The impact of the board of directors' characteristics on the capital structure in the context of Finnish and Swedish firms

Teodora Barb-Dudan

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Barb-Dudan, Teodora

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Abstract

One of the primary duties of the board of directors is to enhance the firm's financial performance in order to meet stakeholder's expectations. Optimal capital structure decisions made by the board of directors have represented a major competitive advantage for firms, crucial to succeed in today's dynamic business environment.

The study's goal was to discover whether board of directors' characteristics have an impact on the firm's capital structure in the Finnish and Swedish context. The thesis employed a deductive research methodology that was compatible with the quantitative approach of the study. The data of 24 Finnish and 36 Swedish firms was collected from the sample firms' annual reports, covering a period of nine years, from 2012 to 2020. Descriptive, correlation and regression analysis were implemented by utilizing IBM SPSS software. The chosen methodology allowed the author to address the research questions, test the hypotheses and ensure the validity and reliability of the study.

The findings of the research demonstrated that board of directors' characteristics had an impact on the firm's capital structure. The results showed that board size, education level, board gender and board independence had an impact on firms' capital structures. The board age and multiple directorship attributes did not have an impact on the firm's total debt. When looking at the long-term debt, board age, multiple directorship and board gender did not have an impact on the long-term debt-to-equity ratio either.

Keywords/tags (subjects)

Capital structure, corporate governance, board of directors, debt-to-equity ratio, debt, equity, Finland, Sweden.

Miscellaneous (Confidential information)

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1 Introduction

The aim of the following chapter is to present the research topic to the reader. This research aims to find out whether the board attributes have an impact on the capital structure of the firm in the Finnish and Swedish corporate sectors. The author outlines the background of the topic, the motivation behind this research as well as the research objective and questions. Furthermore, the structure of the research is explained at the end of the chapter.

1.1 Research background, motivation and questions

Since 1958, when Modigliani Franco and Miller Merton have issued their paper on the "irrelevance theory", numerous studies have criticized and analysed firms' capital structures. While some researchers claim that debt financing influences the firm's capital structure, others argue that debt has no influence on the capital structure (Chandra et al., 2019). Enhancing a firm's financial performance represents one of the boards of directors' key responsibilities to successfully meet stakeholders' expectations. An optimal capital structure may improve firm's financial performance. Therefore, the capital structure decisions made by the board of directors can be turned into a competitive advantage to succeed in today's highly competitive business environment.

Even though there have been numerous research papers about the board of directors and its impact on the firm's capital structure, it is essential to analyse the capital structure in the present era and explore whether there have been changes in the past years. In addition, a substantial number of studies on capital structure have been done outside of Sweden and Finland. Therefore, the significance of this research is even greater. Furthermore, there is a relative shortage of comparative studies about the relationship between board of director's characteristics and its impact on the firm's capital structure, particularly in the context of Nordic countries. The author has chosen sample firms solely from Finland and Sweden because these two nations share a lengthy history, and they have similar cultures (Svensson, 2022). Hence, in the context of Finnish and Swedish firms, the corporate culture and business settings are more comparable. This study allows further comparative analysis to be drawn with other regions and countries. In addition, the author believes that the findings of this research bring significant and applicable knowledge.

This research contributes to the existing literature as it examines empirically the relationship between board of directors' characteristics and capital structure by analysing firms in the context of Nordic countries like Finland and Sweden. The research problem is formulated as "the impact of board of director's characteristics on the firm's capital structure in the context of Finnish and Swedish firms". Given the abovementioned concerns, it appears essential for the author to conduct a comprehensive study on the subject.

To reach the goal of this thesis, the following research questions are addressed:

1. Do the characteristics of the board of directors have an impact on the capital structure involving total debt in the context of Finnish and Swedish firms?
2. Do the characteristics of the board of directors have an impact on the capital structure involving long-term debt in the context of Finnish and Swedish firms?

The data of 24 Finnish and 36 Swedish firms was gathered and analysed for a period of nine years, from 2012 to 2020, to address these questions. The impact of board of directors' characteristics on the firms' capital structure was analysed with the help of various dependent, independent and interaction variables. The financial data required for the capital structure's assessment was collected from the firms' balance sheets while the corporate governance data was collected from the corporate governance reports. Both balance sheets and corporate governance reports can be found from the firms' annual reports. Descriptive, correlation and regression analysis were implemented by utilizing IBM SPSS software.

The results of the empirical analyses support some of the proposed hypotheses where the board attributes truly impact the capital structure of a firm. The majority of the independent variables show a clear impact on firms' capital structures.

1.2 Research structure

The remaining of this thesis is arranged in four chapters: literature review and hypotheses development, research methodology, results, and conclusion. The literature review chapter introduces the reader firstly to the concept of corporate governance and secondly to the concept of capital structure through existing literature and empirical studies. Subsequently, the hypotheses have

been developed at the end of the literature review chapter. The third chapter covers the research methodology while the fourth chapter covers the results of the quantitative data that has been collected for this research. The last chapter involves the discussion whether the findings presented in the previous chapter have been able to answer the research questions. The limitations of the study and the implications for future research have been presented at the end of the fifth chapter.

2 Literature review

The aim of this chapter is to create a theoretical and empirical basis for the current research through existing literature. Moreover, this chapter aims to familiarize the reader with the terms, theories and empirical evidence of previous studies that have been used in the research. The principal themes that have been reviewed are corporate governance, board of directors and capital structures. This chapter also includes six hypotheses that require further analysis.

2.1 Corporate governance

The Centre of European Policy Studies (CEPS) describes corporate governance as a comprehensive framework of rights, procedures, and oversight mechanisms established internally and externally over the management of a business entity, aimed at safeguarding the interests of all stakeholders. Besides, corporate governance plays a major function in the equilibrium between individual and communal targets together with economic and social targets, where ethical decisions are promoted (Cadbury, 2000).

The business ecosystem requires trustworthy and well-functioning capital markets where firms get the opportunity to create value through a fusion of funds and innovative processes. Governance has turned into a key concern when people began to organize themselves towards a common goal. Every corporate entity has a governing body. For instance, the board of directors represents the governing body of profit-oriented firms (Tricker, 2015). Vigorous corporate governance rules and regulations have been designed to establish confidence in the system among all the parties involved. Carlsson (2001) writes that the common aspect of among different corporate governance codes is their focus on an independent and competent board.

In the business world, internal governance mechanisms concentrate on board of directors, capital structure, managerial incentives, and internal control systems whilst external governance mechanisms cover subjects such as laws, regulations, and capital markets (Gillan, 2006). Apart from that, corporate governance can also be observed, analysed, and debated from various points of views such as accounting and reporting, finance, economics, organization design, management and leadership, marketing, and strategy (Nordberg, 2010). Despite the multifaceted nature of corporate governance, this thesis focuses primarily on the financial and organization design viewpoint of corporate governance.

A corporation can be broadly defined as a legitimate entity that it is owned by its shareholders, and it has a few entitlements such as the ability to borrow money, creation of contracts, and even the possibility to buy another corporation (Brealey et al., 2011). Investment decisions are the backbone of a company that generate the actual value of the firm. Regardless of the outstanding capital expenditure, financial decisions are still noteworthy for the business.

Coyle (2015) states that a stakeholder is an individual or a group that has interest or is involved with the company and is influenced by what the company does. Company's stakeholder can be separated into three main categories: internal stakeholders (executive directors, management, and other employees), external stakeholders (government, the general public and pressure groups), and connected stakeholders (non-executive directors, shareholders, lenders, customers, and suppliers) (Coyle, 2015). Internal stakeholders are employed by the company while connected stakeholders are in close contact with the company without working directly for it.

Firms are managed by many different individuals towards the achievement of its goals and objectives regardless of the legal entity status that the firm has. Ineffective corporate governance can open the way to many problems such as corruption, frauds, scandals, and lack of accountability (Pavlovic, 2018). Therefore, managers' and shareholders' interest are meant to be harmonized with the help of good corporate governance practices, where managers must prioritize firm's value.

2.1.1 Theories of corporate governance

In this subsection, the author discusses about various theories of corporate governance such as agency theory, stewardship theory, stakeholder theory, and resource dependence theory.

Agency theory

The starting point of modern corporate governance is commonly attributed to the publication named "The Modern Corporation and Private Property" written by Adolf Berle and Gardiner Means in 1932 (Mitchell, 2005). In this publication, Berle and Means introduced for the first time the theory of separation of ownership and control in companies, also known as the agency theory. According to the agency theory, there are two entities: the principal and the agent (Khan, 2014). During overburdened time, principals might prefer to channel their resources on other activities while the delegated agent has the better abilities and qualifications to implement activities required by the principal.

Throughout the agency relationship, the assignment of responsibilities provides decision-making authority and power to the agent that can be abused for self-interests (Lupia, 2001). As Jensen and Meckling (1976) state, the agency theory assumes that humans have always prioritized their own interests and needs before anyone else. In brief, the agency theory is concerned with the development of various procedures that are meant to diminish such dissimilar interests between principals and agents.

Agency losses arise each time the managerial decisions made by the agent bring less value to the agency relationship than if the decisions were made by the principal. Hill and Jones (1992) state that agency costs are "the sum of the principal's monitoring expenditures, the agent's bonding expenditure, and any remaining residual loss". For instance, the preparation of annual reports and accounts represent monitoring costs, remuneration packages for directors represent boding costs while residual costs arise from reduction in wealth for the shareholders when agents seek to maximize their own interests and take suboptimal decisions (Coyle, 2015).

The only firms that do not have agency costs at all are the firms owned entirely by an owner-manager (Jensen & Meckling, 1976). Therefore, due to conflicting interests between principal and

agent, the agency cost can never be zero. In order to minimize agency losses, performance-based compensation has become the most effective tool (Kopp, 2021). According to Kopp, the purpose of the compensation is to achieve a balance between the principal and the agent.

