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Board Ownership and Stock Market Returns

A study on the relationship between ownership structure and firm performance

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Abstract

Our study examines whether firms in which the board of directors has high ownership perform better than firms in which the board of directors has low or no ownership. To measure firm performance, we take an investor's perspective and study stock price returns and use Fama-French-Carhart's Four Factors Model to test our hypothesis. We use a data set consisting of ownership and stock price data from all Large Cap and Mid Cap companies on the Stockholm Stock Exchange between 2016-2020. Conclusively, we find that firms in which the board of directors had high ownership yielded higher average annual and monthly returns during the 5-year time period (2016-2020) than firms in which the board of directors had low or no ownership. However, the abnormal returns are economically but not statistically significant. Therefore, we cannot ascertain or verify that such a relationship between board ownership and firm performance prevails and are unable to draw conclusions regarding our hypothesis.

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1. Introduction

1.1 Background

In the contemporary academic debate around the board of directors (hereon "the board") and its function in a company, several studies have attempted to outline what characteristics and attributes that form a well-functioning board in the context of maximizing firm performance. These studies have focused on characteristics such as independence of board members, boards' tenure, gender-mix, and board size (Bøhren and Strøm (2005) and Eklund et al. (2009)). However, the relationship between the *ownership* of the board and firm performance has been subject to a limited amount of research, except for the study by Morck et al. (1988). The relationship between ownership and firm performance has mainly been studied in the context of other corporate insiders than the board. This is the gap this study aims to fill, contributing to existing academic research about managerial ownership and firm performance.

Since Berle and Means's (1932) landmark study of the motivational consequences of separating ownership and control, many studies have determined that there is a risk in publicly listed firms that managers' incentives are not aligned with the incentives of the shareholders with clear implications for firm performance. This risk is a consequence of the principal-agent problems that arise because managers do not necessarily have ownership in the firms they manage (Jensen and Meckling (1976)), which can cause them to be incentivized to act in their personal interest rather in the interest of the shareholders. This is referred to as the agency theory. Building on the work of Jensen and Meckling (1976), studies have found that managerial ownership has strong implications for firm performance. Such studies have been conducted for different types of corporate insiders such as CEOs (Lilienfeld-Toal and Ruenzi (2009)), family-owned firms (Cella (2009)), or founders (Lyttkens and Leiser (2017)). Lilienfeld-Toal and Ruenzi (2009), Cella (2009), and Lyttkens and Leiser (2017) all found that managerial ownership is positively correlated with firm performance (estimated as stock market returns). In line with the conclusions of Jensen and Murphy (1990), this suggests that managers should have a strong incentive to increase the firm value when they have an ownership fraction that represents a significant fraction of their personal wealth.

In line with Morck et al. (1988), we propose that the agency theory could be applicable when examining the board as well. One could argue this being of greater relevance for senior

executives or CEOs since a common convention is to see these corporate directors as agents (in a principal-agent relationship) while the board commonly are seen as principals because the board is representatives of the shareholders (principals). If boards are seen as principals, they would be assumed to always carry out the interest of the shareholders, primarily serving a fiduciary function. However, we propose that boards act as an intermediary between the shareholders and the managers, and therefore is subject to a duplex agency status in which the board can be seen as both principals (in relation to managers) and agents (in relation to shareholders). This is based upon the reasoning that shareholders cannot directly observe or guarantee whether the board carries out their interest, in the same way as they cannot directly observe all the behaviors of the managers. This points to a principal-agent relationship between the shareholders and the board, suggesting that the board (similarly to managers/executives) can cause agency costs. Because of this ambiguity in the agency status of the board, one must clarify the responsibilities of the board and its ability to affect firm performance to be able to examine the potential relationship between Board ownership and firm performance. Most studies on the responsibilities of the board acknowledge certain fundamental tasks that are universal for all boards regardless of the board composition and characteristics. These studies have suggested that the role of the board includes overseeing risk and compliance, formulating the overall strategy of the firm, appointing the CEO, controlling the organization, supporting the CEO and management in achieving its objectives and managing stakeholders (Hung (1998), Hillman & Dalziel (2003) and Nicholson and Newton (2015)). Morck et al. (1998) further suggest that the board's decision-making authority would imply that the board can affect firm performance and, consequently, firm value. Therefore, we argue that the board should be highly relevant in the discussion around the importance of corporate insiders having “skin in the game”, in line with the agency theory.

In line with the above, Morck et al. (1988) conclude that board members without financial interest (ownership) in the firm will be more reluctant to monitor senior executives' poor corporate decision making. This suggests that the board members might need an ownership stake (in addition to their fixed annual board fee) to fully align their own interests with those of the shareholders, in line with the agency theory. Accordingly, the ownership of the board might be correlated with firm performance.

With the background above, our thesis aims to examine whether the board's ownership could be a factor affecting firm performance.

1.2 Purpose of the study

The purpose of the study is to examine the relationship between the ownership of the board (hereon "Board ownership") and firm performance from an *investor perspective*. The Board ownership is measured as the collective shareholdings of the board (in the firm they represent) as a percentage of the total number of outstanding shares. The investor perspective means that we estimate firm performance from the perspective of equity investors (hereon "investors"). Investors are, in the study, assumed to primarily be interested in stock price returns (see section 3.1) which also is the proxy used in this study to estimate firm performance. The investor perspective also has implications for the method, which are addressed more in detail under section 3.1. To examine the relationship, we divide the firms into two separate portfolios based on a specific Board ownership criterion and compare the return of the portfolios. The objective is that an investor should have been able to replicate the portfolios in the stock market during the time period (2016-2020) to achieve the same return.

Several studies have found a relationship between stock price returns and the ownership of different corporate insiders (other than the board), such as CEOs (Lilienfeld-Toal and Ruenzi (2009)), family-owned firms (Cella (2009)) or a founder or single person (Lyttkens and Leiser (2017)). As argued above, we suggest that the board should have the ability to influence the firm performance. In line with previous research and the agency theory, if the board can influence firm performance and the ownership provides the board with sufficient economic motivation to align their interest with those of the shareholders, Board ownership could have a positive relationship with firm performance. Based on the reasoning above, the purpose of the study is to answer the following research question:

"Do firms in which the board of directors has a relatively high ownership perform better than firms in which the board of directors has a relatively low or no ownership?"

Should it turn out that this relationship between Board ownership and firm performance exists, this insight could be valuable for investors when making investment decisions. Since the portfolios we construct to examine this relationship are possible for investors to replicate on the stock market, investors could eventually take on a portfolio strategy based on taking a long position in firms in which the board has high ownership and a short position in firms in which the board has low or no ownership.

1.3 Research boundaries

We limit our study to Large and Mid Cap firms listed on the Stockholm Stock Exchange (Nasdaq OMX Stockholm) during the time period 2016-2020. The limitation of the number of firms and the time period is primarily a consequence of the ownership data only being available in the database Holdings between the years 2017-2019, which means that the ownership data must be manually collected for the years 2015 and 2016. The limitation implies that not all firms listed on the Stockholm Stock Exchange are included. Firms included in the Small Cap segment, First North Growth Market, and First North Premier Growth Market on the Stockholm Stock Exchange are excluded. Furthermore, we do not examine firms listed on other Swedish stock exchanges such as Spotlight Stock Market, Nordic Growth Market, or Pepins.

The limitation of the time period also connects with the purpose of the study. Since we intend to examine the relationship between Board ownership and firm performance from an investor's perspective, a 5-year time period is assessed to coincide with a plausible investment horizon of such an investor. Investment horizons, of course, vary between investors, depending on factors such as preference for risk. However, we believe that a 5-year time period is a reasonable estimate of a middle-term investment horizon for an investor that invests in common stocks.

Furthermore, we study these firms based on specific ownership criteria, the collective Board ownership. This means that we do not consider the shareholdings of other corporate insiders such as CEOs, management team members, senior executives, or other employees. This is because we want to isolate the potential effect that Board ownership has on firm performance (stock market returns). Should we include the ownership of other corporate insiders in the aggregated ownership figure (Board ownership), we would not be able to attribute a potential effect on firm performance to the board's ownership alone.

1.4 Contribution

This study contributes to existing research on the topic in several ways. The topic is of great relevance today, as many companies are revising how to optimize their boards and the factors of greatest essence. In a Swedish context, proposed reforms have been made concerning gender quotas in boards. However, no specific regulations or reforms with the purpose of making the board more effective have gained legally binding status. Several other factors (than Board ownership) such as the independence of board members, gender quotas, the board size, and the

number of board positions held simultaneously in different companies, have been the subject of recent research and concluded to have important effects on company performance by scholars such as Abdullah (2004), Huang & Hilary (2018) and Dunn & Sainty (2009). However, little emphasis has been put on assessing Board ownership and its relation to firm performance. We aim to fill this gap in academic research by providing a Swedish contextualization of the problem. Hopefully, this is something companies will weigh into the current discussion of board characteristics and consider when evaluating the board in the future.

Moreover, an explanation for the lack of research in the field, at least in a Swedish context, could be the absence of available structured ownership data for the board in Swedish publicly listed companies. The database Holdings provide ownership data back to 2017 that could be easily extracted and used for research purposes. Before 2017, however, this data needs to be manually extracted from each company's annual reports since no database provides such data. Our contribution partially lies in collecting data manually for the period where no database has yet structurally collected this data. This could potentially be valuable for Holdings, where data before 2017 could be of great value for future research.

Combining the data extracted from Holdings and the manually collected data provides an adequate view of the Board ownership situation over the 5-year research period (2016-2020) for Large and Mid Cap companies on the Stockholm Stock Exchange. This data could be used to further assess the ownership patterns and, hopefully, draw other conclusions about what implications the ownership structure has on firm performance in future research.

1.5 Disposition

Our thesis is separated into six chapters. Chapter 2 contains a review of previous research and literature that is of relevance for our study and the definition of our hypothesis. Chapter 3 accounts for the methodology used to test the hypothesis. Chapter 4 examines our data sample, the variables, and statistical models used to examine the research question. Chapters 5 and 6 discuss our results and analysis. In the final chapter, Chapter 7, we draw conclusions from our analysis and discuss further possible contributions that could be added to existing academic research.

