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MASTER THESIS

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VALDYBOS STRUKTŪROS ĮTAKA NASDAQ BALTIC LISTINGUOJAMŲ ĮMONIŲ REZULTATAMS	INFLUENCE OF THE BOARD STRUCTURE ON THE RESULTS OF NASDAQ BALTIC LISTED COMPANIES

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INTRODUCTION

Relevance of the topic

It would be hard to underestimate the attention that the topic of corporate governance quality effect on firm performance has received at the end of 20th century and at the beginning of 21st century. This has been on the corporate governance studies scope for quite some time and it seems that the discussion is nowhere near being exhausted. One of the most relevant angles to look at the topic is scrutinizing the activity of the board of directors and resolving what kind of impact it has on the economic performance of the firm.

The board of directors is the key element in corporate governance structure, so it is not cynical to assume that its characteristics might echo in the performance of the company by influencing the operational firm's framework by adhering to its advisory and supervisory functions (Martin and Herrero, 2018). Board of directors can improve the management of the business by controlling and advising the management, avoiding unfair or even fraudulent activities that company's executives might have incentives to do. The board could do better or worse job depending on various aspects of their work environment and their own characteristics as a working group. In terms of the topic raised, studies usually tend to look for certain characteristics in the board that would ensure better financial performance of the firm. In other words, the relevant question is *are there any board characteristics in particular that would lead to greater financial results of the firm?*

The level of exploration of the topic

There is a substantial number of studies raising the same question and looking for the relationship between the structure of the board and firm performance. In terms of geography, a lot of studies have used US firm data but in the last two decades or so more and more studies have been conducted outside the US. These studies include various European countries, some countries in Africa and Asia. Additionally, there were studies that took the data from different European countries as well (Brick and Chidambaran, 2010).

Moreover, the diversity of choosing the variables for both measuring board structure and measuring firm performance has been present. In order to find the answer to this question, scholars have looked at numerous board structure criteria like board size, board independence,

board diversity by gender, age, education, nationality, etc. For measuring financial performance, academics have mostly chosen market-based ratio of Tobin's Q and accounting-based measures of ROA along with ROE.

The novelty of the thesis

At least one relevant study has been found that used the data of NASDAQ Baltic listed companies (Butkevičiūtė, 2020). In order to supplement the corresponding study, in this thesis other board structure measures will be used with a slightly different model approach. This thesis will add apparent depth to the topic regarding the Eastern European region that has a visibly lower amount of relevant corporate governance studies conducted.

The problem of the thesis

The problem of the thesis can be formulated in the following way: what impact does the board size and independence have on NASDAQ Baltic listed firm financial performance?

The aim of the thesis

The aim of this thesis is to reveal the relationship and its significance between certain characteristics of board structure and firm performance. Also, the purpose of the thesis is to determine the direction of the relationship as well.

The objectives of the thesis

1. To present the situational framework of the topic and the nature of the question raised.
2. To review, to research and to explore relevant studies on the topic of board composition effect on firm performance.
3. To choose applicable empirical research methodology to evaluate the relationship between board structure and NASDAQ Baltic listed firm performance.
4. To gather and present relevant samples of data from NASDAQ Baltic listed companies.
5. To execute chosen research methodology and measure the relationship between board composition and NASDAQ Baltic listed firm performance.
6. To present empirical study results and give recommendations for further research.

The methods deployed by the thesis

The relevant data for the research thesis has been gathered by the author of the study from companies' annual reports, Bloomberg terminal and other sources for particular information. Statistical and econometric analysis of the dataset is performed on the available software.

The description of the structure of the thesis

The structure of the research paper is logically based on the objectives raised in the thesis. Firstly, theoretical background on the topic is presented. Theoretical framework is described by reviewing relevant regulations in Europe considering corporate governance, exploring a vast number of studies made on the topic – their assumptions, variables used, principles adhered and results reached. Moreover, an ongoing discussion on the topic, limitations of research are presented and hypotheses of the thesis are formulated. In the second part, the chosen empirical research methodology is discussed. Additionally, data samples and data obtaining limitations are presented. Thirdly, empirical research study is executed while revealing the results in terms of hypotheses raised. Finally, the research results are interpreted, limitations of the thesis are drawn, recommendations for further research are presented and final conclusions are made.

