farrell & Hersch (2005)	US	1990-1999	Addition to corporate boards: the effect of gender	309 firms from the Fortune 500 and Service 500 lists in 1990. Reduced number over the time period.
Randøy, Thomsen & Oxelheim (2006)	Nordic	2005	A Nordic perspective on corporate board diversity	Board diversity from 459 largest publicly traded firms in Denmark, Norway and Sweden.
Rose (2007)	Denmark	1998-2001	Does female board representation influence firm performance? The Danish Evidence	443 Danish listed firms on the Copenhagen Stock Exchange during 1998-2001.
Campbell & Mínguez-Vera (2008)	Spain	1995-2000	Gender Diversity in the Boardroom and Firm Financial Performance	The panel data sample: firms listed in Madrid in the period; 68 companies and 408 observations.
Francoeur, Labelle & Sinclair-Desgagné (2008)	Canada	2001-2004	Gender Diversity in Corporate Governance and Top Management	230 firms from the 500 largest Canadian firms per year reported by the Financial Post.
Adams & Ferreira (2009)	US	1996-2003	Women in the boardroom and their impact on governance and performance	Data collected from publishing of the IRRC and ExecuComp on 1 939 US firms; S&P 500, S&P MidCaps and S&P SmallCap firms.
Børhen & Strøm (2010)	Norway	1989-2002	Governance and Politics: Regulating Independence and Diversity in the Board Room	All non-financial firms listed on the Oslo Stock Exchange at year-end at least once over the period 1989-2002.
Dezsö & Ross (2012)	US	1992-2006	Does female representation in top management improve firm performance? A panel data investigation	Panel data: S&P's ExeComp database: list of 1 500 S&P firms.
Halbritter & Dorfleitner (2015)	US	1991-2012	The wages of social responsibility – where are they? A critical review of ESG investing	ESG data of ASSET4 (1170 firms), Bloomberg (1070 firms) and KLD (4209 firms).
Perryman, Fernando & Tripathy (2016)	US	1992-2012	Do gender differences persist? An examination of gender diversity on firm performance, risk, and executive compensation	Data from Compustat and ExecuComp: 2566 firms on firm performance, 2454 firms on risk, and 2564 firms on individual executives.

Marinova, Plantenga & Remery (2016)	Netherland and Denmark	2007	Gender diversity and firm performance: evidence from Dutch and Danish boardrooms	186 listed firms observed in 2007; 102 Dutch and 84 Danish companies.
Conyon & Lerong (2017)	US	2007-2014	Firm performance and boardroom gender diversity: A quantile regression approach	Over 3000 publicly listed US firms per year.
Chen, Leung & Evans (2018)	US	1998-2006	Female board representation, corporate innovation and firm performance.	Data collected from the IRRC, Compustat, US Economics, on 1 224 firms.
Green & Homroy (2018)	Western Europe	2004-2015	Female directors, board committees and firm performance	Largest listed European firms in terms of market cap. (Number of firms) Country: (5) Belgium, (7) Denmark, (24) France, (21) Germany, (10) Italy, (13) Netherlands, (3) Norway, (11) Spain, (4) Sweden, (14) Switzerland, and (30) the UK.

Table 1: Overview of previous studies on the relationship between gender diversity and firm performance.

Source: Own construction.

Study	Region	Method	Results
Carter, Simkins & Simpson (2003)	US	Comparisons of means, firm value (Tobin's Q) and regression analysis.	The results provide evidence of a positive relation between firm value and diversity on the board of directors.
Bauer, Koedijk & Otten (2005)	Germany, UK and US	Regression analysis using CAPM model, Fama and French three-factor model and Carhart model.	Finds no evidence of significant differences in risk-adjusted returns between ethical and conventional funds.
Farrell & Hersch (2005)	US	Regression analysis and event study analysis.	Fails to find convincing evidence that gender diversity in the boardroom is enhancing value.
Randøy, Thomsen & Oxelheim (2006)	Nordic	Pearson correlation coefficients, stock market valuation and ROA, and regression analysis.	Nordic boards are homogenous in terms of gender and nationality, while age is more diverse. Board diversity not significantly related to company performance in 2005.
Rose (2007)	Denmark	Valuation (Tobin's Q) and cross-sectional regression analysis.	Very low female representation on Danish supervisory boards. Gender diversity on board does not influence firm performance.
Campbell & Mínguez-Vera (2008)	Spain	Panel data analysis of firm value (Tobin's Q) and dummy variables on gender diversity.	The presence of women on the board does not in itself affect firm value. However, the diversity of the board has a positive impact on firm value. This implies that the focus

			should be on gender balance rather than simply the presence of women. Increased gender diversity can be achieved without destroying shareholder value.
Francoeur, Labelle & Sinclair-Desgagné (2008)	Canada	Regression analysis using Fama/French three-factor model/valuation framework.	The results shows that firms operating in complex environments do generate positive and significant abnormal returns when they have a high proportion of women officers. The participation of women as directors does not make a difference, but firms with high proportion of women in both their management and governance systems generates value to keep up with normal stock market returns. The findings support the policies currently discussed and implemented in some countries and organizations to foster the advancement of women in business.
Adams & Ferreira (2009)	US	Valuation (Tobin's Q) and regression analysis.	Diversity has a positive impact on firm performance if the governance is weak and negative effect on shareholder value in firms with strong governance. Female directors have a value-relevant impact on board structure. The evidence does not provide support for quota-based policy initiatives based on improvements in governance and firm performance.
Børhen & Strøm (2010)	Norway	Valuation (Tobin's Q), regression analysis and two-stage least squares.	Find that the current politics of board design cannot be justified by valuation arguments due to no convincing economic reasons. Gender diversity should hence not be based on beneficial economic consequences but rather as part of ensuring equal opportunities.
Dezsö & Ross (2012)	US	Firm performance (Tobin's Q) and correlation and regression analysis.	Female representation in top management leads to better firm performance but only to the extent that a firm is focused on innovation as a part of its strategy.
Halbritter & Dorfleitner (2015)	US	Constructs ESG portfolios, and applies the performance with the Carhart four-factor model in regression analysis, and Fama-MacBeth cross-sectional regression.	The ESG portfolios do not state a significant return difference between companies with high or low ESG ratings. The cross-sectional regressions reveal a significant influence of several ESG variables. However, this impact is highly dependent on the rating provider, the company sample and the particular subperiod.
Perryman, Fernando & Tripathy (2016)	US	Panel regression on risk, firm performance (Tobin's Q) and compensation.	Firms with greater gender diversity in top management teams (TMT) show lower risk and deliver better performance. Female executives are paid less than their male colleagues (also at TMT level).

Marinova, Plantenga & Remery (2016)	Netherland and Denmark	Two-stage least-squares estimation, firm value (Tobin's Q) and regression analysis.	The results show no relation between the share and presence of women on boards and firm performance for these two countries for the particular year of study.
Conyon & Lerong (2017)	US	Quantile regression, mean regression, firm performance (Tobin's Q), and ROA.	Heterogeneous performance impact of women directors across performance distribution. Larger positive performance impact of women directors in high-performing firms.
Chen, Leung & Evans (2018)	US	Tobit, Poisson and Fama-MacBeth regression analysis.	Female directors do not improve firm value. Firms with greater representation of female directors achieve greater innovative success.
Green & Homroy (2018)	Western Europe	Two-stage least-squares estimation. Compare CEO's children as a measure, firm profitability and value (Tobin's Q) and regression analysis.	Finds no effect of female board representation on firm profitability. Any case for greater gender diversity needs to be based on arguments for moral justice. The results do demonstrate modest, but economically meaningful, effects of female board representation on firm performance, especially for committee membership.

Table 2: Results of the studies on the relationship between gender diversity and firm performance.

Source: Own construction.

The literature that will be further assessed in this thesis is presented in table 1 and 2. The most common method used in the studies is regression analysis, used in all 16 studies reviewed above. The different studies apply time series data, panel data, or cross-sectional data. The number of variables the studies include varies, but several studies take a wide range of different diversity elements into account and not only gender. When estimating the effect on firm performance, 10 of the 16 studies use Tobin's Q as a measure of firm value, while some also look at stock returns and different profitability ratios such as ROA and ROIC. The datasets vary significantly from 142 to above 3 000 yearly observations. In addition, the time period applied in the studies also varies. 12 of 16 studies investigate firms before the year 2008, and the most recent period investigated ended in the year 2015. This may indicate that the results can already be outdated, which also support the need for updated analyses. Two of the 16 studies investigate ESG and SRI. These are included in the literature review as gender diversity relates to the governance element of ESG.

2.1 Summary of Literature Review

2.1.1 Results in US and Canada

Nine of the 16 studies investigate the US market. Two of these studies agree that female leaders do not improve firm value (Farrell & Hersch, 2005; Chen, Leung & Evans, 2018). One of the studies conclude with a positive relationship between firm value and board diversity (Carter, Simkins & Simpson, 2003). The other studies' results might indicate some positive impacts from female leaders when adding more than economic value into consideration. Female leadership might lead to better firm performance in firms with weak governance or firms with innovation as a part of their strategy and goals (Adams & Ferreira, 2009; Dezsö & Ross, 2012; Conyon & Lerong, 2017). In addition, the study of Perryman, Fernando & Tripathy (2016) find a positive relationship between gender diversity in top management teams, lower risk, and better performance.

The two studies on ESG and ethical investing both look at the US market. Bauer, Koedijk & Otten (2005) do not find evidence of abnormal returns for ethical funds compared to the conventional funds. However, in the study by Halbritter & Dorfleitner (2015), a significant influence of some ESG variables has been discovered, although the constructed ESG portfolios do not find a significant return difference between companies with high or low ESG score. One of the studies investigates the Canadian market (Francoeur, Labelle & Sinclair-Desgagné, 2008). This study looks at gender diversity and firm performance related to abnormal returns by constructing the data into portfolios, which are the same approach as in the two studies of ESG and ethical investing studies (Halbritter and Dorfleitner, 2015; Bauer, Koedijk and Otten, 2015). Francoeur et al. (2008) find that firms generate positive and significant abnormal returns in complex environments when having a higher proportion of women in high leadership positions. Additionally, the study concludes that the findings support promoting the advancement of women in business, related to legislation on the political agenda.

2.1.2 Results in Europe

Eight of the 16 studies evaluated the European market. The results in this region agree more on an overall basis than the US market, where six studies on gender diversity and firm performance in Europe conclude that gender diversity does not influence firm performance (Randøy, Thomsen & Oxelheim, 2006; Rose, 2007; Campbell & Mínguez-Vera, 2008; Børhen & Strøm, 2010; Marinova, Plantenga & Remery, 2016; Green & Homroy, 2018). Similarly, the study on ethical investing does

not find evidence of superior performance of the ethical funds compared to the conventional funds (Bauer et al., 2005). In the study of Campbell & Mínguez-Vera (2008), a positive impact of gender diversity on firm value is established and states that the focus should be on gender balance rather than having female attendance. Two studies of the European market find that laws and regulations on board diversity cannot be justified on firm value reasons (Børhen & Strøm, 2010; Green & Homroy, 2018), opposite to what is stated in the study of the Canadian market (Francoeur et al., 2008). This relates to the topic of countries with and without legislation on gender diversity on boards. The studies agree that instead of economic reasons, gender diversity must be based on equality and moral justice arguments.

2.1.3 Conclusion of Previous Studies

To summarize the presented results of previous studies in table 2 above, it is reasonable to conclude that the economic arguments for gender diversity has not been found exceptionally strong. The empirical studies also indicate that gender diversity has various impacts due to the significant number of different variables to consider, which can also be said for the utilizing of the ESG score. One can also argue that it is limited empirical evidence on the geographical area of Northwestern Europe and that the periods in previous studies are relatively old in terms of the increased focus on gender diversity. As stated, most of the studies apply panel data or cross-sectional data when investigating the relationship between gender diversity and company performance. To the authors' knowledge, there are few studies on this topic that have conducted the same approach as found in many studies on SRI and ESG, namely portfolio analysis, especially not in the selected geographical area.

Based on this, the thesis is inspired to investigate the relationship of gender diversity and the corporate performance of stock returns in Northwestern European companies. To contribute to the existing literature, risk factors are taken into account where most previous studies evaluate a firm's total value, apply accounting ratios, or raw stock returns. Consideration of risk factors will be done by constructing portfolios that consist of companies with a high or low female share on the board of directors and management board, and measure the portfolios' performance by applying multi-factor models. To build our analyses and discussion upon more than previous literature, the next chapter will present a theoretical overview on the topic of gender diversity and financial performance.

3. Theoretical Overview

In this chapter, theories on gender diversity, investor perspective, and risk awareness will be introduced. The purpose of this is to present the frameworks that will be applied together with the discoveries from previous literature in the discussion in chapter 11.

3.1 Gender Diversity on the Agenda

As previously introduced, gender diversity is currently a hot topic. In addition to the authors being inspired by the literature on female leadership and gender diversity, the topic is regularly covered in newspapers, and an increased number of organizations have been founded. In this section, an introduction to how gender diversity is on the agenda and how some of these organizations work to enhance female leadership will be given.

Female Invest

Female Invest was founded in 2017 in Denmark and is currently a leading financial educator in Europe targeting women (Female Invest, 2021). The company aims to close the financial gender gap by educating women through e-learning on investments and personal finance. The three founders of Female Invest have, as the only women in Denmark, been featured on the Forbes list of Europe's 30 most influential people in finance under the age of 30 (Schoenberg & Dawkins, 2020). In addition to offering education, Female Invest has become a platform to inform and highlight female leadership and investing. The Danish newspaper *Finans* published an article in January of 2021 stating that in 2017 below 10% of investment platform customers were women, and by the end of 2020, this number had increased to 25% (Skinbjerg, 2021). Further, the paper points at Female Invest as one of the key drivers behind this development, hereunder the most influential driver being female role models and easily available platforms.

SHE Community

SHE Community is a Norwegian organization founded in 2014 to inspire women to become leaders and investors. SHE Community is the host of the SHE Conference, a yearly conference that has become the most prominent gender equality conference in Europe (SHE Conference, 2021). In addition to hosting the SHE Conference, the organization has launched the SHE Insight magazine, SHE Invest, SHE Leads, and the SHE Index. The SHE Index has been launched in Norway and Sweden, accompanied by Ernst & Young, SHE Community will make the Index global (SHE

Conference, 2021). The index measures gender diversity in the companies included in the index, and it is voluntary to join the SHE Index. In addition to measuring gender balance, the index consists of five other categories, which are (2) policies and targets, (3) actions, (4) gender pay gap, (5) talent and recruitment, and (6) general diversity and inclusion (SHE Index, 2021). Including more categories in the index, shows how gender equality is more than just gender balance. This initiative creates incentives for companies in the Index to have a continuous focus on such matters. If the Index fulfills the mission of becoming global, it is reasonable to assume it will affect the future results of what is discovered in the research of this thesis.

United Nation's Sustainable Development Goals

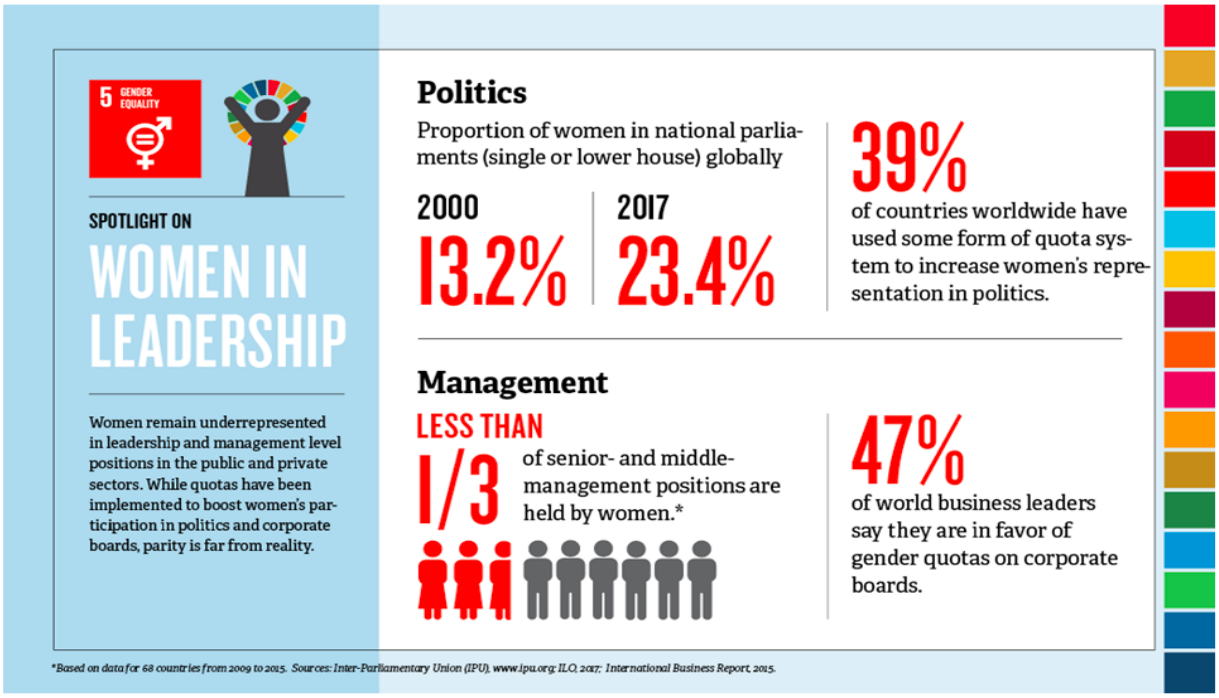


Figure 3: UN Sustainable Development Goals: goal 5.5. **Source:** United Nations/SASEF.org.

In 2015, the United Nations (UN) launched 17 sustainable development goals, where the fifth goal is called "gender equality and women's empowerment." Hereunder, target 5.5 is to "ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic, and public life" (UN, 2021). The goal is to achieve this by 2030. With the influence and political power of the UN, this is an essential contributor to gender equality and enhanced female leadership. This because they influence the laws and regulation at a high political

level, and because it increases attention on gender inequality issues for companies of all sizes and sectors.

The existing literature agrees that one of the reasons for low female leadership rates is the lack of female role models in high leadership positions. Therefore, it is reasonable to assume that the actual results from the organizations' work with gender equality will show in the future. Most of the analysis of this thesis will be based on historical numbers and will not account for the future. However, the highlighted points in this section are exciting and vital for the future of gender diversity.

3.2 The Glass Ceiling Concept

Based on existing literature and the discoveries made when collecting data in this paper, there can be assumed significant entry barriers for women into higher leadership positions. To analyze why the view on female leadership has been, and still to some extent is, different than male leadership, the theory of "glass ceiling" is applied. The glass ceiling concept was introduced in the 1980s and is still relevant today. It describes how women meet intense but invisible barriers when working their way upwards in the organizational hierarchy (Morrison & Von Glinow, 1990). The glass ceiling is a form of discrimination factor that potentially explains why women traditionally have been unable to access power and high-level positions (Bell, McLaughlin & Sequeira, 2002). Additionally, studies have discovered that women historically had lower odds to achieve promotions to top executive roles, and that women in higher positions have less authority within their organization and lower salaries and compensations (Lyness & Thompson, 2000). These conditions may repulse the next generation of potential female leaders, and hence an unfortunate circle is created for the development of gender diversity.

Based on this, one can consider the glass ceiling to be a concept that illustrates the difficulties female employees and managers have struggled with and why differences exist today. Even though there is more focus on incorporating women into leadership roles today, this theory explains why females tend to fill more low-level than high-level positions compared to their male counterparts. Some may argue that there is an increasing trend of women entering higher leadership positions, and one could discuss if the glass ceiling is mostly overcome. However, the higher leadership positions are still occupied mainly by men, and the authors will build further on the glass ceiling concept when discussing the results from the analysis.

As mentioned, the glass ceiling concept leads us to several factors that may explain why the business culture is experiencing gender inequality and higher entry barriers for females. However, as this paper has narrowed the focus down to analyze the relationship between female leadership and stock returns, it is essential to state that many soft factors that would be important to assess have not been considered. The financial focus of this paper leads us into an investor perspective, and in the next section, the shareholder and stakeholder theory will be introduced.

3.3 Shareholder and Stakeholder Theory

When discussing and measuring performance, the outcome is different dependent on the applied perspective. In the last decades, there has been a shift in how performance is measured (Hubbard, 2009). Milton Friedman introduced shareholder theory in the 1970s, where the only responsibility of a corporation was to maximize the profits, meaning that the overall firm performance was measured by shareholder return. Hence, this dominated the organizational performance measurement systems. Robert Edward Freeman introduced a broader perspective known as stakeholder theory in 1984 (Hubbard, 2009). In contrast to the shareholder theory, the stakeholder view says that the firm has a broader set of responsibilities to various stakeholder groups. Different stakeholder groups are e.g., investors, suppliers, government, creditors, customers, employees, community, and media. This stakeholder-based view has influenced organizational performance measurement as we know it today. Further, the stakeholder theory addresses morals and values in the management and can be assumed to explain why companies today focus on CSR. One of the most known performance measurement systems based on stakeholder theory is the triple bottom line by John Elkington (1997). The triple bottom line reflects three pillars of responsibility: social performance, environmental performance, and economic performance, also referred to as the three P's: people, planet, and profit. Hereunder, the topic of gender diversity is a part of the social and people performance of a corporation.

3.3.1 Corporate Governance and Board Structure

As the focus on CSR and the triple bottom line has grown, corporate governance has developed into a crucial element of corporate management. Corporate governance is about the control and direction of managers and is today a complex and dynamic topic and of higher importance than earlier (Thomsen & Conyon, 2019). Some of the reason for this is that the (business) world in general changes more rapidly than previously, and also that the broader stakeholder view has settled. What

works well in one firm does not necessarily work well in another. The corporate governance models shape companies' board structure system, ownership system, and amount of management on board (Thomsen et al., 2019).

In this thesis, the analysis and discussion will look at gender diversity on the board of directors and management board of a company. The board of directors has the final responsibility and power, being the intermediate between the shareholders and management team of a company (Thomsen et al., 2019). Further, the board of directors are often made up of a combination of non-executive and independent directors, and executive and dependent directors. In contrast, the management board, often called the executive board, consists of executive and dependent directors. Even though these two boards have different responsibilities, they are strongly connected as the management board is the board of directors' representation in everyday and urgent matters. Fama & Jensen (1983) argued that the non-executive board and the management board specializes in different stages of the decision-making process. They defined a set of steps in a decision-making process:

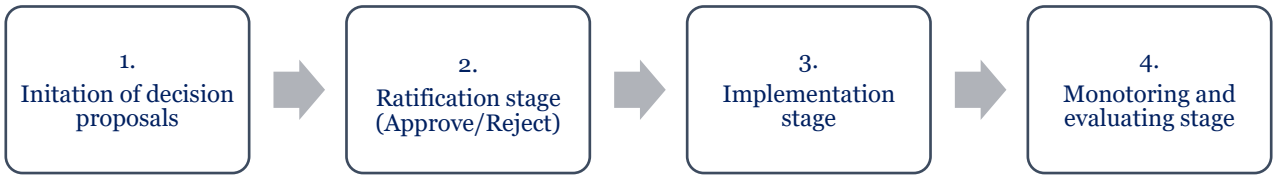


Figure 4: Stages of the decision-making progress. **Source:** Fama & Jensen (1983)/Own construction.

The most efficient division of labor regarding the four steps is when the board of directors takes responsibility for steps 2 and 4, while the management takes charge of steps 1 and 3 (Fama & Jensen, 1983). Further, there are many elements of corporate boards to consider as it is a complex matter. A vital element of the discussion on board structure is diversity. The term diversity contains, among others, gender, ethnicity, experience, education, age, and international memberships. It is a general understanding that diversity enhances a better understanding of different business conditions, and enhancing corporate performance (Thomsen et al., 2019).

3.3.2 The Stakeholder View and ESG

The ESG score is included as a part of the thesis to take a broader stakeholder view into account, and hereunder corporate governance, CSR, and the triple bottom line. One of the criticisms against the

triple bottom line, and other organizational performance measurement systems that reach beyond only financial performance, is that social- and environmental performance is hard to measure due to its complexity (Hubbard, 2009). However, measuring corporate performance and sustainability reporting is a hot topic on the political agenda today (Busco, Malafronte, Pereira & Starita, 2019). This paper will not deliberate further on the matter of complex issues of reporting but leaves this as a topic to include in further research relevant to the research question of this thesis.

Based on the rationale above, gender diversity is an essential part of any company's corporate governance today, due to the stakeholder-based view. Therefore, this thesis will explore if gender diversity can be financially justified applying the stakeholder perspective.

3.4 Modern Portfolio Theory

The modern portfolio theory was introduced by Markowitz (1952). It is a famous theory on achieving the optimal portfolio based on the effect of diversification in connection with the tradeoff between risk and return. Further, the model is also called the mean-variance theory.

Markowitz's (1952) optimal portfolio choice is based on the idea that any risk-averse investor requires the highest expected return given any level of portfolio risk. This assumption is based on investors considering expected return as desirable, while variance is considered undesirable. Assets included in a portfolio should be selected based on their covariance to each other. To diversify non-systematic (firm-specific) risk, the portfolio should include assets with low covariance to each other. With enough diversification, it is possible to eliminate all non-systematic risks and leave the portfolio with only systematic (market-specific) risks (Berk & DeMarzo, 2016). The optimal portfolios related to the relationship of risk (σ) and return (R_i) can be illustrated as follows:

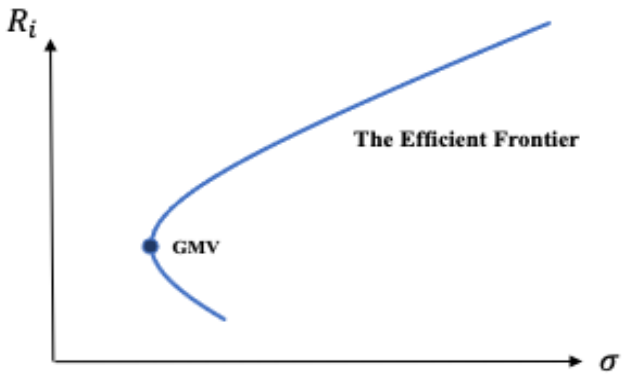


Figure 5: The efficient frontier. **Source:** Markowitz (1952)/Own construction.

To achieve higher expected returns, the investor must accept higher investment risk. There exist several combinations of optimal portfolios for any risk preference. Above, figure 5 illustrates that all portfolios that lie on the efficient frontier, above the global minimum-variance (GMV) portfolio, are optimal portfolios with the best tradeoffs between risk and return. The optimal portfolio for the investor is the result of the individual investor's level of expected return and risk aversion. Hence, the investor's choice of a portfolio depends on its individual risk-aversion (Markowitz, 1952). In the section below, the relationship between gender and risk attitude will be deliberated. The modern portfolio theory evolved in the 1960s to include the Capital Asset Pricing Model (CAPM), and this model will be introduced later in chapter 6 where the models for the regression analysis are explained.