2. Theoretical framework and empirical studies

2.1 Previous empirical studies

2.1.1 Ownership and control: the agency theory

The origins of the research question bring us back to the 1930s when Berle and Means (1932) first introduced the motivational consequences of separating "ownership" and "control". They found that as many American firms were run by directors or managers who did not have ownership in their firm, there is a risk that the economic interests of the owners were not aligned with the ones who had control (the managers). They argued that this might cause the corporations to operate for the benefit of the managers instead of the owners. Jensen and Meckling (1976) further developed this hypothesis into the agency theory, defining an agency relationship as "*a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent*". In the context of this study, the principals are the shareholders that have appointed the board (principals or agents[1]) to provide certain services to assure the managers/executives (agents) maximize shareholder value. Jensen and Meckling (1976) suggested that the agency relationship that prevails when ownership and control are separated in a company might cause the agents to act in their personal interest on behalf of the shareholders' interest. That is, without sufficient ownership in the firm, agents might not have the same interest as the shareholders in the firm's financial performance. Accordingly, as the ownership increases, the incentive to maximize the firm value should also increase. This is referred to as the "incentive effect".

[1] The board can be said to serve a duplex function, acting as an intermediary between the shareholders (principals) and the managers (agents), which causes ambiguity in the agency status of the board since Jensen and Meckling (1976) do not provide any clear guidance regarding the agency status of different corporate directors. A common convention is to see the boards solely as principals since the boards are representatives of the shareholders (also principals). Even though the board are representatives for the shareholders, one can argue that board falls under the definition of an agent (see definition of "agency relationship" above) since they perform service on behalf of the shareholders (principal) and in general have some decision-making authority (for decisions not requiring approval at a general meeting). Further, the shareholders cannot directly observe whether the board carry out their interest, in the same way as they cannot directly observe all the behaviors of the managers, which points at a principal-agent relationship between the shareholders and the board. For this reason, the agency status of the board is controverted. Based on the reasoning above, we propose a duplex agency status in which the board can be seen as both principals (in relation to managers) and agents (in relation to the shareholders).

The costly actions required by the principal to assure satisfactory firm performance when an agency relationship prevails are referred to as *agency costs* (e.g., monitoring of managers, etc.). Agency costs also include expenditures the agents take on that are not in line with the principal's interest or loss in firm value that arise because the agents carry out their own interest rather than that of the principals (Jensen and Meckling (1976)). In line with Morck et al. (1988), we argue that managers/executives are more likely than the board to cause the first-mentioned type of agency costs (e.g., corporate perks, excessive salaries, empire building, etc.) since these can be said to be primarily subject to operational decisions, and the managers/executives could be assumed to have more decision-making authority regarding operational decisions than the board. Further, as argued by Morck et al. (1988), the board can be considered more likely to cause the second type of agency costs (e.g., board members approve projects they consider desirable but not the market, etc.), because the decision-making authority of the boards often includes approving strategically important or large projects/investments. Jensen and Meckling (1976) further argue that when the agent's incentives are aligned with those of the principal, the agency costs are reduced, which increases firm value.

2.1.2 Ownership and firm performance

Building on this idea, several later studies have examined the relationship between managerial ownership and firm performance. For instance, McConnel and Servaes (1990) found a significant positive relationship between the stock ownership of corporate insiders and the market valuation of the firm, measured as Tobin's Q. Later studies have further examined the relationship between the ownership structure and firm performance, approximating firm performance as the stock price returns of listed firms. For the most, this has been studied with regards to the ownership of managers, CEOs, and family-owners. Lilienfeld-Toal and Ruenzi (2009), for instance, concluded that CEOs having ownership of 10% increased the value of the firm in terms of greater stock price returns relative to firms without owner CEOs. According to Lilienfeld-Toal and Ruenzi (2009), the increase in firm value can, to a large extent, be attributable to reduced agency costs. Relating to the research on the relationship between corporate insiders' ownership and firm performance, Cella (2009) found that family-owned firms generated superior stock market returns than non-family-owned firms, also attributing

her findings to reduced agency costs. A recent non-peer-reviewed publication drew similar conclusions.[2]

2.1.3 Board of directors: impact on value creation

According to studies on the role of the board, the responsibilities of the board can be summarized to involve overseeing risk and compliance, formulating the overall strategy of the firm, controlling the organization (including governance and monitoring of the CEO and senior executives), appointing the CEO, supporting the CEO and management in achieving its objectives, and managing stakeholders (Hung (1998), Hillman & Dalziel (2003) and Nicholson and Newton (2015)). Most research unites around these tasks as the common ground that is universal nonetheless of the board composition and characteristics of the firm. However, there is no universal definition of the board's role, which implies that the responsibilities may vary slightly from one firm to another. Since the board has decision-making authority over factors that can be assumed to affect value creation, Morck et al. (1988) suggest that the board should have the ability to affect the firm performance and ultimately the firm value.

Morck et al. (1988) found a non-linear relationship between the ownership of the board and firm's market valuation, measured as Tobin's Q. They found that the market valuation first increases as the ownership increases, up to an ownership level of 5-10%. The market valuation then decreases up to an ownership level of around 25%, to finally increase slightly thereafter as the ownership increases. Morck et al. (1988) concluded that the underlying reason why this relationship prevails (for the ownership levels of 5-10%) is that board members without financial interest in the firm will be less inclined to monitor senior executives' poor corporate decision-making. The lack of ownership, they argue, implies that the board is less attached to the firm and therefore does not necessarily have sufficient interest in the firm's financial performance. That is, as the ownership increases, the incentive to maximize the firm value should also increase. Finally, Morck et al. (1988) attribute the decrease in firm value for the ownership levels of 10-25% to the entrenchment effect (offsetting the incentive effect). See section 3.2.1 pp. 14–15 for a discussion regarding these findings.

[2] A recent bachelor thesis from the Stockholm School of Economics (Lyttkens and Leiser (2017)), focused upon the relationship of the ownership of a founder or a single person and stock price returns. Lyttkens and Leiser (2017) found that companies on the Stockholm Stock Exchange owned by a single person or a founder, during an 8-year time period, generated excess returns relative to companies that did not meet these criteria. The conclusion was that the increased firm value should be attributable to reduced agency costs in line with the conclusions of Lilienfeld Toal and Ruenzi (2009) and Cella (2009).

Beyond the study conducted by Morck et al. (1998), the relationship between ownership and firm performance has not been conducted to a larger extent when examining the board and its relation to firm performance. As previously stated, previous literature has for the most focused upon the ownership of CEOs and other corporate insiders. Other parameters than stock ownership are commonly highlighted when it comes to the existing research on the board of director's role and its effect on value creation. Eklund et al. (2009) examine the relationship between ownership structure, board composition, and firm performance on the Swedish stock market. The findings show that factors such as board size, gender diversity on the board, and the CEO participation on the board have significant effects on the firm performance. Bøhren and Strøm (2007) builds on the same premises and aim to map out how firm performance is connected to observable board characteristics on the Norweigan market by looking at board independence, boards' tenure, board size, and gender mix on the board. The result suggests one critical factor for value creation in the company is insider stock ownership, among other factors. Further research on board characteristics and their implications for the firm performance has been conducted by numerous scholars such as Dalton et al. (1999), Baghat and Black (1998), Raheja (2005).

2.2 Hypothesis

Based on prior insights regarding managerial ownership and firm performance, it could be expected that there is a relationship between Board ownership and stock market returns (firm performance). This is because as the Board ownership increases, the incentive to maximize the firm value should also increase, in line with Morck et al. (1988) and the agency theory. As such a relationship has been found for other corporate insiders (Lilienfeld-Toal and Ruenzi (2009) and Cella (2009)), we expect to find similar results in the context of the board. We, therefore, formulate our hypothesis as follows:

Firms with high Board ownership generate higher stock market returns than firms with low or no Board ownership.

3. Methodology

This chapter aims to outline the methodology used to approach the hypothesis tested and the research question examined. First, we examine the performance measurement used in our thesis

(stock price returns). Subsequently, we specify our research design in detail and examine certain limitations.

3.1 The measurement of firm performance

To examine the relationship between Board ownership and firm performance, one must choose an appropriate measure to use as a proxy for firm performance. To measure what we intend to measure, the firm performance from an investor's perspective, the proxy must be carefully chosen for this purpose. In line with Sharpe (1964), we assume that investors are rational, maximize their returns based on the available investment prospects (i.e., prefer higher expected future wealth to a lower wealth) and agree on the price and risk of the available investment prospects. Regarding market efficiency, we assume Fama's (1970) semi-strong form of market efficiency, that stock prices include all publicly available information (i.e., not insider information). We therefore also assume that all investors can agree on the value of a stock based on all publicly available information. From such an investor's perspective, the firm performance is assumed to be the stock price returns (including dividends). Supporting this approach, several studies, including Gompers et al. (2003), Lilienfeld-Toal and Ruenzi (2009), Cella (2009), have examined the relationship between the ownership structure and firm performance using stock price returns as the proxy for firm performance.

One of the clear advantages of using stock price returns as a proxy is that one can build portfolios that investors could have replicated on the stock market to test the hypothesis using different portfolio selection criteria related to the ownership structure. This approach has been used in other studies such as Gompers et al. (2003), Lilienfeld-Toal and Ruenzi (2009), Cella (2009) and Lyttkens and Leiser (2017). The approach is useful because of the implications that it provides for investors; that they would have been able to replicate the portfolio in the stock market and achieve the same return, given that the data required for portfolio selection (Board ownership data in our case) is publicly available. This is necessarily not possible with the usage of, for example, return on equity ("ROE") as the performance measure because not all firms pay dividends, firms that pay dividends might not distribute all their net earnings, and so forth. Some studies on the relationship between ownership structure and firm performance have used the ROE or Tobin's Q as a proxy of firm performance rather than stock price returns. We do

not consider such performance measures since these proxies do not suit our purposes.[3] In conclusion, we will take a similar approach as Gompers et al. (2003), Lilienfeld-Toal and Ruenzi (2009), Cella (2009), and Lyttkens and Leiser (2017) and focus upon stock returns as a proxy of firm performance.

3.2 Research design

With the stock returns as the proxy of firm performance, we will take a similar approach as Gompers et al. (2003), Lilienfeld-Toal and Ruenzi (2009), Cella (2009), and Lyttkens and Leiser (2017) and develop a method based on formation of portfolios. More specifically, the method is to use specific portfolio selection criteria regarding the collective shareholdings of the board to divide our sample firms into two separate portfolios each year during the 5-year time period (2016-2020). The average annual and monthly returns of the two portfolios during the time period are then compared to determine whether the portfolio consisting of companies that fulfill our ownership criteria performed better than the portfolio consisting of companies not fulfilling our ownership criteria, in line with our hypothesis. Finally, we aim to examine whether the return of the portfolios can be explained through other factors than the Board ownership through regression analysis using Fama-French-Carhart's Four Factor model.