1. THEORETICAL FRAMEWORK

1.1. Corporate governance legislation in European Union and Baltic states

In the beginning of the 21st century the European Union (EU) underwent serious developments of corporate governance regulation. This occurrence of sudden shift in legislation is mostly explained by constant wrongdoing and corruption at the highest level of corporate governance (Butkevičiūtė, 2020). At this point, the move towards more transparent, independent and diverse boards is seen. In the 2003 Directive of the European Parliament and of the Council on insider dealing and market abuse it was pointed out that important decisions shall be made by the board leaders while assuring board independence and avoiding conflicts of interest (2003/6/EC). In the 2005 Commission Recommendation it was highlighted that the firm's board should make an effort to gather a diverse group of directors (2005/162/EC).

Even more attention was brought to the corporate governance regulation after the Global Financial Crisis of 2007-2009. The regulation mostly affected independence and diversity of boards, especially stressing the need to increase the number of females (European Commission, 2012). The changes seek to have an impact on the procedures of selecting board members and introducing a quota of at least 40 % females on the board. Transformation of corporate board compositions were supported by claims that this would increase corporate gains by providing boards with more diverse worldviews, skills and experience (European Commission, 2012). In general, during the EU led regulations development diversifying board composition was presented not only beneficial from the social standpoint but also as being favorable in terms of firm success.

Baltic states, as EU members, endorse legislation implemented by the European Parliament and/or Commission. Nevertheless, it is crucial to mention that the EU did not release laws in regard to ensuring board diversity, they only released recommendations applying using the *comply and explain* method for Member States (Butkevičiūtė, 2020). The directives are only non-obligatory and Baltic States have a choice of following the recommendations or not. Despite EU recommendations, in all three Baltic State countries – Estonia, Latvia and Lithuania – it is assumed that the diversification of board composition and number of independent directors is fairly low (ibid.). Therefore, it comes with no surprise that the level of board diversity in Baltic states is fairly small – this statement is supported by the study made by Butkevičiūtė (2020).

1.2. Board structure's impact on firm performance: current level of academic scrutiny

There is an ongoing debate on whether the firm's board structure has an impact on the firm's financial performance and what is the direction of this influence. The task of the board in an enterprise is primarily to monitor the performance and actions of senior management and to assure that they act in the best interest of the stockholders (Fama and Jensen, 1983; Jensen and Meckling, 1976, as quoted by James, 2020). In other words, boards monitor and supervise executives of the company and provide advice for the decision makers (Martin and Herrero, 2018). Additionally, boards must manage the friction of interests between management of the firm and owners of the firm. Therefore, the work of the board is critical in maintaining sustainable growth and performance of the company. Due to this reasoning, relevant researchers and academics have put forward the question of board structure optimization – the

ideal board composition arrangement that would bring most profit for stockholders (Ammari, Kadria and Ellouze, 2014; Bunget, Mates, Dumitrescu, Bogdan and Burca, 2020; Martin and Herrero, 2018; Meyer and de Wet, 2013; O'Connell and Cramer, 2010; Veklenko, 2016). In academic literature, one can find evidence of belief that superior board composition enables higher quality of decision-making, improves profitability growth while maintaining sufficient level of accountability (Thomsen and Conyon, 2012).

To find the answer to the conundrum of the relationship between board structure and company's financial performance, most studies looked at the composition of the board. Some studies argue that not the composition but recent government reforms and rising impact of institutional investors have pressured board members to make more strategic decisions in the firm (Judge and Zeithaml, 1992; Hoskisson, Hitt, Johnson and Grossman, 2002). This viewpoint is not relevant for this thesis therefore it will not be discussed further. It is quite clear that board of directors and their composition is the key element of corporate governance and its complexity, transparency, experience and so on are crucial determinants of a firm's financial performance. There is much empirical evidence to support an idea that a well-managed board of directors have an obvious impact on a firm's financial performance. Nevertheless, different researchers have chosen slightly distinct approaches to the problem and moreover received diverse and in some cases even completely contrasting results.