All things considered, from the agency theory perspective, the main function of a non-executive board of directors is to oversee the operations of the agents and to preserve the interests of the principals (Jensen and Meckling, 1976). Jensen and Meckling (1976) were among the early advocates of the idea that debt financing encourages agents to be diligent with their financing choices and it simultaneously reduces agency costs by acting as a monitoring mechanism for the investors. Grossman and Hart (1982) assumed that the bankruptcy stress that additional debt brought had led to discipline among the managers, which also reduces agency costs. Vos and Forlong (1996) had also shown that for mature listed firms there is a strong agency benefit of debt.

The agency theory has been criticized by some scholars. Doucouliagos (1994) claims that the theory cannot illustrate the perplexity of human actions. Agency theory can also have a negative impact on the society, and it has also been accused of being one of the main causes of some corporate scandals (Ghoshal and Moran, 1996). Alternative corporate governance theories are discussed.

Stewardship theory

Müller (2011) believes that the stewardship theory represents a positive alternative to the agency theory where the principal-steward relationship's groundwork is based on uprightness and faithfulness. From the stewardship theory point of view, the steward (manager) puts the firm's welfare above its own interests, where both the steward and the firm strive towards the improvement of the company (Keay, 2017).

Donaldson and Davis (1991), the founders of the stewardship theory, consider that the organizational success and the stewards' own interests line up automatically in a natural way if the stakeholders offer a clear image and empowerment to the managers. The utility maximizing factor is present in both the agency theory and stewardship theory. Khan (2014) considers that the agency theory concentrates on the utility maximization of the agent's individual interest while the stewardship theory focuses on the maximization of all of the stakeholders implicated.

Fundamentally, intrinsic remunerations such as mutual trust, reputational improvement, job satisfaction and mission alignment remain at the core of the stewardship theory (Dewiyanti, 2021). Regarding firm's financing, managers with a stewardship perspective would thrive towards an optimal capital structure that aligns with the shareholders' interests.

The stewardship theory must be examined in the light of some limitations since it neglects the outcome of board leadership and the dynamic nature of the board (Balta, 2008). Additionally, the theory concentrates on facilitation and empowerment rather than monitoring and controlling practices (Davis et al., 1997).

Stakeholder theory

Stakeholder theory analysis organizations through a wider lens where ethics such as morals and values are the key elements for running the business (Freeman, 1984). Additionally, shareholder's prosperity shall not be the gist of a business. In other words, a company should add value for both shareholders and stakeholders.

Stakeholder theory gives a foundation to the corporate social responsibility concept. Large companies have such a big influence on the society, hence the companies must act in such a way that serve societies at large (Coyle, 2015). From a stakeholder theory point of view, firms typically maintain lower levels of debt in order to maintain positive relationships with their stakeholders. Hence, Verwijmeren and Derwall (2010) mention that companies that emphasize employee well-being choose to have less debt.

The stakeholder theory has its own boundaries. As an example, the theory has ignored the diversity among all the stakeholders (Harrison and Freeman, 1999). Stakeholder groups often have different interests and responsibilities (Winn, 2001). Additionally, Winn states that despite the share interest and stake, the stakeholders might not share a common goal. Moreover, organizations that seek to satisfy all the stakeholders might be hard and confusing to manage (Argenti, 1993).

Resource dependence theory

Each and every organization is affected by external factors within the society. Resources are an essential concept in the resource dependence theory because firm needs resources to function. Therefore, one of the main aspirations of an organization is to mitigate its dependency on other organizations for the supply of resources.

An additional significant role of the board of directors is the supervision of resources. According to Pfeffer and Salancik's (1978), in their work on resource dependence theory, they claim that when a company selects a person for a board position, it anticipates that the person will align with the company's goals, address its challenges, advocate for it to others, and assist it. Board's accessibility to various resources is highly relevant to the firm performance, where an abundance of resources eases the dependency between the organization and external incidents (Pfeffer and Salancik, 1978). Consequently, Pfeffer (1972) underlines that the board size and ownership structure represent clever ways in which organizations react to the circumstances of the external environment.

Hillman et al. (2009) states that, for instance, merge and acquisitions, joint ventures or executive successions represent a solution that mitigates company's resource dependency. Moreover, Provan (1980) discovered that companies that have members of the community in their board have access to pivotal resources from the environment.

2.1.2 Board of directors

Molz (1985) claims that the corporate board of directors is responsible for making economic decisions that impact the welfare of investor's capital, employee's security, communities' economic health, and the authority and benefits of executives.

The long-term success of the company lies in the hands of the board of directors that needs to lead and control the business (Knell, 2006). The board of directors should have a mutual and clear understanding of the marketplace and the requirements from the stakeholders. As Coyle (2015) mentions, board of directors' main role is to provide entrepreneurial leadership to the company,

set the company's strategy and values, oversee risk management, establish an ethical environment, and guarantee that the company has enough financial and human resources to achieve its objectives.

Unitary boards of directors consist of executive and non-executive directors (Knell, 2006). In essence, executive directors are in charge of the day-to-day activities while non-executive directors bring an external diverse perspective and expertise to the board (Gardoce, 2022). It is important to understand that all the directors within a unitary board have equal functions and responsibilities. Therefore, in board business, executive directors should consider themselves as representatives of the shareholders instead of a member of the CEO's executive team. The board should utilize beneficially a mixture of executive directors' internal business knowledge and non-executive directors' constructive challenges and recommendations (Coyle, 2015).

When it comes to the responsibilities of the non-executive directors, Mintzberg (1983) pinpoints 7 particular roles attributed to the non-executive board of directors: the election of the CEO; seizing control of the organization in times of crisis; supervising managerial functions; integrate external influences; offer connections and financial resources for the organization; strengthening organization's reputation; advising and counselling the organization.

Executive directors have a wide range of duties. For example, they must collaborate tightly with the board of directors, develop firm's strategy, supervise firm's daily operations as well as identify the risks and opportunities that might arise (Coyle, 2015). Moreover, executive directors have to continuously recruit, coach, and supervise the employees of the firm.

Company's executive management team is responsible for the development of the firm's strategic plan while the board of directors' role is to question the executive management team whether the strategic plan is realistic, achievable, and prosperous. With the right approach and set of questions, company's managers are able to strengthen board's own comprehension of the strategy and improve the strategy itself (Charan, 2005).

2.1.3 Board of directors's characteristics

Various theories have indicated that board diversity brings a lot of benefits to the organizations such as creativity and innovativeness, different perspectives, insights into different markets, external networks and greater skills (Garcia-Meca et al., 2015). Despite that, an increased board diversity can increase costs through conflicts, less flexibility, communication issues and slower decision-taking (Arioglu, 2021).

As mentioned in the previous subchapter, the board of directors represents the leadership of the firm and it oversees the strategic planning, hence directors have a direct impact on the strategic decision-making of the firm's capital structure. Therefore, the quality of the board of directors is very important for the success and strategic decision-making of the firm's capital structure. Different board characteristics are discussed in the following subchapters.

Board age

Hambrick and Mason (1984) argue that managers' values and personal experiences restrict their field of vision. In other words, managers' characteristics such as age and education can serve as predictors of a firm's performance and outcomes.

Noburn and Birley (1988) have shown that younger directors have a better performance and Bantel and Jackson (1989) state that the younger a director is, the more educated they are expected to be. In contrast, flexibility and resistance decrease when age increases (Wiersema and Bantel, 1992). Older managers tend to avoid risky decisions due to their conservative nature while financial and career security represents an important factor (Vroom and Pahl, 1971, Hambrick and Mason, 1984).

Board size

Board size refers to the total number of directors within the company. Theoretically, it is still unclear whether large or small board of directors are more valuable.

The foundation of the idea that larger boards should improve firm performance by providing better access to external resources steams from the resource dependence theory (Pfeffer, 1972).

Dalton et al. (2005) emphasizes that larger firms bring more knowledge and high-quality advice and counsel to the board. On the other hand, Jensen (1993) states that boards larger than seven to eight people have a lack of clear communication and decision-making surpasses the effectiveness of such groups while the CEO gets excessive control. Further research has proven that smaller boards are linked to improved firm performance. Hermalin and Weisback (2003) found an inverse relation between the size of the board and the corporate performance stating that smaller boards are more efficient.

Abor (2007) shows that firms with larger boards tend to pursue high debt policies. Similarly, Njuguna and Obwogi (2015) state that an increase in board size is associated with higher leverage among companies in East Africa during the period 2009 to 20013. In contrast, Tawfeeq et al. (2018) have studied the relationship between board size and capital leverage in Jordania and the results indicate that board size has a detrimental impact on capital leverage.

Board education

Educational degree is perceived as an indicator of knowledge and cognitive orientation (Hambrick & Mason, 1984). Goll and Rasheed (2005) have conducted a study that shows a positive relationship between education level and rational decision-making. Moreover, highly educated directors tend to choose innovative and risk-taking actions (Finkelstein and Hambrick, 1996).

King et al. (2016) states that companies have overshadowed their competitors' performance when their CEOs had a Master of Business Administration (MBA) degree from the banking industry. Nevertheless, some researchers, such as Miller and Xu (2016), discovered that CEOs that hold an MBA degree might take self-serving actions harmful to the company's interest.

Board independence

The necessity for transparency and accountability in the organization has raised the number of non-executive directors in the boardroom. From the agency theory perspective, independent directors are expected to monitor effectively and protect the interests of shareholders (Khan and Awan, 2012).

Some studies underline the disadvantages that board independence bring to the firm such as delay of decision making (Bhagat and Bolton, 2008). Yermack (1996) found that a large amount of independent board members has a harmful impact on the firm performance. Wang and Oliver (2009) noted that even though companies might obey the required number of independent directors in a firm, the executive directors might nominate directors that have irrelevant background or knowledge related to the firm or experience mainly in passive boards where board's participation is minimal. Furthermore, boards of directors with larger fractions of independent directors prefer external capital over retained earnings (Alves et al., 2015).