3.2.1 Portfolio selection criteria and categorization

In our thesis, we define "Board ownership" as the boards' collective shareholdings (in the firm they represent) divided by the total number of outstanding shares. We divide the firms into two separate portfolios based on the Board ownership of each firm using the following portfolio selection criteria:

[3] Demsetz and Lehn (1985) used ROE on the basis that the data is readily available, and the profit rate is the "bottom line" that should be of ultimate interest to the shareholders. Many later studies, including Morck et al. (1998) and McConnell and Servaes (1990), have used Tobin's Q. One of the most apparent differences between ROE and Tobin's Q is that ROE relies solely on book values whilst Tobin's Q incorporates market valuations. The purpose of the study is to examine the relationship between Board ownership and firm performance from an investor's perspective. From an investors point of view, the firm performance is assumed to be the actual return an investment in the stock of the firm would yield. Because ROE is limited to current accounting rules and practices, the ROE usually does not reflect the actual market returns. Consequently, the ROE is not an optimal measure for our purposes. Tobin's Q incorporates the prevailing market price of the firm's equity, which implies that the development of Tobin's Q would seem a better proxy of firm performance. However, Dybvig and Warachka (2015) found that from a theoretical perspective, Tobin's Q does not necessarily measure firm performance. Their main argument is that one can inflate Tobin's Q by underinvesting, while the firm performance should decrease when underinvesting since the firm then uses its available capital inefficiently. This suggests that Tobin's Q is not an ideal proxy for our purposes either.

Portfolio A: *The firms in which the Board ownership is ≥ 10% at the end of a specific year are placed in "Portfolio A" during the beginning of the following year.*

Portfolio B: *The firms not fulfilling this criterion (i.e., Board ownership < 10%) at the end of a specific year are placed in "Portfolio B" during the beginning of the following year.*

Like Lilienfeld-Toal and Ruenzi (2009) and Cella (2009), we also construct an additional portfolio each year, which takes a long position in all firms in Portfolio A (high Board ownership) and a short position in all firms in Portfolio B (low or no Board ownership). Hereon, we refer to this portfolio as the long-short portfolio (A – B). The purpose of the long-short portfolio (A – B) is to examine whether firms with low or no Board ownership potentially underperform in relation to the firms with high Board ownership and whether this underperformance contributes even more to the returns of the firms with high Board ownership. Our results and discussion primarily focus upon the returns of this long-short portfolio (A – B).

Finally, we will perform sub-categorizations of Portfolio A and B based on which segment (in our case, Large Cap or Mid Cap) on the Stockholm Stock Exchange a firm in our sample belongs to. The segments refer to the market capitalization of the firms. To be included in the Large Cap or Mid Cap segment on the Stockholm Stock Exchange, a firm's market capitalization must be at least EUR 1 billion (Large Cap) or EUR 150 million (Mid Cap), respectively. The reason why we perform the subcategorization is to be able to understand whether the results differ between the segments and whether a particular segment is the major driver of the results. Moreover, it is interesting to analyze whether there is a difference in Board ownership between the firms in the two segments. In line with the subcategorization, we will present the portfolio returns of Portfolio A and B containing Large and Mid Cap firms collectively as well as Large Cap and Mid Cap firms individually. Based on the above, sub categorizations of Portfolio A and B will be performed as specified below:

Large and Mid Cap: *Refers to when all firms included in our sample are collectively placed in Portfolio A or B.*

Large Cap: *Refers to when only the firms included in our sample that belong to the Large Cap segment on the Stockholm Stock Exchange are placed in Portfolio A or B.*

Mid Cap: *Refers to when only the firms included in our sample that belong to the Mid Cap segment on the Stockholm Stock Exchange are placed in Portfolio A or B.*

Limitations

Board ownership

The Board ownership variable aims to estimate the boards' level of economic motivation to contribute to firm performance. However, there is a risk that the reliability of this estimation differs depending on the private wealth and other shareholdings of the individual board members. A significant shareholding for one board member might be a small shareholding for another board member. Moreover, a board member having other commitments in addition to being a board member of a certain firm might also affect the level of economic motivation this board member has in this firm. To include the effect of such factors in the analysis, we could have added two additional variables addressing these factors; one (1) measuring the specific firm shareholding of the board member as a percentage of the total shareholdings of the board member, and one (2) stating whether a board member has other commitments. While this would add to the analysis, we have chosen to exclude such variables. The first one (1) because the database Holdings only provides individual board members' ownership data in firms in which the individual counts as a corporate insider, meaning that other (private) shareholdings are not taken into consideration, which implies that the data of the total ownership of the individual board member becomes unreliable. Regarding the second alternative variable (2), the data is available but requires manual data collection. However, in line with Morck et al. (1988), we believe that the collective ownership of the board members is a sufficiently reliable estimate of the level of economic motivation for the board to be able to draw conclusions.

Cutoff points

Furthermore, like Cella (2009), we only construct portfolios based on the 10% cutoff point. Other studies on the relationship between managerial ownership and firm performance, such as Morck et al. (1988) and Lilienfeld-Toal and Ruenzi (2009), also looked at the performance of portfolios in which the managerial ownership is even higher (e.g., 30% cutoff point) in addition to the 10% cutoff. This is useful because one can draw conclusions regarding whether "the incentive effect" (see section 2.1.1) increases with ownership and whether the so-called "entrenchment effect" possibly can offset the benefits of increased incentives. Morck et al. (1988) summarize the predictions of the entrenchment hypothesis as that "*corporate assets can be less valuable when managed by an individual free from checks on his control*". They explain

the phenomenon as that individuals for different reasons (e.g., serving the firm for a long time period, personal attachments, ownership, etc.) can become entrenched in the firm and use their control to pursue private benefits. For example, it could be a large shareholder that pursues their own interest rather than the interest of other shareholders or managers, or a CEO that advises the firm to take on projects that require the specific competence of the CEO to assure its relevance in the firm. Both Morck et al. (1988) and Lilienfeld-Toal and Ruenzi (2009) found that firm performance first increased to a specific cutoff and then decreased slightly thereafter and concluded that their findings might be attributable to the entrenchment effect. Accordingly, it would be interesting to look at the performance of additional portfolios in which the cutoff for Board ownership is higher than 10% (e.g., Board ownership ≥ 30%) to be able to draw conclusions regarding whether the entrenchment effect offsets the incentive effect after a certain level of Board ownership. However, because of our limited sample size and since only a small fraction of the companies in our sample would apply to such criteria, such portfolios with higher cutoffs would include only a small number of firms. To a large extent, such portfolios would be influenced by the specific companies in that portfolios and not be representable for the market. Studies that have included such analysis have used significantly larger sample sizes (e.g., S&P 500). Consequently, we have chosen not to include such an analysis in our study.

3.2.2 Portfolio construction

To test our hypothesis, we divide our sample firms into either Portfolio A or Portfolio B based on the portfolio selection criteria specified above. The firms are divided into portfolios once a year, at the end of each year during the time period (2016-2020). In detail, this means that at the end of each year during the time period, we will control whether the Board ownership of each firm is ≥ 10% (e.g., Board ownership as of year-end 2015). Firms fulfilling this criterion will be placed in Portfolio A, and the other firms will be placed in Portfolio B during the entire following year (e.g., during 2016). We buy each firm during the last trading day of the year (e.g., last trading day 2015). Subsequently, at the end of the following year, we control the Board ownership (e.g., Board ownership as of year-end 2016) and divide the firms into either Portfolio A or B for the next year (e.g., 2017) based on the same criteria as mentioned above. Firms that qualified for Portfolio A during a particular year might be included in Portfolio B during the next year if the Board ownership decreased below the cutoff of 10%. This implies that some firms might go back and forth between Portfolio A and B if the Board ownership in

that firm changes during the time period. The described process is then repeated each year during the 5-year time period (2016-2020).

In our calculation of stock price returns, we use the adjusted closing price of the stock at the end of the trading day, including any dividends distributed to shareholders. The closing price is adjusted for certain corporate actions that affect the comparability over time, such as stock splits, etc. To clarify, this means that we study each firm's total stock price returns, including both the change in the prices of the stocks and any dividends distributed. Monthly and annual returns are calculated based on the formula below:

$$\textit{Stock price return (monthly or annual)} = \frac{\textit{Ending price - Starting price}}{\textit{Starting price}}$$

Ending price = Adjusted closing price of the last trading day of period$_T$ *(month or year)*
Starting price = Adjusted closing price of the last trading day of period$_{T-1}$ *(month or year)*

Portfolio A, Portfolio B, and the long-short portfolio are constructed both as equally weighted portfolios and value-weighted portfolios. The equally weighted portfolios are constructed by giving all companies in Portfolio A and B equal weights regardless of the market capitalization of the companies, which means that the total portfolio return is equal to the average return for all the individual companies in the respective portfolios. The value-weighted portfolios are constructed by calculating portfolio weights for all companies in Portfolio A and B, respectively, calculated as each company's market capitalization divided by the sum of the market capitalizations of all companies in Portfolio A and B, respectively. The total portfolio return of the value-weighted portfolio is equal to the sum of the weighted returns for all the individual companies in the respective portfolios.

There is one main reason we divide the firms into portfolios once a year instead of each month. The Holdings database provides ownership data for the board updated quarterly, which would allow us to rebalance our portfolios each quarter. However, the Holdings data only covers a part of our time period (2017-2020). The remaining years (2015-2016) require manual collection of the Board ownership data, collected from the companies' annual reports. For most firms, the quarterly reports do not include such ownership data, which implies that we cannot update the ownership data more frequently than once a year.

This frequency, with which we rebalance the portfolios, also implies that we do not participate in initial public offerings (IPOs) since these tend to occur at some time during an ongoing financial year. However, this aligns well with the *investor perspective* we take in this thesis (that investors should be able to replicate the portfolio) because it would not be reasonable to assume that any investor would get allocation in all IPOs given that allocation in IPOs, in general, are limited.

3.2.3 Fama-French-Carhart's four factors model

Although we expect Board ownership to be a factor that could explain stock price returns, other factors affect stock price returns as well. Several sophisticated models have outlined certain factors that can explain what stock price returns are attributable to. One such model is the Capital Asset Pricing Model[4] (hereon "CAPM"), which to a great extent builds on the findings of Markowitz (1952), Sharpe (1964), and Litner (1965). CAPM aims to explain the excess stock price return of an asset through its risk in relation to the market. In addition to the risk-free rate, the explaining factor is the beta coefficient of the asset multiplied by the excess return of the market index. The beta coefficient (market beta) is interpreted as the sensitivity of the asset's returns to the excess return of the market index. Building on the intuition of CAPM, later studies have suggested that other factors (in addition to market risk) also might explain stock price returns. Fama and French (1992) developed a model including two additional factors, referred to as the Fama French three-factor model, based on their findings that book-to-market values and market capitalization are critical factors to explain stock price returns in addition to market beta. The Fama French three-factor model aims to explain the excess return of an asset through three factors (Market Beta, HML, SMB), examining the following phenomena: Market risk (The beta coefficient), the outperformance of high-book to value companies in relation to low-book to market companies (HML) and finally the outperformance of small-cap companies in relation to large-cap companies (SMB). The rationale behind the three-factor model is that small-cap companies and high-value companies consistently contribute to outperformance over the overall market. Accordingly, Fama and French (1992) find that a model including the HML and SMB factors has a higher explanatory value than CAPM explaining the excess return of a given asset.