3.5 Risk Attitude and Gender

In an organization, decisions are made every day, and with the decisions, risk follows. Risk is the consequences of an event and the associated likelihood of that event (Keremis, 2020). How a person reacts to risk is dependent on their risk attitude, and the literature divides this into three categories; (i) risk-averse, (ii) risk-neutral, and (iii) risk-seeking. Risk-averse refers to being resistant to risk, risk-neutral signifies that a person is indifferent to risk, and risk-seeking is used to describe someone attracted to risk. This section seeks to examine whether attitude towards risk is different depending on gender.

The topic of roles assigned to the genders has been given more attention over the recent years. The focus has primarily been that not everyone identifies with the "classic" gender roles. It has been questioned whether it is right to give the different genders specified roles in society or whether the role one has in society should be determined by how the person choose to identify themselves. The majority of research published before 1980 indicated that gender differences exist from nature and hence also in decision-making (Sonfield, Lussier, Corman & Mckinney, 2019). More specifically, most studies determined that women are more cautious, less confident, less aggressive, easier to persuade, and have inferior leadership and problem-solving abilities when making decisions exposed to risk than men (Johnson & Powell, 1994). However, other research studies are leaning against supporting gender similarities rather than differences (Chaganti & Parasuraman, 1996; Powell & Ansic, 1997). Some studies found no significant gender differences in management decision-making values or styles (Chaganti, 1986; Powell, 1990).

The study by Garikipati & Kambhampati (2020) on the importance of gender in the fight against the Covid-19 pandemic is one of the most recent research on the subject. The research finds that, to some extent, the outcome of the first response was significantly better in countries led by women. The article points at two main reasons for this outcome. The first reason is risk management, in connection with women being assumed to be more risk-averse, this is seen in context with decisions that affect human lives. Secondly, leadership style is mentioned. The leaders have been leaning towards empathy, focusing on children and healthcare workers, making female leadership seem more democratic and participative (Wittenberg-Cox, 2020). However, it should be mentioned that the countries with female leaders may have specific characteristics that enabled them to respond to such crises better (Garikipati & Kambhampati, 2020).

Additionally, another discovery of difference concerning risk is placement of savings. Stocks and funds are well-known saving alternatives, but there is a degree of risk associated with these forms of savings. A Norwegian study conducted in collaboration with the initiative #huninvesterer (#sheinvests) shows that 70% of the shareholders on the Oslo Stock Exchange in 2017 were men, and men received 80% of all dividends in 2018 (Huninvesterer, 2020). This may indicate that men are more willing to take risks concerning savings. However, this observation could also be a sign that the knowledge of personal financial investments is higher for men and organizations such as Female Invest and SHE are working to close this gap. Although research shows that women invest less than men in personal finances, there are several examples of female investors making huge returns (Gara, 2017; Gara, 2020).

Even though risk-aversion will vary from one individual to another, it is based on the above reasonable to assume general gender differences towards risk. However, it is important to keep in mind other explanatory factors when applying this assumption, such as country-specific characteristics. Further, a reason may be that men has historically had more financial knowledge then women. If so, this may explain why men is found to be more risk-seeking concerning savings. The aim of this chapter was to introduce relevant theories forming our analyses and discussion. In the literature review, we found that some studies focus on the topic of political legislation of gender quotas. Inspired by this, the next chapter will present the political landscape of the countries in the dataset.

4. Political Landscape

In this chapter, the political landscape of the countries introduced will be presented. With this, the aim is to highlight the laws and regulations the companies must operate within, besides underlining the countries' similarities and differences. As this section will show, gender diversity is mostly voluntary. However, the increased focus on the topic is likely to influence and enforce mandatory requirements promoting gender diversity on corporate boards. Consequently, the political landscape is essential for corporate governance as regulations will lead the corporations to change their board composition.

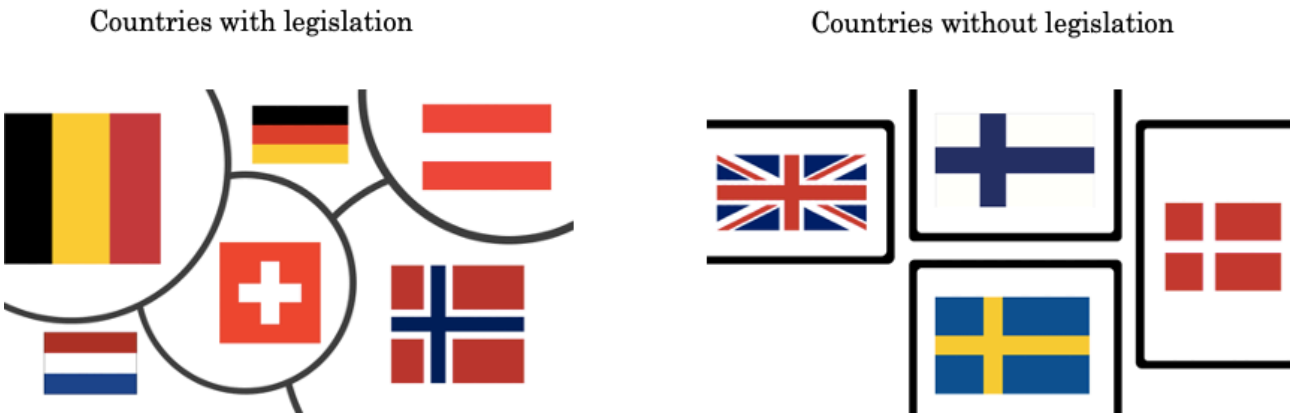


Figure 6: Overview of countries in the dataset with and without legislation. **Source:** Own construction.

4.1 Countries with Legislation

Norway

Norway became the first country to enforce mandatory requirements regarding gender diversity in the boards of directors of all public listed companies in 2003. The law implies that listed companies must maintain a minimum of 40% female presence on corporate boards (Lovdata, 2021). As of the 1st of January 2008, the law came into full effect, ensuring that the companies were given a five-year grace period to adjust the board to fulfill the new requirements. The Norwegian Register of Business Enterprises may refuse registration of a board if the board's composition does not follow the legislation. However, the law does not apply to all Norwegian companies. It is restricted to companies having share capital of at least 1 million NOK. There are also some exceptions to the law regarding the number of members. Additionally, the employee representatives are excluded (Lovdata, 2021). As a result of the law, the female presence has increased from approximately 9% in 2004 to 42% in

2020 (Hoang & Fjærli, 2020). Although the law has increased the female presence on boards, research has shown that the share of female CEOs has not been affected by this change 15 years later (Riise, 2018).

Belgium

In September of 2011, Belgium enforced a law that requires the largest publicly traded companies and certain state-owned or –controlled entities to have at least 30% females on their board (McGrath, 2020). The listed companies were given until 2017 to comply, while smaller companies had until 2019. The law became effective immediately for the state-owned or –controlled entities. Non-compliance can lead to several sanctions. The publicly listed companies face removals of financial benefits to the directors on the boards that do not comply. This creates a strong financial incentive for board members to ensure that the company operates within the law.

Netherland

A gender quota of 30% for the corporate boards of large companies was introduced in Netherland in 2013 (Kruisinga & Senden, 2017). However, there were no sanctions if a company could not comply with the target, and firms were only required to disclose their reasoning as to why they chose non-compliance. Consequently, several reports have concluded that the effect was limited (Valkering & Brouns, 2018). Following the failure of the first try, a new law was passed in December of 2019. The new law requires listed companies in the Netherlands to have at least 30% of their supervisory board seats held by women (Weghoeft, 2020). The companies that fail to comply with the law will have to replace any board position left by a man with a woman or face leaving the position empty.

Germany

As the largest economy in the European Union and the Chancellor of Germany being Angela Merkel, the perception is that Germany is progressive in the matter of gender equality. In 2015, Germany introduced a law requiring some of Europe's largest companies to give 30% of supervisory seats to women (Smaler & Miller, 2015). Companies that failed to fulfill the quota would have to replace with women or leave the positions empty. With this, Germany wanted to move towards a more gender equal business world. The percentage of women on the corporate boards crossed the 30% threshold in 2017 and stood at 35.2% in November 2020 (Reuters, 2021). However, recent research found that the representation of women in senior management in German companies was lagging behind peers

in major rival economies (Goodley, 2020). Out of the 30 largest companies, only 12.8% of the management board members were female (DW, 2021). Following this, Germany enforced a new law in November of 2020 that would require the management boards of listed companies with more than three members to include at least one woman.

Austria

In Austria, the 'Law on equality for women and men as non-executive directors on company boards' entered into force on the 1st of January 2018 (European Commission, 2018). The law requires at least a 30% diversity of publicly listed companies with more than 1 000 employees. If the requirement is not met, the companies will have to leave the seat on the board empty. Consequently, the share of women on the boards of the largest publicly listed companies increased from 7% in 2005 to 25% in 2018 (European Institute for Gender Equality, 2019).

Switzerland

In September 2020, the Swiss Federal Council approved a new requirement of 30% gender diversity for the boards of directors and 20% for the executive committee for large Swiss companies (Ricchetti, 2020). The law was enforced from the 1st of January 2021 and concerns companies that in two consecutive years have a balance sheet of more than 20 million Swiss francs, sales revenues exceeding 40 million Swiss francs, or that have an annual average of more than 250 full-time positions (Gesley, 2020). The companies will be required to include information about gender quotas in their annual report. If the quotas are not met, the companies must explain the non-compliance and take action to increase diversity. In 2020, the female ratio was 23% on the boards of directors and 10% on the executive board in the 100 largest Swiss companies (Gesley, 2020).

4.2 Countries without Legislation

Sweden

For a long time, the Swedish government has discussed the possibility of enforcing a quota law of 40% for company boards. However, the government dropped the bill in January 2017 as they did not have the support in the parliament (The Guardian, 2017). In 2020, Sweden had a female ratio of 32% in corporate boards of listed companies, against an average of 23% in the European Union (EU). Moreover, the female ratio in the national parliament was 44%, against an average of 28% in the EU (World bank, 2021). Even though the government does not have any legislations for gender equality,

around 100 of Stockholm's best-known businesses have publicly declared their commitment to gender equality through the private initiative 'A Woman's Place'. The initiative is about more than making a simple declaration. The companies that sign have to follow five principles, designed to highlight potential pitfalls and prevent inequality (Invest Stockholm, 2021).

Denmark

The discussion of gender quota has been a topic of interest in Denmark for several years. As there was a lack of majority for a law regarding quotas, a guidance was introduced in 2013. Here, the largest companies were asked to set goals and present a plan for gender diversity (Rosenbak, 2018). Consequently, the female representation on board of directors in the large companies has increased from 10% in 2013 to 19% in 2020 (Female Invest, 2021). However, 56% of all Danish companies still does not have women on their board. In 2017, the biggest listed companies on the Copenhagen stock exchange had more foreign men on their boards than women of any nationality (Rosenbak, 2018).

United Kingdom

The United Kingdom does not have any laws concerning female representation on corporate boards. In 2011, the Davies Report recommended a ratio of at least 25% female representation on the FTSE100 boards, which further developed to a recommended ratio of 33% in 2015. The FTSE250 boards were advised to hit the same target by 2020 (The Institute of Leadership & Management, 2021). As the parliament has not turned the recommendations into legislation, these are currently voluntary. Another voluntary effort is the 30% Club. The initiative started in 2010 to achieve a minimum of 30% representation of female share on FTSE100 boards by 2015. The target was reached in September of 2018. The percentage of the 5th of January 2021 stands at 36.1%, up from 12.5% in 2010 (30percentclub, 2021).

Finland

As the first country to give women equal political rights in 1906, Finland has been a pioneer in women's rights. However, there is currently no mandatory legislation in Finland. Instead, there are recommendations through the corporate governance code to have both genders represented, and to have a 40% representation of men and women on corporate boards (Kenerson, 2021). The companies that follow the code should "comply or explain", meaning that if a company is unable to comply, it

must publish the reason for the non-compliance. As of 2019, 31.9% of board seats of listed companies in Finland are held by women (Deloitte, 2019). This has been obtained without legislation. Instead, the focus has been on creating programs that encourage and develop women.

European Union (EU)

To illustrate the political situation in the Europe, we will briefly present the current state in the European Union. For several years, the EU has been concerned with the issue of gender diversity of the corporate boards in their member countries. As the EU legislation will affect most of the countries mentioned, and hereunder Europe's largest corporations, the importance of a potential legislation is high. In 2012, the commission drafted a proposal of enforcing a 40% diversity rate where the companies unable to comply faced fines. However, the proposal ran into opposition, and there is currently no legislation concerning the topic. Despite this, the female presence in corporate boards in the EU had increased from 12% in October 2010 to 28% in April 2019.

5. Hypothesis Formulation

Based on the research question, the literature review, and the presented theory, this chapter presents four hypotheses this study will examine.

Hypothesis 1: ***Companies with a high level of women on corporate boards will more likely have a female Chairman, CEO, or CFO.***

According to the theory, women have had a more challenging time climbing the corporate ladder than men. This is referred to as the glass ceiling concept, and the authors consider this as a potential explanation of why the business world is in an unequal state regarding gender. Based on the literature, there is reason to believe that having women in high leadership positions will bring even more women into higher leadership positions. Following this, the first hypothesis of this study is that companies with a high level of women on corporate boards will more likely have a female in the position of Chairman, CEO, or CFO.

Hypothesis 2: ***Countries with legislations have a higher level of female presence on corporate boards.***

Previous studies have investigated whether financial performance can provide support for gender-based quota on corporate boards. The majority has found that when only considering financial motives, it cannot provide enough support. In this study, six of the countries have legislation and four do not. The authors seek to explore if countries with regulations, on average, have a higher level of female presence on the board compared to those without.

Hypothesis 3: ***Companies with a "high" level of females on the board of directors and management board outperform the stock performance of companies with a "low" level.***

This study has been inspired by previous studies investigating the relationship between gender diversity and financial performance. As argued, we find little empirical evidence on the geographical area of Northwestern Europe, and in contrast to previous studies, this study will focus on the latest years. The authors believe that the portfolios with higher female share will outperform the stock performance of the portfolios with low female share. According to the stakeholder theory and SRI, companies pleasing a wider group of stakeholders will add value to their corporation, and hence the authors suggest this to be reflected in the stock returns.

Hypothesis 4: ***Gender diversity leads to a higher ESG score.***

Previous studies more or less agree that gender diversity on corporate boards does not lead to enhanced firm performance. However, this study wants to explore if the ESG score is higher in companies with a high level of women in top management positions and boards. This is related to financial performance because investors have an increased focus on the social impact of their investment, and for some, a high ESC score may be a part of their investment criteria. If we find that female leadership relates to higher ESG scores, this can provide a financial argument for why companies should focus on gender balance.

6. Empirical Methodology

To analyze if female leadership influences stock performance, regression analyses on monthly stock returns using CAPM and the multi-factor models of Fama & French and Carhart have been conducted. As discussed, previous literature has proposed different approaches to investigate the relationship between gender diversity and firm performance. Inspired by this, two approaches have been applied in this thesis, one approach being on a portfolio level and the other on an individual stock level.

The first approach chooses portfolios as base assets by aggregating stocks into portfolios. The motivation behind this is to reduce unsystematic volatility and create more precise factor exposure, and possibly lower volatility for risk premia (Ang, Liu, & Schwarz, 2017). Well-known financial authors such as Black, Jensen, & Scholes (1972), Fama & MacBeth (1973), and Fama & French (1993) used this as motivation to choose portfolios as base assets, as it diversifies a significant amount of the information on the individual factor exposure. The other approach analyses individual stocks through a panel study.

In this study, the primary analysis applies the portfolio approach and time series regression, inspired by Francoeur et al. (2008) and Halbritter & Dorfleitner (2015). In addition, an individual stock approach has been applied using panel regression to increase the robustness of the results. This approach may cover company-specific details that can be missed in the portfolio studies. Further in this chapter, only the portfolio level approach and models will be deliberated as this is the main focus of the thesis.

6.1 CAPM

The Capital Asset Pricing Model (CAPM) is the most famous model on the relationship between risk and return. It is a single-factor model describing the relationship between systematic risk and expected return on assets. Several authors in the 1960s, including Treynor (1962), Sharpe (1964), Lintner (1965), and Mossin (1966), contributed to shaping the theory of the model. As previously introduced, the model follows the foundations of modern portfolio theory, mean-variance theory, developed by Markowitz (1952, 1959). The CAPM assumes that the return on investment of portfolios are linearly related to the associated risk and that an optimal portfolio is well diversified.

Three main assumptions underlie the model (Berk & DeMarzo, 2016):

1. Investors can buy and sell all securities at competitive market prices (without incurring taxes or transaction costs) and can borrow and lend at the risk-free interest rate.
2. Investors hold only efficient portfolios of traded securities – portfolios that yield the maximum expected return for a given level of volatility.
3. Investors have homogeneous expectations regarding the volatilities, correlations, and expected returns of securities.

If all investors have homogeneous expectations, all investors will demand the same tangent portfolio, also called the efficient portfolio of risky securities (Berk & DeMarzo, 2016). In other words, when the CAPM holds, the tangency portfolio equals the market portfolio, which is the sum of all investors' portfolios. The CAPM equation can be written as follows (Berk & DeMarzo, 2016):

Equation 1: *CAPM*

$$E[R_i] = R_i = R_f + \beta_i\big(E[R_m] - R_f\big)$$

Where $E[R_i]$ is the expected return of asset *i,* R_f is the risk-free rate, $E[R_m]$ is the expected return of the market portfolio, and β_i is the beta of asset *i* concerning the market portfolio.

The beta for asset *i* can be expressed as follows:

Equation 2: *Market beta*

$$\beta_i = \left(\frac{\sigma_i}{\sigma_m}\right)(r_{i,m}) = \frac{Cov(R_i, R_m)}{\sigma_m^2}$$

The beta for asset *i* measures the volatility to market risk. Hence, the expected return of asset *i* is related to the covariance between asset *i* and the market portfolio expressed as $Cov(R_i, R_m)$ in the formula. σ_m^2 reflects the volatility of the expected market return. According to the formula, the beta equals one when the respective assets systematic risk and the market is the same. A beta of zero implies no covariance with the market portfolio, and the security is, in such case, risk-free. The systematic risk of the asset and the market is inverse if the beta is less than zero. Further, if the beta of an asset exceeds one, the security yields a higher expected return. The security market line (SML) illustrates the relationship between the expected return and beta. According to the CAPM, all stocks and portfolios should lie on the SML since the market portfolio is efficient (Berk & DeMarzo, 2016).

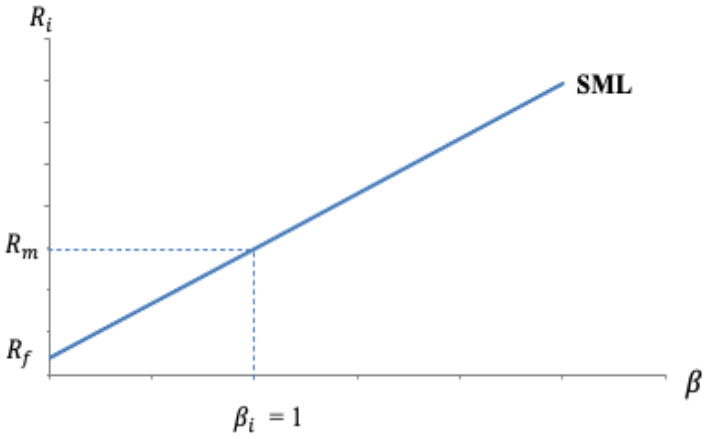


Figure 7: Security Market Line. **Source**: Own construction.

6.2 The Efficient Market Theory

Among other assumptions, the CAPM is based on the efficient market theory, presented as the efficient market hypotheses (EMH) by Fama (1970). The EMH assumes that all available information on assets is immediately reflected in stock prices. The hypothesis was presented in three forms to specify the market efficiency degree; (i) weak form, (ii) semi-strong form, and (iii) strong form (Bodie, Kane & Marcus, 2014). The weak form states that stock prices fully reflect all historical stock prices, and it should not be possible to create superior returns only by applying a trading strategy based on this. The semi-strong form states that stock prices reflect all published information. Thus, it should not be possible to create superior returns by looking at firms' past financial performance or other performance measures such as ESG. Finally, the strong form hypothesis states that stock prices effectively possess all available information, both public and private.

The EMH has later been debated in the literature, and critics argue the underlying assumptions of CAPM to be unrealistic (Heymans & Bruwer, 2015). According to the hypothesis, it should never be possible to obtain significant excess returns. If the assumption holds, actively managed assets would never perform better than the market, and the premium paid to asset managers would not be reasonable. There are many discussions and theories related to the EMH, and the topic could be a thesis on its own.

Further, one of the criticisms of the CAPM and the EMH is the application of the risk-free rate in the model. The assumption that shareholders can borrow and lend at a risk-free rate is not possible in

practice since volatility exists as the yield fluctuates daily. Another criticism is how the CAPM accounts for risk, only depending on the asset's beta and the market portfolio (Ang, 2014). The CAPM can be viewed as a single-factor linear regression model. To create an efficient portfolio, when the market portfolio is not efficient, other factors need to be included (Berk & DeMarzo, 2016).

6.3 Jensen's Alpha

A common approach when estimating the beta in the CAPM is to use linear regression. Hereunder, the CAPM is often written in the excess return form $(R_i - R_f)$. Alpha (α_i) was introduced by Michael C. Jensen (1968) and is a risk-adjusted performance measure, representing the average return on an investment or portfolio above or under the predicted return by CAPM and the SML. Hence, alpha demonstrates the difference between portfolio returns and the market return when the CAPM does not hold (abnormal return over the theoretical expected return). In equilibrium, alpha equals zero according to the CAPM, where all disparities in returns can be explained by asset betas (Berk & DeMarzo, 2016). The error term (ε_i) will also be expected to be zero. Jensen's alpha is expressed as follows:

Equation 3: *Jensen's Alpha (CAPM in excess return form)*

$$(R_i - R_f) = \alpha_i + \beta_i(R_m - R_f) + \varepsilon_i$$

The equation is the same for calculating the excess return of a portfolio as of a single asset. The alpha of a portfolio is a weighted average of the alpha of the portfolio's assets. According to the formula, portfolios situated above the SML have a positive alpha and have outperformed the market, while portfolios situated below the SML have a negative alpha and have performed worse than the market. The stock's distance above or below the SML is the stock's alpha (Berk & DeMarzo, 2016). Jensen's alpha will be denoted as alpha further in this thesis.

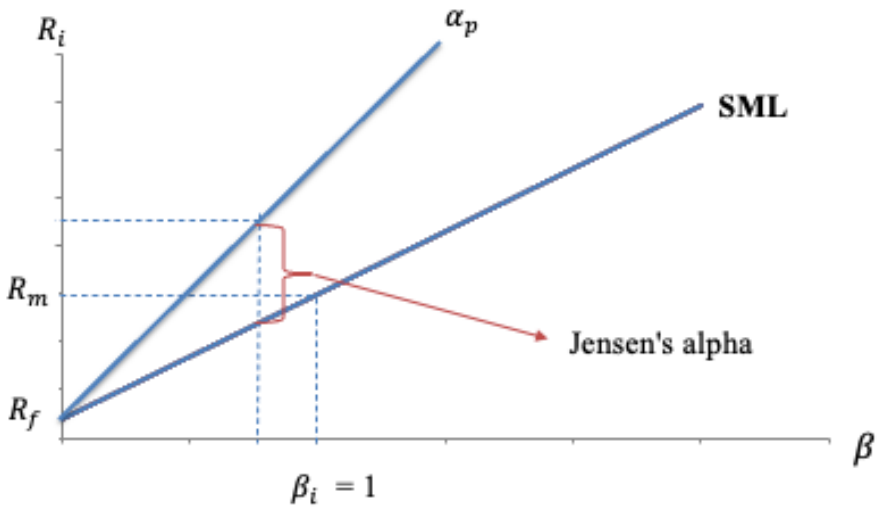


Figure 8: Jensen's alpha. **Source:** Jensen (1968)/Own construction.

6.4 Factor Models and Arbitrage Pricing Theory

When using one efficient portfolio, this alone will capture all systematic risk, referred to as a single-factor model. When several portfolios are used as factors, these will together capture all systematic risk. In such cases, where more than one portfolio is used to capture risk, the model is referred to as a multi-factor model (Berk & DeMarzo, 2016). Multi-factor models can cover other variables that affect stock prices beyond the single-factor model CAPM to better explain the behavior of stock prices. Since it can provide better explanations of stock returns, the use of multi-factor models has significantly enhanced. The multi-factor model is also called the Arbitrage Pricing Theory (ABT) (Berk & DeMarzo, 2016).

The ABT was first introduced by Stephen Ross (1976). The model was an alternative to the CAPM on the relationship between risk and return, stating that the returns of an asset can be described by a factor model. The model is more flexible than the CAPM but more complex due to the choice of what factors to include. In the same way as CAPM, ABT relates return and risk with a predicted security market line (Bodie et al., 2014).

Equation 4: *The APT mode*

$$R_i = a_i + \sum_{j=1}^{j} b_{ij} F_j + \varepsilon_i$$

Where R_i is the expected return of asset *i,* a_i is the expected return of asset *i* if all factors equal zero, b_{ij} is the sensitivity of asset *i* to changes in factor *j*, F_j is the value of factor *j,* and ε_i is the error term.

6.5 The Fama & French Three-factor Model

One of the most famous multi-factor models is the Fama & French three-factor model. Fama & French (1992) found that in addition to the market factor (beta) from the CAPM, there are other factors such as size, leverage, and book-to-market equity affecting stock or portfolio returns. In addition to expand the CAPM, the model builds on Jensen's alpha model, and by adding firm size and book-to-market (B/M) value to the market factor from the CAPM, the model is calculated as follows:

Equation 5: *Fama & French Three-Factor Model*

$$(R_i - R_f) = \alpha_i + \beta_{i\,m}(R_m - R_f) + \beta_{i\,SMB}\,SMB + \beta_{i\,HML}\,HML + \varepsilon_i$$

Where $(R_i - R_f)$ is the excess return on portfolio *i* against the risk-free rate, α_i illustrates the alpha for portfolio *i*, $(R_m - R_f)$ is the excess return on the market portfolio, $\beta_{m,SMB,HML}$ is the factor coefficients, SMB is small minus big (the size premium), HML is high minus low (the value premium), and ε_i, the error term, is the residuals of the regression model.

SMB (small minus big) refers to the size premium in the formula and is the return of a small-company portfolio of stocks minus the return of a portfolio of large-company stocks. HML (high minus low) refers to a value premium. This is the return of a portfolio of stocks with a high B/M value, minus the return of a portfolio of stocks with a low B/M value. Stocks with a high B/M value are often known as growth stocks, and stocks with low B/M value are normally known as value stocks (Munk, 2018).