Board gender

The drive for diversity in corporate boards aims to improve the representation of gender and racial diversity among stakeholders, grounded in principles of equity and fairness (Carter et al., 2007). As stated by Gregory-Smith et al. (2014) in their research, it is suggested that arguments supporting increased board diversity might be more effective based on an ethical principle of diversity, rather than relying on enhanced company performance, where the research's findings did not find any correlation between gender-diverse boards and enhanced firm performance in the UK.

Gender can also have an influence on firms' quality. There is a lot of empirical research that proves the differences between male and female directors. For instance, Krishnan and Parson (2008) write that male directors perform better from a financial point of view. Controversially, Campbell and Mínguez-Vera (2008) stated that diversity within the board improves the film value.

When it comes to the capital market, females tend to have a less risky decision-making approach than male. Nyamweya (2015) find out that there's a positive relationship between gender and debt to equity ratio, where male directors prefer higher leverage in the firm. Additionally, Hillesland (2019) also states that male directors are better at risky investments than females.

Board busyness

Interlocking takes place when one director of a company is part of other firms' boards. Interorganizational dependencies can be minimized by establishing interlocking directorates with the help of

board of directors (Burt, 1980). Hundal (2016) uses the word “busyness” to describe the phenomenon of multiple directorships.

Busyness can have a negative impact on executive and non-executive directors’ performance. Dalton et al. (2003) states that executive directors’ attention to handle day-to-day management duties, risk management, and strategy planning and evaluation might decrease if their busyness increases. Klein (1998) also states that executive managers might not be the perfect candidates to monitor other managerial actions in other firms due to their narrow expertise. Sarkar and Sarkar (2009) discovered that stock market reactions become disadvantageous when inside directors increase their busyness with additional directorships in other companies.

Comparatively, non-executive directors’ busyness can have a negative outcome for the firm as well. For example, non-executive directors might monitor managerial activity in a poor manner if they are too busy (Tanyi and Smith, 2015). If the director serves also for other competitors, delays in decisions or even harmful actions might occur (Fich and Shivdasani, 2006). Moreover, outside directors might have a hard time to comprehend firm’s vision, mission, managerial activity, and nature of operation (Kisgen et al., 2009).

Although managers that hold multiple places in various boards of directors are more noticeable in the business environment, firms can hesitate to choose managers that have multiple board positions in other firms (Kapoor, 2016). Moreover, directors serving on multiple boards may monitor and control the managerial actions poorly, leading to an increased agency cost (Machold & Farquhar, 2013).

2.2 Capital structure

This thesis aims to analyse the capital structure of 60 companies across Finland and Sweden. Hence, the objective of this chapter is to familiarize the reader to the complex concept of capital structure.

A firm needs capital in order to sustain and expand its business. At first, the firm must decide which investment to pursue (investment decision) and secondly, find out how to fund the invest-

ment (financial decision). Firms can create great value with a great investment and financing decisions. The capital structure refers to the various sources of financing that firms utilize. These sources involve debt, equity and hybrid securities that help with the funding of firm's operations, assets, and further growth. The perfect capital structure is a multi-faced issue that corporate governments still contend with (Hillier, et al. 2012).

To succeed in today's highly competitive and dynamic business environment, one must understand how capital markets function and how financial instruments can be exploited to increase the value of the firm. The most commonly pursued financing option by firms is a mixture of equity and debt. Debt capital refers to the borrowed amount of money while equity capital refers to the firm's capital that's hold by the owner or shareholders. Debt and equity are discussed into details in the following subchapters.

Equity

Equity financing represents a method of raising capital either internally through firm's retained profits or externally through equity issuance. Investors typically receive one voting right for each share they purchase. The voting right allows investors to influence crucial decisions introduced by the board of directors. In return for their financial commitment, investors are entitled and expect a return for their investment. Nevertheless, profits can be allocated to shareholders through dividends, or they can be retained for future investments and operations.

Equity has a less risky profile since the company has no obligations to repay the money back to the investors nor interests on the raised capital. In a similar manner, if the business fails, the company is not required to pay back shareholders' investments. Investors' knowledge, contacts and expertise constitute a great advantage for the business (Hecht, 2016). Even though the investors are exposed to firm's bankruptcy, they can participate actively in the firm's decision-making process.

In contrast, dealing with investors is often difficult due to different visions on the business which might lead to potential conflicts. Equity financing means giving away ownership and decision-making power that might bring up disagreements to the table. Moreover, financing exclusively with equity does not bring any tax advantages to the company like the debt financing does. Hudson (2020) states that equity is sometimes more expensive and time-consuming than interest rates on

debt financing due to additional rigorous accounting and reporting processes. It was also noted by Hudson (2020) that unlike moneylenders that are concerned only about loan payments, investors want comprehensive insights of the business's activity and financials.

Debt

Firms can also finance their operations through debt from external sources. Debt acquired from financial institutions is commonly known as private debt due to its non-publicly traded nature, while bonds are termed public debt as they can be exchanged in public financial markets (Titman et al., 2018). Debt constitutes an obligation where repayment is awaited, and the debt's interest and maturity date are negotiated by the firm and the debtholders.

One of the biggest advantages that debt brings to business owners is the freedom and control of how the capital gets spent and how the business is run. Companies are not obligated to keep periodic meetings for the shareholders, seek the vote of shareholders and send emails periodically to a large amount of investors before taking certain actions. Once the business decides to utilize debt financing, the upfront impact on cash flow is clear. This helps the company to have a higher predictability on how to integrate the payments into the cashflow and plan budgeting into more detail. Moreover, the loan interest is tax deductible while the dividends that are given to the shareholders are not (Watson & Head, 2010). Therefore, debt's "tax shield" brings lower costs in comparation to the company's own capital. Debtholders are given priority over shareholders for payments in the event of bankruptcy due to their higher position in the creditor hierarchy (Watson and Head, 2010). Jensen and Meckling (1976) demonstrated that use of debt can lower agency problems by preventing equity ownership dilution and it also contributes with additional monitoring from the debt holders that tends to discipline the managers.

Mandatory periodical payments might cause cash flow issues in the early stages of the business or during unprofitable periods which could reduce the flexibility of the business. Higher amounts of debt increase financial risks that can potentially lead to financial distress and insolvency. In addition, firms can face bankruptcy due to external factors such as recessions together with fluctuations in commodity prices, interest rates and exchange rates (Brealey et al., 2011).

Optimal capital structure and various theories related to the capital structure are discussed in the upcoming chapters.

2.2.1 Optimal capital structure

The board of directors bears the duty of managing a company's operations and strategic decisions. Therefore, the board of directors has a pivotal function in shaping decisions concerning the firm's optimal capital structure (Hundal & Eskola, 2020).

An optimal capital structure refers to an optimal blend of debt and equity financing that maximizes a firm's value while simultaneously reducing its cost of capital.

There are various internal and external factors that must be considered by the board of directors when deciding the firm's capital structure. When it comes to internal factors, one must pay attention to the business model characteristics, existing leverage, corporate tax rate, capital structure policies and guidelines as well as third party debt ratings (Forjan, 2022). For instance, some businesses have volatile revenues making it challenging to handle debt obligations at times. Conversely, other firms might have stable income streams that increases their ability to manage debt obligations. Creditors always prefer tangible and liquid assets due to their increased ability to handle debt. In terms of existing leverage, companies with higher levels of debt have a reduced ability to service new debt in comparison with underleveraged companies. In many countries, the tax-shield benefit turns the debt in a more profitable financing option as the corporate tax increases over time. Debt rating systems are also a great tool that analyses whether the firm is able to pay its debt. If the company choses to raise its leverage, this results in a higher credit risk reflected by a lower debt rating. The higher the firm's debt rating, the better, reflecting a more flexible and cheaper borrowing cost.

In contrast, some external forces such as market conditions and industry leverage also have an impact on the firm's capital structure (Forjan, 2022). Market conditions such as interest rates and the condition of the economy have a direct impact of the firm's capital structure. Higher interest rates cause firm to be hesitant towards debt. Moreover, businesses tend to lend more money during economic booms and less money during economic decelerations. Companies that belong to the

same industry tend to have similar capital structures due to common assets and business model features.

2.2.2 Theories of capital structure

Several capital structure theories have been developed by numerous academic scholars after Modigliani and Miller's (1958) capital structure irrelevance theorem, which is considered to be the beginning of the modern theory of capital structure. In the following subchapters, the following concepts are discussed: Modigliani and Miller's propositions, the trade-off theory, and pecking order theory.

Modigliani and Miller's propositions

The capital structure irrelevance theorem (hereafter MM theorem) states that, in a perfect market setting, firm's market value is unaffected by its capital structure (Modigliani & Miller, 1958). Therefore, the firm's capital structure decisions are insignificant to the firm's value. MM theorem relies on the following assumptions: absence of taxes, lack of brokerage costs, absence of bankruptcy costs, investors are able to borrow at the same rate as corporations, all investors have equal access to the same information as management about the firm's future investment opportunities, and EBIT remains unaffected by the debt financing (Ehrhardt & Brigham, 2011).

The initial capital structure irrelevance theory was based on impractical set of assumptions, and it has received a lot of criticism. Therefore, in 1963, Modigliani and Miller published a follow-up publication where they decided to add the effect of corporate profit taxes on the cost of capital and firm value. The new findings emphasized the extra value that debt's tax shield brings to the firm, where the firm's price would be maximized at 100% borrowed capital, where there is no offsetting cost of debt.

Trade-off theory

Kraus and Litzenberger (1973) have originally introduced the trade-off theory, where an optimal capital structure is achieved through a balance between the tax benefits of debt and the cost of financial distress. The trade-off theory emphasizes the importance of two concepts for a firm's capital structure – the cost of financial distress and agency costs.