[4] The CAPM formula: $R_{it} - Rf_t = \beta\,(Rm_t - Rf_t) + e_{it}$

Subsequent research by Carhart (1997) has furtherly developed Fama and French's (1992) three-factor model by adding a fourth factor that is suggested to increase the explanatory value further, which is referred to as the Fama-French-Carhart's four factors model (hereon "the Four-Factor Model"). Carhart's (1997) fourth factor, the momentum factor (UMD), builds on Jegadeesh and Timan's (1993) findings that the share price development of stocks that have performed well or poorly in the past tend to continue in the same direction during a certain period in the near future. This is referred to as the momentum of a stock.

In accordance with the above, we use the Four-Factor Model to capture other factors (than Board ownership) that may affect the portfolio returns. This approach is similar to previous studies that, for similar purposes, used the Fama and French Three-Factor Model (Gompers et al. (2003), Lilienfeld-Toal and Ruenzi (2009) and Lyttkens and Leiser (2017)) or a version of this model including only two factors (Cella (2009)). We extract the factors in the Four-Factor Model calculated on both an equally and value-weighted basis to be able to use the Four-Factor Model to potentially explain the returns of both our equally and value-weighted portfolios.

The Four Factors Model has the following structure:

$$R_{it} - Rf_t = \alpha_{it} + \beta_1 (Rm_t - Rf_t) + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 UMD_t + e_{it}$$

The variables of the Four Factors Model can be defined as follows:

R_{it}-Rf_t = *The return on portfolio i in excess of the risk-free rate for time t*

$(Rm_t$-$Rf_t)$ = *The return on the market index in excess of the risk-free rate for time t*

SMB_t = *The size factor (Small Minus Big) of the Four-Factor Model for time t*

HML_t = *The value factor (High Minus Low) of the Four-Factor Model for time t*

UMD_t = *The momentum factor (Winners Minus Losers or Up minus Down) of the Four Factor Model for time t*

e_{it} = *Portfolio i residual for time t*

α_{it} = *The part of the excess return on portfolio i that cannot be explained by the other variables in the Four-Factor Model for time t*

4. Data

4.1 Collection of financial data

Stock price data of all Large and Mid Cap companies on the Stockholm Stock Exchange are collected from the database Finbas, provided by the Swedish House of Finance. To calculate portfolio returns for 2016-2020, we assess monthly stock price data over a 5-year period, corresponding to 60 months, between 2015-12-30 and 2020-12-30. The last trading day of each period (month or year) is used as the measuring point to calculate the monthly and annual returns, respectively.

For the stock price data, several adjustments have been made to the raw data set provided by Finbas. In line with our research boundaries, we only assess firms listed on the Large and Mid Cap segments on the Stockholm Stock Exchange. This implies that firms that belong to other segments (i.e., Small Cap, First North Growth Market, First North Premier Growth Market) have been excluded from the data set. Furthermore, companies listed less than one full year have been excluded since annual returns cannot be calculated, and we only rebalance the portfolios once a year (last trading day of the preceding year). Companies with missing or unreliable data points (share prices and market capitalization) have also been excluded. Moreover, for companies that have changed segments, e.g., Small Cap to Mid Cap, we only include the data for the period the company is included in the Mid Cap or Large Cap segment, in line with our research boundaries. Finally, in cases where companies in our selection have divested a part of the business that comes to be publicly listed during the period, the divested entity will be excluded during the year of its listing and treated as a separate company from the subsequent year of its listing.

Regarding firms with multiple share classes listed, we have only included the largest share class, defined as the share class that accounts for the largest proportion of the company's market capitalization. Firms only having a preferred stock listed are excluded. In the event of a firm having share classes with equal market capitalization, the most traded share class is used. This implies that in the calculation of the portfolio weights for each company, in both the equally weighted and value-weighted portfolios, only the market capitalization of the company's largest share class is used. This represents how the value-weighted reference index we use (SIXRX) is weighted and thus increases the comparability between our value-weighted

portfolios and the SIXRX index. In addition, the factors in the Four Factors Model provided by Swedish House of Finance (see below) are also calculated using SIXRX as the market index.

4.2 Collection of ownership data

To examine the Board ownership (as defined in section 3.2.1), we have used data available in the database Holdings, provided by Modular Finance, for the years 2017 to 2020. For the years 2015 and 2016, where Holdings lacks data on Board ownership, we have manually collected ownership data available in the annual reports. The Board ownership data used contains the shareholdings of individual board members in all outstanding share classes for the specific company. We study annual Board ownership data between the periods 2015-12-31 and 2019-12-31. The end of each financial year (e.g., 2015-12-31) is used as the measuring point to calculate the Board ownership used as portfolio selection criteria for the subsequent financial year (e.g., 2016). Companies with missing or unreliable Board ownership data, in either the annual reports or the Holdings database, have been excluded from our sample.

In connection to the manual collection of the ownership data, various critical considerations regarding the data have been made. To the extent possible, we only include shareholdings owned directly by the individual board members or indirectly through a company over which the board member has significant direct influence. This implies that we include shares owned through private holding companies. However, the Board ownership can also include shareholdings of relatives since the ownership of the board member and its relatives (in some cases) are aggregated into one collective ownership figure. These criteria are similar to the criteria applied by the database Holdings in their presentation of ownership data for corporate insiders. Shares owned through foundations associated with the board members have been excluded since we do not access such information. In cases where a board member represents another company (i.e., investment firms, private equity funds, etc.) that owns shares in the company for which we calculate the Board ownership, we have only included the personal shareholdings of the board member. We exclude the shares owned by the other company that the board member represents. In cases where several family members are represented in a board, strictly personal shareholdings are counted, and adjacent holdings are excluded.

Further adjustments to the ownership data provided by Holdings have been made concerning management and corporate insiders. In some cases, members of the management team have

been included in the data set for board members. Comparisons between annual reports of the companies and the Holdings data have been completed regarding the board to ensure that only adequate data for actual board members is used.

4.3 Final sample

Table 1 shows the sample construction process from the raw data provided by Finbas to our final sample, obtained after all adjustments examined above under sections 4.1 - 4.2. Our final sample consists of a total of 246 companies and the same number of different stocks.

Table 1: Sample construction process

Sample construction step	**Number of firms**
Total number of firms listed on the Stockholm Stock Exchange ("SSE") 2016-2020 (Finbas raw data)	530
Less: Firms not listed on SSE (falsely included in raw data), Firms listed on the Small Cap segment or First North (Premier) Growth Market on SSE, Firms with missing stock price data, Firms listed less than 1 year	(254)
Less: Firms only having a preferred stock listed	(13)
Subtotal:	**263**
Less: Firms with unreliable or missing Board ownership data	(17)
Final Sample	**246**

The stock price data consists of 12 924 monthly observations and the ownership data consist of 1 094 yearly observations, used for both the equally- and value-weighted portfolios.

4.4 Data for the Four Factors Model

Since we only examine stocks listed on the Stockholm Stock Exchange, the factors in the Four-Factor Model are calculated based on the relevant data of Swedish listed companies. This data has been extracted from the database Finbas for the period 2016-2019. In lack of available data for the year 2020, our regression using the Four Factors Model is restricted to 4 years (2016-2019) compared to the 5-year observation period used for stock price data and ownership data (2016-2020). In the data provided by Finbas, factors for the Four Factors Model are calculated based on monthly stock prices and accounting data for all stocks traded on all Swedish stock markets (apart from 4 small market segments that are excluded). The one-month Swedish treasury bill rate is used to estimate the risk-free interest rate, and SIXRX is used as a proxy of the market index. The SIXRX is a value-weighted index consisting of all stocks listed on the Stockholm Stock Exchange, in which the stock returns are adjusted for dividends received.

4.5 Descriptive statistics

Table 2A shows the number of companies included in Portfolio A (Board ownership ≥ 10%) and Portfolio B (Board ownership < 10%), respectively, as well as the total number of companies included in our study for the years 2016-2020. Table 2B shows the distribution of the number of companies in Portfolio A and Portfolio B, expressed as a percentage of the total number of companies included in our study. Specifications in the Table 2A and Table 2B are made to illustrate the distribution of the Large and Mid Cap companies in the respective portfolios. As shown in Table 2A, the number of companies included in the sample varies between the years in the research period due to listings, delistings, and data availability, as examined above. Some companies are part of Portfolio A or Portfolio B during the entire period, while some companies move between the portfolios due to changes in Board ownership.

As can be seen in Table 2B, the majority of the companies belong to Portfolio B during the entire research period for each of our three segments (Large and Mid Cap collectively, Large Cap individually, and Mid Cap individually). When observing the Large and Mid Cap segments collectively, on average 61.7% of the companies are part of Portfolio B, and 38.3% of the companies are part of Portfolio A during the research period. Table 2B further shows that, when comparing the Large Cap and Mid Cap segments, a smaller proportion of the Large Cap companies belong to Portfolio A (30.7-36.3%) relative to the Mid Cap segment in which 39.5-44.3% of the companies belong to Portfolio A. Moreover, Table 2B shows that the percentage distribution of the number of companies in Portfolio A and Portfolio B is relatively stable during the research period for all three segments. This might be interpreted as indirect evidence that Board ownership might be “sticky” over time (i.e., the ownership is stable over shorter time periods) in line with the findings of Claessens et al. (2002) and Ellul (2007).