The analyses tend to look at the size of the board and the number of independent directors as the most important measures for determining board structure. Size of board and influence of independent directors will be discussed later in separate sections as these to characteristics for the board structure has been used most widely, although there are studies that took the age, gender, nationality or professionalism of directors into consideration as well (Campbell and Minguez-Vera, 2008; Carter, D'Souza, Simkins and Simpson, 2010; Marinova, Plantenga and Remery, 2016). It was found that gender diversity in boards is beneficial for the firm's financial performance and may generate economic gains. This is true not only in the US where the most studies analyzing this question were conducted but also in Spain, for example, where historically females had minimal participation in the workforce. Not all studies came to the same conclusions – Carter et. al. (2010) did not find a significant relationship between the gender or ethnic diversity of the board and financial performance. The abundance of contradicting or neutral results received by different studies done in US, Europe or other regions might show that structure of the board and financial performance are not entirely and directly linked. This viewpoint is supported by reasonable theoretical arguments drawn from

resource dependence theory, human capital theory, agency theory, and social psychology that suggest that gender and ethnic diversity may have either a positive, negative, or neutral effect on the financial performance of the firm (Carter, D'Souza, Simkins and Simpson, 2010). The same conclusions could be made by investigating the same question by taking data from Northern Europe – Marinova et. al. (2016) gathered data from Netherlands and Denmark where within boards women share only 5,4% of board seats. They did not find a significant relation between board diversity and firm performance.

Furthermore, some studies have also investigated the effect of appointing directors that are also executive directors in other firms and the impact of the proxy advisers (McCahery, Sautner and Starks, 2016; Murayev, Talavera and Weir, 2016). There has been found a positive relation between the presence of outside non-executive directors and performance of the firm. The effect is even stronger if those appointed outside directors are also executive directors in other firms that perform well. The results have been consistent with the general view that non-executive directors that are executives in other companies contribute to both the monitoring and advisory functions of corporate boards (Murayev, Talavera and Weir, 2016). To sum up this part, one can conclusively assert that the linkage between board structure and firm's financial performance is not entirely clear and differs when analyzing a particular region or timeframe or choosing various variables to assess board composition.

The Baltic region companies have already been partially studied regarding this question but the analysis done remains quite scarce. There has been a bachelor thesis done concerning this topic which took two board composition variables – directors' age and gender – into analysis (Butkevičiūtė, 2020). The author of this study did not find a particularly strong influence of board directors' age and gender on a firm's financial performance while sampling Baltic and Norwegian publicly listed companies.

Table 1

A sample of reviewed board structure and firm performance studies

Study	Board characteristic measures	Performance measures	Empirical data analyzed	Key findings
Ammari et. al. (2014)	Board size, board independence, functions of	ROA, ROE, Tobin's Q, Market to Book	Sample of 40 French companies on the SBF 120	Support the idea that board structure is a

	decision and control		for the period 2002-2009	determinant factor for French firm performance.
Arosa et. al. (2010)	Board independence	ROA	Non-listed family firms in Spain	Affiliated directors have a positive impact on firm performance in family firms.
Brick & Chidambaran (2010)	Number of annual board meetings	Tobin's Q	Broad panel of firms over a six-year period from 1999 to 2005	Board activity has a positive impact on firm value.
Butkevičiūtė (2020)	Gender and age of directors	Tobin's Q	NASDAQ Baltic listed companies	There is no significant relationship between gender and age of board and firm performance.
Campbell & Minguez-Vera (2008)	Gender of directors	Tobin's Q	Sample of Spanish companies	Gender diversity has a positive effect on firm value and the opposite causal relationship is not significant.
Carter et. al. (2010)	Number of women directors, number of ethnic minority directors	ROA, Tobin's Q	Firms in the S&P 500 index for the five-year period 1998–2002	Did not find a significant relationship between the gender or ethnic diversity of the board, or important board committees, and financial performance for a sample of major US corporations.
Cheng (2008)	Board size	ROA, Tobin's Q, Stock price	Large sample (1252) of firms for a period of 1996-2004	Provides empirical evidence that firms with larger boards have lower variability of corporate performance.
Dagsson & Larsson (2011)	Age of directors	ROA, Tobin's Q	Companies listed on the OMX Stockholm exchange between 2005 and 2009	We found that age diversity significantly affects firm performance as measured by ROA, but not as measured by Tobin's Q.