6.6 Carhart's Four-Factor Model

Carhart's four-factor (Carhart, 1997) is another famous multi-factor model. The model is an extension of the Fama & French three-factor model by adding a factor. This factor is called the momentum factor (MOM) and builds on the findings of Jagadeesh & Titman (1993). The strategy Carhart found concerns going long on top performers and short on bad performers. By adding this to the Fama & French three-factor model, the model is expressed as follows:

Equation 6: *Carhart's Four-Factor Model*

$$(R_i - R_f) = \alpha_i + \beta_{i\,m}(R_m - R_f) + \beta_{i\,SMB}\,SMB + \beta_{i\,HML}\,HML + \beta_{i\,WML}\,WML + \varepsilon_i$$

WML stands for winners minus losers and represents the MOM factor. The WML factor considers assets' tendency of following a given path among two periods, called the momentum effect. The factor is the premium on winners minus losers (WML), on the assumption that prior winners will receive more than prior losers. The model can be interpreted as a performance attribution model, where the effects of adding the factor to the CAPM and three-factor model reduce the pricing errors in both models.

7. Econometric Methodology

In order to make use of the models presented in the previous chapter, linear regression has been applied. This chapter will briefly describe the underlying theory of linear regression. The linear regression model is a form for regression analysis, as it is used as a method of analyzing the relationship between the dependent and independent variables (Stock & Watson, 2015). The regression analysis will be performed using the statistical software Stata.

7.1 Linear Multiple Regression

The most common form of regression analysis is the linear regression model. The analysis seeks to answer whether the unknown effect of changing one variable, referred to as the dependent variable, will affect the independent variable. When creating a linear regression model, both one and several factors can be used. A classic one-factor model has the following equation (Stock & Watson, 2015):

Equation 7: *One-factor model*

$$Y_i = \beta_0 + \beta_1 X_i + u_i$$

Hereunder, Y_i is the dependent variable, X_i is the independent variable, $\beta_0 + \beta_1 X_i$ is the regression line, β_0 is the intercept of the regression line, β_1 is the slope of the regression line, and u_i is the error term. A multi-factor model is created by adding more factors to the equation and has the following equation (Stock & Watson, 2015):

Equation 8: *Multi-factor model*

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_k X_{ki} + u_i$$

7.2 The Ordinary Least Squares (OLS)

When performing a regression analysis, a regression coefficient is used to estimate a line to explain the relationship between the dependent and independent variables. To assess if a model for linear regression gives the best possible estimates, the OLS estimator is the most common method. According to the OLS, the regression line that minimizes the sum of the squares of the difference between the observed dependent variable and the predicted dependent variable should be chosen (Stock & Watson, 2015).

The OLS estimator finds the regression coefficients, and one of the most common approaches when measuring the beta in the CAPM is using the OLS estimators to measure it. OLS estimators are also applied for the betas in the multi-factor models of Fama & French and Carhart. When a linear regression has been estimated, the R^2 and adjusted R^2 measure how well the regression line fits. The R^2 is the part of the sample variance of Y predicted by X, but it has problems when more than one variable is measured. When adding a new variable, R^2 will increase and improve the fit of the model. Adjusted R^2 does not increase by this and is a modified version of R^2 in the case of more than one variable (Stock & Watson, 2015).

7.3 The OLS Assumptions

OLS is a popular method amongst practitioners, and as it is widely used, it becomes easier to compare the results of the analysis. In order to ensure that the model is unbiased and consistent, Stock & Watson (2015) present four assumptions in the multiple regression model:

1. The conditional distribution of u_i given $X_{1j}, X_{2i}, \ldots, X_{ki}$ has a mean of zero.
2. $(X_{1j}, X_{2i}, \ldots, X_{ki}, Y_j)$, $i = 1, \ldots, n$ are independent and identically distributed (i.i.d.)
3. Large outliers are unlikely; $X_{1j}, \ldots, X_{ki}$, and Y_j have nonzero finite fourth moments.
4. There is no perfect multicollinearity.

The first assumption is that the error term's conditional distribution given the value of the dependent variable X has a mean of zero. This means that the independent variable Y's value can be both above and below the regression line, but the value follows the regression line on average. Following this, for any value of the dependent value X, the error term should be zero.

The second assumption says that the dependent and the independent variable should be independent and identically distributed (i.i.d). This means that the distribution is identical for each observation, and each observation should be independent. The data retrieved in this dissertation, stock prices, is called time series data, as it is collected for the same entity at multiple points in time (Stock & Watson, 2015). For time series regression, the second assumption changes to a time series version of the assumption. The second assumption that replaces the above (2.) assumption when working with time series data is that the joint distribution of the variables, including lags, does not change over time (Stock & Watson, 2015):

2. (a) The random variables $(Y_t, X_{1t}, \ldots, X_{kt},\ )$ have stationary distribution, and
   (b) $(Y_t, X_{1t}, .., X_{kt},\ )$ and $(Y_{t-j}, X_{1t-j}, \ldots, X_{kt-j},\ )$ become independent as j gets large

The third assumptions are that large outliers are unlikely. When using the OLS estimation, observations far out of the data range should be unlikely as the OLS is sensitive to outliers. Large outliers will have a significant effect on the regression line, making the estimate unprecise.

The fourth assumption is that there is no perfect multicollinearity. Perfect multicollinearity is when one of the independent variables is a perfect linear function of another independent variable. This will lead to an improper mathematical equation, as this gives an equation where the result would be divided on zero.

In addition to the four assumptions above, it is critical to consider heteroskedasticity and autocorrelation to achieve the best possible regression. Heteroskedasticity occurs when the error term has a conditional distribution given X_i, and the error term must not depend on X_i (Stock & Watson, 2015). In other words, heteroskedasticity exists when the standard errors of variable change when measured over a particular period. The opposite of heteroskedasticity is homoskedasticity. The OLS estimator is unbiased even if the errors are heteroscedastic or homoscedastic. However, the results may be incorrect due to one-sided t-tests and p-values. Autocorrelation in errors is another critical issue when dealing with time series data. Similar to the presence of heteroskedasticity, autocorrelation in errors may result in inconsistent standard errors and misleading results, even though the OLS estimator will still be unbiased (Stock & Watson, 2015). This will be tested and presented in section 9.1 robustness test.

8. Data

This chapter will present the dataset of the study and the techniques applied when collecting the data sample. In order to describe this process, the chapter is divided into six sections. The obtained data is assumed reliable based on critical choices, in addition to the independence between the authors and the investigated objects, established in section 1.7.

First, a thorough description of company information is presented, where both the selection of companies and the study of companies are explained. This is followed by a section describing the data collection of stock prices. Next, the ESG score collection will be explained, where the choice of ESG data provider is argued in addition to an illustration of the score's measures. Then a section will describe the process of the portfolio construction, which will be the basis for the following portfolio analysis. Finally, the collection of the factor data is described.

8.1 Selection of Companies

In this section, the choice of companies will be introduced. To create a credible and reasonable analysis, predetermined criteria to select companies have been used.

8.1.1 Geographical Area

Geographically, the focus is narrowed to Northwestern Europe, as one can assume that countries in the same area have some homogeneity regarding business environment, political environment, and social environment. In other words, the cultural differences are assumed to be relatively low. In chapter 4. Political Landscape, the laws, and regulations per country regarding female quota on the board have been described more in detail.

8.1.2 Number of Companies

In this study, 100 companies have been analyzed based on selecting ten companies each in the ten selected countries. Hereunder, the choice of ten companies was selected by ranging the top ten largest publicly listed companies by market cap in the year 2020. No country-specific adjustments have been made, and the adjustments made for companies are deliberated below. It could be argued if the selection of companies should be weighted differently between the countries since countries as Sweden and Germany have many large companies compared to other countries like Austria in the selection. Further, the same 100 companies are analyzed each year.

8.1.3 Company Type

The research has been restricted to only listed firms, as the relevant information for the research is easily available. This criterion also makes the companies and the data collection more comparable, ensuring the quality of the dataset. Further, previous studies suggest that the female share on boards of directors is more remarkable in larger firms (Carter et al., 2003; Farrell & Hersch, 2005). However, the paper's conclusion could have been different if other company types, such as small-cap companies, were included.

8.1.4 Sector and Size

Data regarding the sector and size of the companies in the data sample has been collected and will be applied as elements to consider next to the results of the financial analysis. The size, measured in market cap, was retrieved from the Refinitiv Eikon database. In order to have comparable values, all numbers were collected in the currency Euro. The companies are assessed and further divided into appropriate sectors. To clarify, the choice to sort by sector instead of industry was made as the term sector covers a broader segment where the industry is a more specific consortium. However, the two terms may be used interchangeably in this thesis. The 100 companies are divided into 15 sectors, where the number of companies within a sector varies from one to 21 companies. Figure 9 shows the full table of sectors and the number of companies within each sector.

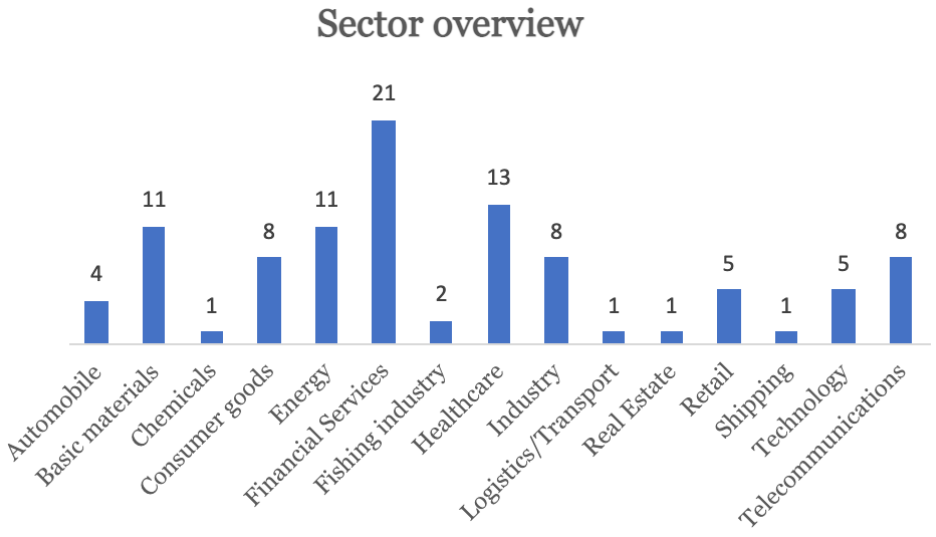


Figure 9: Sector overview. **Source:** Own construction.

8.1.5 Time Horizon and Other Adjustments

One of the most important adjustments made to the dataset has been excluding companies that have been publicly listed on a shorter horizon than the last five years. The companies that this accounts for are Spotify (Sweden), Essity (Sweden), Prosus (Netherland), and Bawag Group (Austria). In addition, two companies were excluded from the selection due to language obstacles. The authors decided that we could not account for reliable results if the results were based on annual reports in languages other than English, Norwegian or Danish. It has been confirmed with the companies by email correspondence that the information only is available in French. Hence, Proximus (Belgium) and Sofina Societe Anonyme (Belgium) were excluded from the dataset. These six companies have been replaced with the second largest companies by market cap in the relevant country, so the dataset ends with a selection of ten companies from each country.

Further, one could discuss if some sectors should be taken out of the dataset due to high volatility. However, we have not excluded any industries based on volatility. Due to the Covid-19 pandemic, some companies might suffer significant shifts in stock prices in 2020. Hence, an assessment has been made about whether any companies should be excluded as it could be argued to cause noise in the analysis. However, since the crisis's effect is global, it will be difficult to argue for the type of effects companies must have undergone in the last year to qualify to be excluded from this analysis. The full list of companies in the dataset can be found in Appendix 1.1.

8.2 Empirical Study of Companies

The empirical study has collected information on each company's composition of the board of directors and management team. Some critical issues regarding the collected information will now be deliberated.

8.2.1 Governance and Organizational Structure

The challenge when collecting information about the companies chosen is the wide range of governance systems. The two central systems are two-tier or one-tier board systems, where the two-tier system consist of a supervisory board and a management board while the one-tier system only has one board. A distinction is made between the supervisory board and management board in the two-tier system to make the different systems comparable.

Additionally, a concern when comparing the systems is that there are individual differences in each system. For example, there are especially discovered differences in the presentations of the management team. The management team is presented in various forms, such as the management board, the executive team, the executive board, and the senior management board. Moreover, the size of the management boards varies from two to 40 members. For clarity reasons, what is called 'management board' in this thesis refers to all types of management teams for the companies in the selection. These management boards all have in common that they include the top operational leaders of the organizations. Specifically, they consist of senior-level executives such as the chief executive officer, chief financial officer, chief operating officer, chief technological officer, chief risk officer, and head of a country division.

Other discoveries when collecting data could be discussed, such as the board membership classification of the employee representatives. However, the individual differences within the systems will not be examined further, and the data obtained is assumed to be relevant and extensive for the analysis and research question asked in this thesis.

8.2.2 Annual Reports

Annual reports have been assessed when collecting information about the composition of the board and management of the companies. The primary method used to determine the gender of the members in situations of doubt was to search for images or prefixes. When this information was not available, the members' names were searched via Google, or the first names were matched to commonly gender-specific names. A total of 400 annual reports between 2016-2019 were used in the research. Further, all 100 companies' websites were used for the year 2020, as a consequence of the annual reports for this year not being published when collecting data in January and February of 2021. In total, 500 boards and 500 management teams have been examined and obtained through the various websites and annual reports, ensuring that the collected information on board composition is accurate.

8.3 Quantitative Study of Stock Market Observations

Data collection regarding financial performance was primarily collected from The Bloomberg Terminal in addition to Yahoo Finance. The Bloomberg Terminal is a computer software system provided by the financial data vendor Bloomberg L.P. and brings together real-time data on every

market, breaking news, in-depth research, and powerful analytics, among other things (Bloomberg, 2021). If there was information missing or a need for supplements, financial data was obtained from Yahoo Finance.

The performance measure chosen to estimate financial performance is the stock price. The particular reason for this choice is that stock price is considered an all-consuming measurement, as the price of a stock is affected by internal and external factors. Hence, The Bloomberg Terminal and Yahoo Finance were used to obtain the monthly 5-year stock prices for all the 100 companies. When collecting stock prices, the adjusted closing price has been chosen as it reflects the correct price of the stock by taking dividends and splits into account. The collection date has been set between the 31st of December 2015 and the 31st of December 2020. All prices are downloaded in local currencies to exclude the potential differences in the exchange rate, as this could affect the calculated returns.

8.4 Quantitative Study of ESG-score

The ESG scores were collected from the Refinitiv Eikon, one of the world's biggest financial market data providers. Refinitiv was formerly known as Thomason Reuters, an update from the Asset4 ESG database and includes an ESG score from close to 9000 global companies (Refinitiv, 2021). Asset4 was the first agency to provide ESG data for investors, and all data is numerically assessed. The database only uses publicly available information. Hence, it does not rely on information from the individual companies (Huber & Comstock, 2017). This distinguishes them from other sources, and Refinitiv argues that this makes them more reliable. Other sources, like Bloomberg or MSCI, could have been assessed for ESG data. As ESG is a complex topic and not the main focus of this thesis, the only provider used is Refinitiv. The most crucial reason for choosing Refinitiv as the primary source is that it is widely used in previous empirical studies making the data highly comparable.

Refinitiv applies over 450 measures when calculating the score. Out of the 450, 186 indicators are selected. Further, the measures are divided into ten categories with weights to make up for the three pillars of the ESG score. For instance, under the pillar governance and the category management, we find diversity and compensation on the boards. In the table below the pillars, the categories, and their respective weights are presented.

Pillar	Category	Indicators	Weights	Pillar Weights
Environmental	Resource use	20	11%	37%
	Emission	28	15%	
	Innovation	20	11%	
Social	Workforce	30	16%	33%
	Human rights	8	4%	
	Community	14	7,5%	
	Product responsibility	10	5%	
Governance	Management	35	19%	30%
	Shareholdes	12	6,5%	
	CSR Strategy	9	5%	
Total		186	100%	

Figure 10: Refinitiv Eikon ESG measures. **Source:** own construction.

Refinitiv provides three ESG data measurements. In addition to the ESG score, the ESG controversies score and the ESG combined (ESGC) score is provided. The ESGC score has the purpose of discounting the ESG score for negative controversies. This includes an analysis of 23 controversy measures using a percentile rank score from 0 to 100. If a company has no controversies, the ESGC score is the same as the ESG score. This thesis uses the ESGC score as the chosen measure, and this term will be referred to as the ESG score from this point.

8.4.1 Issues with ESG scores

The providers of ESG score have become influential institutions in finance and business, and many investments are based on ESG rankings. Hence, the score can be a critical factor in the decision-making process on whether to invest or not invest. However, throughout the process of investigating the ESG ranking, it has become clear that the ESG score varies between the different providers. As the information varies, issues are connecting to the use of the score. Berg et al. (2019) present in their analysis that the correlation between five different ESG providers is, on average, 0.61. Accordingly, the investors are exposed to noise, leading to three substantial issues. First, ESG performance is unlikely to reflect the stock market accurately. Second, the variation can lead to frustration among the companies striving to improve the ESG score, while it is unsure which measures will contribute to improvement. Third and lastly, the variation poses a challenge for empirical research as the use of different sources can lead to different results and be incomparable (Berg et al., 2019).

8.5 Portfolio Construction

In this thesis, the portfolio creation is based on the female share of the board of directors and management board of the 100 companies to analyze the relationship between female share and stock performance. In order to create the portfolios, several approaches were assessed in preparation for finding the most appropriate method. To construct the portfolios we have chosen an approach were we sort the dataset based on gender diversity as a screen. ESG and SRI inspired the approach as gender diversity is one of the indicators in the ESG score. This screen aims to minimize the exposure to companies with poor gender diversity by integrating a gender diversity criterion.

There is no consensus in the literature concerning the most appropriate cut-off levels for the portfolios. The levels vary from the top or bottom 1% up to 50%. In this thesis, the cut-off level is twofold, with both 10% and 25%. Consequently, the portfolios consist of the top and bottom 10 or 25 companies sorted on the female share in the board of directors or management board. The following eight portfolios are created:

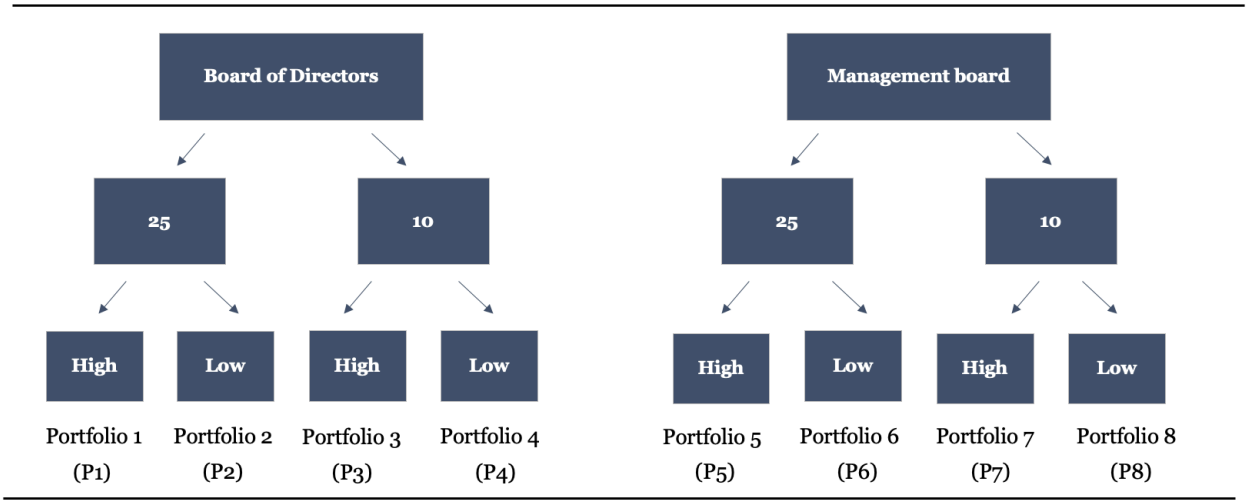


Figure 11: Overview of portfolio construction. **Source:** own construction.

Presented in figure 11, the number represents if the portfolio consists of 25 or 10 companies within the given sorting. High and low speaks of either the companies with the highest or lowest proportion of women either among the board of directors (BD) or management board (MB).

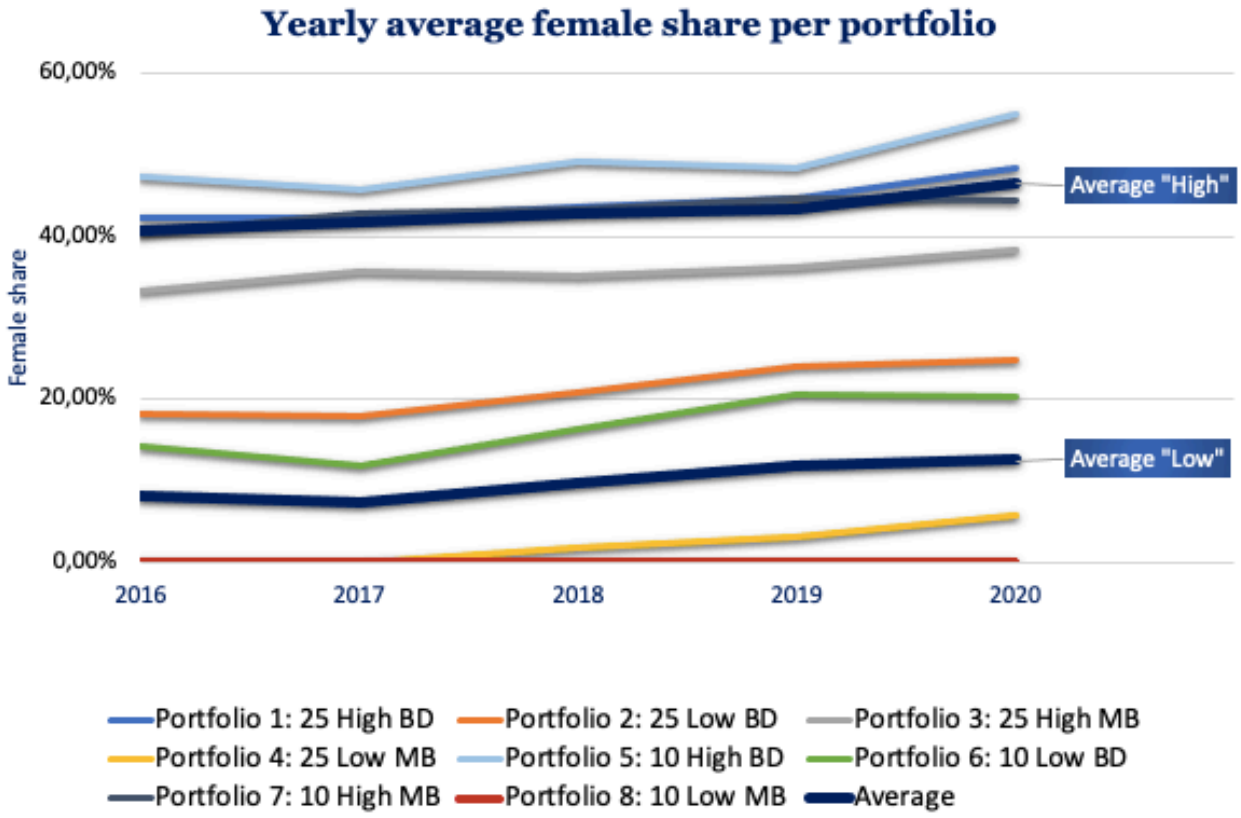


Figure 12: Average female share per portfolio. **Source:** own construction.

The portfolios of high female share consist on average of 43% women on either the board of directors or management board, while the portfolios with a low female share on average has 10% women. As a result, portfolios of "high" are presenting gender balance, whereas "low" are reflecting the opposite. This is illustrated above in figure 12.

The portfolios created are based on an equally weighted approach, where the portfolio return is the average return for all the stocks included. Further, the portfolios are rebalanced yearly based on the female share. The purpose of this is to make sure the portfolios continuously consist of the top and bottom companies based on female share for each year. In total, the thesis ends up with eight portfolios and 48 regressions.

	P1	P2	P3	P4	P5	P6	P7	P8
Norway	22%	1%	25%	2%	26%	0%	28%	2%
Denmark	8%	15%	10%	14%	4%	14%	16%	28%
Sweden	18%	9%	21%	3%	30%	10%	22%	0%
Finland	18%	4%	6%	5%	8%	4%	8%	4%
Germany	5%	10%	3%	6%	2%	0%	0%	4%
United Kingdom	11%	6%	19%	4%	12%	6%	16%	8%
Netherland	8%	11%	3%	16%	4%	8%	0%	8%
Belgium	3%	3%	12%	12%	6%	6%	10%	6%
Switzerland	3%	24%	2%	14%	6%	30%	0%	8%
Austria	3%	18%	0%	26%	2%	22%	0%	32%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 3: Country share in the portfolios. **Source:** Own construction.

The average percentage of each country in the portfolios is illustrated in table 3. The Nordic countries generally have a high presence in the portfolios with a high female share. However, Danish companies stands out compared to the other Nordic companies with a higher presence in the portfolios with a low female share. On the contrary, Austrian companies have the highest presence in the portfolios with a low female share and the lowest presence in portfolios with a high female share.

8.6 Factor Data

This section will describe the process of identifying proxies and factor data for the regression analysis. The factor data was collected from the Kenneth R. French data library, an extensive database that contains factors constructed and available for different markets (French, 2021). Examples of the factors are the market risk premium, the SMB and HML factor for the Fama & French three-factor model, and the WML factor for the Carhart four-factor model. The factors are continuously updated and include both domestic and international factors, one being the European factors that consider 16 European countries. Analyzing Northwestern Europe, the European factors have been found most relevant. The list of countries for the European factors is included in Appendix 2.1.

A complete market portfolio covering our selection is not possible to collect. It would be possible to generate the factors based on the dataset by using ten different stock indexes. However, this would take a considerable amount of time and is a demanding process. In addition, the factors collected from Kenneth R. French data library will most likely behave more in line with our expectations when performing regression on our high/low female share-sorted portfolios due to the factors builds on a larger dataset. Further, all ten countries in our data sample are included among the 16 European

countries used in the database. Hence, the European factors collected, namely the market, SMB, HML, and WML, work as a proxy for the factors in the models. The data is reported as monthly figures and retrieving the factors from the Kenneth R. French database improves the comparability and reliability of the results, as this is common practice for factor model analyses (Friede, Busch and Bassen, 2015).

The U.S. one-month T-bill rate is used as the risk-free rate for the European factors in the collected data from Kenneth R. French database. However, we have utilized the yield of a one-year German government bond as a proxy for the risk-free rate, as it is considered a better estimate of the risk-free rate in the Euro area. The interest rate has been collected by monthly rates from 31st of December 2015 and the 31st of December 2020 collected from S&P Capital (2021). As illustrated below, the yield is negative the entire period.