Table 2A: Descriptive statistics of the number of companies in the study

Year	2016	2017	2018	2019	2020
Large and Mid Cap					
Portfolio A	74	76	84	90	86
Portfolio B	112	123	140	141	147
Total	186	199	224	231	233
Large Cap					
Portfolio A	35	33	35	34	31
Portfolio B	63	65	65	67	71
Total	98	98	100	101	102
Mid Cap					
Portfolio A	39	43	49	56	55
Portfolio B	49	58	75	74	76
Total	88	101	124	130	131

Table 2B: Descriptive statistics of the percentage of firms in Portfolio A and B

Year	2016	2017	2018	2019	2020	Average 2016-2020
Large and Mid Cap						
Portfolio A	39.8	38.2	37.5	39.0	36.9	38.3
Portfolio B	60.2	61.8	62.5	61.0	63.1	61.7
Total	100.0	100.0	100.0	100.0	100.0	
Large Cap						
Portfolio A	36.3	34.1	36.2	34.7	30.7	34.4
Portfolio B	63.7	65.9	63.8	65.3	69.3	65.6
Total	100.0	100.0	100.0	100.0	100.0	
Mid Cap						
Portfolio A	44.3	42.6	39.5	43.1	42.0	42.3
Portfolio B	55.7	57.4	60.5	56.9	58.0	57.7
Total	100.0	100.0	100.0	100.0	100.0	

Table 3 shows descriptive statistics of the monthly stock price returns (our main variable) during the 5-year research period (2016-2020) for the equally weighted Portfolio A and Portfolio B, and an equally weighted portfolio consisting of all firms in our final sample. As can be seen in Table 3, the total number of monthly observations amounts to 12 924. The average monthly return for the portfolio containing all firms in our sample is equal to 1.83%, and the median monthly return for the same portfolio is equal to 1.19%. Furthermore, the average monthly return for Portfolio A and Portfolio B is equal to 2.18% and 1.61%, respectively. Moreover, as shown in Table 3, our sample includes some unusually high positive and low negative monthly returns ("outliers"), as indicated by the min and max values of the

monthly returns. Both Portfolio A and Portfolio B include such outliers. We chose not to exclude outliers from our sample since the unusual returns are considered a normal part of the natural variation on the stock market. Again, the purpose of our study is to examine the actual returns an investor would have yielded on the stock market during the research period (2016-2020), which naturally would have included such unusual returns.

Table 3: Descriptive statistics for the monthly returns
This table presents descriptive statistics of the monthly stock price returns (our main variable) for the *equally weighted* Portfolio A (Board ownership ≥ 10%) and Portfolio B (Board ownership < 10%) during the period 2016-2020 consisting of 5 years, corresponding to 60 months. The table also presents the descriptive statistics of the monthly stock price returns for an equally weighted portfolio consisting of all firms included in our sample (Large and Mid Cap collectively). The returns are expressed in percentage. The average returns represent the arithmetic mean of the monthly stock price returns and therefore do not consider the effect of compound interest.

	Monthly Observations	Average	Standard Deviation	Median	Max	Min
Large and Mid Cap						
Portfolio A	4961	2.18	0.1761	1.15	-90.24	924.53
Portfolio B	7963	1.61	0.1056	1.21	-66.73	117.31
All firms	12924	1.83	0.1370	1.19	-90.24	924.53

5. Results

This chapter examines the empirical results of our thesis. To begin with, we present the average annual and monthly returns for the 5-year research period (2016-2020) for both the equally weighted and value-weighted portfolios. We then present the regression results for the equally weighted portfolios. Subsequently, as a robustness test, we present the results of the regression for the value-weighted portfolios. Finally, we examine certain statistical considerations. Throughout chapter 5, the figures in brackets following the average annual returns represent the average monthly returns for the different portfolios and indices, respectively.

5.1 Portfolio returns

5.1.1 Equally weighted portfolios

Table 3 shows the average annual and monthly returns for the 5-year research period (2016-2020) for the equally weighted Portfolio A (Board ownership ≥ 10%), Portfolio B (Board ownership < 10%), and the long-short portfolio (A – B). An equally weighted portfolio is a

portfolio in which all firms in the portfolio are given equal portfolio weights. The long-short portfolio refers to a portfolio that takes a long position in Portfolio A and a short position in Portfolio B. As presented in Table 3, the equally weighted Portfolio A yields an average annual return of 27.85% (2.13% monthly) for both Large Cap and Mid Cap companies collectively, compared to 19.34% (1.59% monthly) for Portfolio B. This implies that the long-short portfolio (A - B) had an average annual return of 8.51% (0.54% monthly) over the 5-year research period, indicating that the firms in Portfolio A experienced superior performance.

The results in Table 3 are presented on a segment basis to illustrate the difference in the results between the Large Cap and Mid Cap segments. Similar results, as for Large and Mid Cap firms collectively, are found for both Large Cap firms individually and Mid Cap firms individually. The equally weighted Portfolio A has consistently outperformed Portfolio B. The equally weighted Portfolio A including only Large Cap firms yielded an average annual return of 27.83% (2.04% monthly) compared with an average annual return of 16.80% (1.38% monthly) for the equally weighted Portfolio B including only Large Cap firms. As for the portfolios including only Mid Cap firms, Portfolio A yielded an average annual return of 27.97% (2.20% monthly), and Portfolio B yielded an average annual return of 22.13% (1.81% monthly). This implies that, on a segment basis, the long-short portfolio (A – B) yielded an average annual return of 11.03% (0.66% monthly) for the Large Cap firms and 5.84% (0.39% monthly) for the Mid Cap firms.

Furthermore, the equally weighted portfolios are compared to the relevant market index to evaluate the performance against widely accepted passive investment strategies. As a comparable market index for the equally weighted portfolios, we have chosen OMXS50EW. OMXS50EW is an equally weighted index constructed to reflect the stock price development of the 50 largest shares, with regards to market capitalization, on the Stockholm Stock Exchange. Similar to the construction of our portfolios, the OMXS50EW only considers the share classes with the highest market turnover. The comparable index consists of fewer stocks than our portfolios. However, to our best knowledge, it is the most suitable market-based proxy for the Stockholm Stock Exchange that reflects a similar investing strategy. As Table 3 shows, over the observation period, the OMXS50EW index has experienced an average annual return of 13.26% (1.09% monthly), indicating an inferior performance compared to both Portfolio A and B including Large and Mid Cap firms collectively, Large Cap firms individually and Mid Cap firms individually. The plausible cause why both Portfolio A and B overperformed the

benchmark index might be that OMXS50EW only includes the largest firms on the Stockholm Stock Exchange. This could decrease the average return of the market index (since the portfolio is equally weighted) in line with Fama and French (1992) findings that smaller firms tend to outperform larger firms.

Table 3: Descriptive statistics of equally weighted portfolio returns

This table presents the average annual and monthly returns ("returns") of the equally weighted Portfolio A (Board ownership ≥ 10%) and Portfolio B (Board ownership < 10%), and the equally weighted benchmark index OMXS50EW, during the period 2016-2020 consisting of 5 years, corresponding to 60 months. The table also presents the returns of the long-short portfolio, which refers to a portfolio that takes a long position in all firms Portfolio A and a short position in all firms in Portfolio B (A – B). Further, the difference between the returns of Portfolio A and OMXS50EW are presented. The returns are expressed in percentage. Specifications in the table are made to present the portfolio returns of Portfolio A, Portfolio B, and the long-short portfolio on a segment basis, i.e., separate scenarios in which the portfolios include both Large and Mid Cap firms, only Large Cap firms, and only Mid Cap firms.

	Portfolio A	Portfolio B	OMXS50EW (EW Index)	Long-short Portfolio (A - B)	Difference (A - EW Index)
Large and Mid Cap					
Annual Return	27.85	19.34	13.26	8.51	14.59
Monthly Return	2.13	1.59	1.09	0.54	1.04
Large Cap					
Annual Return	27.83	16.80	13.26	11.03	14.57
Monthly Return	2.04	1.38	1.09	0.66	0.95
Mid Cap					
Annual Return	27.97	22.13	13.26	5.84	14.71
Monthly Return	2.20	1.81	1.09	0.39	1.11

5.1.1 Value-weighted portfolios

Table 4 shows the average annual and monthly returns for the 5-year research period (2016-2020) for the value-weighted Portfolio A (Board ownership ≥ 10%), Portfolio B (Board ownership < 10%), and the long-short portfolio (A – B). The portfolios are value-weighted which means that all firms in the respective portfolios are weighted with respect to the market capitalization of the share class included in the sample (see section 4.1 above) in relation to the total market capitalization of the firms included in the portfolio. The long-short portfolio (A – B) refers to a portfolio that takes a long position in all firms in Portfolio A and a short position in all firms in Portfolio B. As presented in Table 4, the value-weighted Portfolio A yields an average annual return of 13.79% (1.08% monthly) for both Large Cap and Mid Cap companies collectively, compared to 12.05% (1.00% monthly) for Portfolio B. This implies

that the long-short portfolio (A – B) yields an average annual return of 1.74% (0.08% monthly) over the 5-year research period. This indicates that the firms in Portfolio A performed better than Portfolio B during the 5-year time period.

Similarly, as for the equally weighted portfolios, the results in Table 4 are presented on a segment basis to illustrate the difference in the results between the Large Cap and Mid Cap segments. Similar results, as for Large and Mid Cap firms collectively, are found for both Large Cap firms and Mid Cap firms individually. The value-weighted Portfolio A has consistently outperformed Portfolio B. The value-weighted Portfolio A including only Large Cap firms yielded an average annual return of 13.76% (1.08% monthly), compared with an average annual return of 12.15% (1.01% monthly) for the value-weighted Portfolio B including only Large Cap firms. As for the portfolios including only Mid Cap firms, Portfolio A yielded an average annual return of 15.19% (1.28% monthly), and Portfolio B yielded an average annual return of 9.00% (0.86% monthly). This implies that, on a segment basis, the long-short portfolio (A - B) yielded an average annual return of 1.61% (0.08% monthly) for the Large Cap firms and 6.18% (0.43% monthly) for the Mid Cap firms. Accordingly, most of the excess return of Portfolio A relative to Portfolio B is attributable to the Mid Cap segment.

Table 4 also presents a comparison between the returns of the value-weighted portfolios and the relevant market index to evaluate the performance against widely accepted passive investment strategies. As a comparable market index for the value-weighted portfolios, we have used the SIXRX index. SIXRX is a value-weighted index consisting of all stocks listed on the Stockholm Stock Exchange, in which the stock returns are adjusted for dividends received. According to SIX Financial Information, the owner and provider of SIXRX, the purpose of the index is to reflect the market returns from the perspective of a fund manager. This fits the purpose of our thesis, to examine our hypothesis from an *investor perspective*. Moreover, to our best knowledge, SIXRX is an accepted benchmark index for value-weighted portfolios consisting of stocks on the Stockholm Stock Exchange, widely used as a benchmark index by fund managers and the financial services industry in general. As presented in Table 4, over the observation period, the SIXRX index has yielded an average annual return of 12.89% (1.06% monthly). This implies that the SIXRX index consistently experienced a lower annual and monthly return than Portfolio A for all segments (collectively and individually), as presented in Table 4. The opposite is observed for Portfolio B, with the SIXRX index having

a higher annual and monthly return than Portfolio B for all segments (collectively and individually).