Financial distress arises when obligations to creditors are not met, or they are fulfilled with difficulty. The financial distress costs increase significantly when a firm choses higher levels of debt for its capital structure. Financial distress periods might bring firm's bankruptcy, or they might put the firm into jeopardy. In such situations, financial distress costs can be categorized into bankruptcy costs and costs of financial distress short of bankruptcy (Brealey et al., 2011). Bankruptcy costs involve lawyers' and accountants' fees and managerial time used on short-term cash flow and liquidity issues (Brealey et al., 2011). The costs of financial distress short of bankruptcy can be much more significant. As an example, the uncertainty among customers and suppliers might reduce sales and increase disadvantageous payment terms, key employees might leave and conflicts between bondholders, stockholders and management might lead to flawed operating and investment choices (Brealey et al., 2011). Typically, these conflicts tend to bring up agency issues, resulting in higher agency costs.

Pecking order theory

The pecking order theory originates from the idea of asymmetric information, where managers posess a deeper understanding of the firm's potential, risks, and value in comparison to the external investors. Therefore, the pecking order theory focuses on the hierarchy of financing rather than the optimal capital structure (Brealey et al., 2011). Donaldson (1961) was the first one to state that managers prefer internal financing over external financing.

Myers and Majluf introduced the theory, in which internal funds (including retained earnings) are utilized first, followed by debt financing and equity financing as a final resort (Myers 1984; Myers & Majluf 1984). Debt financing can be utilized as long as it does not bring great costs of financial distress to the firm. Hence, this explains why firms with greater operating profits utilize less debt financing in contrast with less profitable firms (Myers & Majluf 1984). This theory aims to minimize information asymmetry between ownership and management while maintaining lower transactional costs. Moreover, the theory emphasizes the added value of financial slack – without an adequate slack, firms might be obliged to issue undervalued shares, use more debt that leads to more financial distress or abandon positive net present value investments (Brealey et al., 2011). The pecking order theory does not reject the importance of taxes and financial distress, but it does put an emphasis on manager's preference of internal funds over external funds and debt financing over new issues of common stock.

2.2.3 Cost of capital

Financing always comes with a cost. The cost of capital can be obtained through the capital asset pricing model and the weighted average cost of capital.

The capital asset pricing model

The capital asset pricing model (CAPM) is used to calculate a firm's cost of equity, representing the expected rate of return on the firm's common stock (Brealey et al., 2011). The CAPM model aims to evaluate the interraction between systematic risk and expected return on assets.

Beta (β) is used to calculate a stock's sensitivity to market movements, and it indicates the systematic risk (Brealey et al., 2011). From a statistics point of view, beta gauges how a firm's average returns on its stocks align with the market's overall performance through regression of data.

The formula of the CAPM is:

$$R_i = R_f \ + \beta(R_m - R_f)$$

where:

R_i = the rate of return of security *i* predicted by the model;

R_f = the risk-free rate;

β = the beta coefficient of security *i*;

R_m = the return of the market (Watson & Head, 2010).

The weighted average cost of capital

The weighted average cost of capital (WACC) represents the total cost of capital employed by firms and it represents a benchmark for the firm's performance. It also serves as a benchmark rate that the firm must achieve in its business operations in order to meet the return expectations of

its financiers. Leveraged firms, in contrast to unleveraged firms, rely heavily on their capital structure choices in various aspects, including WACC.

An optimal capital structure minimizes the WACC, and it simultaneously maximizes the intrinsic value of the stock. Regardless of the debt-to-equity ratio that the firm has, the firm must pay the cost of capital – for instance, dividend payments on common stocks and interests payments on bonds. Consequently, WACC's purpose is to calculate firm's overall cost of capital. For investors, the WACC shows the lowest rate of return that a firm must gain to meet their investors' expectations (Stewart 1991). For managers, the WACC is used as a measurement to figure out whether the firm's future projects and capital budget strategies are worth initiating (Stewart 1991).

The WACC is calculated with use of firm's capital structure, interest rates, firm's risk, and the market's perception of risk (Ehrhardt & Brigham, 2011). When a firm is financed with both equity and debt, the WACC is calculated with the help of the following formula:

$$\text{WACC} = \frac{E}{E+D} K_e + \frac{D}{E+D} K_d(1-t)$$

where:

E = the total shareholder's equity;

D = the total debt;

K_e = the cost of equity;

K_d = the cost of debt;

t = the effective corporate tax rate (Fernandes 2014).

2.3 Hypotheses development

After completing the literature review, the next stage involves formulating hypotheses based on the examined theories. A hypothesis represents a proposition that can be tested regarding the relation between two or more variables (Saunders et al., 2019). The main goal of a researcher is to narrow down the area of the research and focus on the important aspects of it with the help of a specific, simple, and precise hypothesis (Kothari 2004).

Throughout the literature review, the author has come up with six hypotheses that require further analysis. The following hypotheses have been developed:

H_1: The median age of board of directors affects a firm's capital structure.

H_{1a}: The median age of board of directors affects a firm's total debt.

H_{1b}: The median age of board of directors affects a firm's long-term debt.

H_2: The size of a board affects a firm's capital structure.

H_{2a}: The size of a board affects a firm's total debt.

H_{2b}: The size of a board affects a firm's long-term debt.

H_3: The education level of a board affects a firm's capital structure.

H_{3a}: The education level of a board affects a firm's total debt.

H_{3b}: The education level of a board affects a firm's long-term debt.

H_4: Board gender diversity affects a firm's capital structure.

H_{4a}: Board gender diversity affects a firm's total debt.

H_{4b}: Board gender diversity affects a firm's long-term debt.

H_5: Multiple directorships held by board members affects a firm's capital structure.

H_{5a}: Multiple directorships held by board members affects a firm's total debt.

H_{5b}: Multiple directorships held by board members affects a firm's long-term debt.

H_6: A more independent board affects a firm's capital.

H_{6a}: A more independent board affects a firm's total debt.

H_{6b}: A more independent board affects a firm's long-term debt.

3 Methodology

Research methodology represents a systematic approach to solve a research problem (Kothari 2004). The research methodology aims to study the multiple steps that researchers generally undertake in their research along with the logic behind it. Simply put, the research methodology represents a research plan that aims to keep the researcher on track by limiting its scopes.

3.1 Research design

This study aims to analyse the interaction between corporate governance structures and firms' capital structure based on a sample of 60 different size Finnish and Swedish firms. The data covers a period of nine years, from 2012 to 2020. The data has been collected from the annual reports of the sample firms. After the author has familiarized itself with the topic, the impact of board of director's characteristics on the firms' capital structure has not been researched sufficiently in the Nordic context. Hence, this thesis aims to deepen the understandings of the issue and examine its consequences within Finland and Sweden.

The thesis' research methodology starts with the research philosophy. The research philosophy refers to the researcher's own beliefs and assumptions of the surrounding world that influence all the aspects of the research (Saunders et al., 2019). The researcher has adopted a positivist philosophy due to the highly structured and quantitative nature of the study. Positivism research can be easily generalized, and they offer value-free research where the researcher has a neutral and objective stance (Saunders et al., 2019).

Since this thesis aims to analyse the relationship between the board of director's characteristics of a firm and its capital structure, statistical analysis must be applied. Therefore, the current study opted for a mono quantitative research method. Due to constraints in time and resources, the author decided to avoid the incorporation of qualitative data. Moreover, the current study represents an explanatory study, where the main goal is to analyse and justify a situation between variables (Saunders et al., 2019).

When it comes to research approaches, two fundamental approaches exist: deductive and inductive (Saunders et al., 2019). This study's goal is to clarify the causal relationship between variables, where a theory and hypotheses have been developed to be tested through a research strategy. Hence, a deductive approach has been chosen. Furthermore, a six-year time frame has been selected for an increased reliability of the study. This study qualifies as longitudinal, as it is a description of events during a specific period (Saunders et al., 2019).

3.2 Data collection

The secondary data from 60 non-financial Finnish and Swedish companies has been gathered in the context of this research. Specifically, 24 Finnish and 36 Swedish non-financial firms. The data is made out of corporate governance information and accounting figures, which has been collected from the sample firms' annual reports, precisely from the corporate governance reports and financial statements. For this research, all the data sources are classified as secondary data, which is described as data that has previously been gathered by someone else for different purposes (Kothari 2004). The data covers the period from 2012 to 2020. Altogether, the sample data encompasses a period of nine years.

The data collection phrase begins as soon as the research problem and research methodology have been formulated. Firstly, it is important to understand the differences between primary and secondary data sources since this research uses secondary data sources. Primary data constitutes information collected explicitly by the researcher for the ongoing research project while secondary data represents data collected initially for other purposes that can be further utilized by others to generate additional interpretations (Saunders et al., 2019). Primary data can be gathered through observation, interviews, and questionnaires while secondary data is usually published data that can be found in various publications and reports, books, magazines, public records, and other sources (Kothari 2004). For this research, secondary data has been collected from the sample firms' annual reports.

The data has been collected from the sample firms' balance sheet and corporate governance statement and it is categorized as secondary. Accounting measures have been used in order to assess the internal performance of the company. The data collected to analyse the corporate government structure of the firms include board age, board size, board education, board gender, board busyness and board independence. In contrast, the data utilized to assess firms' capital structure include current debt, non-current debt, total debt, total equity, and D/E ratio.

It is unlikely that research papers would include data from an entire population since this process can be time-consuming and usually the population includes endlessly many members. Hence, sampling has been used in this research. This research's population are firms from various industries listed in the Finnish and Swedish stock exchange. Furthermore, the judgement sampling method has been used in this research. The judgement sampling represents a non-statistical sampling method where researcher's judgement and knowledge determines the appropriate items of the sample (Kothari 2004).

The selected sample firms illustrate different size firms and industries in the Finnish and Swedish market. The motive for using firms only from Finland and Sweden was to maintain the data analysis as simple and comparable as possible. In this approach, the firms have been chosen from various industries with the authors belief that they represent the population at its best. Furthermore, public companies tend to have more consistent and accessible data. The variable structure is introduced in the Figure 1.