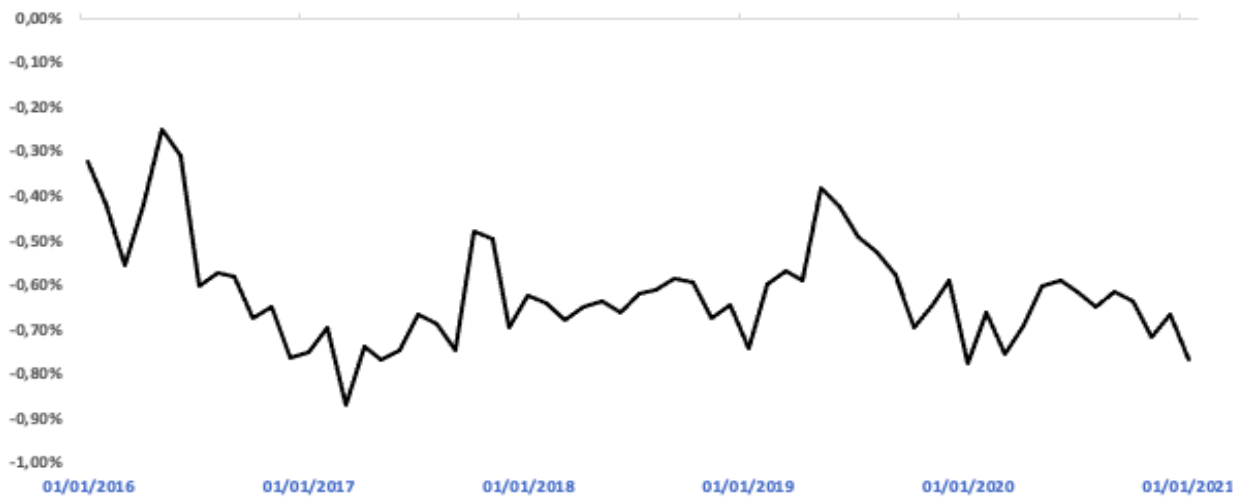


Figure 13: 1-Year German government bond, 2016-2020. **Source:** S&P Capital/Own construction.

This subsection will shortly explain how the factors have been calculated by French (2021). Additionally, the formulas can be found in Appendix 2.2. The market factor is the return on a region's value-weighted market portfolio minus the risk-free rate (French, 2021). The SMB and HML factors are constructed by sorting the stocks based on their market cap and three B/M groups at the end of each June (French, 2021). The SMB is the equal-weight average of the returns on the three small stock portfolios for the region minus the average returns on the three extensive stock portfolios. The HML is the equal-weighted average of the returns for the two high B/M portfolios for a region minus the average of the returns for the two low B/M portfolios (French, 2021). The WML factor is the

average return of two high-performing portfolios for a region minus two low returning portfolios. The WML portfolio consists of the top 30 percent returning portfolios in the last 2-12 months, minus the bottom 30 percent returning portfolios of a region (Carhart, 1997; French, 2020).

To compare the performance of the self-constructed portfolios towards the market index, the returns will be indexed through the following formula:

Equation 9: *Return Index*

$$RI_t = RI_{t-1} * \frac{P_t}{P_{t-1}}$$

Where RI_t is the return index at time t and RI_{t-1} is the return index at time t-1. Further, P_t is the price at time t, and P_{t-1} is the price at time t-1.

Illustrated in this chapter, our study consist of a varied quantitative data sample that will be applied in our analyses. Before applying the collected data in various analyses, the data has been tested. The next chapter will present the testing performed to ensure robustness.

9. Robustness

In this chapter of the thesis, the aim is to test the data to ensure the quality and validity of the results later provided. This will be done through robustness tests of the portfolio dataset and by applying a second method to analyze the data.

9.1 Robustness Tests

To achieve reliable and justifiable results from the analyses, the applied data needs to satisfy the assumptions introduced in chapter 7, namely the OLS assumptions, and heteroskedasticity and autocorrelation in errors. This section describes the testing of whether the assumptions hold or not, and if not, what adjustments will be made.

The OLS estimate is the best linear unbiased estimator (BLUE) if all assumptions hold (Wooldridge, 2016). A violation of the assumptions of homoscedasticity and no perfect collinearity may affect the reliability of the OLS method of estimating the regressions coefficients. In addition, a consequence may be wrong conclusions related to the significance of the coefficients in the model.

9.1.1 Stationarity

When using time series data in regression analysis, stationarity is a vital assumption. Since the study uses monthly stock returns, it is reasonable to expect some degree of stationarity in the time series. However, to formally confirm the stationarity of the data, a Dickey-Fuller (1979) test has been conducted. The Dickey-Fuller test results can be found in Appendix 3.1, and as assumed, the series is confirmed to be stationary.

9.1.2 Multicollinearity

One of the main assumptions applying OLS estimation is no perfect multicollinearity. If two variables have nearly a perfect linear relationship, collinearity exists, and if it involves more than two variables, it is called multicollinearity. Multicollinearity leads to invalid test results, and to examine the multicollinearity across variables, a variance inflation factor (VIF) has been applied (Wooldridge, 2016). A rule of thumb says that a VIF higher than ten may have multicollinearity. A more conservative approach applies a cutoff of five. The results of the VIF tests in Appendix 3.2 show that the values of the regression variables are substantially below the proposed cutoff levels.

9.1.3 Heteroskedasticity

As stated in chapter 7, heteroskedasticity will not bias the OLS estimator but may create misleading standard errors. If so, it can lead to incorrect p-values that affect the regression results, and the test model will not be BLUE. To test for heteroskedasticity, the Breusch-Pagan (1979)/Cook-Weisberg (1983) test was applied. The test results found in Appendix 3.3 exhibit that we only have a few p-values below 0.05 and many p-values above 0.05, indicating few heteroskedasticity issues. The White test for heteroskedasticity, a more flexible test, has also been applied, also showing heteroskedasticity issues (Appendix 3.4).

9.1.4 Autocorrelation

Another issue regarding the OLS model and its adequacy is autocorrelation, or serial correlation, in the residuals. Even though the OLS estimator will be unbiased, it will not be BLUE if the error term holds autocorrelation. However, it may lead to misleading results due to biased standard errors. In this thesis, the LM-test, also known as the Breusch-Godfrey (1978) test, is used to test for autocorrelation. One lag is used in this step, and the test results can be found in Appendix 3.5. H_0 in

the Breusch-Godfrey test states no serial correlation. In other words, that autocorrelation is not present in the regression model. For this to be the case, a high Chi^2-value and p-value below 0.05 indicate a low presence of autocorrelation. The test results reveal p-values above the statistical threshold, with no p-values below 0.05. Therefore, we fail to reject the null hypothesis and conclude that the model has problems with autocorrelation.

9.1.5 Adjusting for Heteroskedasticity and Autocorrelation with Newey-West Adjusted Standard Errors

Based on the test results for heteroskedasticity and autocorrelation, the regressions will not be BLUE. This can be handled by using heteroskedasticity-and-autocorrelation-consistent (HAC) standard errors. Newey and West (1987) proposed a HAC estimator, and it has become a common tool to apply when estimating standard errors and t-statistics, to yield unbiased results. Therefore, the Newey-West robust standard errors have been used in this thesis to handle the highlighted issues with heteroskedasticity and autocorrelation. Even though not all regressions show these issues, the Newey-West robust standard errors were applied on all. By applying robust standard errors, the regressions will give consistent results and estimators, and simultaneously be BLUE.

9.2 Panel Regression

A panel regression is done to test if the results of the time series regression can be supported by recreating similar results using a different approach. The time series regression analyzes the dataset in portfolios, while the panel regression focuses on the individual stock performance. Hence, it is utilized to capture company-specifics that may have disappeared in the portfolio analysis. Panel regression controls the dependencies of unobserved, independent variables on a dependent variable, which can lead to biased estimators in traditional linear regression models (Brugger, 2021). However, panel data will not solve all the problems that a time series or a cross-section study could not handle (Baltagi, 2021).

Panel regression is further divided into three types; pooled OLS, fixed effects, and random effects. The most common type to use when doing research is the fixed effects model. A fixed effects model refers to a regression model in which the group means are fixed, instead of a random effects model in which the group means are a random sample from a population. In order to decide which type is most appropriate for the dataset, a Hausman test is conducted. The results of the Hausman test can be

found in Appendix 4.1 and suggest fixed effects. Panel data is a two-dimensional concept, where the same individuum is observed repeatedly over different periods in time. All the individuals have the same variables and are present in all periods. Consequently, our dataset is deemed strongly balanced.

10. Results

This chapter will present the results from the conducted analyses to answer this thesis' research question and hypotheses, divided into three main sections. First, the results from the analyses of gender composition on the board of directors and management board will be presented. Here will also the female share in the positions of Chairman, CEO, and CFO be illustrated, before a subsection will present the difference between countries with and without legislation. Following this, the results from the financial analyss of gender diversity and stock performance will be presented exhaustively in two sections; the portfolio analysis and the company level analysis. The focus of this chapter is to present the results as a foundation for the discussion taking place in the next chapter.

10.1 Composition of the Board of Directors and Management Board

The collection of the board of directors and management board's gender composition has been a central part of the data collection. The following section aims to present the results from the examination of gender diversity within the data sample. With this, the purpose is to highlight the trend over five years.

10.1.1 Board of Directors

Average female share on Board of Directors						
	2016	2017	2018	2019	2020	Average
Norway	42,21%	39,45%	38,76%	37,23%	42,87%	40,10%
Denmark	27,55%	30,81%	29,56%	32,10%	33,98%	30,80%
Sweden	35,71%	37,17%	39,18%	39,58%	38,64%	38,06%
Finland	34,11%	35,40%	36,76%	35,65%	36,06%	35,60%
Germany	26,41%	29,73%	30,14%	31,47%	35,24%	30,60%
United Kingdom	29,36%	27,46%	34,61%	35,21%	42,12%	33,75%
Netherland	29,92%	29,14%	28,42%	34,58%	34,93%	31,40%
Belgium	28,50%	30,05%	31,09%	34,62%	37,26%	32,31%
Switzerland	20,47%	23,47%	26,71%	27,53%	29,32%	25,50%
Austria	23,73%	22,56%	27,01%	33,67%	32,47%	27,89%
Total average	**29,80%**	**30,52%**	**32,22%**	**34,17%**	**36,29%**	

Table 4: Average female share on Board of Directors. **Source:** Own construction.

The average female share on the board of directors over the five years is presented above in table 4. When looking at the average of the period, the top three countries are Nordic, with Norwegian companies on the top, followed by Swedish and Finnish companies. The Danish companies stand out among the Nordic countries having a lower average. Companies from Switzerland and Austria have the lowest average female share on the board of directors. Illustrated in table 4, the trend is that the female share is growing over the period. This indicates that most companies have a positive trend. However, the Norwegian companies has a negative trend between 2016 and 2019 before experiencing a positive growth for 2020. In addition, companies from Austria have a negative development in 2020.

10.1.2 Management Boards

Average female share on management boards						
	2016	2017	2018	2019	2020	Average
Norway	24,98%	27,25%	27,52%	30,24%	33,90%	28,78%
Danmark	11,03%	12,46%	16,41%	20,45%	22,57%	16,58%
Sweden	26,22%	26,88%	28,64%	28,00%	26,38%	27,22%
Finland	17,32%	16,87%	17,71%	20,06%	22,98%	18,99%
Germany	12,83%	17,47%	16,75%	18,89%	20,95%	17,38%
United Kingdom	19,74%	23,39%	23,76%	28,06%	28,27%	24,64%
Netherland	9,38%	8,23%	13,22%	13,95%	18,16%	12,59%
Belgium	17,92%	15,87%	17,71%	18,73%	19,70%	17,99%
Switzerland	7,43%	8,59%	10,47%	13,67%	17,31%	11,49%
Austria	1,67%	2,50%	2,50%	3,93%	7,50%	3,62%
Total average	14,85%	15,95%	17,47%	19,60%	21,77%	

Table 5: Average female share on management boards. **Source:** Own construction.

Table 5 illustrates the average female share on the management boards over the five years. Compared to the board of directors, the average female share on management boards is considerably lower. Norwegian companies still have the highest average, followed by companies from Sweden and the United Kingdom. Similar to the average female share on the board of directors, companies from Switzerland and Austria have the lowest average. Austrian companies stand out with a remarkable low share of female presences at an average of 3.62% over the past five years.

10.1.3 Chairman, CEO, and CFO

In addition to collecting the composition of the board of directors and management boards, the decision was made to collect data on the gender of the Chairman, CEO, and CFO. The aim is to take the gender diversity within the specific leadership positions into account. In addition, the thesis will later examine if there is a correlation between a high proportion of women in the corporate boards and women in top positions.

	Chairman				
	2016	2017	2018	2019	2020
Norway	20%	20%	30%	30%	30%
Denmark	0%	0%	0%	0%	10%
Sweden	0%	10%	10%	10%	10%
Finland	10%	10%	0%	0%	10%
Germany	0%	0%	0%	0%	0%
United Kingdom	0%	0%	0%	0%	0%
Netherland	0%	0%	0%	0%	0%
Belgium	10%	20%	10%	10%	10%
Switzerland	0%	0%	0%	0%	0%
Austria	10%	10%	10%	10%	10%
Total average	5%	7%	6%	6%	8%

Table 6: Average share of female Chairman. **Source**: own construction.

From table 6 above, the average of female representatives among the Chairman position by countries for the period is evident. Again, Norwegian companies have the highest percentages. Noticeable, the study finds that 27 out of the 50 values presented in the table, have a female share of 0%. Further, all companies in four out of the ten countries have a male Chairman over the entire period. The numbers are quite stable as there are minor changes during the period. This is, to some degree, expected as the position of Chairman is commonly filled by the same person for a longer tenure. Despite the low numbers, the trend is positive, looking at the period in its entirety.

	CEO				
	2016	2017	2018	2019	2020
Norway	0%	0%	0%	20%	20%
Danmark	0%	0%	0%	0%	10%
Sweden	0%	0%	10%	10%	10%
Finland	0%	0%	0%	10%	10%
Germany	0%	0%	0%	0%	0%
United Kingdom	0%	0%	20%	20%	10%
Netherland	0%	0%	0%	0%	0%
Belgium	0%	0%	0%	10%	10%
Switzerland	0%	0%	0%	0%	0%
Austria	10%	0%	0%	10%	10%
Total average	1%	0%	3%	8%	8%

Table 7: Average share of female CEO. **Source:** Own construction.

As above, table 7 shows the average of female representatives, this time among the CEO position, by countries for the period. Companies from the United Kingdom have the highest average of female CEOs. The results also show that in 2017 there were no female CEOs in our dataset. Despite this, the trend of female CEOs is positive.

	CFO				
	2016	2017	2018	2019	2020
Norway	10%	10%	10%	10%	20%
Denmark	20%	30%	40%	30%	20%
Sweden	20%	20%	10%	10%	20%
Finland	0%	0%	0%	0%	0%
Germany	0%	0%	0%	0%	0%
United Kingdom	10%	10%	10%	20%	20%
Netherland	20%	20%	20%	20%	30%
Belgium	10%	10%	10%	10%	20%
Switzerland	0%	0%	0%	0%	0%
Austria	0%	10%	10%	10%	10%
Total average	9%	11%	11%	11%	14%

Table 8: Average share of female CFO. **Source:** Own construction.

Finally, table 8 show the average of female representatives among the CFO position by countries for the period. Compared to the table 6 and 7 of Chairman and CEO, the numbers are higher. Danish companies have the highest average, followed by companies from Netherland and Sweden.

In conclusion, the tables reveal that the proportion of females is relatively low for the positions of Chairman, CEO, and CFO, especially compared to the average of female shares in the board of directors and management boards.

10.1.4 With or Without Legislations

To analyze the effect of female quotas, this section presents the difference of the female share in corporate boards and leadership positions between countries with and without legislations.

	2016	2017	2018	2019	2020	Averge
Board of directors						
With	28,54%	29,07%	30,36%	33,18%	35,35%	31,30%
Without	31,68%	32,71%	35,03%	35,64%	37,70%	34,55%
Management board						
With	12,37%	13,32%	14,69%	16,57%	19,59%	15,31%
Without	18,58%	19,90%	21,63%	24,14%	25,05%	21,86%
Chairman						
With	6,67%	8,33%	8,33%	8,33%	8,33%	8,00%
Without	2,50%	5,00%	2,50%	2,50%	7,50%	4,00%
CEO						
With	1,67%	0,00%	0,00%	6,67%	6,67%	3,00%
Without	0,00%	0,00%	7,50%	10,00%	10,00%	5,50%
CFO						
With	6,67%	8,33%	8,33%	8,33%	13,33%	9,00%
Without	12,50%	15,00%	15,00%	15,00%	15,00%	14,50%

Table 9: With or without legislation. **Source:** Own construction.

The results show that the average for the countries without legislation is higher on the board of directors and management board. Over the five years, the increase of the female share on corporate boards is higher for the countries with legislation. The countries with legislation have a higher average on the position of Chairman, while the countries without legislation have a higher average on the position of CEO and CFO.

10.1.5 Correlation

A correlation analysis between the variables of gender diversity on the board of directors, the management board, Chairman, CEO, and CFO is conducted to illustrate their relationship.

	BD	MB	Chairman	CEO	CFO
BD	1				
MB	0,298	1			
Chairman	0,223	0,141	1		
CEO	0,177	0,209	0,030	1	
CFO	0,096	0,283	0,063	-0,008	1

Table 10: Correlation matrix female share. **Source:** Own construction.

The correlation measures the degree to which two variables move in relation to each other. The only occasion with a negative correlation is the relationship between CFO and CEO. In general, the correlation values are low, hence the variables are weakly correlated. The relationship with the highest correlation is between the board of directors and management board with 0.298. In principal, when the correlation between BD and MB is positive, this means that having female members at the board of directors correlates in line with having female members on the management board. For a correlation to show a strong positive connection, the numbers should be 0.6 and above. A value of between 0 and 0.3 is usually defined as weak or only showing an association between the variables.

10.2 Portfolio Analysis

This section presents the results of the portfolio analysis, which has been divided into seven sub-sections. First, the descriptive statistics of the portfolios and factors will be presented. Then the result from a correlation analysis of the factors will be given, before illustrating the indexed return of the portfolios and the market index, and their movements over the period. Additionally, the results from the regression analysis of the portfolios will be presented. The final part of the portfolio analysis will present the results from the analysis of ESG score, followed by sector and size.

10.2.1 Descriptive Statistics

The descriptive statistic is constructed for the portfolios to give the reader a better understanding of the portfolios and factors. All numbers presented are calculated based on the monthly returns. For the period 2016-2020, N is 60 (12 months over five years).

	Average	Median	SD	Minimum	Maximum
Portfolio 1: 25 High BD	1,09%	1,03%	3,68%	-12,15%	13,23%
Portfolio 2: 25 Low BD	1,34%	2,03%	4,82%	-16,55%	18,43%
Portfolio 3: 25 High MB	1,25%	1,56%	3,91%	-12,24%	14,91%
Portfolio 4: 25 Low MB	1,33%	1,98%	5,01%	-18,42%	20,31%
Portfolio 5: 10 High BD	0,74%	0,69%	4,36%	-15,25%	14,82%
Portfolio 6: 10 Low BD	1,35%	2,16%	4,92%	-14,90%	16,59%
Portfolio 7: 10 High MB	1,37%	1,59%	3,88%	-9,46%	12,82%
Portfolio 8: 10 Low MB	1,07%	1,55%	5,45%	-17,75%	22,69%
European factors market index	0,89%	0,89%	4,76%	-15,32%	16,63%
Market	1,51%	1,48%	4,78%	-14,57%	17,35%
SMB	0,33%	0,33%	1,68%	-4,22%	5,04%
HML	-0,35%	-0,40%	2,91%	-11,30%	10,76%
WML (MOM)	0,66%	0,69%	3,64%	-18,39%	8,50%
Rf	-0,62%	-0,64%	0,12%	-0,87%	-0,25%

Table 11: Descriptive statistics. **Source:** Own construction.

All our portfolios have an average return above the market index, except for portfolio 5. The market index is collected from the Kenneth R. French database. As there is no market index for our data sample, this index has been chosen as a proxy. Hence, the market index does not necessarily reflect our data sample. As mentioned in factor data, it would be possible to create an index for our dataset by using the ten stock exchanges, however as this process is demanding and time-consuming, the choice to use this as proxy was made.

Considering the portfolios consisting of the board of directors, the portfolios with high female shares have a lower average return than the portfolios with low female shares. In addition, the low portfolio has a higher maximum and lower minimum than the high portfolio looking at the 25 top and bottom (P1 and P2). In the top and bottom 10 companies, the low portfolio has a higher maximum then the high portfolio (P5 and P6). Nevertheless, portfolio 5 has a lower minimum than portfolio 6. However, in both the 10 and 25 top and bottom portfolios, the low portfolios have a higher standard deviation (SD) and more variation.

For the constructed portfolios of the management board, for the top and bottom 25 companies, the portfolio with a lower female share has a higher average return than the high female share portfolio (P3 and P4). However, for the top and bottom 10 companies, the portfolio with a high female share

has a higher average return than the lower female share portfolio (P7 and P8). Additionally, the low portfolios have a higher maximum and a lower minimum than the high portfolios. Consequently, the portfolios have more variation, shown in a higher standard deviation (SD).

10.2.2 Correlation Between the Factors

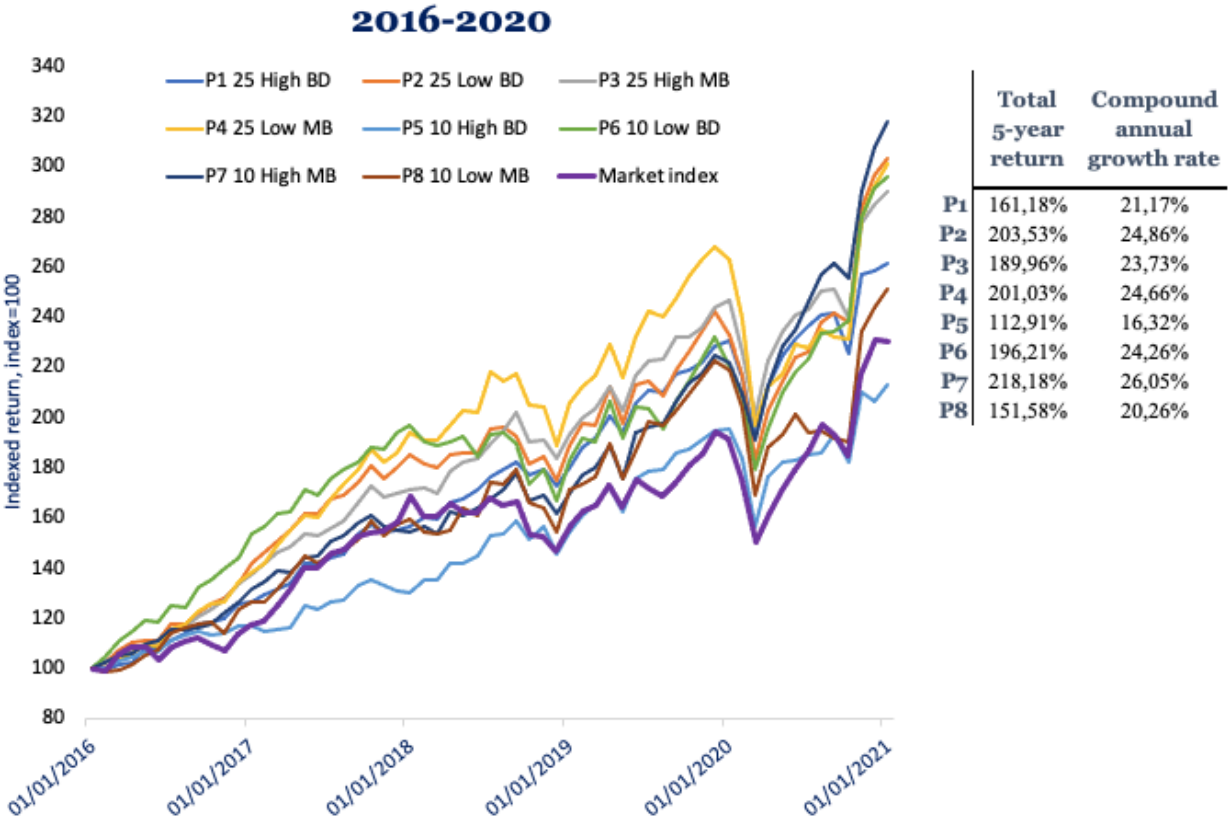
	Market	*SMB*	*HML*	*WML (MOM)*
Market	1			
SMB	0,348	1		
HML	0,419	-0,038	1	
WML (MOM)	-0,548	0,021	-0,680	1

Table 12: Correlation between the factors. **Source:** Own construction.

The correlation between the factor variables used in this thesis is presented in table 12. Aa a rule of thumb, a correlation above 0.7 may implicate an issue with collinearity. Illustrated in table 12, HML and WML are highly correlated. However, multicollinearity was tested and presented in section 9.1.2. We did not find any multicollinearity issues. HML correlates negatively with both SMB and WML, meaning that the variables are moving in different directions. The rest of the numbers are positively correlated.

10.2.3 Indexed Return

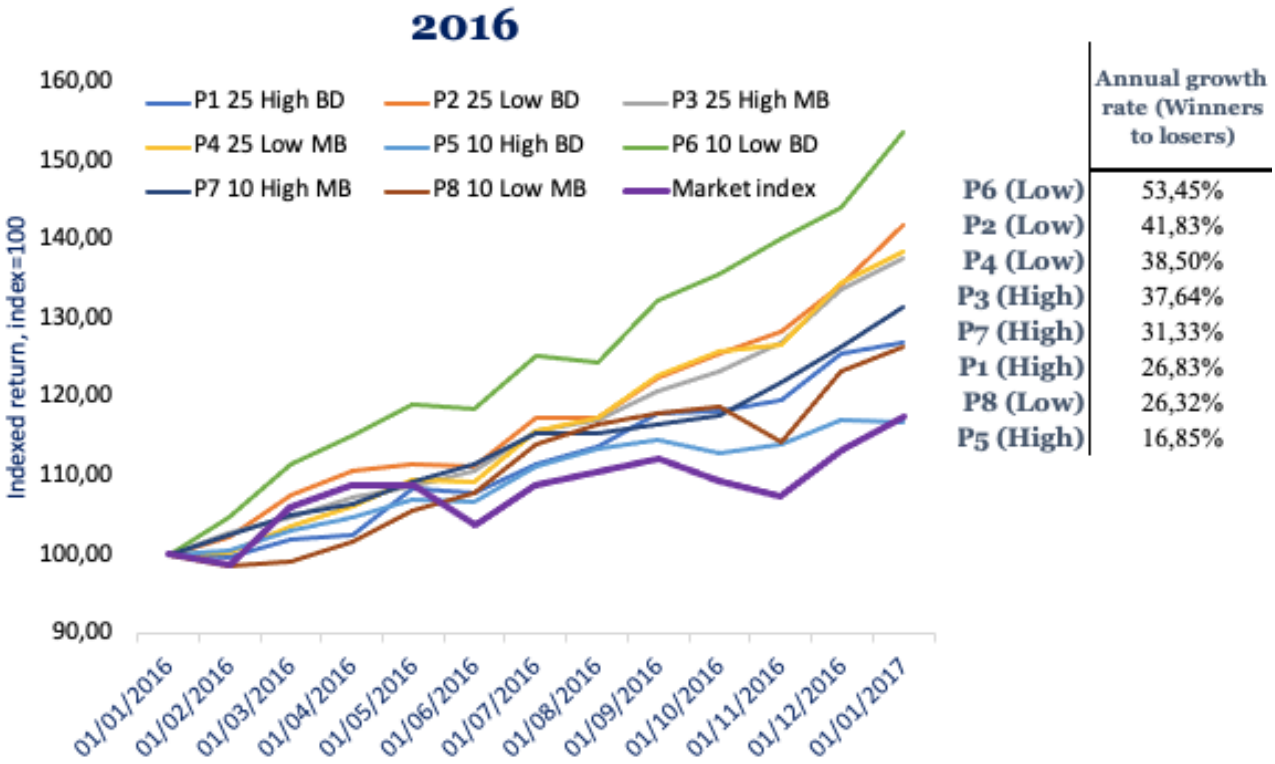
In this subsection, the indexed excess returns of the self-constructed portfolios and the market index will be presented.