Dehaene et. al. (2001)	Board independence, CEO duality	ROE	122 Belgian companies	There is a positive relationship between the number of external directors and the return on equity.
Elsayed (2007)	CEO duality	ROA, ROE, ROI, Tobin's Q	Sample of Egyptian listed firms	The impact of CEO duality on corporate performance is found to vary across industries, a result that is supportive of both agency theory and stewardship theory.
Emadeldeen et. al. (2021)	Age, gender, education and nationality of directors	ROA, Tobin's Q	London Stock Exchange (FTSE 350) of non-financial companies for the years 2000–2016	Age diversity has a negative effect on firm performance. Education diversity has a negative effect on firm performance. Gender diversity has a positive effect on firm performance. Nationality diversity has a positive effect on firm performance.

Sources: author, various studies

1.3. Characteristics of board structure and measuring firm performance

Due to varying results across academic literature when evaluating the effect of board structure on a firm's financial performance it is crucial to sensibly decide on which variables to use for measuring board composition and which to use for measuring firm performance. Most variables for measuring board structure have already been mentioned. The most prominent being the size of the board. Quite obviously the size of the board is being measured by the number of the directors on the board in particular point in time. Likewise, the level of board independence is represented by a number of external (outside) directors in opposition to a total number of board members. It has been shown that the size of the board and its independence mostly depends on the size of the firm and complexity of its operations (Booth and Deli, 1999). It is suggested that the complexity of companies increases with its age of

operations (Boone, Casares Field, Karpoff and Raheja, 2007). The structure of the company is much simpler at the beginning of its operations and complexity increases due to necessary expansion due to the interest of increasing profits. Despite this, at some point a more complex internal governance structure does not increase its effectiveness – on the contrary, the enterprise becomes overly complex and loses growing momentum. Alternatively, directors' gender, age, nationality and so on are also used in similar studies to characterize the structure of the board.

Previously done empirical research has suggested that the configuration of the board is the product of the trade-off between the benefits and the costs of monitoring and depends on the firm's characteristics itself (ibid.). The investigation done by Boone et. al. (2007) found that board size and its independence increase as firms grow and diversify over time, that essentially board size and not board independence reflects an adjustment between the firm-specific benefits and costs of monitoring, and finally that board independence is negatively related to the manager's influence and positively related to constraints on that influence. The authors of this study concluded that economic applications aid to explain cross-sectional variation in corporate board size and its formation. Therefore, one might assert that structure and composition of the board are determined by the characteristics of the company, its environment, its information demand and the possible agency conflicts it faces.

The theoretical implications and impact of agency theory must be taken into consideration when selecting the variables for the relevant question of concern. Agency theory presupposes that corporations act as agents of its shareholders according to the general principal-agent problem. Shareholders invest in corporate ownership and thereby entrust their resources to the management of the directors and officers of the corporation. It is noted that there is often an essential distinction between the short and long-term interest of officers and shareholders. This is primarily carried on by short-term demand for profits and the asymmetry of information that executives possess compared with that of shareholders (Gordon, 2021). The friction arising from the agency theory in an enterprise affects the composition of the board that subsequently determines its effectiveness in monitoring and supervising company's executives and in turn influence the firm's financial achievements.

Another point to take into deliberation is the impact of the liberalization and globalization of financial markets on corporate governance. Constant scandals (especially before the Global Financial Crisis of 2007-2009) in the corporations urged the public to

demand more transparency, accountability and availability of understanding functions of the boards of directors. Because of this, immense legislation and corporate culture changes were implemented that made board role research even more meaningful. Due to this insight, the value of understanding board configuration and its effectiveness to the operations of business also increased.

Furthermore, the obligation to monitor the management team relies on the ownership structure (Mak and Li, 2001). It was found that corporate ownership and board structures are related – if the ownership of the firm is very concentrated, it will be easier to control the actions of the management team and the demand for independent directors will be minor. Alternatively, it is argued that if the ownership structure of the company is widespread, fewer shareholders will demand more supervision of the management team and thereupon would require a greater presence of external directors (Acero and Alcalde, 2012). The board size is susceptible to the firm's advisory needs and board composition depends to a larger extent on the requirement of control, which is determined by the company's share structure. It was also evident that external directors' primary objective is an adequate representation of the ownership formation of the company rather than providing expertise and counseling. Similarly, according to the stakeholder theory, it is stated that the larger number of small shareholders, the greater is the diversity and self-reliance of the boards (Kang, Cheng, and Gray, 2007). This relationship is explained by emphasizing the insight that this assures that the different groups are represented in the decision-making process. The ownership structure of the company could be another determinant that is important to look at and that can assist in explaining the composition of the board.