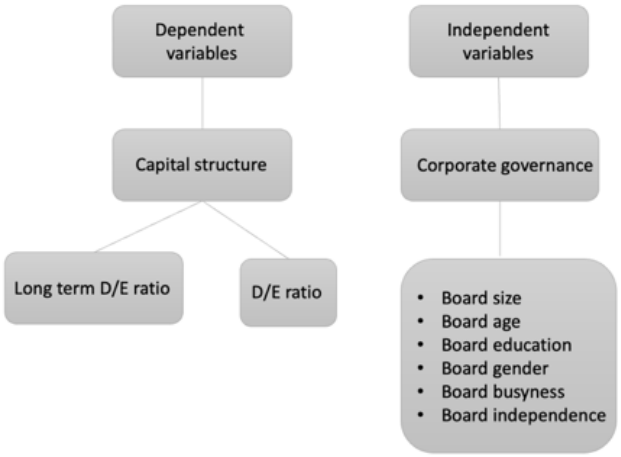

Figure 1: Variable classification

Since the capital structure consists of a mixture of equity and debt, the dependent variables of this research are the debt-to-equity ratio and long-term debt-to-equity ratio. These metrics have been used to analyse the sample firms' capital structures. These two dependent variables try to approach the firms' book value leverage from two different perspectives: total debt and long-term debt. Firstly, the debt-to-equity ratio represents the proportions of debt and equity used to finance its assets. Through the debt-to-equity ratios, investors and stakeholders are able to assess the firm's financial stability and risk. Usually, ratios higher than 1 show that the firm's debt surpasses its equity, and it might mean that the company might be in a financial distress. On the other hand, ratios lower than 1 show that the firm's equity exceeds its debt. Lower debt-to-equity ratios might portray the firm's conservative financial strategy that might bring an easier access to debt but also a suboptimal and pricey equity funding. The ideal debt-to-equity depends a lot on the industry where the firm operates. The debt-to-equity ratio formula is:

$$Debt - to - equity\ ratio\ (D/E) = \frac{Total\ debt}{Total\ shareholders\ equity}$$

Secondly, the long-term debt to equity ratio had been used. Long-term debt is one of the instruments used in the planning of the long-term strategic decision making of the firm. Boards of directors utilize long-term debt in the firms' strategic investments. The long-term debt to equity ratio formula is:

$$Long - term\ debt\ to\ equity(LonG\ D/E) = \frac{Long\ term\ debt}{Total\ shareholders\ equity}$$

The independent variables consist of board members' characteristics which represent a combined group of attributes for each firm's board of directors. These attributes include board age, board size, boar education, board gender, board busyness and board independence. These characteristics have been described in the subchapter 2.1.3. and they are discussed further into detail in the upcoming subchapter 3.3.

For the firm value, the Finnish and Swedish firms' original values have been obtained in Euros and Swedish Kronor. However, to make the variable homogeneous in terms of values, the year ending exchange rates have been used to convert Swedish Kronor to Euros.

3.3 Definition of key variables

Table 1 from bellow illustrates the used variables, their label, definitions, and sources.

Table 1: Variable descriptions

Variable	Label	Definition	Found in
Dependent variables			
D/E ratio	D/E	Capital structure of firm calculated by dividing debt by equity (book values)	Annual reports
Long-term D/E ratio	LongD/E	Capital structure of firm calculated by dividing long-term debt by equity (book values).	Annual reports
Independent variables			
Age	Age	Median age of a firm's directors	Annual reports
Board size	BS	Total amount of firm's directors	Annual reports
Education	Edu	The education variable reflects the combined educational background of a firm's directors. Starting with bachelor's degree, each variable went up with a point. For example, a director with one bachelor's degree, two master's degree and a Doctor of Philosophy gets one point for one bachelor's degree, four points for two master's degree and three points one a Ph.D. That would be a total of eight points for one director.	Annual reports
Gender	Gen	The gender variable represents the ratio of female directors of a board. Gender = $\frac{female\ board\ members}{board\ size}$	Annual reports
Busyness	Busy	The busyness (multiple directorship) represents the median busyness of a firm's board of directors.	Annual reports
Board independence	Ind	The board independence variable represents the ratio of independent members of a board. Board independence = $\frac{independent\ board\ members}{board\ size}$	Annual reports
Control variable			
Firm value	FV	Firm value represents the sum of total debt and total equity, also known as book value.	Annual reports

3.4 Data analysis

Data analysis represents the management, analysis, and interpretation of data (Bell et al., 2019). In this research, the author has used three types of analysis: descriptive statistics that are meant to understand and sum up the data; Pearson's correlation coefficient to explore associations among variables; and OLS regression analysis to find interdependencies between variables.

In the descriptive statistics table, the following results have been considered: range of the variable, which represents the variance between the highest and the lowest value; the minimum and maximum of a variable; mean of the variable, which is the arithmetic average of the variable; median of a variable, which is the middle value if a data set would be ordered from least to greatest; standard deviation representing the dispersion of values in relation to their mean.

Moreover, inferential analysis such as correlation and regression analysis techniques have been applied in order to find out how persistent and powerful the relationship between variables is. IBM SPSS Statistics application has been utilized for the descriptive and inferential analysis.

Firstly, Pearson's Product Moment Coefficient (PMCC), also known as "r", has been used to assess the correlation, which is meant to capture the connection between variables (Saunders et al., 2019). The r value spans from -1 to 1. An r of -1 signifies a directly related negative linear relationship where both variables' values increase simultaneously while a value of +1 indicates a directly related positive association where one variable's value increases while the other variable's value decreases. An r value between -1 and +1 shows a weaker positive or negative correlation while a value of 0 indicates a completely independent relationship between two variables. The formula applied for the calculation of Pearson's Product Moment Coefficient is:

$$r_{xy} = \frac{cov(x,y)}{S_x S_y} = \frac{\Sigma(X_1 - \bar{X})(Y_1 - \bar{Y})/(n-1)}{S_x S_y}$$

Where:

$cov =$ the covariance

S_x *and* S_y= the standard deviation of X and Y

$\bar{X}$ = the mean of the X-variable

$\bar{Y}$ = the mean of the Y-variable

n = the number of data points

Secondly, the ordinary least square (OLS) regression model has been applied to this research. The goal of the regression analysis is to understand how one variable affects another variable. The coefficient of determination, also known as the R square, represents the most important output of the OLS regression and it has been used for further validations. R square, ranging from 0 to 1, signifies the percentage of variation of the dependent variable that can be statistically accounted for by the independent variable (Saunders et al., 2019). R square's formula is:

$$R = \frac{\Sigma\ squares\ explained\ by\ regression}{Total\ \Sigma\ of\ squares\ (before\ regression)} = \frac{\Sigma\ (\hat{y}_t - \bar{y})^2}{\Sigma\ (y_t - \bar{y})^2}$$

The OLS regression analysis formula is:

$$y_{it} = a_{it} + \sum_{k=1}^{p} \beta_k\, x_{it} + \varepsilon_{it}$$

Where:

y_{it}= the dependent variable of company *i* in the period *t*

a_{it}= the intercept of the model

x_{it}= corresponding to the *i*, the explanatory variable of the model

ε= the random error with expectation 0 and variance σ^2

The following multivariate OLS regression analysis have been applied in order to assess models' functional relationship for the independent variables:

$$DE_{it} = a_{it} + \beta_1(LogAge)_{it} + \beta_2(LogBS)_{it} + \beta_3(LogEdu)_{it} + \beta_4(LogGen)_{it} + \beta_5(LogBusy)_{it} + \beta_6(LogInd)_{it} + \beta_7(AgeBS)_{it} + \beta_8(AgeInd)_{it} + \beta_9(BSEdu)_{it} + \beta_{10}(BSInd)_{it} + \beta_{11}(EduGen)_{it} + \beta_{12}(EduBusy)_{it} + \beta_{13}(EduInd)_{it} + \beta_{14}(GenBusy)_{it} + \beta_{15}(LogF/V)_{it} + \varepsilon_i$$

$$LongDE_{it} = a_{it} + \beta_1(LogAge)_{it} + \beta_2(LogBS)_{it} + \beta_3(LogEdu)_{it} + \beta_4(LogGen)_{it} + \beta_5(LogBusy)_{it} + \beta_6(LogInd)_{it} + \beta_7(AgeBS)_{it} + \beta_8(AgeInd)_{it} + \beta_9(BSEdu)_{it} + \beta_{10}(BSInd)_{it} + \beta_{11}(EduGen)_{it} + \beta_{12}(EduBusy)_{it} + \beta_{13}(EduInd)_{it} + \beta_{14}(GenBusy)_{it} + \beta_{15}(LogF/V)_{it} + \varepsilon_i$$

In addition, the author has been interested in finding out how the relationship between dependent and independent variables change if another independent variable is added to the equation. Therefore, the independent variables' values have been grouped in pairs by multiplying a set of two variables, creating a series of interaction variables.

3.5 Validity and reliability

The target of a research is to generate information that is both accurate and trustworthy. Researchers must deliver reliable findings and demonstrate that the methods and tools used in the research are justified and credible. The reliability of a research is defined by its measurements' consistency and stability while the validity of a research is defined by the accuracy and relevance of the measurement (Saunders et al., 2019). Simply put, reliable research generates persistent results across different circumstances over time whereas valid research evaluates precisely what it is meant to be analysed.

When it comes to reliability, participant error and bias and observer error and bias must be considered (Saunders et al., 2019). Considering that the researcher has used secondary data from publicly released annual reports, the participant error and participant bias have been eliminated. Moreover, since the researcher has followed similar research methods and processes adopted by other similar research in the finance and corporate governance discipline, the author assumes that

the observer error and bias have also been avoided. The author believes that the variables that have been selected for this study, along with the regression model, can be utilized for different sample firms as well. Hence, the researcher believes that this thesis is considered to be reliable, hence its objectives are clear and unambiguous.

From a research validity point of view, results must satisfy the objectives of the study internally and externally. Internal validity questions the causal relationship between variables, whether the independent variable really is responsible for the changes that have been observed in the dependent variable (Bell et al., 2019). By contrast, external validity revolves around the inquiry of whether the findings of a study can be generalized beyond the original research context (Kothari 2004).