	Total 5-year return	Compound annual growth rate
P1	161,18%	21,17%
P2	203,53%	24,86%
P3	189,96%	23,73%
P4	201,03%	24,66%
P5	112,91%	16,32%
P6	196,21%	24,26%
P7	218,18%	26,05%
P8	151,58%	20,26%

Figure 14: Indexed excess returns 2016-2020. **Source:** Own construction.

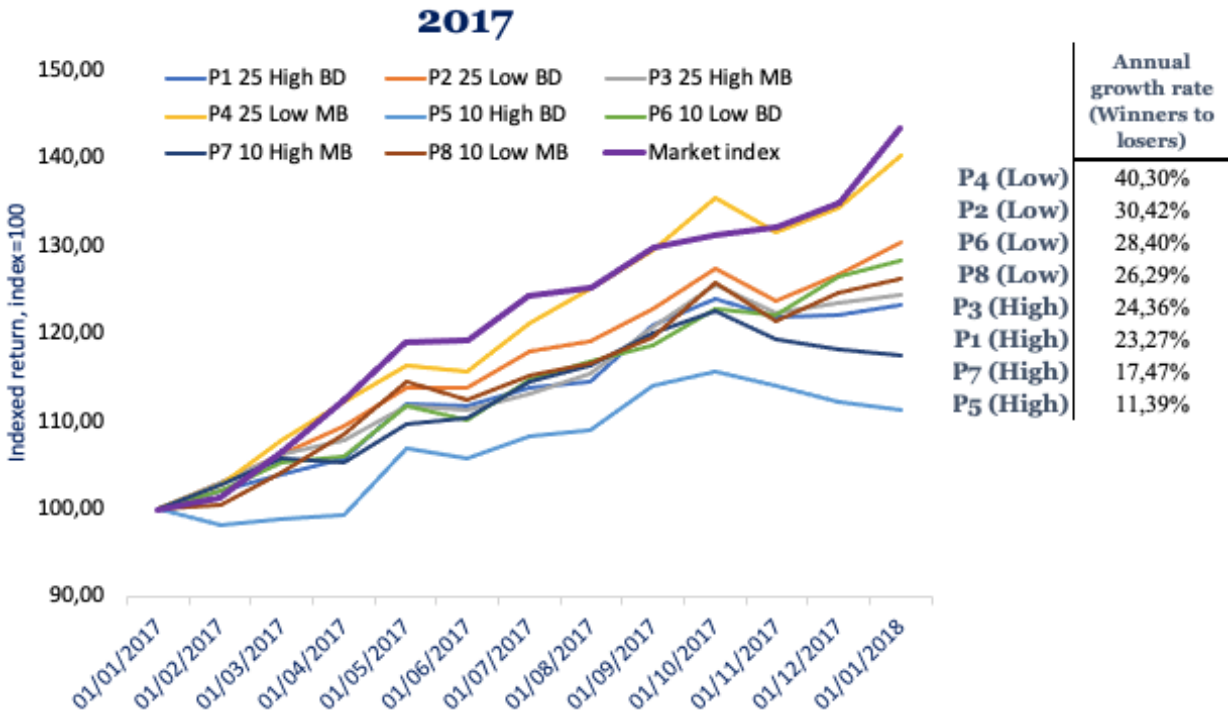
Figure 14 illustrates the indexed return for the market index and the self-constructed portfolios from 31st of December 2015 and the 31st of December 2020. As visualized, all portfolios experienced growth through the period. Portfolio P7 has the highest 5-year indexed excess return at 31st of December 2020, and portfolio P5 has the lowest. These are both portfolios with high female share, and being both top and bottom performers, this does not indicate either gender diversity as an advantage nor disadvantage related to the return. In order to analyze the performance of each portfolio, the indexed return per year will be illustrated.



	Annual growth rate (Winners to losers)
P6 (Low)	53,45%
P2 (Low)	41,83%
P4 (Low)	38,50%
P3 (High)	37,64%
P7 (High)	31,33%
P1 (High)	26,83%
P8 (Low)	26,32%
P5 (High)	16,85%

Figure 15: Indexed excess returns for the year 2016. **Source:** Own construction.

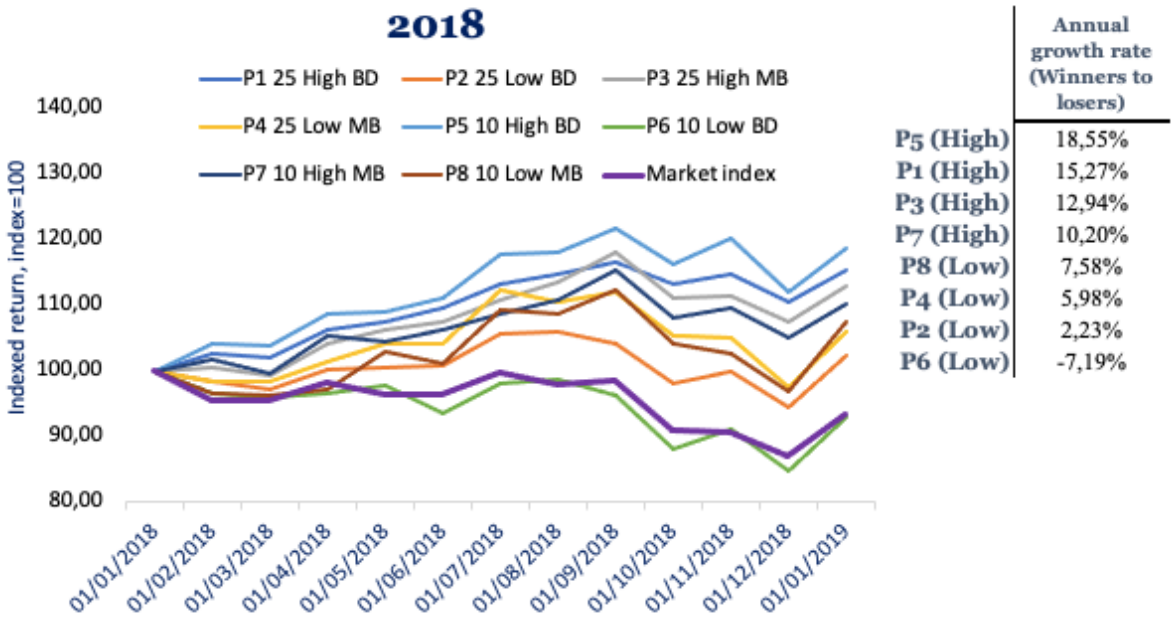
In the first year of the analyzed period, the winner is the portfolio consisting of the 10 companies with the lowest female share on the board of directors (P6), while the worst performing portfolio is the portfolio consisting of the 10 companies with the highest female share on the board of directors (P5). All portfolios beat the market except this portfolio.



	Annual growth rate (Winners to losers)
P4 (Low)	40,30%
P2 (Low)	30,42%
P6 (Low)	28,40%
P8 (Low)	26,29%
P3 (High)	24,36%
P1 (High)	23,27%
P7 (High)	17,47%
P5 (High)	11,39%

Figure 16: Indexed excess returns for the year 2017. **Source:** Own construction.

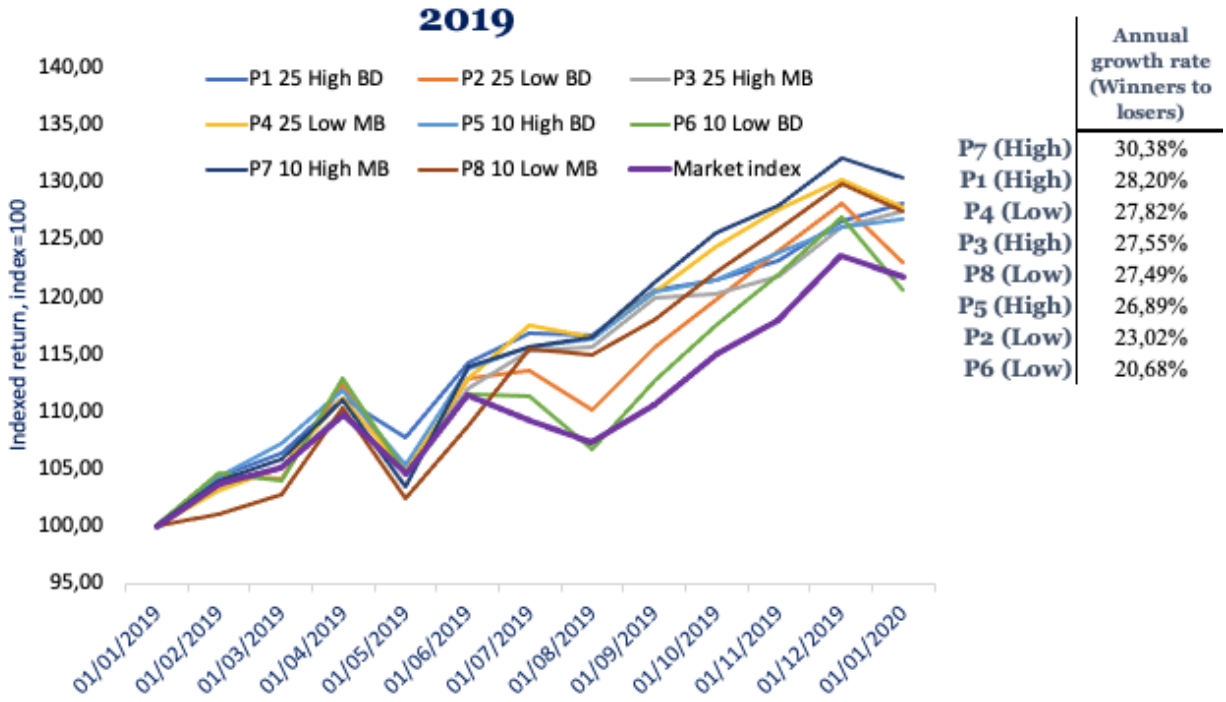
In the second year of the period, all the portfolios with the lowest female share perform better than the portfolios with the highest female share. At the same time, the market outperforms all eight portfolios. Similar to 2016, P5 is the worst performing portfolio.



	Annual growth rate (Winners to losers)
P5 (High)	18,55%
P1 (High)	15,27%
P3 (High)	12,94%
P7 (High)	10,20%
P8 (Low)	7,58%
P4 (Low)	5,98%
P2 (Low)	2,23%
P6 (Low)	-7,19%

Figure 17: Indexed excess returns for the year 2018. **Source**: Own construction.

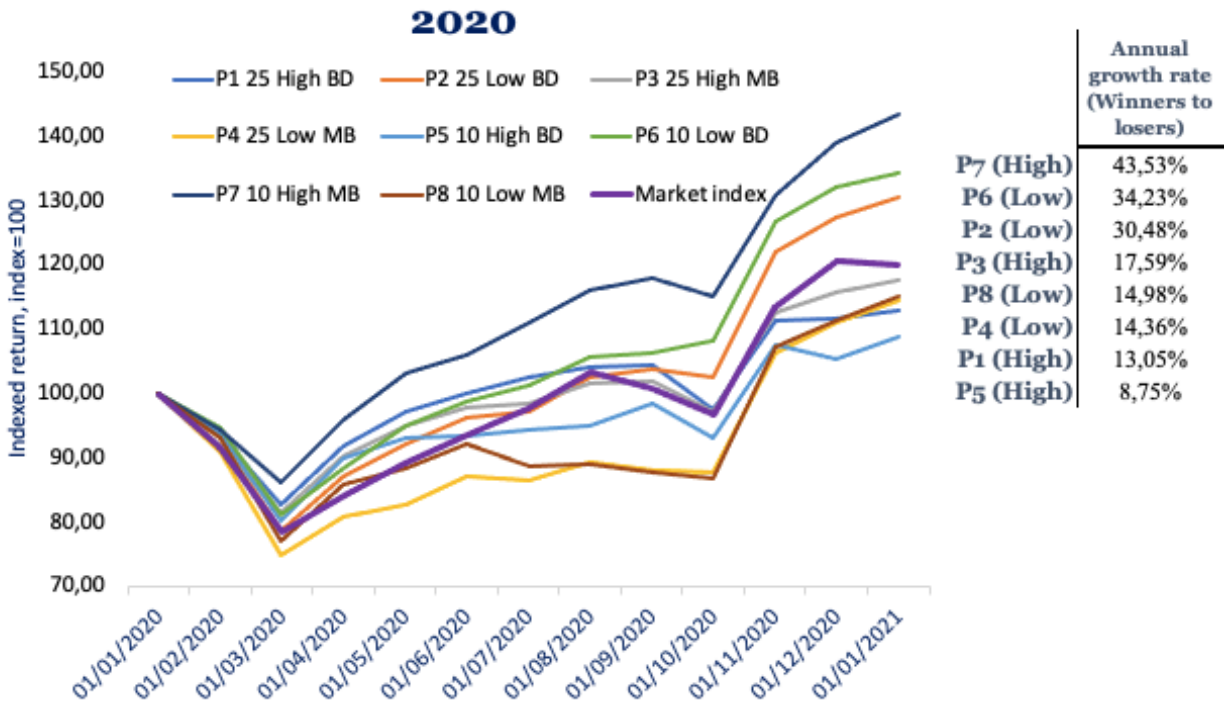
In 2018, particularly in the second half, the market experienced a decrease and ended with an annual growth of -6.64%. As illustrated, the four portfolios of companies with a high female share outperformed the four portfolios of companies with a low female share during this period.



	Annual growth rate (Winners to losers)
P7 (High)	30,38%
P1 (High)	28,20%
P4 (Low)	27,82%
P3 (High)	27,55%
P8 (Low)	27,49%
P5 (High)	26,89%
P2 (Low)	23,02%
P6 (Low)	20,68%

Figure 18: Indexed excess returns for the year 2019. **Source:** Own construction.

In 2019, all portfolios except the 10 companies with the lowest female share at the board of directors (P6) beat the market. The best performing portfolio is P7 entailing of the 10 companies with the highest female proportion at the management board.



	Annual growth rate (Winners to losers)
P7 (High)	43,53%
P6 (Low)	34,23%
P2 (Low)	30,48%
P3 (High)	17,59%
P8 (Low)	14,98%
P4 (Low)	14,36%
P1 (High)	13,05%
P5 (High)	8,75%

Figure 19: Indexed excess returns for the year 2020. **Source**: Own construction.

At the beginning of 2020, the Covid-19 virus had its outbreak in Europe, which led to a significant fall in the stock market. However, the market recovered quickly and ended with an annual growth of 20.15%. From 1st of March 2020 to 31st of December 2020, the market had a growth rate of 53.18%. Three of the eight portfolios in our analysis performed better than the market. Portfolio 7, with a high female share at the management board, had the highest annual growth rate in 2020, and portfolio 5, with a high female share at the board of directors, had the lowest annual growth.

10.2.4 Time Series Regression Analysis

To answer whether gender diversity affects stock performance, an investing strategy based on a gender screen comparing companies with high and low female share has been tested. The risk-adjusted returns have been compared between each constructed portfolio, calculated with the introduced asset pricing models. The alphas show if a portfolio is over- or underperforming and will be the focus in this brief result presentation before a more exhaustive discussion occurs in the next chapter. In this section, the results from the time series regressions will be deliberated, separated into each asset pricing model to compare the results between each respective model. The asset pricing models demonstrate the exposure each portfolio has to different factors from the models. The p-value must be less than 0.10, 0.05, and 0.01 to have statistically significant results at the 90%, 95%, and

99% confidence interval. In this thesis, results presented as significant have a p-value less than 0.05, or exceptions will be explicitly stated in the text.

The portfolios' alphas can be analyzed from different perspectives, one being to separate the eight portfolios into two groups; board of directors and management boards. Hereunder, we create four groups; 25% and 10% highest and lowest companies relative to their female share. With these groups, the aim is to compare the two high and low portfolios within each separate group. The group numbers, illustrated in the figure below, will be referred to in the following presentation of the results.

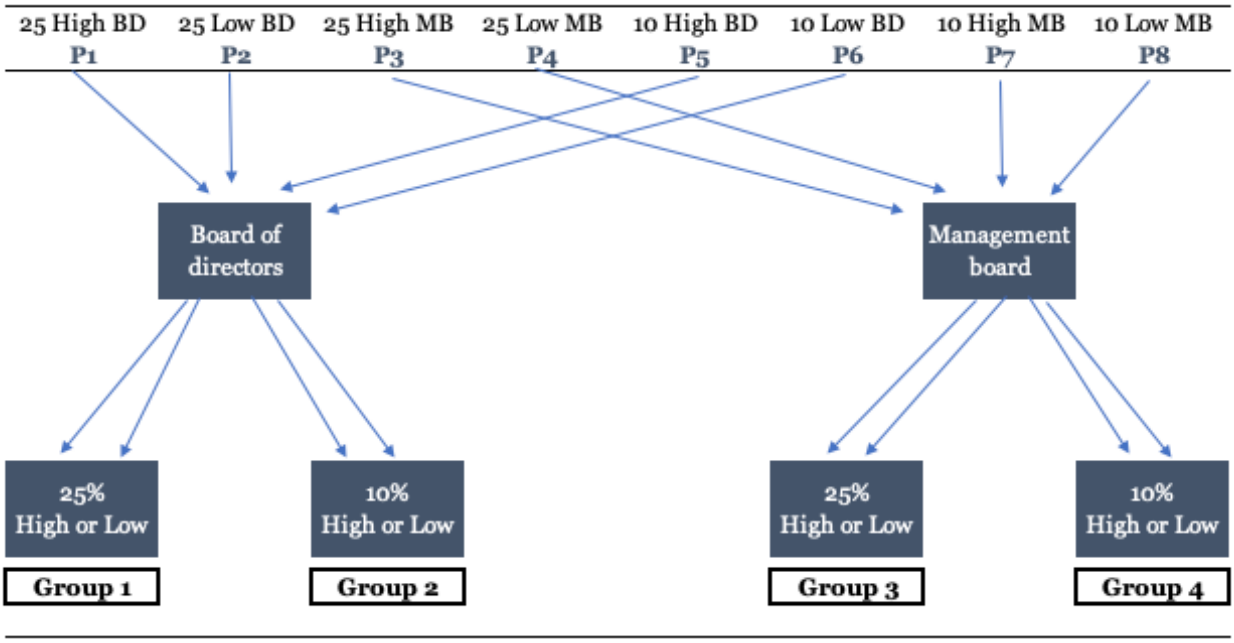


Figure 20: Overview of self-constructed portfolios separated into groups. **Source:** Own construction.

10.2.4.1 The CAPM

The CAPM is the first asset pricing model used to explain the returns. The alpha represents the over- or underperformance of the portfolios relative to the one factor the CAPM considers, namely the market factor. In the output of the regressions, the market factor is denoted as 'Market'.

CAPM

	Dependent variable:							
	25 High BD P1 (Group 1)	25 Low BD P2 (Group 1)	25 High MB P3 (Group 3)	25 Low MB P4 (Group 3)	10 High BD P5 (Group 2)	10 Low BD P6 (Group 2)	10 High MB P7 (Groupe 4)	10 Low MB P8 (Groupe 4)
β1 Market	0,621***	0,910***	0,675***	0,928***	0,687***	0,869***	0,651***	0,925***
	(0,073)	(0,068)	(0,075)	(0,064)	(0,101)	(0,066)	(0,064)	(0,119)
α	0,007794**	0,005886*	0,008582***	0,005554	0,003230	0,006593*	0,010103***	0,002969
	(0,003)	(0,003)	(0,003)	(0,003)	(0,004)	(0,004)	(0,003)	(0,004)
Observations	60	60	60	60	60	60	60	60
R^2	0,650	0,810	0,678	0,783	0,567	0,713	0,645	0,658
Adjusted R^2	0,644	0,807	0,673	0,779	0,559	0,708	0,638	0,652

The table shows the results from the CAPM model for the different portfolio's excess returns. It shows the coefficients and standard errors from the regressions made from monthly returns per portfolio. The portfolio consists of 25% and 10% highest and lowest companies relative to their female share in the board of directors and management board. The observations indicates the number of months in the timeseries. Standard errors in parantheses.

**p<0.10; **p<0.05; ***p<0.01*

Table 13: The results from time series regression using CAPM. **Source:** Own construction.

In the tested period of 2016-2020, all portfolios yield a positive monthly alpha. Three of the portfolios have significant alphas at the 0.05 level, and all these three are portfolios with high female share. Two more portfolios, both with low female share, are significant at the 0.10 level. All portfolios have significant market factors at the 0.01 level indicating all portfolios to be sensitive to the market.

Comparing each group individually, portfolios with a high female share yield higher monthly alphas than the portfolios with a low female share in Group 1, Group 3, and Group 4, but not in Group 2. Separately, it is P7 that exposes the highest significant monthly alpha followed by P3, and P5 and P8 produces the lowest, but insignificant, monthly alphas. No group has two significant monthly alphas at the 0.05 level. However, at the 0.10 level, Group 1 has two significant monthly alphas, where the portfolio with a high female share has higher monthly alpha than the low female share portfolio.

The adjusted R^2 illustrates the model´s explanatory power and shows how much the market factor explains the returns of the portfolios. As expected, it is higher the more sensitive the portfolios are to the market factor.

10.2.4.2 Fama & French Three-Factor Model

The second asset pricing model is the Fama & French three-factor model. The model adds two new factors, in addition to the market factor, namely the size factor (SMB) and B/M value-factor (HML). A positive SMB signals that the portfolio has a small-cap tilt, and a negative SMB indicates a portfolio weighting on large-cap stocks. Further, a positive HML implies a portfolio to be comprised mainly of value stocks, while a negative HML signals weighting towards growth stocks.

Three-Factor Model

	Dependent variable:							
	25 High BD P1 (Group 1)	25 Low BD P2 (Group 1)	25 High MB P3 (Group 3)	25 Low MB P4 (Group 3)	10 High BD P5 (Group 2)	10 Low BD P6 (Group 2)	10 High MB P7 (Groupe 4)	10 Low MB P8 (Groupe 4)
β1 Market	0,636***	0,855***	0,667***	0,880***	0,706***	0,808***	0,690***	0,902***
	(0,073)	(0,076)	(0,079)	(0,071)	(0,098)	(0,089)	(0,089)	(0,095)
β2 SMB	-0,106	0,082	-0,116	-0,192	-0,252	0,244	-0,078	-0,244
	(0,189)	(0,190)	(0,216)	(0,179)	(0,341)	(0,197)	(0,234)	(0,270)
β3 HML	-0,008	0,177	0,087	0,281**	0,044	0,123	-0,113	0,210
	(0,112)	(0,113)	(0,120)	(0,126)	(0,162)	(0,122)	(0,115)	(0,179)
α	0,007895**	0,007068**	0,009396***	0,007913**	0,003931	0,007134*	0,009385***	0,004875
	(0,003)	(0,003)	(0,003)	(0,003)	(0,004)	(0,004)	(0,003)	(0,004)
Observations	60	60	60	60	60	60	60	60
R^2	0,651	0,819	0,685	0,812	0,577	0,721	0,650	0,676
Adjusted R^2	0,633	0,810	0,668	0,802	0,554	0,706	0,632	0,659

The table shows the results from the Fama-French three factor model for the different portfolio's excess returns. It shows the coefficients and standard errors from the regressions made from monthly returns per portfolio. The portfolio consists of 25% and 10% highest and lowest companies relative to their female share in the board of directors and management board. The observations indicates the number of months in the timeseries. Standard errors in parantheses.

**p<0.10; **p<0.05; ***p<0.01*

Table 14: The results from time series regression using the Fama & French three-factor model.

Source: Own construction.

Utilizing the three-factor model, all portfolios have significant market factors at the 0.01 level, similar results to the CAPM. As with the CAPM, all portfolios have positive monthly alphas, where five of them are significant at the 0.05 level, and six portfolios are significant at the 0.10 level.

Each group is again compared, which reveals equivalent results between the two portfolios of each group as when doing it for the CAPM. Like the CAPM, all groups, except Group 2, have alphas for the portfolios with high female share that yield higher monthly alphas than the portfolios with low

female share. Again, it is P7 that yields the highest significant monthly alpha, and P3 exposes the second-highest significant monthly alpha. From the CAPM, P5 and P8 showed the lowest monthly alphas, and this is also the case using the three-factor model, still with insignificant alphas. Unlike the CAPM, both Group 1 and Group 3 have two significant monthly alphas, where the portfolios with a high female share have higher monthly alpha than the low female share portfolios.

The SMB factor has a negative value for six portfolios and a positive value for two. However, the SMB factor is insignificant for all portfolios. It explains little of the portfolios' return, and the portfolios do not have significant exposure to the SMB factor. It is anticipated that the portfolios consisting of top and bottom 10 companies with high or low female share strengthen the factors exposure to each 25 portfolio, as a portfolio of fewer companies will be more sensitive to the companies' characteristics. For instance, P1 shows a negative SMB factor meaning the portfolio performs better when large-cap firms are "winners". Hence, P5 shows a more negative SMB factor meaning the portfolio performs even better under these conditions than P1. Even though this is not the case for P3 and P7, this depends on the characteristics of the respective companies in these portfolios. Even though a positive SMB factor might not be expected as our dataset is based on the ten countries' largest companies by market cap, it is possible. The portfolios can consist of companies with a market cap value from €1.6 million to € 277 million, as the largest companies in Austria are smaller than the largest companies in Germany or the United Kingdom. A portfolio with a relatively small allocation to smaller stock can expose a positive SMB factor, as shown in these results. However, as the SMB factor is insignificant for all portfolios, it does not explain the portfolios' return.

The HML factor has a positive value for six portfolios and a negative value for two, but it is only significant for one portfolio, namely P4. A positive and significant HML factor indicates that the value premium explains some of this portfolio's returns. The descriptive statistics in table 11 showed that the SMB and HML factors yield negative monthly returns during the period, and the negative coefficients of SMB and HML may signal the reason for increased excess returns. However, neither the SMB nor the HML factors provide significant drivers of this matter in our results.