Regarding board size, a number of studies argue that it is pricey to monitor high-growth firms and therefore the size of the board should be small (Gaver and Gaver, 1993; Smith and Watts,1992). Additionally, it is fair to assume that smaller boards will be more dependent on company's ownership and have fewer independent directors. Companies like this will have a larger number of internal directors who have the best information about the operations of the firm and the need to hire external directors would be non-existent (Boone et. al., 2007; Linck, Netter and Yang, 2008).

It would also be fruitful to discuss the firm's indebtedness and its implications to the board composition as well. Some scholars have considered that more indebted companies are more reliant on external advisory and are in need of information and guidance (Coles, Daniel

and Naveen, 2008; Linck et. al., 2008). This observation would imply that a higher level of indebtedness requires larger boards of directors to resolve the situation. In other words, more complex business situations or operations in general would require larger boards with more outside directors. In sum, the greater the complexity of the company, the larger the size, independence and diversity of its board (Martin and Herrero, 2018).

Furthermore, it is central to recognize that the choice of how to measure the performance of the firm is an aspect that affects the results and the possible conclusions of the study. Many authors have noticed that using different ratios might show contrasting results when we seek to determine the relationship between board structure and a firm's financial performance. The most prominent three metrics used are Return on assets (ROA), return on shareholders' equity (ROE) and Tobin's Q ratio. Overall, profitability means a firm's capacity to generate profit. The profitability can be measured in multiple ways but they are grouped into two main categories: accounting- and market- based measures. Accounting-based measures focus on historical evaluation from the actual results of the company. These measures take only accounted financial data into consideration. ROA and ROE fall into this category of profitability measures. Market-based measures focus on forward-looking market value indicators and expected future growth of earnings. These indicators are affected by the investors and financial markets' belief in company success. Tobin's Q ratio fall into this category of profitability measures. The higher the ROA, ROE and Tobin's Q, the higher is the performance (Bell, 1990).

ROA takes into account all available assets that contribute to earnings and divide net income from the amount of those assets (net income/ total assets) (Brealey and Myers, 1991). ROA indicates how profitable a company is in relation to its total assets. The higher the ROA, the more efficient and productive a company is at managing its balance sheet to generate profits. A lower ROA would indicate that there is room for improvement in regard to using a firm's assets to generate profits. The main difference compared to ROE is that ROA takes a company's debt into consideration while ROE does not.

ROE relates to a firm's earnings to assets invested by shareholders (net income/ average shareholders' equity). ROE profitability ratio implies the ability of a firm to generate net profit with the available shareholders' investments. This measure is appropriate to use in studies concerned with shareholders' welfare. The higher the ROE, the more efficient a firm's management is at generating income and growth from its equity financing. It is useful to

mention that ROEs will significantly vary based on the industry or sector in which the company operates.

Tobin's Q is an extremely commonly used financial measure of performance of a firm in corporate governance literature. It is calculated as the market value of a company divided by the replacement value of the firm's assets. Tobin's Q does not always fully represent a firm's financial performance, and instead can reflect growth opportunities used in a company that arise from external conditions rather than managerial decisions (Pham, Suchard, and Zein, 2011). The Q ratio was popularized by an American economist Nobel Laureate James Tobin and invented in 1966 by an economist Nicholas Kaldor. This ratio measures whether a firm is relatively over- or undervalued. Usually, a simplified version of this ratio is used in which a firm's equity market value is divided by equity book value. This is due to the fact that the replacement cost of total assets (which is required in the original Tobin's Q ratio calculation formula) in reality is difficult to estimate. A low Tobin's Q ratio (between 0 and 1) would mean that the cost to replace a firm's assets is greater than the value of its stock and therefore the stock is considered undervalued and vice versa.