Table 4: Descriptive statistics of value-weighted portfolio returns

This table presents the average annual and monthly returns ("returns") of the value-weighted Portfolio A (Board ownership ≥ 10%) and Portfolio B (Board ownership < 10%), and the value-weighted benchmark index SIXRX, during the period 2016-2020 consisting of 5 years, corresponding to 60 months. The table also presents the returns of the long-short portfolio, which refers to a portfolio that takes a long position in all firms in Portfolio A and a short position in all firms in Portfolio B (A – B). Further, the difference between the returns of Portfolio A and SIXRX are presented. The returns are expressed in percentage. Specifications in the table are made to present the portfolio returns of Portfolio A, Portfolio B, and the long-short portfolio on a segment basis, i.e., separate scenarios in which the portfolios include both Large and Mid Cap firms, only Large Cap firms, and only Mid Cap firms.

	Portfolio A	Portfolio B	SIXRX (VW Index)	Long-short Portfolio (A - B)	Difference (A -VW Index)
Large and Mid Cap					
Annual Return	13.79	12.05	12.89	1.74	0.90
Monthly Return	1.08	1.00	1.06	0.08	0.03
Large Cap					
Annual Return	13.76	12.15	12.89	1.61	0.87
Monthly Return	1.08	1.01	1.06	0.08	0.02
Mid Cap					
Annual Return	15.19	9.00	12.89	6.18	2.29
Monthly Return	1.28	0.86	1.06	0.43	0.22

5.2 Regression results

5.2.1 Equally weighted portfolios

Table 5 shows the regression results of the monthly returns of the *equally weighted* Portfolio A (Board ownership ≥ 10%), Portfolio B (Board ownership < 10%), and the long-short portfolio (A – B) for all segments (Large and Mid Cap collectively and individually). In lack of available data for the factors in the Four Factor Model for the year 2020, our regression using the Four Factors Model is restricted to 4 years (2016-2019) compared to the 5-year time period used for stock price data and ownership data (2016-2020). We focus upon the "abnormal return" (i.e., the alpha) of the long-short portfolio (A – B). This represents the abnormal return yielded by the investment strategy to take a long position in Portfolio A and a short position in Portfolio B (see section 3.2.2). As presented in Table 5, the long-short portfolio (A – B) including Large and Mid Cap firms collectively generated an abnormal monthly return of 0.34% during the time period 2016-2019, which is economically significant. However, the

abnormal return is not statistically significant at the 10% level, which implies that we cannot ascertain how likely it is that this abnormal return for the long-short portfolio was yielded. As indicated by the R^2 value amounting to 0.0628, the independent variables only explain 6.28% of the abnormal return of the long-short portfolio (A – B). This can be explained by the long-short portfolio (A – B) having minimal net exposure to the market because the long position in Portfolio A is offset by the short position in Portfolio B, as indicated by the value of the MKT coefficient for Portfolio A and Portfolio B equal to 1.0335 and 1.0329 respectively (both coefficients statistically significant). As seen in Table 5, this results in a considerably low MFK coefficient for "Portfolio A - Portfolio B" of 0.0006. The independent variables have considerably higher explanatory value for the excess return of Portfolio A and Portfolio B (as separate portfolios), as indicated by the R^2values for Portfolio A and Portfolio B equal to 0.7793 and 0.9043, respectively.

Further, Table 5 shows that the coefficients for SMB for both Portfolio A and Portfolio B are close to 0, meaning that the return of the portfolios has a weak correlation with the SMB portfolio, which indicates that the portfolios are affected mainly by the share price development of larger companies. A coefficient for SMB close to 1 would indicate that the return of the portfolios is mainly affected by the returns of smaller companies. This value is in line with our expectations since our study is limited to the Large and Mid Cap segments on the Stockholm Stock Exchange, in which many firms are classified as larger companies in the construction of the SMB portfolio used to calculate the SMB factors in the Four Factors Model. However, the coefficients are not statistically significant at the 10% level, why we cannot ascertain how much this factor explains the alpha of the portfolios.

The results in Table 5 are presented on a segment basis to illustrate the difference in the results between the Large Cap and Mid Cap segments. Similar results as for the Large and Mid Cap firms collectively are found for the Large Cap and Mid Cap segments individually. The long-short portfolio (A – B) including Large Cap firms individually and Mid Cap firms individually generated an abnormal monthly return of 0.31% and 0.37% during the time period 2016-2019, respectively, which in both cases is economically significant. However, neither of these abnormal returns are statistically significant at the 10% level, meaning that we cannot determine the probability of this abnormal return for the long-short portfolio (A – B) was yielded for neither the Large Cap nor the Mid Cap segments. The R^2 value of the long-short

portfolio for both the Large Cap firms and Mid Cap firms individually were low in absolute terms, amounting to 0.0758 and 0.0509, respectively, indicating that the independent variables only can explain 7.58% and 5.09% of the abnormal returns of the long-short portfolio respectively. This is expected as the arguments regarding the minimal net exposure to the market for the long-short portfolio, also are applicable for the Large and Mid Cap firms individually. The beta coefficients are statistically significant on the 10% level for both Portfolio A and B (as separate portfolios) including both the Large Cap firms and Mid Cap firms individually. Similar to the regression results for Large and Mid Cap collectively, the independent variables have considerably higher explanatory value for the excess return of Portfolio A and B (as separate portfolios) for the Large Cap and Mid Cap firms individually. The R^2 values were 0.7765 (Portfolio A) and 0.9297 (Portfolio B) for the Large Cap firms, and 0.6963 (Portfolio A) and 0.8143 (Portfolio B) for the Mid Cap firms.

The coefficients for SMB, as presented in Table 5, differ between the Large Cap and Mid Cap segments. Both are close to 0, which is expected since both segments include larger companies. The portfolios including Large Cap firms individually had a lower coefficient for SMB than the portfolios including Mid Cap firms individually. This is reasonable since the Large Cap segment consists of larger companies than the Mid Cap segment. However, the coefficients are not statistically significant at the 10% level, why we cannot ascertain how much this factor explains the alpha of the portfolios for neither segment.

Table 5: Regression of monthly returns of the equally weighted portfolios

The table presents the results of a regression of the monthly returns of the equally weighted Portfolio A (Board ownership ≥ 10%) and Portfolio B (Board ownership < 10%) in excess of a one-month Swedish Treasury bill ("the risk-free rate"). The table also shows the regression results of the monthly returns of the long-short portfolio, which refers to a portfolio that takes a long position in all firms in Portfolio A and a short position in all firms in Portfolio B (A – B). The regression is based on monthly stock price data for a 4-year period, corresponding to 48 months, between 2016-12-30 and 2019-12-30. The portfolios and the factors in Fama-French-Carhart's Four Factors Model are calculated on an *equally weighted* basis. The monthly portfolio returns subtracted by the risk-free rate ("excess return") and the monthly return of the long-short portfolio are the dependent variables, respectively. Alpha is the part of the excess return of the respective portfolios that cannot be explained by the other variables in the Four-Factor Model ("abnormal return"). MTK is the return of the SIXRX index in excess of the risk-free rate. SMB is the size factor in the Four-Factor Model, HML is the value factor in the Four-Factor Model, and UMD is the momentum factor in the Four-Factor Model. The table shows the coefficients of the above-mentioned factors in Fama-French-Carhart's Four Factors Model. The significance level (i.e., the p-values) are presented in brackets under respective coefficient values. Specifications in the table are made to present the regression returns of the excess return of Portfolio A and B on a segment basis, i.e., separate scenarios in which the portfolios include both Large and Mid Cap firms, only Large Cap firms, and only Mid Cap firms. Results that are significant at the 10%-level are indicated with bold font.

		R^2	Alpha	B(MKT)	B(SMB)	B(HML)	B(MOM)
Large and	**Portfolio A - Risk-free rate**	0.7793	**0.6837**	**1.0335**	0.0581	0.2474	0.1210
Mid Cap	(P-value)		(0.0439)	(0.0000)	(0.6328)	(0.2677)	(0.1307)
	Portfolio B - Risk-free rate	0.9043	0.3388	**1.0329**	0.0051	-0.0410	0.0807
	(P-value)		(0.1061)	(0.0000)	(0.9462)	(0.7666)	(0.1064)
	Long-short Portfolio (A - B)	0.0628	0.3449	0.0006	0.0530	0.2884	0.0403
	(P-value)		(0.2309)	(0.9933)	(0.6133)	(0.1363)	(0.5551)
Large Cap	**Portfolio A - Risk-free rate**	0.7765	**0.6090**	**1.0055**	-0.0925	0.3632	0.0878
	(P-value)		(0.0713)	(0.0000)	(0.4478)	(0.1065)	(0.2694)
	Portfolio B - Risk-free rate	0.9297	**0.2953**	**0.9840**	-0.0638	0.0022	0.0404
	(P-value)		(0.0811)	(0.0000)	(0.2981)	(0.9839)	(0.3106)
	Long-short Portfolio (A - B)	0.0758	0.3137	0.0215	-0.0286	0.3610	0.0474
	(P-value)		(0.3496)	(0.8071)	(0.8150)	(0.1113)	(0.5522)
Mid Cap	**Portfolio A - Risk-free rate**	0.6963	**0.7650**	**1.0568**	0.1818	0.1719	0.1463
	(P-value)		(0.0732)	(0.0000)	(0.2403)	(0.5405)	(0.1481)
	Portfolio B - Risk-free rate	0.8143	0.3922	**1.0856**	0.0808	-0.0617	0.1255
	(P-value)		(0.2236)	(0.0000)	(0.4913)	(0.7730)	(0.1049)
	Long-short Portfolio (A - B)	0.0508	0.3728	-0.0288	0.1010	0.2336	0.0208
	(P-value)		(0.2886)	(0.7548)	(0.4316)	(0.3199)	(0.8031)

5.3 Robustness tests

5.3.1 Regression for the value-weighted portfolios

To assure the robustness of our results, we have chosen to construct value-weighted portfolios in addition to the equally weighted portfolios. In an equally weighted portfolio, all firms are given the same weight regardless of their market capitalization. This implies that the return of an equally weighted portfolio is the same as the average return of all firms in the portfolio, meaning that smaller firms can affect the results significantly. In contrast, in a value-weighted portfolio, firms are given a portfolio weight with regards to the individual firm's market capitalization in relation to the total market capitalization of all firms in the portfolio. Since smaller firms are assigned with a relatively low portfolio weight, they do not affect the portfolio's total return to the same extent. The regression results for the equally weighted portfolios are presented above (see section 5.2.1).