Considering the explanatory power, the adjusted R^2 has increased for three portfolios, indicating that the three-factor model of Fama and French, to some extent explains the returns better than the CAPM when considering the SMB and HML factor in addition to the market factor.

10.2.4.3 Carhart Four-Factor Model

Finally, Carhart's four-factor model is the last model used to explain the portfolios' return. The model adds a fourth factor to the Fama & French three-factor model, namely the momentum factor (WML). A positive WML factor signals a portfolio weighting towards past good performers (winners) and a negative WML signifies exposure towards bad performers (losers) in the past.

Four-Factor Model

	Dependent variable:							
	25 High BD P1 (Group 1)	25 Low BD P2 (Group 1)	25 High MB P3 (Group 3)	25 Low MB P4 (Group 3)	10 High BD P5 (Group 2)	10 Low BD P6 (Group 2)	10 High MB P7 (Groupe 4)	10 Low MB P8 (Groupe 4)
β1 Market	0,602***	0,765***	0,633***	0,832***	0,637***	0,715***	0,657***	0,809***
	(0,088)	(0,064)	(0,093)	(0,077)	(0,110)	(0,093)	(0,097)	(0,096)
β2 SMB	-0,073	0,172	-0,082	-0,144	-0,182	0,338*	-0,045	-0,151
	(0,248)	(0,197)	(0,234)	(0,190)	(0,351)	(0,198)	(0,250)	(0,292)
β3 HML	-0,083	-0,024	0,010	0,173	-0,112	-0,087	-0,187	0,002
	(0,148)	(0,152)	(0,153)	(0,165)	(0,223)	(0,165)	(0,151)	(0,214)
β4 WML	-0,116	-0,311***	-0,119	-0,168	-0,242	-0,324**	-0,114	-0,322*
	(0,104)	(0,116)	(0,127)	(0,111)	(0,146)	(0,145)	(0,138)	(0,182)
α	0,008789**	0,009461***	0,010314***	0,009206***	0,005796	0,009630**	0,010263***	0,007349*
	(0,003)	(0,003)	(0,003)	(0,003)	(0,004)	(0,004)	(0,003)	(0,004)
Observations	60	60	60	60	60	60	60	60
R^2	0,657	0,843	0,690	0,819	0,595	0,746	0,655	0,696
Adjusted R^2	0,633	0,832	0,668	0,805	0,565	0,728	0,630	0,674

The table shows the results from the Carhart four factor model for the different portfolio's excess returns. It shows the coefficients and standard errors from the regressions made from monthly returns per portfolio. The portfolio consists of 25% and 10% highest and lowest companies relative to their female share in the board of directors and management board. The observations indicates the number of months in the timeseries. Standard errors in parantheses.

**p<0.10; **p<0.05; ***p<0.01*

Table 15: The results from time series regression using Carhart's four-factor model.

Source: Own construction.

The results from applying the four-factor model show that all portfolios have significant market factors at the 0.01 level, the same from the CAPM and three-factor model. Furthermore, all portfolios have positive monthly alphas, six significant at the 0.05 level, seven at the 0.10 level, and one portfolio has an insignificant monthly alpha. In other words, the Carhart model results in one

additional portfolio with a significant alpha compared to the three-factor model. In addition, the monthly alphas increase for all eight portfolios from the three-factor model.

Again, the portfolios will be evaluated on a group level. From the CAPM and three-factor model, all groups except Group 2 had higher monthly alphas for the portfolios with a high female share than the portfolios with a low share in the same group. Applying the four-factor model, we find that Group 1 acts as Group 2; P1 yields a lower monthly alpha compared to P2. Further, Group 1 and Group 3 both have significant monthly alphas for both groups, unlike Group 2 and Group 4. The two groups with two significant monthly alphas show that for Group 1, the portfolio with a high female share has a lower monthly alpha compared to the portfolio of a low female share and opposite for Group 3. The results also show that P7 yields the highest and significant monthly alpha of all the portfolios, followed by P3. At the bottom, we find that P5 and P8 yield the lowest, although positive, monthly alphas.

The SMB shows the same pattern as with the three-factor model, where one portfolio is now significant at the 0.10 level. The HML factor has decreased for all portfolios, but it is insignificant for all. The new factor, WML, has a negative value for all portfolios, two significant at the 0.05 level and three at the 0.10 level. A negative WML signals that the weighting is towards "loser" stocks. In other words, a negative WML indicates that winners in prior periods are not winners this period. As the WML factor has a positive monthly return shown by descriptive statistics in table 11**,** this can explain why alphas increased when adding this factor since it leads to a decrease in the expected return of the portfolios. However, the WML factors are insignificant for most of the portfolios, which indicates that they do not have any significant exposure to this factor.

The adjusted R^2 increases for all portfolios except P7 and indicates a higher explanatory power of the four-factor model than the Fama & French three-factor and CAPM, which means the WML factor helps explain more of the portfolios return.

10.2.4.3 Summary of the Time Series Regression Analysis

To summarize, the findings of the monthly alphas and the different factors from applying the three models are presented in table 16 to 20. The purpose is to summarize the results that have been

presented for each model above. The results from the regression analysis will be discussed in the next chapter.

Summary of alphas				
	25 High BD P1 (Group 1)	25 Low BD P2 (Group 1)	10 High BD P5 (Group 2)	10 Low BD P6 (Group 2)
	Coefficient	Coefficient	Coefficient	Coefficient
CAPM	0,007794**	0,005886*	0,00323	0,006593*
Three-factor model	0,007895**	0,007068**	0,003931	0,007134*
Four-factor model	0,008789**	0,009461***	0,005796	0,009630**
	25 High MB P3 (Group 3)	25 Low MB P4 (Group 3)	10 High MB P7 (Group 4)	10 Low MB P8 (Group 4)
	Coefficient	Coefficient	Coefficient	Coefficient
CAPM	0,008582***	0,005554	0,010103***	0,002969
Three-factor model	0,009396***	0,007913**	0,009385***	0,004875
Four-factor model	0,010314***	0,009206***	0,010263***	0,007349*
			*p<0.10; **p<0.05; ***p<0.01	

Table 16: Summary of monthly alphas. **Source:** Own construction.

The monthly alphas are all positive, and the summary table shows that all portfolios' monthly alphas, except one, increase when adding more factors into consideration of the return. Additionally, the significance level of the alphas increases when expanding the CAPM to the three-factor model, and from the three-factor model to the four-factor model.

Summary of market factor				
	25 High BD P1 (Group 1)	25 Low BD P2 (Group 1)	10 High BD P5 (Group 2)	10 Low BD P6 (Group 2)
	Coefficient	Coefficient	Coefficient	Coefficient
CAPM	0,621***	0,910***	0,687***	0,869***
Three-factor model	0,636***	0,855***	0,706***	0,808***
Four-factor model	0,602***	0,765***	0,637***	0,715***
	25 High MB P3 (Group 3)	25 Low MB P4 (Group 3)	10 High MB P7 (Group 4)	10 Low MB P8 (Group 4)
	Coefficient	Coefficient	Coefficient	Coefficient
CAPM	0,675***	0,928***	0,651***	0,925***
Three-factor model	0,667***	0,880***	0,690***	0,902***
Four-factor model	0,633***	0,832***	0,657***	0,809***
				*p<0.10; **p<0.05; ***p<0.01

Table 17: Summary of the market factor. **Source:** Own construction.

All portfolios have positive exposure to the market factor at the 0.01 significance level. In most cases, the exposure to the market factor decreases when adding more risk factors, which is expected since the new factors explain some of the portfolios' returns when added in the three-factor and four-factor model.

Summary of SMB factor				
	25 High BD P1 (Group 1)	25 Low BD P2 (Group 1)	10 High BD P5 (Group 2)	10 Low BD P6 (Group 2)
	Coefficient	Coefficient	Coefficient	Coefficient
Three-factor model	-0,106	0,082	-0,252	0,244
Four-factor model	-0,073	0,172	-0,182	0,338*
	25 High MB P3 (Group 3)	25 Low MB P4 (Group 3)	10 High MB P7 (Group 4)	10 Low MB P8 (Group 4)
	Coefficient	Coefficient	Coefficient	Coefficient
Three-factor model	-0,116	-0,192	-0,078	-0,244
Four-factor model	-0,082	-0,144	-0,045	-0,151
				*p<0.10; **p<0.05; ***p<0.01

Table 18: Summary of the SMB factor. **Source:** Own construction.

The SMB factor is negative for all portfolios except the two portfolios P2 and P6, consisting of the 25 and 10 companies with the lowest female share on the board of directors. It is expected that the portfolio of 10 companies strengthens the factor in comparison to the portfolio of 25 companies, as we can see here. In addition, most portfolios have a negative exposure towards SMB, indicating that the portfolios consist of most large-cap companies. All SMB factors are insignificant at the 0.05 level, signaling no significant exposure against this factor for the portfolios.

Summary of HML factor				
	25 High BD P1 (Group 1)	25 Low BD P2 (Group 1)	10 High BD P5 (Group 2)	10 Low BD P6 (Group 2)
	Coefficient	Coefficient	Coefficient	Coefficient
Three-factor model	-0,008	0,177	0,044	0,123
Four-factor model	-0,083	-0,024	-0,112	-0,087
	25 High MB P3 (Group 3)	25 Low MB P4 (Group 3)	10 High MB P7 (Group 4)	10 Low MB P8 (Group 4)
	Coefficient	Coefficient	Coefficient	Coefficient
Three-factor model	0,087	0,281**	-0,113	0,210
Four-factor model	0,010	0,173	-0,187	0,002
				*p<0.10; **p<0.05; ***p<0.01

Table 19: Summary of the HML factor. **Source:** Own construction.

The HML factor is primarily positive, indicating that the portfolios are exposed to the value premium. However, all HML factors are insignificant except P4 when applying the three-factor model. The HML factor is insignificant when adding the WML factor. As shown in table 12, these factors are negatively correlated, which can be a possible explanation even though the regressions do not have multicollinearity problems as stated by the VIF test (Appendix 4.1). As the factor is insignificant for all portfolios except one, we do not find that this risk factor explains much of the portfolios' returns.

Summary of WML factor				
	25 High BD P1 (Group 1)	25 Low BD P2 (Group 1)	10 High BD P5 (Group 2)	10 Low BD P6 (Group 2)
	Coefficient	Coefficient	Coefficient	Coefficient
Four-factor model	-0,116	-0,311***	-0,242	-0,324**
	25 High MB P3 (Group 3)	25 Low MB P4 (Group 3)	10 High MB P7 (Group 4)	10 Low MB P8 (Group 4)
	Coefficient	Coefficient	Coefficient	Coefficient
Four-factor model	-0,119	-0,168	-0,114	-0,322*
				*p<0.10; **p<0.05; ***p<0.01

Table 20: Summary of the WML factor. **Source:** Own construction.

The WML factor is negative for all portfolios and significant for two at the 0.05 level and three at the 0.10 level. It is only significant for portfolios with a low female share, indicating an exposure against the momentum factor for these portfolios.

10.2.5 ESG

In addition to analyzing the risk-adjusted stock returns, the portfolios' female share has been compared against the corresponding ESG score. The plot chart illustrates the relationship between the ESG score, and the female share in the portfolios.

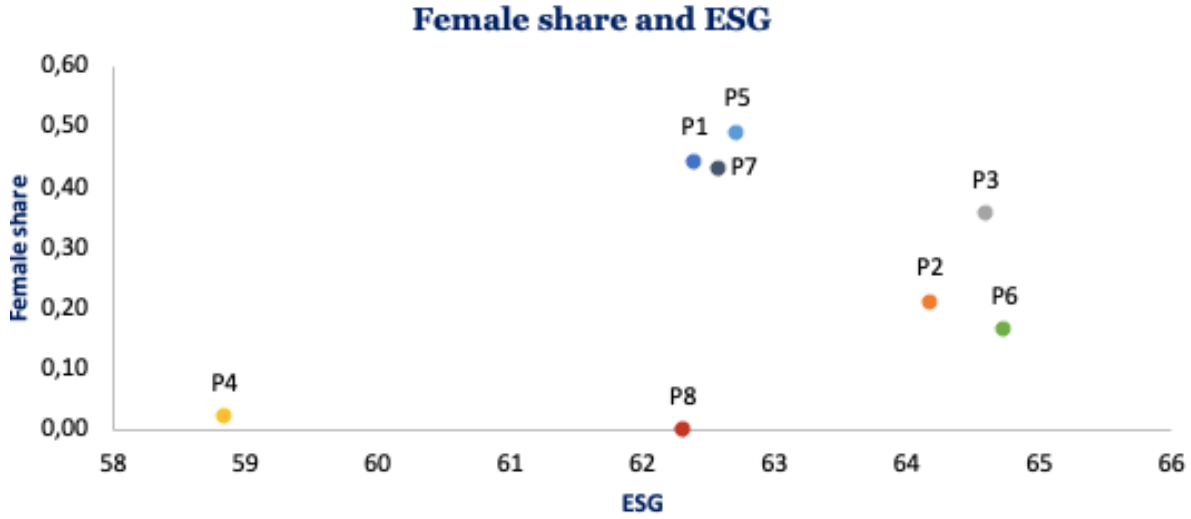


Figure 21: A plot chart of the average female share and average ESG score for the portfolios.

Source: Own construction.

Figure 21 illustrates that the two portfolios with the lowest ESG score is two of the portfolios with a low female share (P4 and P8). Except for these two portfolios, the other portfolios gather in two clusters. The first cluster consists of three portfolios of a high female share (P1, P5 and P7), where all have an average ESG score between 62 and 63. The second cluster comprises one portfolio with a high female share and two with a low female share (P2, P3 and P6). Although they are visually more spread than the first cluster, they have ESG scores between 64 and 65. P6, having a low female share, is the portfolio with the highest ESG score. However, observing the portfolios with a high female share compared to those with a low female share, the gender diverse portfolios have, on average, a higher ESG score.

10.2.6 Sector

	P1	P2	P3	P4	P5	P6	P7	P8
Automobile	0,0%	4,8%	3,2%	2,4%	0,0%	2,0%	0,0%	0,0%
Basic materials	4,0%	14,4%	18,4%	11,2%	4,0%	16,0%	24,0%	12,0%
Chemicals	0,0%	0,8%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Consumer goods	9,6%	5,6%	7,2%	7,2%	10,0%	6,0%	10,0%	10,0%
Energy	12,0%	7,2%	12,0%	11,2%	8,0%	6,0%	10,0%	8,0%
Financial services	28,8%	12,0%	19,2%	20,0%	36,0%	12,0%	22,0%	22,0%
Fishing industry	4,0%	0,0%	1,6%	1,6%	4,0%	0,0%	0,0%	2,0%
Healthcare	8,8%	18,4%	13,6%	13,6%	12,0%	8,0%	14,0%	12,0%
Industry	4,0%	16,0%	5,6%	9,6%	0,0%	18,0%	2,0%	6,0%
Logistics/Transport	1,6%	0,0%	0,0%	4,0%	0,0%	0,0%	0,0%	8,0%
Real estate	0,0%	2,4%	0,0%	2,4%	0,0%	4,0%	0,0%	2,0%
Retail	4,8%	8,8%	4,8%	4,0%	10,0%	14,0%	8,0%	4,0%
Shipping	0,0%	2,4%	0,8%	1,6%	0,0%	4,0%	2,0%	4,0%
Technology	6,4%	3,2%	0,8%	8,8%	8,0%	4,0%	0,0%	10,0%
Telecommunications	16,0%	4,0%	12,8%	2,4%	8,0%	6,0%	8,0%	0,0%
Total	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**

Table 21: Sector overview in the portfolios. **Source:** Own structure.

Table 21 illustrates the distribution of the total 15 sectors within the eight constructed portfolios. The financial services sector has the highest total presence of the sectors, also shown in figure 9. All portfolios of companies with a high female share have a high composition of companies from the financial services sector. Other sectors with a relatively high presence in portfolios with a high female share are energy and telecommunications. In contrast, sectors with a low presence in portfolios with a high female share are automobile, real estate, and shipping. We have already established that sectors are not equally distributed in the dataset, displayed in the sector overview in figure 9.

10.2.7 Size

Our dataset consists of the largest ten companies by market cap from each of the ten countries Norway, Sweden, Denmark, Finland, United Kingdom, Germany, Austria, Switzerland, Netherland, and Belgium. The market cap values of the companies in our dataset range from €1.6 million to € 277 million. On a portfolio level, we investigate how the total average value of each portfolio is arranged. The market cap values are analyzed on average, since the portfolios differ in size regarding the number of companies.

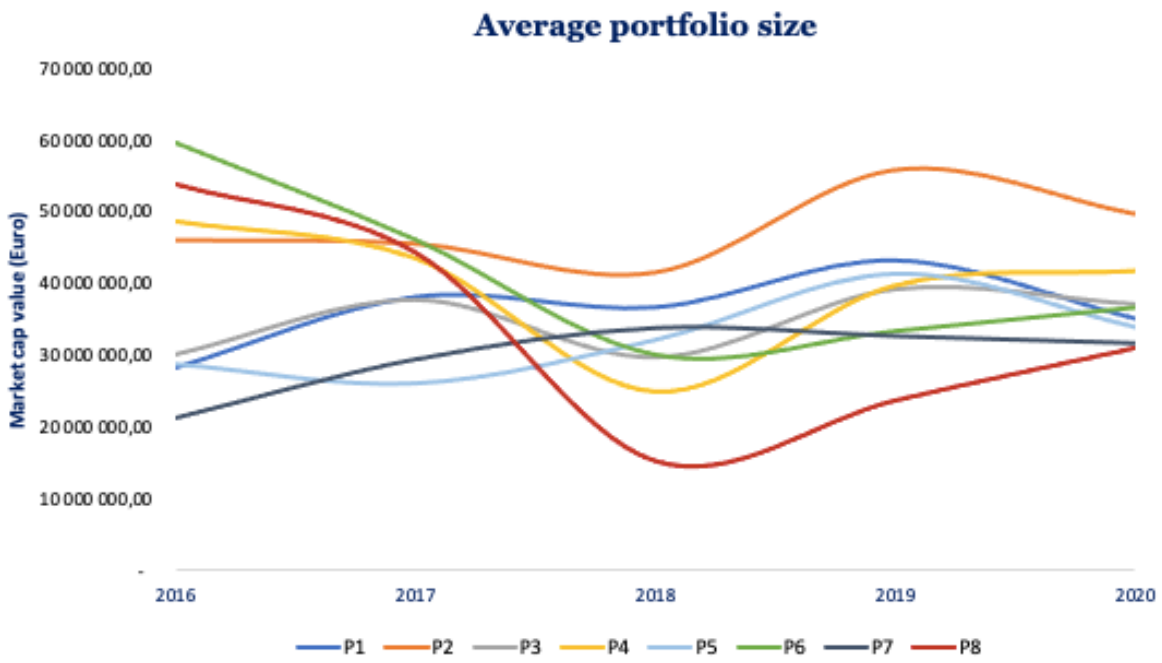


Figure 22: Average portfolio size by market cap value. **Source:** Own construction.

In 2016, portfolio P6 with a low female share on the board of directors had the highest average market cap value, and P7 with a high female share on the management board had the lowest. The same portfolio had the highest average market cap value in 2017, but portfolio P5 with a high female share on the board of directors had the lowest. In 2018, 2019, and 2020, portfolio P2 of the 25 companies with the lowest female share on the board of directors had the highest average market cap value. However, portfolio P8 with the lowest female share on the management board had the lowest average market cap value in 2018, 2019, and 2020.

10.3 Company Level Analysis

To capture information that the portfolio analysis may have overseen and to verify the results, a company level analysis has also been performed. The analysis on the company level has been divided into two sub-sections, namely a stock performance analysis and an ESG score analysis.

10.3.1 Panel Regression Analysis

The panel regression aims to support the results of the time series regression. While the time series regression analyzes the dataset as portfolios, the panel regression analyzes the dataset on an individual stock level. The analysis was performed on three different models. In total, six regressions were conducted.

Three different models have been created to analyze several aspects of the dataset. All the models apply annual stock performance as the dependent variable. The first model applies the female share of the board of directors (BD) as the independent variable. Additionally, a control variable of board size is used to control for the size of the board. The second model uses the female share of the management board (MB) as the independent variable. As a control variable, the size of the management board is applied. The third and last model applies the variables BD, MB, Chairman, CEO, and CFO, and the two control variables. Natural logarithmic transformation of the numerical variable board size and management board size is utilized in all three models to better approximate a normal distribution and overcome a possible problem of heteroskedasticity. In addition, to avoid heteroskedasticity, robust standard errors are applied.

The Hausman test is performed to establish whether the fixed effect model or the random effect model is the most appropriate model for our data. The null hypothesis of the Hausman test is that the random effect model is the most appropriate. If the p-value is lower than 0.05, the null hypothesis is rejected, and the decision to use the fixed effects model is made. The result of the Hausman test is presented in Appendix 4.1. For all three models, the p-value is lower than 0.05. Hence, the null hypothesis is rejected, and we apply the fixed effect model.

Panel regression with fixed effects

Model	1	2	3
BD	-0,434		-0,250
	(0,270)		(0,270)
MB		-0,358*	-0,240
		(0,199)	(0,215)
Chairman			0,097*
			(0,054)
CEO			-0,026
			(0,047)
CFO			-0,123**
			(0,047)
BD size	0,248		0,268*
	(0,170)		(0,168)
MB Size		-0,264***	-0,266***
		(0,099)	(0,093)
Observations	500	500	500
Groups	100	100	100
R^2 within	0,0157	0,031	0,0493
R^2 between	0,0538	0,0753	0,006
R^2 overall	0,0033	0,0274	0,0093

The table shows the results of the fixed effects panel regressions: the dependent variable is stock performance. The coefficients and standard error from the regressions is displayed where the standard error is reported in parentheses. The observations indicates the number of companies over the time period.

**p<0.10; **p<0.05; ***p<0.01*

Table 22: Panel regression with fixed effects. **Source:** Own construction.

The results of the fixed effect model regression are illustrated in table 22. In the first model, both coefficients are insignificant. For the second model, the MB is significant at the 0.10 level, while the MB size is significant at 0.01 level. For the third model, the BD, MB, and CEO are insignificant. The MB size is significant at the 0.01 level, the CFO is significant at the 0.05 level, and the Chairman and BD size is significant at the 0.10 level. Out of the total 11 coefficients, nine has a negative value. A negative coefficient suggests that as the independent variable increases, the dependent variable tends

to decrease. Hence, the negative numbers indicate that the variables have a negative effect on the stock performance.

For model one, the negative coefficient of the BD explains that the female share on the board of directors has a negative effect on the stock performance. Similar results can be seen in model two, where the negative MB states that when the female share on the management increases, the stock performance decreases. In model three, the results are similar as with model one and two. However, the female share on the position of Chairman will increase the stock performance. The significance of the numbers is weak or insignificant for most of the coefficients.

10.3.2 ESG

To illustrate the relationship between ESG score and gender diversity, the ESG score is added as a variable in a correlation analysis. Some observations from the original dataset with 500 observations were missing the ESG score. Hence, they have been excluded, and the dataset consist of 420 observations.

	ESG	*BD*	*MB*	*Chairman*	*CEO*	*CFO*
ESG	1					
BD	-0,047	1				
MB	0,135	0,300	1			
Chairman	-0,035	0,252	0,162	1		
CEO	0,017	0,163	0,204	0,066	1	
CFO	-0,003	0,063	0,278	0,052	-0,025	1

Table 23: ESG correlation matrix. **Source:** Own construction.

Looking at the values of the correlation between ESG, female share on board of directors, management board, the gender of Chairman, CEO, and CFO, three of the five is negatively correlated, while two is positive. However, all the values fall between -0.047 and 0.135, which are considered weak correlations.

11. Discussion

In this chapter, the results of the analysis considered most crucial will be discussed in relation with a selection of previous literature presented earlier. Research implies both a positive and negative relationship between the proportion of females and financial performance. Furthermore, the main goal of this chapter is to determine whether to reject or keep the initial hypotheses, which will lead to an answer to the research question.

11.1 Composition of Boards and Legislations

After assessing previous literature and looking at several aspects of the topic of gender diversity, four hypotheses were developed and introduced in chapter 5. In the following section, the first two hypotheses will be reviewed and discussed according to the results of the analyses carried out in this thesis.

The first hypothesis implies that companies with a high level of women on the board will more likely have a female Chairman, CEO, or CFO. This hypothesis was made based on the suggestion that more female members of the board will increase the possibility of a female being chosen for a leadership position. Further, this was inspired by the study of Perryman et al. (2016), who found that top female executives receive higher compensation in more gender diversified firms. Hence, it may be reasonable to assume that more gender diversified companies have better conditions for women, such as higher compensation.

For the assumption to hold, the authors assume that women use their positions to empower other women. Some women in a position of power may feel that a part of their responsibility is to ensure female empowerment. However, this is not necessarily the case. The glass ceiling concept theory assumes it exists entry barriers for women into higher leadership positions (Morrison & Vin Glinow, 1990; Bell et al., 2002). As previously stated, the glass ceiling theory can be considered a concept that illustrates the difficulties female managers have struggled with and why gender differences exist today. Based on the entry barriers, some women may feel a responsibility for ensuring an easier way for the next women. On the other hand, some may dislike giving others an easier way than they had themselves, or consider it as a biased free-rider path. A third alternative is simply that not everyone is concerned or aware of the issue of gender diversity.

The correlation analysis in table 10 can be used to support this discussion. As mentioned, all variables are positively correlated, with the exception of the relationship between CEO and CFO. The negative relationship between the role of CEO and CFO may indicate that the likelihood of females filling both positions is low. If a female fills one of the positions, the correlation results indicate that it is more likely that the other position is employed by a male. However, due to weak values we do not find a strong relationship on this matter. A positive correlation indicates that there is a positive relationship between the variables. Following this, it can be argued that female share in the board of directors will have a positive impact on female employment in the position of Chairman, CEO, and CFO. The relationship between BD and CFO, Chairman and CEO, or Chairman and CFO are low. Consequently, it can also be argued that they are more or less not correlated based on a quantitative approach, not taking soft factors into consideration.

The second hypothesis suggests that countries with legislation have a higher female presence on the corporate boards. For this hypothesis to hold, the assumption is that the female share will be influenced and presumed higher due to the legislation. Norway was the first country to introduce legislation and have one of the strictest legislations to this day, with a legal requirement of 40% female presence among the board of directors on all listed companies. Our analysis shows that Norwegian companies have the highest average female share in our dataset during the five years on the board of directors. Following this, even though there is no legal requirement within the management board or Chairman position, Norwegian companies has the highest average. Therefore, the findings indicate that the legislation have to some degree been efficient in perceiving gender equality. In the position of CEO and CFO, Norwegian companies have a low female share. It is unclear if this is due to the lack of legislation or just a coincidence. Hence, the legislation concerning the board of directors might not have an effect on executive positions.