As a result of the specific accounting- and market-based financial measures in place, most corporate governance studies concerned with the search of relevant relationships between firm's characteristics and financial performance, commonly use both types of financial ratios. Accounting-based measures assist in maintaining focus on the actual economic profitability of a firm while Tobin's Q as a market-based financial measure serves as an indicator of future prospects of a firm.

1.4. Board size and its impact on firm performance

It is largely evident that one of the most popular approaches that researchers have to the question of whether board composition impacts a firm's financial performance is looking at the number of directors on the board. This approach is perfectly reasonable as measuring the number of directors on the board is simple and straight-forward. Furthermore, the number of directors on the board, their diversity and the number of independent directors most likely depend on the complexity and size of business and its operations (Martin and Herrero, 2018). The larger the business, the larger need for the higher number of independent directors on the board and more board members overall. There is rather a general consensus on this statement being true but there is no particular agreement on how board size affects a company's

performance. It would be more precise to say that different studies have concluded rather contrasting results on the topic.

Some authors discovered that larger boards are more preferable (Fratini and Tettamanzi, 2015; Lanser, 1969; Sah and Stiglitz, 1991). Studies have found that larger boards tend to make fewer extreme decisions and therefore the variability of performance for such a company is smaller compared to the firm which has fewer members on the board. This is due to the fact that larger groups in general are less likely to accept more risky projects but also miss out on some good projects as well (Sah and Stiglitz, 1991). Larger boards also have more expertise to manage a business and directors have greater extent of external connections (Goodstein, Gautam and Boeker, 1994; Zahra and Pearce, 1989). On the other hand, smaller boards are more likely to take riskier projects and do not dismiss them as larger boards would do (Cheng, 2008). As a result of this particular trait, smaller boards can have rather both short-term gains and losses (ibid.).

Decent number of scholars would argue that smaller boards are more preferable and they have evidence to support their claim (Lipton and Lorsch, 1992; Singh and Davidson, 2003; Yermack, 1996). It is argued that larger boards (with the size of ten members or more) suffer from the time limitation and meeting ineffectiveness when not being able to fully express their concerns, ideas and opinions on business projects. Additionally, companies with small boards display more favorable attitudes for financial ratios and provide stronger CEO performance incentives from compensation and the threat of dismissal (Yermack, 1996). The case for smaller boards being superior to larger boards is understandable as fewer directors can communicate more frequently and effectively and therefore make less dreadful decisions (Guest, 2009). Smaller board of directors require less monitoring due to fewer possible communication and coordination errors that might arise in larger boards as a result of more complex monitoring processes and possible free-riding problems. Moreover, compared to small boards, large ones have to face a more prominent problem of asymmetric information that leads to difficulties when trying to reach a unilateral decision (Yermack, 1996). When board size exceeds seven-eight persons, the board will function ineffectively and it will be easier for the CEO to control and influence the board (Jensen, 1993). Nevertheless, the evidence for CEOs being more in control when the board gets bigger is not entirely conclusive as there are studies to support mixed results (Goodstein et. al., 1994).

Other studies managed to acquire contrasting results to that of the already mentioned research. Most recurrent result being that of a U-shaped relationship between board size and firm's financial performance, meaning that either very small or very large boards are the most effective (Coles et. at., 2008). U-shaped relationships between Tobin's Q and board size appear due to differences between operationally uncomplicated and complex firms. Tobin's Q increases in board size for complex firms and vice versa. This relationship is pushed by the number of outside directors (ibid.). Furthermore, it was found that this relationship is not the result of director's personal traits, but the consequence of the internal board environment created by the board composition.

Crucial to mention that it is easier to study larger firms as they provide better accessibility to the data required for the analysis. This fact may incur a particular bias to the research done as bigger enterprises tend to have higher number of directors on their boards, on the other hand, there is a larger pool of companies to analyze and from which certain results can be stressed (Zahra and Pearce, 1989). Additionally, it is far easier to find data on publicly listed companies than on those who are not. It seems that availability of data, different corporate governance cultures among countries and other factors influenced mixed results across the whole scope of academic research. The impact of board size (or corporate government structures in general) may vary across jurisdictions, countries and regions therefore cross-country research would be useful and could provide crucial evidence into the debate (Brennan, 2006; James, 2020). Unfortunately, this kind of approach might be beyond the scope of this thesis even though all three Baltic states are taken into consideration. As commented a few sections ago, all three Baltic states are fairly similar in their corporate governance legislation and culture.