Table 6 shows the regression results of the monthly returns of the *value-weighted* Portfolio A (Board ownership ≥ 10%), Portfolio B (Board ownership < 10%), and the long-short portfolio (A – B) for all segments (Large and Mid Cap collectively and individually). In lack of available data for the factors in the Four Factor Model for the year 2020, our regression using the Four

Factors Model is restricted to 4 years (2016-2019) compared to the 5-year time period used for stock price data and ownership data (2016-2020). We focus upon the abnormal monthly return (i.e., the alpha) of the long-short portfolio (A – B). This represents the abnormal return yielded by the investment strategy to take a long position in Portfolio A and a short position in Portfolio B (see section 3.2.2). As presented in Table 6, the long-short portfolio (A – B) including Large and Mid Cap firms collectively generated a negative abnormal monthly return of -0.02% during the time period 2016-2019, in contrast to the same figure for the equally weighted long-short portfolio that was positive and economically significant (0.34% monthly). However, the alpha is not statistically significant at the 10% level, meaning that we cannot determine the probability that the long-short portfolio (A – B) yielded a negative abnormal return.

The results for the value-weighted portfolios in Table 6 are presented on a segment basis to illustrate the difference in the results between the Large Cap and Mid Cap segments. In contrast to the findings of the equally weighted portfolios, the results for the Large and Mid Cap firms individually differ for the value-weighted portfolios. The long-short portfolio (A – B) including Large Cap firms individually and Mid Cap firms individually generated an abnormal monthly return of 0.10% and 0.42% during the time period 2016-2019, respectively. This means that only the abnormal return for the Mid Cap segment (0.42%) can be seen as economically significant, in contrast to the equally weighted portfolios for which long-short portfolio (A – B) for both segments had economically significant abnormal returns. However, neither of the abnormal returns are statistically significant at the 10% level.

Table 6: Regression of monthly returns of the value-weighted portfolios

The table presents the results of a regression of the monthly returns of the value-weighed Portfolio A (Board ownership ≥ 10%) and Portfolio B (Board ownership < 10%) in excess of a one-month Swedish Treasury bill ("the risk-free rate"). The table also shows the regression results of the monthly returns of the long-short portfolio, which refers to a portfolio that takes a long position in all firms in Portfolio A and a short position in all firms in Portfolio B (A – B). The regression is based on monthly stock price data for a 4-year period, corresponding to 48 months, between 2016-12-30 and 2019-12-30. The portfolios and the factors in the Fama-French-Carhart's Four Factors Model are calculated on a *value-weighted* basis. The monthly portfolio returns subtracted by the risk-free rate ("excess return") and the monthly return of the long-short portfolio are the dependent variables, respectively. Alpha is the part of the excess return of the respective portfolios that cannot be explained by the other variables in the Four-Factor Model ("abnormal return"). MTK is the return of the SIXRX index in excess of the risk-free rate. SMB is the size factor in the Four-Factor Model, HML is the value factor in the Four-Factor Model, and UMD is the momentum factor in the Four-Factor Model. The table shows the coefficients of the above-mentioned factors in Fama-French-Carhart's Four Factors Model. The significance level (i.e., the p-values) are presented in brackets under respective coefficient values. Specifications in the table are made to present the regression returns of the excess return of Portfolio A and B on a segment basis, i.e., separate scenarios in which the portfolios include both Large and Mid Cap firms, only Large Cap

firms, and only Mid Cap firms. Results that are significant at the 10%-level are indicated with bold font.

		R^2	Alpha	B(MKT)	B(SMB)	B(HML)	B(MOM)
Large and Mid Cap	**Portfolio A - Risk-free rate**	0.7461	0.16739	**0.9261**	0.0308	-0.3511	**-0.1444**
	(P-value)		(0.6169)	(0.0000)	(0.8355)	(0.0979)	(0.0197)
	Portfolio B - Risk-free rate	0.5161	0.19634	**0.6351**	0.0027	**-0.5965**	0.0177
	(P-value)		(0.6492)	(0.0000)	(0.9886)	(0.0312)	(0.8187)
	Long-short Portfolio (A - B)	0.1762	-0.02894	**0.2910**	0.0281	0.2454	-0.1622
	(P-value)		(0.9612)	(0.0912)	(0.9154)	(0.5103)	(0.1340)
Large Cap	**Portfolio A - Risk-free rate**	0.7143	0.24079	**0.9115**	-0.0235	**-0.4455**	**-0.1818**
	(P-value)		(0.5142)	(0.0000)	(0.8859)	(0.0580)	(0.0083)
	Portfolio B - Risk-free rate	0.9290	0.13954	**0.9580**	**-0.1569**	-0.1177	0.0190
	(P-value)		(0.3684)	(0.0000)	(0.0264)	(0.2262)	(0.4928)
	Long-short Portfolio (A - B)	0.1228	0.10125	-0.0465	0.1334	-0.3278	**-0.2008**
	(P-value)		(0.8299)	(0.7287)	(0.5250)	(0.2688)	(0.0214)
Mid Cap	**Portfolio A - Risk-free rate**	0.7810	-0.25633	**1.0585**	**0.4599**	0.3408	**0.1223**
	(P-value)		(0.4340)	(0.0000)	(0.0027)	(0.1001)	(0.0417)
	Portfolio B - Risk-free rate	0.7623	**-0.68331**	**1.0746**	**0.5543**	-0.1974	0.0310
	(P-value)		(0.0682)	(0.0000)	(0.0014)	(0.3913)	(0.6378)
	Long-short Portfolio (A - B)	0.1329	0.42699	-0.0161	-0.0944	**0.5383**	0.0912
	(P-value)		(0.2447)	(0.8762)	(0.5602)	(0.0218)	(0.1672)

5.3.2 Statistical considerations

A critical factor to account for when performing a multiple regression analysis is to evaluate multicollinearity. Multicollinearity refers to a condition in which two or more of the independent variables in a regression are significantly linearly correlated, meaning that one independent variable can be explained by another independent variable. High multicollinearity imposes a problem to regression analysis since it invalidates the independence of an independent variable, implying a reduced explanatory value of the coefficients of the regression and hence the validity of the regression results. Testing for multicollinearity, we have used the Variance Inflation Factors (VIF), where each independent variable is tested as a dependent variable in the regression. If the independent variables in the test recognize a high R^2 value or high intercorrelations with another independent variable, multicollinearity can be indicated. The following calculation is performed to extract the VIF: VIF = 1 / (1-R^2). The VIF score ranges from 1, with no upper bound. Literature from Wooldridge (2019) suggests that a VIF higher than 10 indicates severe multicollinearity. As presented in Table 7, none of our variables had a VIF higher than 2, implying that multicollinearity does not impact our regression results.

Table 7: Variance Inflation Factors (VIF)

This table presents the Variance Inflation Factors (VIF) for all the independent variables (MKT, SMB, HML, MOM) in our regression models calculated both on an equally weighted and value-weighted basis. MTK is the return of the SIXRX index in excess of the risk-free rate. SMB is the size factor in the Four-Factor Model, HML is the value factor in the Four-Factor Model, and UMD is the momentum factor in the Four-Factor Model.

		MKT	SMB	HML	MOM
Equally weighted factors	**VIF**	1.06	1.19	1.77	1.82
Value-weighted factors	**VIF**	1.09	1.08	1.63	1.52

6. Analysis

In this chapter, we analyze the empirical results of our study in relation to our hypothesis. To begin with, we examine the actual portfolio returns presented in Table 3 and Table 4 to provide an understanding of the returns an investor would have yielded during the 5-year time period (2016-2020) when adapting our portfolio selection criteria. Subsequently, we examine whether the portfolios generated statistically significant abnormal returns during the 4-year time period (2016-2019), analyzing whether Board ownership could be a statistically significant factor in explaining stock price returns. Finally, we compare our results to comparable studies of other corporate insiders.

6.1 Analysis of Portfolio Returns

As presented in Table 3, the equally weighted long-short portfolio (A – B) including Large and Mid Cap firms collectively yielded an average annual return of 8.51%, corresponding to an average monthly excess return of 0.54% during the time period 2016-2020. Similar results are found for both Large Cap and Mid Cap firms individually. Portfolio A consistently outperformed Portfolio B (i.e., the long-short portfolio yielded a positive return) in terms of excess average annual and monthly return. For the Large Cap firms individually, the equally weighted long-short portfolio (A – B) yielded an average annual return of 11.03%, corresponding to an average monthly return of 0.66%. For the Mid Cap firms individually, the average annual return of the equally weighted long-short portfolio (A – B) was 5.83%, corresponding to an average monthly return of 0.39%. We find similar results, as for the equally weighted portfolios, for the value-weighted portfolios. As presented in Table 4, the value-weighted Portfolio A for all segments (Large and Mid Cap segments collectively and individually) consistently experienced a higher average annual and monthly return than

Portfolio B (i.e., the long-short portfolio yielded a positive return for all segments) during the time period 2016-2020.

These portfolio returns of the long-short portfolio (A – B) indicate that an investment strategy to take a long position in firms with high Board ownership and a short position in firms in which low or no Board ownership would have yielded an economically significant positive return during the time period 2016-2020 on both an equally and value-weighted basis. It also indicates that firms with high Board ownership showed superior performance, in terms of stock price performance, relative to firms with low or no Board ownership. This could be attributable to the incentive effect of ownership. However, while these results provide indications in line with our hypothesis, we cannot determine whether the long-short portfolio (A – B) yielded an abnormal return on the stock market based on these results alone. As argued in section 3.2.3 above, there is a possibility that the portfolio returns can be explained by other factors than Board ownership (e.g., the factors in the Four Factors Model). Thus, we cannot draw any conclusions regarding whether these findings provide evidence in line with our hypothesis that *"firms with high Board ownership generate higher stock market returns than firms with low or no Board ownership"*. Consequently, to draw conclusions with regards to our hypothesis, we must rely on the regression results analyzed below.

6.2 Analysis of Regression results

In lack of available data for the factors in the Four Factor Model for the year 2020, our regression using the Four Factors Model is restricted to 4 years (2016-2019) compared to the 5-year time-period used for stock price data and ownership data (2016-2020). The results in Table 5 shows that the *equally weighted* long-short portfolio (A – B) including Large and Mid Cap firms collectively generated an abnormal monthly return of 0.34% during the time period (2016-2019), which is economically significant. Similar results are found for the Large Cap and Mid Cap firms individually. The long-short portfolio (A – B) including Large Cap firms and Mid Cap firms individually, generated an abnormal monthly return of 0.31% and 0.37% during the time period (2016-2019), respectively, which in both cases can be seen as economically significant. However, neither of these results are statistically significant at the 10% level. This implies that we are unable to either accept or reject our hypothesis that *"firms with high Board ownership generate higher stock market returns than firms with low or no Board ownership"*, based on the regression results.