Within the Nordic countries, our results find that Danish companies have the lowest ratio of gender diversity at the board of directors and the management board. Further, Danish companies have a low female share in the position of Chairman and CEO. With this, it can be argued that the lack of legislation in Denmark may be a reason for the low numbers. However, they have the highest share of females compared to the nine other countries in the CFO position. To compare the low gender diversity ratios in Denmark, we find that Swedish companies, which neither have legislation on gender quotas, have contradictory results. The Swedish companies have a high average percentage in the board of directors and management board. Based on the comparison of Danish and Swedish

companies, the argument for the need for gender quota legislation to increase gender diversity is not justified.

Companies from the Netherlands, Belgium, Germany, and United Kingdom have relatively similar results, and in our analysis, they neither have the highest or lowest female share in the measured positions. Out of these, United Kingdom is the only one without legislation. Hence, the results indicate a minimal difference between countries with and without legislation. The companies from Austria and Switzerland have the lowest female share on the board of directors and management board. Of all the ten countries, the Austrian companies stand out, having an average female share of 3.62% on the management board. This indicates that the gender quota on the board of directors might not affect the management board. However, both Austria and Switzerland have recently introduced legislation, and it may be reasonable to assume that the effect will be more visually and measurable in the future.

Comparing the countries with and without legislation, the countries without legislation have a higher average female share than those with legal requirements in both the board of directors and management boards. The increase is more significant over the five years for the countries with legislation, this might be a reflection that several countries have introduced legislation in recent years, and as the legislation often comes with grace periods, the effect might not be visible. For instance, in Switzerland, the law was formally fully enforced as of the 1st of January 2021. Based on this, it can be questioned if this thesis is ahead of time, as it is likely that the results of legislations will be more visible in a few years. Additionally, the SHE community has a goal of making the SHE index global within the next couple of years (SHE, 2021), while the UN sustainable development goals is set for 2030 (UN, 2021). As a consequence, the results of our analysis might be substantially different in a couple of years.

Based on the results of Norwegian companies, it may be argued that the legislations have had an effect. In contrast, Swedish companies have the similar proportions of females as Norwegian companies, and this has been accomplished without legislations. However, other countries without legislations do not have as high percentages as Sweden. This may indicate that the results may not be a consequence of the legislation itself, but rather a product of culture and other soft factors.

11.1.1 Conclusion of Hypothesis 1 and 2

Based on our findings and discussion, the first hypothesis can neither be supported nor excluded. Hence, the authors reject the hypothesis. The results show that an increased female share in the board of directors and management boards will make it more likely that a female fills Chairman, CEO, or CFO positions. This is supported by the literature (Perryman et al., 2016). However, the results of the correlation analysis are low, indicating a weak relationship. Further, the thesis does not find evidence to support the second hypothesis. Therefore, the second hypothesis is also rejected. Based on our results, the introduction of legislation cannot alone be said to have a considerable effect on female share. It is reasonable to assume that several factors affect the female share on the board of directors, management board, and executive positions.

11.2 Stock Performance

In the second part of the discussion, the main goal is to determine whether to reject or keep the third hypothesis, where the authors suggested that companies with a "high" level of females on corporate boards outperform companies with a "low" level measured in stock performance. This will be based on the presented results from the portfolio analysis, in addition to the results from the individual stock performance analysis. We repeat that "high" refers to gender balance while "low" refers to the opposite.

The stock performance analysis shows both a positive and a negative relationship between female shares and stock returns. All the self-constructed portfolios yield growth through the analyzed 5-year period. The results show that the applied method of gender screening leads to positive abnormal and risk-adjusted returns for portfolios with both a high and low female share. From a shareholder perspective, these results may signal that investing in companies with a high female share will not lead to superior returns. However, our results do not show that companies with a low female share perform better than companies with a high share, which has been the case in many previous studies (Randøy et al., 2006; Rose, 2007; Campbell & Mínguez-Vera, 2008; Børhen & Strøm, 2010; Marinova et al., 2016; Green & Homroy, 2018). The portfolio analysis shows that, applying a shareholder perspective, an investor can be satisfied by investing in companies with a high female share, but should not invest in companies with a high female share instead of companies with a low female share, nor the opposite. However, this discussion is only based on shareholder returns, and in today's business world, the stakeholder view has settled as a vital perspective. Based on the positive

alphas we find for the portfolios with a high female share, in addition to taking a broader stakeholder view, investors should invest in companies with a high female share. This to enhance female leadership and global support initiatives such as the UN's sustainable development goal 5.5 introduced in section 4.1 in this thesis (UN, 2021).

For the entire period, the analysis finds that the best performing portfolio is consisting of the ten companies with a highest female share on the management board (P7), but we also find that the worst-performing portfolio of our study consists of the ten companies with the highest female share on the board of directors (P5). Hence these results do not, isolated, indicate an advantage nor a disadvantage of female presence and gender diversity. However, this might suggest a different financial impact on the board of directors and the management board, and that the analysis and discussion should separate these two. As previously stated, the board of directors and management board specializes in different phases of the decision-making process (Fama & Jensen, 1983). However, the responsibilities are often, to some extent, diffuse. Fama & Jensen (1983) argue that an efficient division of labor is when the board of directors takes charge of the ratifications and monitoring, while the management board takes responsibility for the daily implementation of decisions and strategy. It will not be possible to state if this is the case for all the board of directors and management boards in this thesis, but it can be reasonable to assume that, in general, the two have different responsibilities. One of the most observable differences is regarding frequency of meetings. While the board of directors often has four to eight meetings a year, the management board meets regularly. In other words, the management board acts in a more operational role than the board of directors.

The results from the time series regression were presented utilizing a group perspective. Group 1 and 2 consist of the portfolios sorted after the board of directors, and Group 3 and 4 consist of the portfolios sorted by the management board. We find that the portfolios sorted by the board of directors perform better when the female share is low compared to the same portfolio with a high female share. This supports the findings in previous literature on female board representation (Randøy et al., 2006; Rose, 2007; Børhen & Strøm, 2010; Marinova et al., 2016; Green & Hamroy, 2018). With these findings, we contribute to previous findings that female presence on the board of directors cannot argue for gender diversity when financial performance is the primary goal. By receiving similar results as previous studies, it may signify that our analysis approach has been executed in a reliable matter.

In contrast to the results from the board of directors, the portfolios sorted by high female share in the management board outperform the portfolios with a low female share. The results may indicate that having a high proportion of women at the management board leads to better stock returns than having a low female share. This is also consistent with the overall best performing portfolio from our analysis being portfolio P7, which contains 43% women on average. This result is in line with the studies of Dezsö & Ross (2012) and Perryman et al. (2016), where they find evidence for better firm performance when having female representation in top management teams. These two studies focus on the US market, but it is still reasonable to believe that our results may be appropriate. Further, we argued that one could assume that the management board acts in a more operational role. Hence, these results might indicate that enhanced gender diversity in a firm's operational groups positively affects the stock performance.

In addition to revealing a positive relationship between the management board and firm performance, the study of Perryman et al. (2016) finds that firms with a higher female share tend to have lower risk appetite. This topic is also deliberated in section 3.5 of this thesis, where the results from different studies discover varied conclusions on the effect of gender and decision-making. A vast part of this discussion relates to how individuals identify with the "classic" gender roles, but one should be very careful to use gender as the only argument in conclusions. However, what is certain, is that every investor has an individual risk preference which affects the investor's required rate of return (Markowitz, 1952). Our dissertation has based the financial analysis singularly on companies with a high or low female share, and this will be applied when discussing how companies perform related to risk attitude and decision-making.

When comparing each portfolio's performance towards each other and the market, there is especially one result related to the risk discussion. As mentioned in the introduction, the authors were inspired to investigate the chosen topic after reading articles on how countries with a female leader handled the Covid-19 crisis better than comparable countries having a male leader. To investigate this, we analyzed each year individually. In 2018 when the market experiences negative growth, all portfolios with a high female share perform better than the low female share portfolios. This might indicate that companies with more gender diversity perform better than companies with few women during crises or difficult periods. A possible reason for this is that companies with less risk aversion decrease more

when the market falls and increase more when the market performs well. A company's risk aversion is connected to the risk aversion of the individual employees. In other words, the reason portfolios with a high female share outperform those with a low female share may be due to individual's risk aversion. This result is also reflected in the market factor, where the portfolios with a low female share have higher coefficients, indicating they are more sensitive to the market than the portfolios with a high female share. However, it is essential to state that this is a one-time event in our study, and that a five-year period may be too short to confirm a connection. There is also a high possibility that other individual characteristics of the companies explain this development.

In the literature, it is agreed that gender diversity is positive for other reasons than financial performance as it contributes to, among other things, increased board experience, which might increase the quality of the decision-making process (Bøhren & Strøm, 2010; Chen et al., 2018). The topic is highly complex, where some experience that with more diversity within a board, conflicts will more easily occur, and the decision-making progress becomes more time-consuming. However, this will not be discussed further as the topic is beyond the reach of this thesis. Campbell & Mínguez-Vera (2008) argued that gender diversity could be achieved without destroying shareholder value, which agrees with the results from the portfolio analysis in this dissertation.

In addition to analyze the relationship between gender diversity and stock performance, we have discussed if the legislation of female quotas on corporate boards leads to more gender diversity. Another perspective in this discussion is whether the results in this thesis indicate that legislation can be justified based on stock performance, which also has been the topic of discussion in previous literature (Francoeur et al., 2008; Adams & Ferreira, 2009; Bøhren & Strøm, 2010; Green & Homroy, 2018). Our findings are, to some degree, consistent with the results from these studies, as we have found that gender diversity is neither an advantage nor a disadvantage when analyzing stock performance. Since political legislations are mainly focused on the board of directors, our results do not find that stock performance is a solid argument for gender quotas. If legislation on the board of directors indirectly increases the female share on the management board, our results may argue why legislations are favorable from the perspective of shareholders. The correlation matrix in table 10 shows a positive correlation between the share of females on the board of directors and the management board. Further, the correlation indicates that more women in the board of directors may also increase the number of women in leadership positions such as Chairman of the board, CEO, and

CFO. Based on the rationale above, the authors cannot provide arguments as to why legislations on the board of directors may be justified based on stock performance. As other studies already have stated, arguments for legislation must instead be based on morality and equality. According to the results discussed above, where we find that gender diverse portfolios outperform portfolios with a low female share in periods where the market decreases, stock performance might justify political legislation. Again, we mention that this result could also be a coincidence, and we urge the need for more thorough analyses on cases of bearish markets.

A panel regression focusing on the individual stocks was performed to increase the robustness of our portfolio analysis. The results of the panel regression more or less support all the findings of our time series regression. We discover a critical exception of the results from the portfolio analysis, indicating that the female presence on management boards will have a negative instead of a positive effect on the stock performance. Both the second and third model of the panel regression applied the variables of the management board. In both models, the variables' coefficient has a negative value, indicating that the female presence instead has a negative effect on the stock performance. However, as the coefficient are only significant at the 0.10 level for the second model and insignificant at the third model, the results are too insignificant, and a conclusion should not be based on these results.

The results of the panel regression, showing that stocks with high female presence do not perform better than the stocks with a low female share for both board of directors and management board, is in line with the findings of the literature (Randøy et al., 2006; Rose, 2007; Børhen & Strøm, 2010; Marinova et al., 2016; Green & Hamroy, 2018). Consequently, the time series regression findings of the management boards might be a coincidence, as there is no support for this in the panel regression. Additionally, the whole dataset has been analyzed in the panel regression, implying that the analysis includes all companies, compared to the portfolio analysis, which deals with a reduced part of the dataset. This might be an explanation as to why the results may differ between the two analysis approaches. However, there is an overall consensus in the two regression analyses, suggesting that the robustness of the analyses is at an acceptable level.

11.2.1 Conclusion of Hypothesis 3

Based on the discussion on stock performance, the third hypothesis is rejected by the authors. Nevertheless, some evidence on a positive relationship between gender diversity on the management board and stock performance has been found. We would require more substantial evidence not to

reject the hypothesis, which can be explained by three reasons. The first reason is that the portfolio analysis' exposes that portfolios with a high female share on the board of directors perform worse than portfolios with a low female share on the board of directors. The second reason is that the company level analysis reveals a negative relationship between gender diversity on corporate boards and stock returns, even though the results in this test are weak. The final reason we have based the conclusion on, is that the monthly alphas found in the portfolio analysis are positive for both portfolios with high and low gender diversity, and the alphas are relatively small. Even though these alphas describe neither an advantage nor disadvantage of gender diversity, the positive abnormal results are low and close to 0. Hence, to not reject the third hypothesis, further solid range of results are required.

11.3 ESG

As earlier discussed, gender diversity is an essential element of corporate performance today and has become more critical since corporations only had to care about shareholders' needs. Today, in addition to economic performance, firms are measured on ESG performance, inspired by, among others, Freeman's (1984) stakeholder theory and the theory of the triple bottom line (Hubbard, 2009; Elkington, 1997). If a positive relationship between gender diversity and ESG score can be proved, it can justify an argument for focusing on gender diversity regardless of the effect on stock performance. Additionally, investors following an SRI approach will probably consider the ESG score before a potential investment, which raises the financial aspect of the ESG score in this context. Following this, the fourth and last hypothesis is that gender diversity leads to a higher ESG score. The purpose is to discuss if the ESG score could provide a financial argument as to why companies should focus on gender diversity in corporate boards.

The portfolio with the highest ESG score is a portfolio consisting of a low female share on the board of directors on portfolio level. When comparing the portfolios with high female shares against the portfolios with low female shares on average, the portfolios with high female shares have a higher ESG score. However, this is only marginally. As a result of this, a statement that a higher female share will lead to a higher ESG score may be hard to support. Nevertheless, the analysis gives us valuable insights to consider. The results based on average, showing a positive relationship between gender diversity and ESG score, might be expected. This because the ESG scoring system for Refinitiv Eikon includes corporate governance and diversity as a part of the score (Refinitiv, 2021).

On an individual stock level, the ESG score is negatively correlated with the variable for female share on board of directors and positively correlated with the variable for female share on management board. Nevertheless, the correlations are weak and cannot prove a connection between the female share and the ESG score.

Even though the findings in this thesis communicate different results, the authors still suggest that it is reasonable to expect a positive connection between gender diversity in companies and their ESG score. A reason that our results do not find this, may be that we are solitary analyzing the gender diversity in leadership positions and corporate boards. The ESG score looks at the gender diversity of the total employees of a firm, therefore the results may be different. Further, companies with proper gender balance may not automatically receive a high ESG score because the score illustrates a wide range of elements. A company may have an equal share of women and men but simultaneously be non-eco-friendly, and the ESG score shall reflect both.

11.3.1 Conclusion of Hypothesis 4

Based on the results and following discussion on gender diversity and ESG score, the authors reject the last hypothesis, which proposes that gender diversity leads to a higher ESG score. In order to not reject the hypothesis, the analysis would need to have more consistent results. On the portfolio level, gender diversity leads to a higher ESG score on average. However, on the company level, the correlation analysis reveals a negative relationship between gender diversity on the board of directors and ESG score. ESG is a highly complex topic, and to measure the effect gender diversity has on it may require thorough analysis. Further, our results and discussion agree with previous studies that ESG is hard to measure due to its complexity (Halbritter & Dorfleitner, 2015). If the results in this thesis had found a positive relationship between gender diversity and the ESG score, this could have provided a financial argument as to why companies should focus on gender diversity in corporate boards. However, to deliver a valid conclusion, more analysis is needed. Given the insights the authors have gained working on this thesis, a possible approach to analyzing the relationship between gender diversity and ESG score may consider the results per sector.

11.4 Sector and Size

In addition to analyzing the effect of gender diversity on stock performance and, to some degree, on ESG score, we have added two specific elements to the discussion; sector and size. These have only

been applied at the portfolio level, and the results could have been different if the analysis were conducted at a company level.

When sectors are taken into account, we find that all portfolios with a high female share have a portfolio composition of 20% or more of companies from the financial services sector. This result alone may indicate that this sector focuses more on gender diversity in executive positions and corporate boards than others. For stock performance, the best overall performing portfolio is P7, and the worst-performing portfolio is P5. Hence, the difference in sector composition of these two portfolios is a relevant discussion approach. Previously we have stated that the most crucial difference is that P7 represents the management board while P5 represents the board of directors. Concerning sector, the most visual difference between the two is that P7 consists of a high share of companies from the basic materials sector compared to P5, and that P5 has more companies from the financial services sector and technology sector compared to P7. These results suggest that even though the financial services sector has a higher gender diversity in corporate boards than others, this does not necessarily have a positive relationship with the stock returns.

In addition, it is relevant to consider how different sectors experience dissimilar volatility levels. Therefore, we repeat ourselves in the fact that our portfolios are unequally weighted regarding sectors. As a consequence, some results may, to some degree, be biased. Some portfolios have a high composition of stocks in one or two specific sectors, and hence, these portfolios are highly exposed to the market sensitivity of these sectors. Therefore, the sector consideration may weaken the evidence of gender diversity's effect on stock performance.

The analysis of the size of the portfolios showed that the portfolios with the highest average market cap value have a low female share on the board of directors. This result might suggest that large-cap companies tend to have a low proportion of women on corporate boards, which is consistent with the discussion in the study of Green & Homroy (2018). As the portfolios have been rebalanced yearly, it is reasonable to assume that a stable trend of this relationship through the analyzed period could signify a realistic result. On the other hand, we also find that the portfolio with the lowest female share on the management board has the lowest average market cap value in 2018 to 2020. Again, we find that the results for the board of directors and management board are different. This supports our discussion above, where separation of these two has been found necessary.

Applying the three-factor and four-factor model when analyzing stock performance, the SMB factor is taken into consideration. Our results show insignificant and negative SMB factors for all portfolios except one. The SMB factor is positive and significant at the 0.10 level for portfolio P6 when applying the four-factor model. This portfolio consists of the ten companies with the lowest female share on the board of directors. In table 3**,** each portfolio's distribution of country share was illustrated. The table explains that more than 50% of the companies in P6 are Swiss or Austrian, where especially Austrian companies have low market cap values compared to the rest of the dataset. However, the results being insignificant, we will not discuss the factors' influence on our results any further.

The overall best and worst-performing portfolios measured in stock return were considered when discussing the sector, and this viewpoint will therefore be used for size as well. The two portfolios, P7 and P5, have a high female share in the companies' corporate boards. The average portfolio size of the two does not show any considerable difference regarding market cap value, and their size is relatively stable for both throughout the whole period. Hence, it is not reasonable to suggest a particular connection between the financial results from a gender screen approach and portfolio size.

Our analyses of both sector and size are relatively brief. However, it has provided valuable insights into the many elements one should consider. To apply the results to a solid conclusion, we would need to perform a more thorough analysis with different perspectives and methods. Hence, our results on sector and size should be examined further before concluding, and this is a suggestion for future studies.

12. Conclusion

The purpose of this thesis was to investigate the relationship between gender diversity and companies' stock returns with an empirical study of large companies in Northwestern Europe from 31st of December 2015 to 31st of December 2020. Hence, the aim of the thesis was to answer the following:

"How does gender diversity affect the stock returns of Northwestern European companies?"

To answer the research question, the study collected data from 100 companies in ten countries over five years. As a measure of gender diversity, the female share of the board of directors and management board has been assessed. In addition, the gender of the Chairman, CEO, and CFO has been considered. Further, the thesis presented four sub-questions, which now will be summarized and lead us to the conclusion.

(1). What is gender diversity?

The first sub-question was deliberated early in the thesis, where it was stated that the term gender diversity refers to an equal representation between people of a different gender. To analyze gender diversity and financial performance, several elements of gender diversity were assessed. As a result, this thesis found that gender diversity on corporate boards will make it more likely that a female fills the position as Chairman, CEO, or CFO. Further, our study also finds that legislation of gender quota is hard to justify based on financial arguments, this consistent with previous studies. However, the authors suggest that these results may be more applicable in a few years when legislation has settled properly.

(2). How does gender diversity affect the risk-adjusted returns?

To analyze the relationship of gender diversity and risk-adjusted stock returns and answer the second sub-question, the multi-factor models CAPM, Fama & French three-factor model, and Carhart's four-factor model has been applied on a portfolio level. From a shareholder perspective, the results do not find that an investor should invest in companies with gender diversity instead of companies with low female share, nor the opposite. Interpreting the results, looking at the board of directors and management board separately, gender diversity has a negative effect on stock returns for the board of directors but positive for the management board.

(3). How do different approaches affect the result when investigating the relationship between gender diversity and stock performance?

A company level analysis was performed to consider company-specific characteristics that the portfolio analysis might miss and to verify the results as a robustness test. The portfolio analysis was conducted through self-constructed portfolios based on a gender screen, where two categories of gender diversity were compared, namely high and low. Portfolios of high and low gender diversity had on average a 43% and a 10% female share on the corporate boards. The portfolio analysis also investigated the difference between the board of directors and the management boards, specific time-periods, sector, and size. The results show that different elements and approaches affect the result to some degree. We find that the company analysis mostly supports the results from the portfolio analysis, with the exception that the individual stock analysis finds a negative, but insignificant, effect on stock returns for the management board. Further, the thesis' result may suggest a relationship between gender diversity, lower risk, and stability. Taking sectors into account, we find that the results indicating some effect from the gender screen approach becomes weaker, as the results may be biased of each portfolio's diverse sector composition.

(4). Can ESG score provide a financial argument for enhanced gender diversity?

The last sub-question has been deliberated by discussing how the importance of companies' and investors' responsibilities and social impact have increased. This thesis does not find evidence to support a strong positive relationship between gender diversity and ESG score.

The main finding of this thesis' empirical study, and answer to the research question, is that gender diversity does not affect companies' stock returns. Hence, from a shareholder perspective, there is no financial argument stating that an investor should prefer gender diverse companies. However, in today's business world, the stakeholder view has settled as a vital perspective. Moreover, the thesis provides valuable insights where it finds that large companies in Northwestern Europe still are far from gender diversified. Further, the authors have gained insights as to why corporate boards should be more gender diversified. Gender diversity is also a matter of social and moral justice, where this in itself is an argument. In addition, the results suggest a relationship between risk, stability, and gender diversity. For some, gender diversity may also be a part of the corporate coherence, as a gender diverse environment are likely to be connected with the balance of hard and soft factors within a firm. As a result of this, and by applying a stakeholder perspective, the study of this thesis does not find any argument for not encouraging gender diversity.

12.1 Further Research

The authors would recommend further studies to focus on board diversity and board structure. Diversity is complex, and hence the attention can be drawn to several elements than just gender. For instance, ethnicity, experience, education, age, and nationality can be variables to consider alongside gender when discussing diversity in the board. Followingly, gender diversity is a part of the board structure and there might be other factors to consider apart from gender diversity to find contexts. For instance, the size of the board, the independence, duality, or tenure. Another proposal would be to reapply the same hypothesis and research question in another study, while the shift in focus can relate to the dataset. An analysis of small and medium-size enterprises could be done. However, it might be more challenging to obtain sufficient data. Further, the authors will recommend further research on the topic to take sector into account at an earlier stage of the analysis. For instance, one can construct equally weighted sector portfolios, investigating the gender diversity of each portfolio ex-post instead of ex-ante. The authors also want to encourage further studies to examine an expansion or change to the geographical location of the dataset, such as the US, Scandinavia or the whole of Europe. Finally, the thesis has aimed to help future research build a discussion around the role of regulation and legislation in controlling the diversity among management and boards. As the focus and legislation on gender diversity are currently under evolution, the result of a similar analysis in the future could possibly provide a different result.

12.2 Limitations and Weaknesses

The authors acknowledge that the analyses and conclusions in this thesis may, to some degree, be affected by choices made during the research process. This thesis mainly has three concerns important to be aware of, and the conclusion should be interpreted with this in mind.

The first concern relates to the investigated time period and dataset limitations as a result of this. The choice of the time period was set to five years, which is relatively short. Consequently, the analysis is sensitive to the market fluctuations within this period. Ideally, the authors would prefer to include a more extended period in the analysis. However, as the analysis is connected to the gender composition in 100 companies each year, the five-year restraint had to be made due to lack of capacity and focus on quality when analyzing 500 annual reports. It is also relevant to state that the financial analysis is looking at historical numbers, hence the conclusions are based on the past instead of predicting the future. Following this, the data sample excludes companies that do not have data for

the five-year period. Additionally, the choice to sort based on the highest market cap might expose the analysis to survivorship bias, meaning that some companies were possibly overlooked when the choice of companies was made. However, performing the analysis with companies where information either lacks, is incomplete, or not comparable would create a number of challenges.

The second limitation concerns the portfolio construction in two ways. First, the portfolio analysis is sensitive to the portfolio's size related to the number of companies. In this thesis, the portfolios consist of either 25 or 10 companies. As a result, it is reasonable to believe that some portfolios may be especially exposed to firm-specific coincidences due to reduced diversification. Further, different sizes of the portfolios, such as 50, may lead to other results. Secondly, the portfolios are sorted by applying an ex-ante gender screen approach. The fact that some portfolios have high exposure to some sectors as a result of the approach is a possible source to biased results when analyzing the relationship between gender diversity and stock returns.

The last source of uncertainty is connected to choices made related to the ESG score. First, it is important to mention that the complexity of the ESG score makes it difficult to apply the score in a sub-analysis since it needs in-depth analysis to prove useful. The choice of data provider of the ESG score is undeniably a critical process as the different providers use different methods to measure a company's ESG performance. When analyzing the relationship between gender diversity and ESG scores, some observations were excluded due to missing ESG scores. When reducing the number of companies in the dataset it may become less representative for the investigated market.

Bibliography

The annual reports of 2016-2020 for all companies in the dataset has been examined.

30% Club. (2021, 01 21). *30% Club*. Retrieved 01 2021, from United Kingdom: https://30percentclub.org/about/chapters/united-kingdom

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, 94(2) 291-309.

Ang, A. (2014). *Asset Management: A Systematic Approach to Factor Investing (Financial Management Association Survey and Synthesis).* Oxford University Press.

Baltagi, B. H. (2008). *Econometric Analysis of Panel Data.* Chichester, UK: John Wiley & Sons.

Bauer, R., Koedijk, K., & Otten, R. (2005). International evidence on ethical mutual fund performance and investment style. *Journal of banking & finance*, 29(7), 1751-1767.

Bell, M. P., Mclaughlin, M. E., & Sequeira, J. M. (2002). Discrimination, Harassment and the Glass Ceiling: Women Executives as Change Agents. . *Journal of Business Ethics*, 37, 65-76.

Berg, F., Koelbel, J. F., & Rigobon, R. (2019). Aggregate Confusion: The Divergence of ESG Ratings. *MIT Sloan School of Management*, 1–42.

Berk, J., & DeMarzo, P. (2016). *Corporate Finance: The Core* (Vol. Fourth edition). Global Edition: Pearson Education Limited.

Bodie, Z., Kane, A., & Marcus, A. (2014). *Investments.* Mc Graw Hill.

Boulouta, I. (2013). Hidden Connections: The Link Between Board Gender Diversity and Corporate Social Performance. . *Journal of Business Ethics, 113*, 185-197.