In an effort to guarantee validity to this research, the author has selected a sample of 60 different size firm from 11 different industries that are listed on two different stock exchanges (NASDAQ OMX Helsinki and NASDAQ OMX Stockholm). Despite the fact that all the firms are originally from Finland and Sweden, this diversity approach allows generalizability of other non-sampled firms from Finland and Sweden. The sample diversification related to the external validity is presented below.

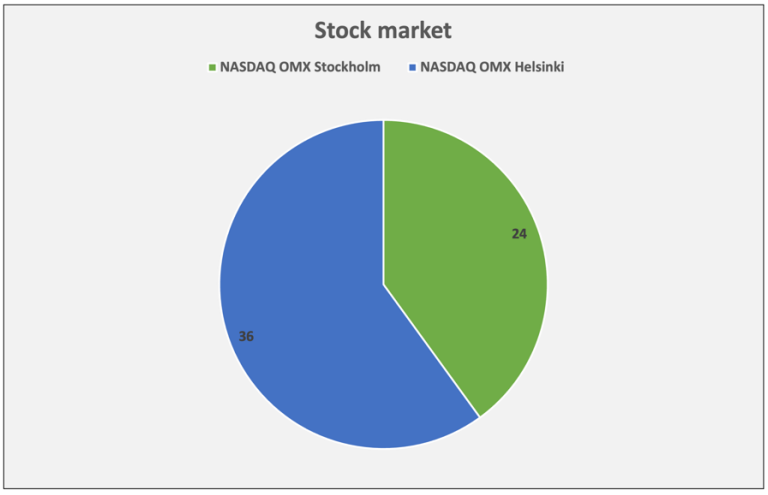

Figure 2: Firms divided by the location of the stock market

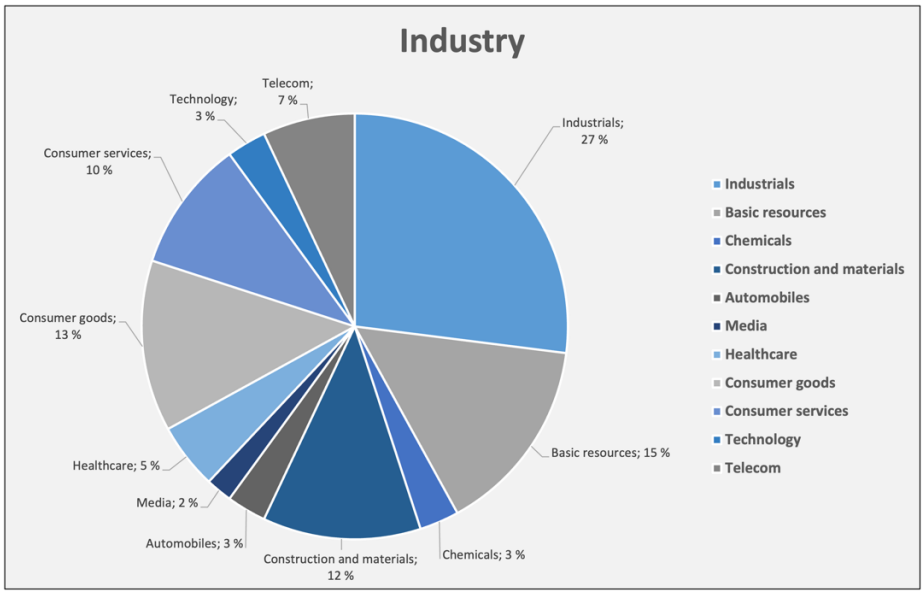

Figure 3: Firms divided by the industry

4 Results

This chapter presents the findings related to the hypotheses while utilizing the data and methodologies outlined in the 3rd chapter. The first subchapter includes the descriptive statistics, while the second and third subchapter include the correlation and regression analysis.

4.1 Descriptive statistics

The purpose of descriptive statistics is to provide a summary of this research's variables. Table 2 shows relevant descriptive statistics such as minimum and maximum values, range, mean, median and standard deviation. Descriptions of the terms have been stated in the subchapter 3.4. The descriptive statistics of the age, board size and education variables are presented in raw numbers while gender, busyness, board independence, debt-to-equity and long-term debt-to-equity are presented in percentages.

An outline of the Finnish and Swedish board structure can be observed in the Table 2. The minimum median age of the Finnish and Swedish boards' directors is 44 years old while the maximum is 70 years old. This indicates that some boards have significantly younger directors compared to other boards, and vice versa. Regardless of the minimum median age of directors of 44, the stand-

ard deviation of 4 shows that such young boards are uncommon in the chosen sample of this research. The mean of the median age of directors of 57 demonstrates that board directors are older on average. The minimum amount of board members in a firm is 5, and the maximum is 12. The mean of 8 people shows the common size of board of directors of the research sample.

When it comes to the cumulative educational capital, education variable's minimum of 0 points shows that some firms have directors without an academic background. Additionally, the mean of 18 points shows that the majority of the board of directors have relatively educated people. The gender variable's mean of 0,3314 or 33% shows an overall smaller proportion of female directors in the Finnish and Swedish market. Furthermore, the minimum of 0 means that some firms have no female directors at all. Therefore, it can be concluded that female directors are outnumbered by male directors in boards. Busyness's minimum value of 0 indicates that some boards have directors working solely for one firm, while the maximum median busyness is 7,5 points. The mean of the busyness variable is 3,5 points, demonstrating that board members are on average active and have multiple directorships. The minimum board independence is 14% while the maximum is 100%. On average, boards have around 45% independent directors and 55% non-independent directors.

In terms of capital structure, debt-to-equity ratio's mean value of 0,6528 or 65% shows that the sample firms have preferred debt over internal financing between 2012 and 2020. In terms of long-term debt, the debt-to-equity ratio mean value of 0,4522 indicates that companies have relied more on internal financing in the long run.

Table 2: Descriptive statistics

Descriptive statistics							
	N	Range	Minimum	Maximum	Mean	Median	Standard deviation
Age	529	25,50	44	69,50	57,30	57,50	4,31
BS	529	7	5	12	7,95	8	1,40
Edu	529	43	0	43	18,16	18	6,04
Gen	529	0,67	0	0,67	0,33	0,33	0,12
Busy	529	7,50	0	7,50	3,58	3,50	1,43
Ind	529	3,56	0,14	1	0,48	0,45	0,19
D/E	529	45,97	-13,17	32,80	0,65	0,52	2,15
LongD/E	529	42,21	-12	30,21	0,45	0,3521	1,93

4.2 Correlation analysis results

The correlation analysis among all the variables employed in this research can be found in the two tables below. The tables include dependent, independent and interaction variables. Only the correlations with significance levels of 0.05% and 0.01% have been discussed by the author.

Based on the results, the board size seems to be significantly correlated with a lot of the other variables. To begin with, age, education level and busyness are positively correlated with the board size at the 0.01 level of significance. The larger the board, the more educated, busier, and older the directors are cumulatively. In contrast, board size is negatively correlated with the amount of female directors. This means that the bigger the board, the lower the amount of female directors is. Moreover, board size seems to be positively correlated with the total debt and long-term debt, denoting that larger boards prefer debt over equity.

In the matter of education, education level is positively correlated with total debt, long-term debt, and busyness. Therefore, relatively educated directors tend to choose debt over equity and they also have more multiple directorships. Directors tend to have multiple directorships the older they get. Besides, the more educated the directors are, the less independent the board is.

There is a positive significant correlation between gender and busyness and a negative significant correlation between gender and independence. Consequently, the more female directors there are in a board of directors, the higher the total amount of directorships an average director has. It can also be assumed that a large share of female decreases the amount of independent directors in a firm.

If we have a closer look at the independence, it seems like age, education and gender are negatively significantly correlated with it. Thus, the independence of the board decreases if older, more educated, and more female directors are part of it. Additionally, board independence is also negatively correlated to the long-term debt and total debt, showing the independent directors' reluctancy towards debt.

The next step is to have a closer look at the interaction variables and their correlation with the capital structure. Long-term debt and total debt are positively correlated to larger and older

boards of directors as well as more educated and older boards of directors. Consequently, also larger and more educated boards are positively correlated to long-term and total debt.

Larger boards with directors that have multiple directorships are also positively correlated to total debt. In addition, boards where directors have multiple directorships and are relatively educated are positively correlated with total debt and long-term debt.

In terms of negative correlation amongst interaction variables, a higher independence of the board has a negative impact on the long-term and total debt correlation. Thus, older and more independent boards are negatively correlated with long-term debt and total debt. The same applies with independent boards that are separately larger, more educated and busier.

Ultimately, firm value is also positively correlated with long-term debt and total debt.