As shown in Table 6 in our robustness test above, an economically significant abnormal return for the *value-weighted* long-short portfolio (A – B) was only yielded for the Mid Cap firms individually. For the Mid Cap segment, the long-short portfolio (A – B) generated an abnormal monthly return of 0.42% during the time period 2016-2019. In contrast to the results for the equally weighted portfolios, the value-weighted long-short portfolio (A – B) including Large Cap firms individually yielded an abnormal monthly return of 0.10% during the time period 2016-2019, which cannot be seen as economically significant. The long-short portfolio (A – B) including Large and Mid Cap firms collectively generated a (negative) abnormal monthly return of -0.02%. However, none of these results are statistically significant at the 10% level, why we cannot verify or reject our hypothesis based on these results either.

Naturally, the question is why no statistical significance was found for any of the abnormal monthly returns above. In comparison with the other studies on ownership and stock price returns (performance) that used the same research design with regards to the portfolio construction and the factor-model regression, there are three main differences: (1) The length of the time period, (2) number of ownership levels considered and (3) type of corporate insider.

First, the time period used in our study is significantly shorter than that of the other studies. Similar studies considering other corporate insiders used the following time periods; Lilienfeld-Toal and Ruenzi (2009) used 21.5 years (258 months), Cella (2009) used 14 years (168 months), and Lyttkens and Leiser (2017) used 8 years (96 months). Given that our regression is limited to a time period of 4 years (48 months), we have a significantly lower number of observations than these studies. Since a larger sample size, in general, increases the likelihood of achieving a higher significance level of the results, we could potentially get a higher explanatory value by extending the research period. However, as mentioned above (see section 1.3) our shorter time period is a consequence of the board ownership data only being available in the Holdings database from the current date back to 2017. Also, the data for the factors in the Four Factor Model has not yet been constructed by Finbas for the year 2020.

Secondly, like (Cella 2009), we only consider one arbitrary ownership level (Board ownership ≥ 10%) as the cutoff point in the portfolio construction. In line with the findings of Morck et al. (1988), Lilienfeld-Toal and Ruenzi (2009), and Lyttkens and Leiser (2017), that considered multiple ownership levels as cutoff points, we cannot rule out the possibility that another

arbitrary ownership level (e.g., Board ownership ≥ 20%) would have yielded different results because of the tradeoff between the incentive effect and the entrenchment effect (as examined above under section 3.2.1). For instance, Lyttkens and Leiser (2017) found that a long-short portfolio similar to the long-short portfolios considered in this study, with founder ownership as portfolio selection criteria, yielded a statistically significant abnormal monthly return at a 10% cutoff point but not at a 30% cutoff point. Consequently, there might be another level of Board ownership (i.e., cutoff point) for which the relationship between Board ownership and firm performance is stronger that we did not consider, which could have yielded statistically significant results.

Finally, there is a possibility that the relationship between ownership and firm performance is existing but weaker for the board in comparison to other corporate insiders. The previous studies mentioned above examined the relationship between ownership and stock price returns with regards to the ownership of other corporate insiders than the board, such as CEOs (Lilienfeld-Toal and Ruenzi (2009)), family-owned firms (Cella (2009), or founders (Lyttkens and Leiser (2017)). These corporate insiders might potentially have a greater ability than the board of directors to affect factors that matter for value creation and, consequently, firm performance. For reference, we include the comparable results of these studies to analyze the difference between our results. Lilienfeld-Toal and Ruenzi (2009) found a statistically significant abnormal (monthly) return of 0.36% for a similar long-short portfolio with CEO-ownership as portfolio selection criteria. Cella (2009) found a statistically significant abnormal monthly return of 0.59% for a similar long-short portfolio with the long portfolio containing family firms and the short containing non-family firms. Finally, Lyttkens and Leiser (2017) found a statistically significant abnormal monthly return of 0.84% for a similar long-short portfolio with founder-ownership as portfolio selection criteria. All the portfolios mentioned in this paragraph were equally weighted. The abnormal monthly return we find for the equally weighted long-short portfolio (A – B) consisting of Large and Mid Cap firms collectively with Board ownership as portfolio selection criteria amounted to 0.34%, which is lower than the abnormal returns of the comparable studies. However, the alpha of our long-short portfolio (A – B) is not statistically significant at either the 10% or 5% level. Therefore, we cannot conclude if our results could indicate that the relationship is existing but weaker for the board in relation to other corporate insiders. However, as argued above, the underlying reason why we did not find statistically significant results in the first place might be that the relationship is weaker for the board (i.e., other corporate insiders' ownership may matter more).

7. Conclusions

Our study has examined whether firms with high Board ownership generate greater stock market returns than firms with low or no Board ownership. Using stock price data from Finbas, ownership data from Holdings, and manually collected ownership data from annual reports, for Large and Mid Cap firms listed on the Stockholm Stock Exchange during the 5-year time period between 2015-12-30 and 2020-12-30, we have constructed portfolios based on Board ownership to test our hypothesis. Applying a deductive, quantitative method, we have performed regression analysis with the help of Fama-French-Carhart's Four Factors Model to determine whether the portfolios generated an economically and statistically significant abnormal return. In lack of available data for the factors in the Four Factor Model for the year 2020, our regression using the Four Factors Model is restricted to 4 years (2016-2019) compared to the five-year observation period used for stock price data and ownership data (2016-2020). With regards to the regression results, we focus upon the abnormal monthly return (i.e., the alpha) an investor would have yielded during the 4-year period (2016-2019), following the investment strategy to take a long position in firms with high Board ownership (Portfolio A) and a short position in firms with low or no Board ownership (Portfolio B). This is referred to as the long-short portfolio (A – B).

Simply observing the portfolio returns, we conclude that an investor replicating the equally weighted long-short portfolio (A – B) including both the Large and Mid Cap firms would have yielded an average annual return of 8.51%, corresponding to an average monthly return of 0.54%, for the 5-year time period (2016-2020). This ignores any potential transaction costs (i.e., courtage). Similar results are found for long-short portfolios (A – B) including only the Large and Mid Cap firms, respectively, with Portfolio A consistently outperforming Portfolio B in terms of average annual and monthly returns. From the regression results, we find an economically significant abnormal monthly return for the equally weighted long-short portfolio (A – B) for all three segments (Large and Mid Cap collectively and individually) during the 4-year time period (2016-2019). However, the abnormal monthly returns lack statistical significance on the 10% level, why we cannot draw any conclusions from the results.

Controlling our results' robustness, we find similar results in terms of the portfolio returns for the value-weighted portfolios. The value-weighted long-short portfolio (A – B) including both the Large and Mid Cap firms would have yielded an average annual return of 1.74%, and an

average monthly return of 0.08% during the 5-year time period (2016-2020), ignoring potential transaction costs (i.e., courtage). However, in contrast to the equally weighted portfolios, the value-weighted long-short portfolio (A – B) including only Mid Cap firms yielded a considerably higher return than the corresponding portfolio including only Large Cap firms. For the value-weighted portfolios, an economically significant abnormal monthly return was only observed for the long-short portfolio (A – B) including only Mid Cap firms during the 4-year time period (2016-2019). The alphas for the value-weighted portfolios also lacked statistical significance at the 10% level, why we cannot draw any conclusions from the result.

The lack of statistical significance in the regression results implies that we neither can reject nor accept our hypothesis that "*firms with high Board ownership generate higher stock market returns than firms with low or no Board ownership".* We are thus unable to draw any conclusions regarding the association between Board ownership and stock market returns. Comparing our results with similar studies that found a statistically significant relationship between the ownership of other corporate insiders and stock market returns, using the same methodology (Lilienfeld-Toal and Ruenzi (2009), Cella (2009) and Lyttkens and Leiser (2017)), we conclude that the lack of statistical significance in our regression results possibly could be attributable to three main differences: (1) The significantly shorter time period used in our study, (2) that we only consider one arbitrary ownership level rather than multiple ownership levels and (3) that the ownership of other corporate insiders might be of greater importance for firm performance than the ownership of the board. Finally, we cannot rule out the possibility of a lack of relationship between Board ownership and firm performance as the reason why we did not find statistically significant results. However, as the actual average portfolio returns observed during 5-year time period (2016-2020) indicates findings in line with our hypothesis, we still believe that there are reasons to reexamine the relationship between Board ownership and stock market returns in future studies.

7.1 Future research

Our thesis aims to examine the relationship between board ownership and stock market returns for Large and Mid Cap companies for the period 2016-2020. Our findings provide several opportunities for further research on the topic, with the possibility to examine factors not included in our research paper. This topic has still not been the subject of much research,

especially in a Swedish context, enabling endless possibilities for further exploration. Potential future contributions on the topic are suggested below.

First, it would be interesting to deduct a study on the same topic with a longer time frame, to account for potential changes in market cycles, and to possibly find a higher significance of the results. Our study has been limited to 5 years of data, mainly affected by a severe restraint in the availability of structured ownership data for firms on the Swedish Stock Market. If data provided by databases such as Holdings ranged further back in time, it would facilitate performing similar studies with more extended time perspectives in the future.

Another aspect that would be interesting to investigate in future research would be to consider how *individual* board members ownership affect stock price performance, in opposition to our study, which considers *collective* Board ownership. Suggestively, one could observe the entrance and exit of individual board members with significant shareholdings in the company and its implications for the stock price returns. Some boards are characterized by one board member holding a large position in the company, and it would be compelling to highlight the importance of that person to the company, in terms of company performance, and potentially compare to boards where several board members have large shareholdings in the company.

Moreover, future research could examine the two other variables that we intended to use in our study but decided to ultimately exclude, which consisted of (1) observing the firm ownership of the individual board members as a percentage of their total portfolio and to examine if (2) the board owners have other company commitments. These additional variables could provide a more complete picture of the board members' commitment to the firm in which they hold a board position and essentially highlight more thoroughly how important the agency theory potentially is in the context of boards.

Finally, a possible extension of our study could be made with regard to industry specification. Our thesis makes the distinction between Large Cap companies and Mid Cap companies. However, it would be interesting to analyze if companies in specific industries where the board owns more than 10% of the outstanding shares differ from other industries in terms of performance and if specific industries benefit more from large board ownership positions.

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