Brugger, B. (2021, 01 06). *Towards data science*. Retrieved 03 2021, from Panel Data Analysis: https://towardsdatascience.com/a-guide-to-panel-data-regression-theoretics-and-implementation-with-python-4c84c5055cf8

Busco, C., Malafronte, I., Pereira, J., & Starita, M. G. (2019). The determinants of companies' levels of integration: Does one size fit all? *The British Accounting Review, 51(3)*, 277-298.

Bøhren, Ø., & Strøm, R. Ø. (2010). Governance and Politics: Regulating Independence and Diversity in the Board Room. *Journal of Business Finance & Accounting, 37(9-10)*, 1281-1308.

Campbell, K., & Vera, A. M. (2018). Gender Diversity in the Boardroom and Firm Financial Performance. *Journal of business ethics, 83(3)*, 435-451.

Carhart, M. M. (1997). On Persistence in Mutual Fund Performance. *The Journal of Finance, 52(1)*, 57–82.

Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate Governance, Board Diversity and Firm Value. *Financial Review, 38(1)*, 33-53.

Chaganti, R. (1986). Management in Women-Owned Enterprises. *Journal of Small business management, 24*, 18.

Chaganti, R., & Parasuraman, S. (1996). A Study of the Impacts of Gender on Business Performance and Management Patterns in Small Business. *Entrepreneurship Theory and Practice, 21(2)*, 73–75.

Chen, J., Leung, W. S., & Evans, K. P. (2018). Female board representation, corporate innovation and firm performance. *Journal of Empirical Finance, 48*, 236-254.

Conyon, M., & Lerong, H. (2017). Firm performance and boardroom gender diversity: A quantile regression approach. *Journal of Business Research, 79*, 198-211.

Deloitte. (2019, 10 30). *Deloitte*. Retrieved 01 2021, from Deloitte Global's latest Women in the Boardroom report highlights slow progress for gender diversity: https://www2.deloitte.com/global/en/pages/about-deloitte/press-releases/deloitte-global-latest-women-in-the-boardroom-report-highlights-slow-progress-for-gender-diversity.html

Dezsö, C. L., & Ross, D. G. (2012). Does female representation in top management improve firm performance? A panel data investigation. *Strategic Management Journal, 33(9)*, 1072-1089.

DW. (2021, 02 01). *DW*. Retrieved 02 2021, from German Cabinet approves gender quota bill for company boards: https://www.dw.com/en/german-cabinet-approves-gender-quota-bill-for-company-boards/a-56144530

Elkington, J. (1997). *Cannibals with forks: The Triple Bottom Line of 21st Century Business.* Capstone.

Euribor rates. (2021, 03 10). *Euribor rates.eu*. Retrieved 03 2021, from What is Euribor: https://www.euribor-rates.eu/en/what-is-euribor/

European Commission. (2019). *2019 Report on equality between women and men in the EU.* European Commission.

European Commission. (2018). *2018 Report on equality between women and men in the EU.* European Commission.

European Institute for Gender Equality. (2019, 06 28). *Eige*. Retrieved 01 2021, from Gender Statistics Database: https://eige.europa.eu/gender-statistics/dgs/data-talks/legislative-quotas-can-be-strong-drivers-gender-balance-boardrooms

EWOB. (2019). *European Women on Boards Gender Diversity Index.* EWOB.

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance, 25(2)*, 383-417.

Fama, E. F., & French, K. R. (1992). The Cross-Section of Expected Stock Returns. *The Journal of Finance, 47(2)*, 427–465.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33(1)*, 3–56.

Fama, E. F., & Jensen, M. C. (1983). Separation of Ownership and Control. *The Journal of Law and Economics, 26 (2)*, 301-325.

Farrell, K. A., & Hersch, P. L. (2005). Additions to corporate boards: the effect of gender. *Journal of Corporate Finance, 11(1)*, 85-106.

Female Invest. (2021, 02 08). *Female Invest*. Retrieved 02 2021, from About us: https://www.femaleinvest.com/about-us/

Female Invest (2021, 01 25) Do you see a problem? LinkedIn. Retrieved 01 25 2021 from: https://www.linkedin.com/posts/female-invest_do-you-see-a-problem-only-19-of-board-members-activity-6758006677737353216-uZJR/

Francoeur, C., Labelle, R., & Sinclair-Desgagné, B. (2008). Gender Diversity in Corporate Governance and Top Management. *Journal of Business Ethics volume 81*, 83-95.

French, K. R. (2021, 03 23). *Kenneth R. French database*. Retrieved 03 2021, from Current Research Returns: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Developed

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment, 5(4)*, 210-233.

Gara, A. (2020, 12 21). *Forbes*. Retrieved 01 2021, from How These Women Investors Crushed It In 2020: https://www.forbes.com/sites/antoinegara/2020/12/21/how-these-women-investors-crushed-it-in-2020/?sh=694a61df5701

Gara, A. (2017, 10 03). *Forbes*. Retrieved 01 2021, from Meet The Best Investor You've Never Heard Of: Why She Stuck With Amazon, Netflix And Tesla For Years: https://www.forbes.com/sites/antoinegara/2017/10/03/nancy-zevenbergen-investor-tesla-amazon-netflix-best-investor/?sh=2e599bbc6ffd

Garikipati, S., & Kambhampati, U. (2021, 01 12). *Leading the Fight Against the Pandemic: Does Gender 'Really' Matter?* Retrieved 01 11, 2021, from SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3617953

Gesley, J. (2020, 09 29). *Library of Congress*. Retrieved from Switzerland: Gender Quotas for Boards of Large Companies to Take Effect January 1, 2021: https://www.loc.gov/law/foreign-news/article/switzerland-gender-quotas-for-boards-of-large-companies-to-take-effect-january-1-2021/

Global-rates. (2021, 03 10). *Global-rates*. Retrieved 03 2021, from 1 month Euribor interest rate: https://www.global-rates.com/en/interest-rates/euribor/euribor-interest-1-month.aspx

Goodley, S. (2020, 11 22). *The Guardian*. Retrieved 01 2021, from Germany agrees 'historic' mandatory boardroom quota for women: https://www.theguardian.com/business/2020/nov/22/germany-agrees-historic-mandatory-boardroom-quota-for-women

Green, C. P., & Homroy, S. (2018). Female directors, board committees and firm performance. *European economic review, 102*, 19-38.

Guba, E. G., & Linkcoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin, & Y. S. Lincoln, *Handbook of qualitative research* (pp. 105-117). CA: Thousand Oaks.

Halbritter, G., & Dorfleitner, G. (2015). The wages of social responsibility – where are they? A critical review of ESG investing. *Review of Financial Economics, 26*, 25-35.

Heymans, A., & Brewer, W. P. (2015). The influence of volatility spill-overs and market beta on portfolio construction. . *South African Journal of Economic and Management Sciences, 18(2)*, 277–290.

Hoang, J., & Fjærli, E. (2020, 03 06). *Statistisk sentralbyrå*. Hentet 01 2021 fra Fleire kvinner i styre og leiing: https://www.ssb.no/virksomheter-foretak-og-regnskap/artikler-og-publikasjoner/fleire-kvinner-i-styre-og-leiing

Hubbard, G. (2009). Measuring Organizational Performance: Beyond the triple bottom line. . *Business Strategy and the Environment, 18(3)*, 177-191.

Huber, B. M., & Comstock, M. (2017). *ESG Reports and Ratings: What They Are, Why They Matter.* Davis Polk & Wardwell LLP.

Huninvesterer. (2018). *Huninvesterer*. Retrieved 01 2021, from Aksjer: I fjor gikk 80 % av alt aksjeutbytte til menn: https://huninvesterer.no/artikkel/fond?faktaoversikt&subview=fordeling-av-aksjeutbytte

Invest Stockholm. (2018, 09 18). *Invest Stockholm*. Retrieved 01 2021, from A WOMAN'S PLACE: Stockholm's best-known businesses pledge to further gender equality: https://www.investstockholm.com/move-to-stockholm/awomansplace/updates/stockholms-best-known-businesses-pledge-to-further-gender-equality/

Jegadeesh, N., & Titman, S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. . *Journal of Finance, 48(1)*, 65–91.

Johnson, J., & Powell, P. (1994). Decision Making, Risk and Gender: Are Managers Different? . *British Journal of management, Vol. 5*, 123-138.

Kenerson. (2021). *Finland*. Retrieved 01 18, 2021, from Paul Hastings: https://www.paulhastings.com/genderparity/countries/finland.html

Kruisinga, S. A., & Senden, L. (2017, 09). Gender Diversity on Corporate Boards in the Netherlands: Waiting on the World to Change. *Gender Diversity in the Boardroom*, pp. 177-204.

Lintner, J. (1965). Security prices, risk, and maximal gains from diversification. . *The Journal of Finance, 20(4)*, 587-615.

Lovdata. (2021, 01 11). *Lovdata*. Retrieved 01 2021, from Lov om allmennaksjeselskaper (allmennaksjeloven): https://lovdata.no/dokument/NL/lov/1997-06-13-45/KAPITTEL_6-1#%C2%A76-1

Lyness, K. S., & Thompson, D. E. (2000). Climbing the Corporate Ladder: Do Female and Male Executives Follow the Same Route? *Journal of Applied Psychology, 85(1)*, 86-101.

Marinova, J., Plantenga, J., & Remery, C. (2016). Gender diversity and firm performance: evidence from Dutch and Danish boardrooms. *International Journal of Human Resource Management, 27(2)*, 1777-1790.

Markowitz, H. M. (1952). Portfolio Selection. *The Journal of Finance, 7(1)*, 77–91.

McGrath. (2021). *Belgium*. Retrieved 01 18, 2021, from Paul Hastings: https://www.paulhastings.com/genderparity/countries/belgium.html

Morrison, A. M., & Glinow, A. M. (1990). Woman and Minorities in Management. . *American Psychologist, 45(2)*, 200-208.

Mossin, J. (1966). Equilibrium in a capital asset market. . *Econometrica, 34*, 768–783.

Munk, C. (2018). *Financial Markets and Investments.* Copenhagen: CBS.

Oakley, J. G. (2000). Gender-based Barriers to Senior Management Positions: Understanding the Scarcity of Female CEOs. . *Journal of Business Ethics, 27(4)*, 321-334.

Perold, A. F. (2004). The Capital Asset Pricing Model. *Journal of Economic Perspectives 18(3)*,

3-24.

Perryman, A. A., Fernando, G. D., & Tripathy, A. (2016). Do gender differences persist? An examination of gender diversity on firm performance, risk, and executive compensation. . *Journal of business research, 69(2)*, 579-586.

Powell, G. (1990). One More Time: Do Male and Female Managers Differ? *Academy of Management Executive 4(3)*, 68–75.

Powell, M., & Ansic, D. (1997). Gender Differences in Risk Behaviour in Financial Decision-Making: An Experimental Analysis . *Journal of Economic Psychology 18(6)*, 605–628.

Randøy, T., Oxelheim, L., & Thomsen, S. (2006, 01 01). *A Nordic perspective on corporate board diversity* . Nordic Innovation Centre. Retrieved from http://norden.diva-portal.org/smash/get/diva2:707100/FULLTEXT02.pdf

Refinitiv. (2021). *ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) SCORES FROM REFINITIV.* Refinitiv.

Reuters. (2021, 01 06). *Reuters*. Retrieved 01 2021, from German cabinet agrees quota for women on company boards: https://www.reuters.com/article/germany-women-companies/german-cabinet-agrees-quota-for-women-on-company-boards-idINKBN29B17W?edition-redirect=in

Ricchetti, F. (2020, 12 08). *Glass Lewis*. Retrieved 01 2021, from https://www.glasslewis.com/a-new-gender-diversity-quota-for-german-management-boards/

Riise, K. V. (2018, 04 22). *Kvoteringslov ga ikke flere kvinner i toppen*. Retrieved 01 2021, from Dagens Næringsliv: https://www.dn.no/arbeidsliv/kjonnsdelt-arbeidsliv/kjonnskvotering/sissel-jensen/kvoteringslov-ga-ikke-flere-kvinner-i-toppen/2-1-311464

Rose, C. (2007). Does female board representation influence firm performance? The Danish evidence. *Corporate Governance: An International Review, 15(2)*, 404-413.

Rosenbak, S. (2017, 11 25). *Finans.dk*. Retrieved 01 21, 2021, from Den danske model for flere kvinder i ledelse har fejlet: https://finans.dk/debat/ECE10052590/den-danske-model-for-flere-kvinder-i-ledelse-har-fejlet/?ctxref=ext

Ross, S. A. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory, 13(3)*, 341–360.

Saunders, M. N., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students.* Pearson.

Schoenberger, L., & Dawkins, D. (2020). *30 under 30*. Retrieved 02 08, 2021, from Forbes: https://www.forbes.com/30-under-30/2020/europe/finance/#32a0c15b144a

Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *The Journal of Finance, 19(3)*, 425-442.

SHE Index. (2021).*SHE Index*.Retrieved 0208, 2021,from SHE: https://sheindex.com/no/framework

SHE. (2021). *About us*. Retrieved 01 2021, from SHE: https://www.sheconference.no/about

Skinbjerg, D. (2021, 01 20). *Finans.dk*. Hentet 01 2021 fra Kvinderne strømmer til de danske investeringsplatforme, men er stadig i undertal: »Jeg synes ikke, at vi har været gode nok«: https://finans.dk/privatokonomi/ECE12696406/kvinderne-stroemmer-til-de-danske-investeringsplatforme-men-er-stadig-i-undertal-jeg-synes-ikke-at-vi-har-vaeret-gode-nok/

Smale, A., & Miller, C. C. (2015, 03 06). *Germany Sets Gender Quota in Boardrooms*. Retrieved 01 2021, from The New York Times: https://www.nytimes.com/2015/03/07/world/europe/german-law-requires-more-women-on-corporate-boards.html

Sonfield, M., Lussier, R., Corman, J., & McKinney, M. (2019). Gender Comparisons in Strategic Decision-Making: An Empirical Analysis of the Entrepreneurial Strategy Matrix. *Journal of Small Business Management 39(2)*, 165-173.

Stock, J. H., & Watson, M. W. (2015). *Introduction to Econometrics.* Pearson.

Terjesen, S., Sealy, R., & Singh, V. (2009). Women Directors on Corporate Boards: A Review and Research Agenda. *Corporate Governance: An International Review, 17(3)*, 320-337.

The Guardian. (2017, 01 12). *The Guardian*. Retrieved 02 08, 2021, from Sweden rejects quotas for women on boards of listed companies: https://www.theguardian.com/world/2017/jan/12/sweden-rejects-quotas-women-boardroom-listed-companies

The Institute of Leadership & Management. (2021, 01 11). *The Institute of Leadership & Management*. Retrieved 01 18, 2021, from Should UK boardrooms have tougher gender quotas?: https://www.institutelm.com/resourceLibrary/should-uk-boardrooms-have-tougher-gender-quotas.html

Thomsen, S., & Conyon, M. (2019). *Corporate Governance and Board Decisions.* Djøf Publishing.

UN. (2021, 01 11). *UN*. Retrieved 01 2021, from Goal 5: Achieve gender equality and empower all women and girls: https://www.un.org/sustainabledevelopment/gender-equality/

Valkering, D., & Brouns, A. (2018). *Do diversity targets really help increase diversity in the boardroom?* Retrieved 01 27, 2021, from Deloitte: https://www2.deloitte.com/nl/nl/pages/risk/articles/revised-corporate-governance-code-diversity-targets-really-help-increase-diversity-in-the-boardroom.html

Weghoeft, M. (2020, 02 24). *Seuss*. Retrieved 02 08, 2021, from The Netherlands introduces new legislation to improve gender diversity on corporate boards: https://www.seuss.plus/news/new-dutch-law-to-improve-gender-diversity-on-corporate-boards/

Wiersema, M. F., & Bantel, K. A. (1992). Top Management Team Demography and Corporate Strategic Change. . *The Academy of Management Journal, 35(1)*, 91-121.

Wittenberg-Cox, A. (2020, 04 13). *Forbes*. Retrieved 01 2021, from What Do Countries With The Best Coronavirus Responses Have In Common? Women Leaders: https://www.forbes.com/sites/avivahwittenbergcox/2020/04/13/what-do-countries-with-the-best-coronavirus-reponses-have-in-common-women-leaders/?sh=6c859ce33dec

Wittenberg-Cox, A. (2020, 09 08). *Forbes*. Retrieved 01 2021, from Women Leaders' Competence On COVID: The Proof: https://www.forbes.com/sites/avivahwittenbergcox/2020/09/08/women-leaders-competence-on-covid-the-proof/?sh=a3c10be6fb64

World Bank (2021). *World Bank*. Retrieved 04 2021, from: https://data.worldbank.org/indicator/SG.GEN.PARL.ZS

Wooldridge, J. M. (2013). *Introductory Econometrics: A Modern Approach.* South-Western .

Appendix

Appendix 1: Company data

1.1 Full list of companies

	Company	Country	Sector
1	Equinor	Norway	Energy
2	DNB ASA	Norway	Financial Services
3	Telenor	Norway	Telecommunications
4	Mowi	Norway	Fishing industry
5	Aker BP ASA	Norway	Energy
6	Yara	Norway	Basic materials
7	Orkla Group	Norway	Consumer goods
8	Gjensidige	Norway	Financial Services
9	Norsk Hydro	Norway	Basic materials
10	SalMar	Norway	Fishing industry
11	Novo Nordisk	Denmark	Healthcare
12	Ørsted	Denmark	Energy
13	A.P. Moeller Maersk	Denmark	Shipping
14	DSV Panalpina	Denmark	Logistics/Transport
15	Coloplast	Denmark	Healthcare
16	Carlsberg	Denmark	Consumer goods
17	Vestas Wind Systems	Denmark	Energy
18	Genmab	Denmark	Healthcare
19	Danske Bank	Denmark	Financial Services
20	Novozymes	Denmark	Healthcare
21	Atlas Copco	Sweden	Industry
22	Investor	Sweden	Financial Services
23	Volvo Group	Sweden	Automobile
24	H&M Group	Sweden	Retail
25	Ericsson	Sweden	Telecommunications
26	Assa Abloy	Sweden	Industry
27	Skandinaviska Enskilda Banken (SEB)	Sweden	Financial Services
28	Sandvik	Sweden	Industry
29	Hexagon	Sweden	Technology
30	Svenska Handelsbanken	Sweden	Financial Services
31	Nordea Bank	Finland	Financial Services
32	Kone	Finland	Industry
33	Neste	Finland	Energy
34	Sampo	Finland	Financial Services
35	Nokia Corporation	Finland	Telecommunications
36	Fortum	Finland	Energy
37	Upm-Kymmene	Finland	Basic materials
38	Stora Enso	Finland	Basic materials

39	Elisa	Finland	Telecommunications
40	Kesko	Finland	Retail
41	SAP SE	Germany	Technology
42	Volkswagen	Germany	Automobile
43	Siemens	Germany	Technology
44	Allianz SE	Germany	Financial Services
45	Deutsche Telekom AG	Germany	Telecommunications
46	Bayer	Germany	Healthcare
47	BASF SE	Germany	Chemicals
48	Adidas	Germany	Retail
49	Daimler AG	Germany	Automobile
50	Bayerische MotorenWerke (BMW)	Germany	Automobile
51	HSBC Holdings	United Kingdom	Financial Services
52	Unilever Group	United Kingdom	Consumer goods
53	BHP Group	United Kingdom	Basic materials
54	Astrazeneca	United Kingdom	Healthcare
55	BP P.L.C.	United Kingdom	Energy
56	Glaxosmithkline (GSK)	United Kingdom	Healthcare
57	Rio Tinto Group	United Kingdom	Basic materials
58	Vodafone	United Kingdom	Telecommunications
59	Diageo	United Kingdom	Consumer goods
60	British American Tobacco	United Kingdom	Consumer goods
61	Royal Dutch Shell	Netherland	Energy
62	ASML Holding	Netherland	Technology
63	Akzo Nobel	Netherland	Basic materials
64	Airbus	Netherland	Industry
65	ING Group	Netherland	Financial Services
66	Philips	Netherland	Healthcare
67	NXP Semiconductors	Netherland	Technology
68	Lyondellbasell Industries	Netherland	Basic materials
69	Heineken	Netherland	Consumer goods
70	Ahold Delhaize	Netherland	Retail
71	Anheuser-Busch Inbev	Belgium	Consumer goods
72	KBC Group	Belgium	Financial Services
73	Groupe Brunxelles Lambert SA	Belgium	Financial Services
74	UCB SA	Belgium	Healthcare
75	Galapagos	Belgium	Healthcare
76	Solvay SA	Belgium	Basic Materials
77	Umicore SA	Belgium	Industry
78	Ageas SA	Belgium	Financial Services
79	Elia System Operator	Belgium	Energy
80	Telenet Group Holding	Belgium	Telecommunications
81	Nestle AG	Switzerland	Consumer goods
82	Roche Holding AS	Switzerland	Healthcare

83	Novartis AG	Switzerland	Healthcare
84	Chubb	Switzerland	Financial Services
85	Zurich Insurance Group AG	Switzerland	Financial Services
86	Lonza	Switzerland	Healthcare
87	ABB	Switzerland	Industry
88	UBS Group AG	Switzerland	Financial Services
89	Compagnie Financiere Richemont SA	Switzerland	Retail
90	Glencore	Switzerland	Basic Materials
91	OMV Group	Austria	Energy
92	Verbund	Austria	Energy
93	Erste Group Bank	Austria	Financial Services
94	Raiffeisen Bank International	Austria	Financial Services
95	Telekom Austria	Austria	Telecommunications
96	Voestalpine	Austria	Basic Materials
97	Andritz	Austria	Industry
98	Vienna Insurance Group	Austria	Financial Services
99	Ca Immobilien Anlagen	Austria	Real Estate
100	Oberbank	Austria	Financial Services

Appendix 2: Factor data

2.1 List of countries from the Kenneth R. French Library

Country	Developed	Developed ex US	Europe	Japan	Asia Pacific ex Japan	North America
Australia	✔	✔			✔	
Austria	✔	✔	✔			
Belgium	✔	✔	✔			
Canada	✔	✔				✔
Switzerland	✔	✔	✔			
Germany	✔	✔	✔			
Denmark	✔	✔	✔			
Spain	✔	✔	✔			
Finland	✔	✔	✔			
France	✔	✔	✔			
Great Britain	✔	✔	✔			
Greece	✔	✔	✔			
Hong Kong	✔	✔			✔	
Ireland	✔	✔	✔			
Italy	✔	✔	✔			
Japan	✔	✔		✔		
Netherlands	✔	✔	✔			
Norway	✔	✔	✔			
New Zealand	✔	✔			✔	
Portugal	✔	✔	✔			
Sweden	✔	✔	✔			
Singapore	✔	✔			✔	
United States	✔					✔

Source: Kenneth R. French library

2.2 Formulas for the factors

Market factor

$$Market = (R_m - R_f)$$

Small minus big

$$SMB = \frac{1}{3}\,(Small\ value + Small\ Neutral + Small\ Growth) - \frac{1}{3}\,(Big\ value + Big\ Nautral + Big\ Growth)$$

High minus low

$$HML = \frac{1}{2}\,(Small\ value + Big\ value) - \frac{1}{2}\,(Small\ Growth + Big\ Growth)$$

Winners minus losers

$$WML = \frac{1}{2}\,(Small\ High + Big\ High) - \frac{1}{2}\,(Small\ Low + Big\ Low)$$

Appendix 3: Robustness testing

3.1 Augmented Dickey-fuller test

Augmented Dickey-Fuller test

	Test values		Critical values for test statistics:		
Portfolio	Z(t)	P-value	1%	5%	10%
P1	-9,107	0,0000	-3,567	-2,923	-2,596
P2	-8,002	0,0000			
P3	-8,241	0,0000			
P4	-7,523	0,0000			
P5	-10,494	0,0000			
P6	-7,930	0,0000			
P7	-8,070	0,0000			
P8	-8,379	0,0000			
Models	Z(t)	P-value			
Market	-7,17	0,0000			
SMB	-7,528	0,0000			
HML	-6,835	0,0000			
WML	-8,595	0,0000			

Test for stationarity

3.2 VIF test

Variance Inflation factor: VIF test

Variable	VIF	1/VIF
Market	1,77	0,565198
SMB	1,23	0,810571
HML	1,88	0,531304
WML	2,28	0,438672
Mean VIF	1,79	

Test for multicollinearity

3.3 Breusch-Pagan/Cook-Weisberg test

Breusch-Pagan/Cook-Weisberg test

	Models					
	CAPM		Three-factor		Carhart	
Portfolios	chi^2	P-Value	chi^2	P-value	chi^2	P-value
P1	0,00	0,9454	12,59	0,0056	13,66	0,0085
P2	0,46	0,4987	0,63	0,8899	6,40	0,1712
P3	0,01	0,9127	4,98	0,1729	4,29	0,3686
P4	0,55	0,4581	2,75	0,0972	5,99	0,0144
P5	0,04	0,8338	0,38	0,5395	1,55	0,2138
P6	1,73	0,1879	0,83	0,3627	2,58	0,1082
P7	0,29	0,5926	1,35	0,7180	0,00	0,9987
P8	2,21	0,1374	4,13	0,2475	0,76	0,3820

Test for heteroskedasticity

3.4 White test

White test

	Models					
	CAPM		Three-factor		Carhart	
Portfolios	chi^2	P-Value	chi^2	P-value	chi^2	P-value
P1	1,67	0,4338	22,03	0,0088	26,33	0,0235
P2	2,47	0,2902	8,16	0,5182	28,44	0,0124
P3	2,89	0,2363	18,80	0,0269	31,13	0,0053
P4	8,83	0,0121	7,60	0,5747	14,56	0,4091
P5	3,24	0,1984	25,19	0,0028	32,91	0,0030
P6	3,83	0,1474	6,25	0,7143	14,78	0,3931
P7	0,26	0,8774	6,93	0,6442	15,40	0,3512
P8	6,67	0,0356	14,69	0,9980	16,28	0,2964

Test for heteroskedasticity

3.5 Breusch-Godfrey test

Breusch-Godfrey test

	Models					
	CAPM		Three-factor		Carhart	
Portfolios	chi2	P-Value	chi2	P-value	chi2	P-value
P1	1,332	0,2485	1,761	0,1845	0,893	0,3348
P2	1,449	0,2209	1,577	0,2091	0,075	0,7838
P3	0,064	0,8008	0,085	0,7705	0,001	0,9744
P4	0,482	0,4873	0,035	0,8510	0,068	0,7940
P5	2,696	0,1006	3,275	0,0704	2,363	0,1242
P6	1,771	0,1833	2,603	0,1067	0,842	0,3590
P7	0,017	0,8969	0,042	0,8378	0,000	0,9967
P8	0,420	0,5170	0,564	0,4528	0,260	0,6101

Test for autocorrelation

Appendix 4: Panel regression

4.1 Hausman test

Hausman test			
Model	**1**	**2**	**3**
Chi 2	6,61	7,87	18,53
Prob>chi2	0,0366	0,0195	0,0098