Table 3: Correlation analysis results

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
X1	1	,158**	,241**	-0,037	,091*	-,094*	-0,017	-0,076	-0,058	-0,075	0,024	-0,085	0,011	,435**
X2	,158**	1	,562**	-,161**	,166**	0,044	,146**	,125**	,153**	-0,011	-0,013	0,045	-0,012	,952**
X3	,241**	,562**	1	-0,020	,105*	-,101*	,143**	,118**	,144**	-0,030	0,011	0,026	0,017	,585**
X4	-0,037	-,161**	-0,020	1	,114**	-,143**	0,017	0,032	0,035	-0,050	0,021	-0,030	0,029	-,145**
X5	,091*	,166**	,105*	,114**	1	-0,019	0,005	0,046	0,046	0,003	-0,017	0,019	-0,022	,194**
X6	-,094*	0,044	-,101*	-,143**	-0,019	1	-0,031	-,117**	-,119**	-0,033	-0,023	-0,071	-0,022	-0,008
X7	-0,017	,146**	,143**	0,017	0,005	-0,031	1	,246**	,446**	,121**	0,056	,263**	0,019	,130**
X8	-0,076	,125**	,118**	0,032	0,046	-,117**	,246**	1	,973**	,213**	0,082	,532**	,098*	,100*
X9	-0,058	,153**	,144**	0,035	0,046	-,119**	,446**	,973**	1	,223**	,092*	,551**	,090*	,131**
X10	-0,075	-0,011	-0,030	-0,050	0,003	-0,033	,121**	,213**	,223**	1	-0,003	,937**	0,002	-0,034
X11	0,024	-0,013	0,011	0,021	-0,017	-0,023	0,056	0,082	,092*	-0,003	1	0,031	,992**	-0,001
X12	-0,085	0,045	0,026	-0,030	0,019	-0,071	,263**	,532**	,551**	,937**	0,031	1	0,034	0,018
X13	0,011	-0,012	0,017	0,029	-0,022	-0,022	0,019	,098*	,090*	0,002	,992**	0,034	1	-0,005
X14	,435**	,952**	,585**	-,145**	,194**	-0,008	,130**	,100*	,131**	-0,034	-0,001	0,018	-0,005	1
X15	,401**	,529**	,938**	-0,014	,112*	-0,007	,123**	,101*	,124**	-0,046	0,019	0,006	0,025	,605**
X16	-0,005	-,158**	-0,015	,999**	,117**	-,146**	0,017	0,030	0,033	-0,051	0,021	-0,032	0,029	-,133**
X17	,183**	,174**	,123**	,131**	,945**	-0,050	0,027	0,044	0,051	0,009	-0,008	0,027	-0,013	,229**
X18	-0,062	0,049	-,093*	-,145**	-0,016	,999**	-0,032	-,120**	-,121**	-0,035	-0,021	-0,073	-0,021	0,006
X19	,253**	,792**	,915**	-0,070	,147**	0,070	,157**	,141**	,168**	-0,030	0,006	0,035	0,013	,801**
X20	-0,027	-0,059	0,038	,993**	,136**	-,136**	0,036	0,050	0,056	-0,047	0,021	-0,020	0,029	-0,049
X21	,134**	,414**	,244**	0,082	,915**	-0,030	0,065	0,083	,096*	0,010	-0,010	0,043	-0,015	,432**
X22	-0,079	,166**	-0,037	-,159**	0,005	,991**	-0,018	-,112*	-,110*	-0,035	-0,025	-0,070	-0,024	,108*
X23	-0,012	-0,072	,152**	,978**	,119**	-,142**	0,044	0,056	0,063	-0,050	0,024	-0,020	0,035	-0,057
X24	,191**	,367**	,509**	,101*	,847**	-0,037	0,082	,099*	,113**	-0,003	0,000	0,038	0,000	,406**
X25	-0,028	,300**	,235**	-,143**	0,022	,965**	-0,002	-,137**	-,130**	-0,047	-0,020	-,087*	-0,021	,255**
X26	-0,001	-,092*	-0,001	,932**	,437**	-,130**	0,023	0,044	0,048	-0,041	0,011	-0,018	0,018	-0,070
X27	-,109*	-0,048	-0,039	,665**	,094*	,586**	0,002	-0,068	-0,064	-0,049	0,003	-0,065	0,010	-0,076
X28	-0,056	,109*	-0,058	-0,076	,294**	,932**	-0,021	-,107*	-,105*	-0,027	-0,026	-0,061	-0,026	0,069

Table 4: Correlation analysis results -cont.

	X15	X16	X17	X18	X19	X20	X21	X22	X23	X24	X25	X26	X27	X28
X1	,401**	-0,005	,183**	-0,062	,253**	-0,027	,134**	-0,079	-0,012	,191**	-0,028	-0,001	-,109*	-0,056
X2	,529**	-,158**	,174**	0,049	,792**	-0,059	,414**	,166**	-0,072	,367**	,300**	-,092*	-0,048	,109*
X3	,938**	-0,015	,123**	-,093*	,915**	0,038	,244**	-0,037	,152**	,509**	,235**	-0,001	-0,039	-0,058
X4	-0,014	,999**	,131**	-,145**	-0,070	,993**	0,082	-,159**	,978**	,101*	-,143**	,932**	,665**	-0,076
X5	,112*	,117**	,945**	-0,016	,147**	,136**	,915**	0,005	,119**	,847**	0,022	,437**	,094*	,294**
X6	-0,007	-,146**	-0,050	,999**	0,070	-,136**	-0,030	,991**	-,142**	-0,037	,965**	-,130**	,586**	,932**
X7	,123**	0,017	0,027	-0,032	,157**	0,036	0,065	-0,018	0,044	0,082	-0,002	0,023	0,002	-0,021
X8	,101*	0,030	0,044	-,120**	,141**	0,050	0,083	-,112*	0,056	,099*	-,137**	0,044	-0,068	-,107*
X9	,124**	0,033	0,051	-,121**	,168**	0,056	,096*	-,110*	0,063	,113**	-,130**	0,048	-0,064	-,105*
X10	-0,046	-0,051	0,009	-0,035	-0,030	-0,047	0,010	-0,035	-0,050	-0,003	-0,047	-0,041	-0,049	-0,027
X11	0,019	0,021	-0,008	-0,021	0,006	0,021	-0,010	-0,025	0,024	0,000	-0,020	0,011	0,003	-0,026
X12	0,006	-0,032	0,027	-0,073	0,035	-0,020	0,043	-0,070	-0,020	0,038	-,087*	-0,018	-0,065	-0,061
X13	0,025	0,029	-0,013	-0,021	0,013	0,029	-0,015	-0,024	0,035	0,000	-0,021	0,018	0,010	-0,026
X14	,605**	-,133**	,229**	0,006	,801**	-0,049	,432**	,108*	-0,057	,406**	,255**	-0,070	-0,076	0,069
X15	1	-0,004	,143**	0,014	,929**	0,038	,239**	0,071	,167**	,525**	,246**	0,001	0,024	0,053
X16	-0,004	1	,137**	-,148**	-0,065	,993**	,087*	-,162**	,978**	,106*	-,145**	,933**	,661**	-0,078
X17	,143**	,137**	1	-0,045	,164**	,154**	,964**	-0,026	,139**	,903**	-0,022	,451**	,092*	,300**
X18	0,014	-,148**	-0,045	1	0,084	-,138**	-0,025	,991**	-,144**	-0,027	,968**	-,132**	,583**	,933**
X19	,929**	-0,065	,164**	0,084	1	0,010	,342**	,188**	,102*	,532**	,307**	-0,034	0,024	,143**
X20	0,038	,993**	,154**	-,138**	0,010	1	,133**	-,140**	,984**	,147**	-,110*	,935**	,670**	-0,062
X21	,239**	,087*	,964**	-0,025	,342**	,133**	1	0,024	,114**	,927**	0,064	,396**	0,083	,312**
X22	0,071	-,162**	-0,026	,991**	,188**	-,140**	0,024	1	-,143**	0,026	,974**	-,138**	,583**	,935**
X23	,167**	,978**	,139**	-,144**	,102*	,984**	,114**	-,143**	1	,192**	-0,081	,913**	,732**	-0,040
X24	,525**	,106*	,903**	-0,027	,532**	,147**	,927**	0,026	,192**	1	,102*	,383**	,110*	,406**
X25	,246**	-,145**	-0,022	,968**	,307**	-,110*	0,064	,974**	-0,081	,102*	1	-,124**	,520**	,857**
X26	0,001	,933**	,451**	-,132**	-0,034	,935**	,396**	-,138**	,913**	,383**	-,124**	1	,625**	0,038
X27	0,024	,661**	,092*	,583**	0,024	,670**	0,083	,583**	,732**	,110*	,520**	,625**	1	,610**
X28	0,053	-0,078	,300**	,933**	,143**	-0,062	,312**	,935**	-0,040	,406**	,857**	0,038	,610**	1

Note: ** p < 0.01; * p < 0.05

X1: Age; X2: BS; X3: Edu; X4: Gen; X5: Busy; X6: Ind; X7: CDebt; X8: NCDebt; X9: TDebt; X10:Equity; X11: D/E; X12: FV; X13: LongD/E; X14: AgeBS; X15: AgeEdu; X16: AgeGen; X17: AgeBusy; X18: AgeInd; X19: BSEdu; X20: BSGen; X21: BSBusy; X22: BSInd; X23: EduGen; X24: EduBusy; X25: EduInd; X26: GenBusy; X27: GenInd; X28: BusyInd

4.3 Regression analysis results

In this subchapter, the author familiarizes the readers with the regression analysis concept. The linear regression represents a powerful tool for research that is able to capture the relationship between a dependent variable and one or more independent variables.

At first, the author assumed that the variables' mutual dependence could be observed through a traditional linear regression model, where the cause-and-effect relationship could be demonstrated. However, the causation on the dependent variable is not always linear. Hence, the researcher must try different regression models in order to be able to capture a relationship between the variables.

When the author attempted to analyse the raw values of the dependent and independent variables of this research, the results were insignificant. The results were still insignificant when the author used the natural logarithmic (nl) values of the variables. Ultimately, the author was able to capture the relationship between the variables by changing the form of the variables into common logarithmic values (log). According to the several transformations that have been applied to the variables, it can be concluded that even though the regression results might not seem substantial at first, it does not mean that there is not a relationship between the variables.

Table 5 represents the regression analysis results of this thesis. Specifically, the dependence of debt-to-equity and long-term debt-to-equity on all the independent variables, including the interaction variables. The regression analysis results have been compressed. Thus, tables' upper lines represent the unstandardized beta value and the value in brackets indicates the t-value. When the unstandardized beta value is negative, the variables are negatively correlated while a positive unstandardized beta value illustrates a positive correlation between the variables. The t-test represents an indicator of significance.

It is essential to determine whether the regression model is suitable for the data chosen data. The fit of a model can be estimated with the help of the coefficient of determination (discussed in subchapter 3.4), Durbin-Watson and significance. The Durbin-Watson test is a statistical test that observes the existence of autocorrelation in the residuals, where the value ranges from zero to four.

Values from zero to two indicate a positive autocorrelation, a value of two indicates no autocorrelation, and values from two to four indicate a negative correlation. A range between 1.5 and 2.5 is statistically allowed. The significance levels are indicated by *, ** and ***, symbolizing p<0,1, p<0,05 and p<0,01 correspondingly. The author has considered and discuss only variables that have a significance level of 90% or greater. The two R square values show that all the independent variables combined bring changes of 15% and 24% respectively in the dependent variables with a significance level of nearly 100%. Moreover, the Durbin-Watson tests' values of 2,012 and 1,986 are within acceptable parameters.

Based on the outcomes of the regression analyses presented in Table 5, it can be concluded that when we have a closer look at each board of directors' characteristic individually, only a few board characteristics have an impact on the sample firms' debt-to-equity and long-term debt-to-equity ratios.

On the subject of total debt, educated boards tends to borrow more debt with a significance level of 96%. The higher the percentage of females in a board, the lower the debt-to-equity ratio, and this can be said with a significance level of 95%. Moreover, it can be said with nearly 100% confidence that independent directors prefer to have lower debt-to-equity ratios. Firms with larger values also tent to borrow more.

In terms of long-term debt-to-equity ratio, larger boards choose to borrow less long-term debt with a significance of nearly 100%. In contrast, a higher level of education in the board leads to more long-term debt. It can be said with almost 100% guaranty that there is a negative correlation between independent directors and long-term debt and a positive correlation between firms with higher value and long-term debt.

The author was interested to analyse the dynamics between dependent variables when an additional independent variable is introduced to the equation, which lead to the creation of interaction variables. With reference to total debt, five interaction variables seem to have a significant correlation with the total debt. Comparatively older and larger boards lead to more debt-to-equity ratio with a guaranty of nearly 96%. Contrarily, relatively educated and larger boards have less lev-

erage. Independent and larger boards prefer to rely less on debt. Moreover, educated and independent boards choose to have more leverage. Boards with more female directors and overall multiple directorships prefer less debt.

Eight interaction variables seem to be significantly correlated to the long-term debt-to-equity ratio. Older and larger boards prefer more long-term leverage with nearly 100% significance. Older and independent boards do not prefer long-term debt. The larger and more educated the directors are, the less they choose to rely on debt financing. Similarly, the larger and more independent the board, the smaller the leverage is likely to be. Relatively educated female directors, busy educated directors and independent educated directors prefer leverage over equity. On the opposite, busy female directors would choose equity over debt.

Table 5: OLS regression results

	Dependent variables	
Independent variables	LogD/E	LogLongD/E
LogAge	-0,380 (-0,564)	-0,142 (-0,200)
LogBS	-0,455 (-1,250)	-1,247*** (-3,217)
LogEdu	0,340** (2,072)	0,581*** (3,178)
LogGen	-0,372* (-1,932)	-0,302 (-1,504)
LogBusy	-0,002 (-0,003)	-0,004 (-0,021)
LogInd	-0,797*** (-4,598)	-0,917*** (-4,895)
AgeBS	1,483** (2,057)	3,953*** (4,656)
AgeInd	-1,145 (-0,699)	-4,893*** (-2,957)
BSEdu	-1,762* (-1,696)	-3,787*** (-3,562)
BSInd	-5,704** (-2,295)	-5,066* (-1,867)
EduGen	1,244 (0,843)	2,655* (1,693)
EduBusy	0,763 0,837	2,929*** (2,818)
EduInd	7,142*** (4,373)	10,863*** (5,910)
GenBusy	-3,727*** (-3,791)	-2,633** (-2,567)
LogF/V	0,070** (2,208)	0,130*** (3,856)
R square	0,147	0,24
Durbin-Watson	2,012	1,986
F test	5,605	9,208
Significance	<0,001	<0,001

Note: ***p<0.01; **p<0.05; *p<0.1

5 Conclusion

The objective of this chapter is to provide a summary and explication of the outcomes that were presented and analysed in the Results chapter. The author intends to answer the research questions, test the hypotheses and underline the connection between the results and the theoretical findings. Additionally, this subchapter includes the limitations of the study and further research recommendations.

5.1 Discussion

The goal of this thesis was to analyse the potential impact of board of directors' attribute on the firm's capital structure. With the help of both theoretical and empirical analysis, the author has been able to answer the two research questions and test the hypotheses.

In summary, the correlation and regression analyses results indicate that the board's attributes have an impact on the firm's debt-to-equity ratio. However, not all the attributes have an impact on the debt-to-equity ratio. The hypotheses have been solely accepted or rejected based on the OLS regression analysis's results for each standalone independent variable. However, the author has chosen to mention in this chapter also the interaction variables' significant correlations.

1. Do the characteristics of the board of directors have an impact on the capital structure involving total debt in the context of Finnish and Swedish firms?

H_{1a}: The median age of board of directors affects a firm's total debt.

The hypothesis 1a is rejected since the correlation and OLS regression analysis have not revealed any relationship nor correlation between the median age of a board and a firm's debt-to-equity ratio.

H_{2a}: The size of a board affects a firm's total debt.

It can be stated that there is a positive significant correlation between board size and total debt based on the correlation analysis results. Furthermore, the OLS regression analysis reveals that the

larger and older the board is, the higher the debt-to-equity ratio is. Therefore, the hypothesis 2a is accepted.

H_{3a}: The education level of a board affects a firm's total debt.

In regard to the hypothesis 3a, education level is significantly positively correlated to total debt in the correlation analysis. The OLS regression analysis results show a clear positive correlation between education and debt-to-equity ratio. When we have a look at the interaction variables' OLS regression analysis, educated and independent boards are positively correlated to debt-to-equity and educated and larger boards are negatively correlated to debt-to-equity ratio. Consequently, the third hypothesis is accepted.

H_{4a}: Board gender diversity affects a firm's total debt.

When it comes to the hypothesis 4a, the correlation analysis has not exposed any significant correlation between gender and total debt. However, the OLS regression analysis shows that there is a significant negative correlation between gender and debt-to-equity ratio. For this reason, it can be said that gender affects firm's total debt. Thus, the hypothesis 4a is accepted.

H_{5a}: Multiple directorships held by board members affects a firm's total debt.

Concerning the hypothesis 5a, both correlation and OLS regression analysis did not reveal a significant correlation between multiple directorship and total debt. Nevertheless, the OLS regression analysis has captured a negative correlation between debt-to-equity ratio and a larger share of female directors that have multiple directorships. As a result, the fifth hypothesis is rejected.

H_{6a}: A more independent board affects a firm's total debt.

The last hypothesis 6a is accepted because of the significant negative correlation results that both of the inferential analyses have uncovered. Moreover, there is a significant negative correlation between debt-to-equity and large sized independent boards. Thus, the sixth hypothesis is accepted.

When analysing the long-term debt-to-equity ratio, the OLS regression analyses' results show that the board of directors' characteristics have an impact on the firm's long-term capital structure. However, none of the correlation analyses on long-term debt-to-equity ratio have indicated any significant correlations in between variables. Therefore, only the OLS regression analysis results are discussed hereafter.

2. Do the characteristics of the board of directors have an impact on the capital structure involving long-term debt in the context of Finnish and Swedish firms?

H_{1b}: The median age of board of directors affects a firm's long-term debt.

Firstly, the hypothesis 1b is rejected due to lack of significant correlations between directors' age and long-term debt. However, when the board age and board size are considered simultaneously, the regression analysis shows a positive correlation with long-term debt.

H_{2b}: The size of a board affects a firm's long-term debt.

Board size is significantly negatively correlated with long-term debt-to-equity ratio. Therefore, the hypothesis 2b is accepted.

H_{3b}: The education level of a board affects a firm's long-term debt.

When it comes to education level, there is a positive correlation with long-term debt-to-equity. However, when the board size is added to the equation, larger educated boards are negatively correlated. The hypothesis 3b is accepted.

H_{4b}: Board gender diversity affects a firm's long-term debt.

Larger proportions of female directors individually do not impact the long-term debt. As a result, the hypothesis 4b is rejected. However, boards with multiple directorships and more female directors are negatively correlated to long-term debt. Furthermore, relatively educated boards with more female directors are positively correlated to long-term debt.

H_{5b}: Multiple directorships held by board members affects a firm's long-term debt.

Multiple directorships are not directly correlated to long-term debt-to-equity ratio. Therefore, the hypothesis 5b is rejected. Regardless, as mentioned before, busier female directors and busier educated directors are significantly correlated to long-term debt.

H_{6b}: A more independent board affects a firm's long-term debt.

The hypothesis 6a is accepted since board independence is significantly negatively correlated to long-term debt. When education level and board independence are analysed together, the correlation turns out to be positively significant.

In conclusion, the findings of the research demonstrate that board of directors' characteristics have an impact on the firm's capital structure. Thus, both of the research questions have been answered. The board age and multiple directorship attributes do not have an impact on the firm's total debt. When looking at the long-term debt, board age, multiple directorship and board gender do not have an impact on the debt-to-equity ratio either. It can be said that board size and education level are positively correlated to total debt. On the other hand, board gender and board independence are negatively correlated to total debt. The education level seems to have a positive correlation with long-term debt. However, board size and board independence are negatively correlated to long-term debt.

5.2 Limitations and suggestions for future research

The study's limitations and suggestions for future research are discussed in this subchapter. The author points out that that there is a risk that the findings might be outdated at the time of publication.

The author has left out of the study banks and financial institutions, therefore the study does not apply to these two sectors. Given the considerably larger size of the Finnish and Swedish market, 60 companies represent a small sample that might not capture a precise overview of these markets. Additionally, since Finland and Sweden are two closely related markets, the applicability to

other regions is restricted. Regardless of this, since Denmark, Norway and Iceland are labelled as Nordic countries, the applicability of the study could be broadened for these three countries.

For further research, the author recommends a larger firm sample, for instance, from all the Nordic countries. Moreover, the findings could be compared between countries. New board of directors' attributes could also be included in future research.

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