Furthermore, the relationship between board size and financial performance of the firm can vary depending on the financial performance ratio used in the research. For instance, it was found that accounting-based measures, such as return on assets and return on sales are particularly inversely related to the board size (Yermack, 1996). This insight supports the case for smaller boards as being more effective than larger ones. Again, the backing of the idea of groups becoming less effective when increasing in size due to the fact that arrangement and process problems overwhelms the advantages from having more people included is imminent. Some scholars found that Tobin's Q ratio in particular can show less significant relationship between the size of the board and firm's performance than ROA or ROE (Brick and Chidambaran, 2010).

Finally, some studies have found that there is no significant relationship between the number of board directors and a firm's performance (Dehaene, De Vuyst and Ooghe, 2001; Mak and Li, 2001). It seems that a minority of studies reached these conclusions that might indicate that there are external factors determining results of the studies (e. g. specific attributes of the country's private sector, corporate governance legislation and culture and so on).

1.5. Number of independent directors on the board and firm performance

The term "independent director" refers to non-executive directors (NEDs) who are free from any personal or economic association with the firm and its management (James, 2020). There is also a mixed type of director which is neither executive, nor independent and are usually referred to as "grey" directors. It is commonly recommended that the proportion of external directors would be higher than the proportion of internal directors on the board (Hampel, 1998). The roles of independent board members include higher objectivity, integrity, and open-mindedness. They can supervise management and provide good assistance for decision-making more fairly than inside directors even though they lack some information about the business as they are from the outside (Fama, 1980). Furthermore, outside members of the board can provide an industry wide professional knowledge which is crucial in reaching exceptional business performance. Moreover, it is necessary to have independent directors who can effectively monitor the CEO as internal directors are more hesitant to do so due to the fact that their promotion is directly linked with the CEO (Anderson, Reeb, Upadhyay and Zhao, 2011). Outside directors have an incentive to be competent monitors in order to maintain their reputation and be wanted in the external labor market (Fama, 1980).

In terms of board composition by number of independent directors, most studies have found the positive correlation with the firm performance (Agrawal and Knoeber, 1996; Anderson and Reeb, 2004; Baysinger and Butler, 1985; O'Connell and Cramer, 2010; Weisbach, 1988). In other words, there is a positive and significant relationship between the proportion of outside directors and firm value. It was found that most valuable firms are those which have a balanced number of outside directors. This may be explained by the significant benefits provided by those external directors such as various experience of business management, mixed expertise and knowledge, and a more objective point of view. As a result of this more diverse board in the sense of a balanced mix of inside and outside directors can advise better and supervise the firm's management more objectively and transparently. In turn,

businesses can make more efficient decisions and perform exceptionally. It is not difficult to obtain the idea that the higher independence of the board provides better advice, allowing for stronger decision-making. In one study it was found that a higher number of non-executive and non-independent (grey) directors on the board decreases the probability of business bankruptcy (Hsu and Wu, 2014).

Alternatively, there is evidence to suggest that higher numbers of independent directors do not necessarily bring more value to the company (Arosa, Iturralde and Maseda, 2010; Dulewicz and Herbert, 2004). These studies have questioned the exact impact that independent directors have on a firm's financial performance. They suggest that board practices and its composition have a fairly weak relationship to the performance of the company. Also, independent directors might not be as favorable, as they usually have less information and cannot monitor management that effectively. They cannot obtain inside information that effortlessly, as management is reluctant to provide them with it (Adams and Ferreira, 2007). Quite clearly internal directors have a greater knowledge of business operations than independent directors. Not having a lot of specific knowledge about the business and management being reluctant to share some information to the external directors undermines their ability to monitor which in turn allows management to create strategies that would increase their own wealth and possibly decrease firm's (Hsu and Wu, 2014). Some studies suggest that the relationship of independence of the board and firm performance can alter depending on the financial metric used for measuring financial performance (Martin and Herrero, 2018). Higher number of independent directors can lower a firm's performance if it is calculated by ROA or Tobin's Q. This could be the case of companies having excess monitoring and in turn less economically effective. After the economic downturn of late 2000s the role and ability of external directors to effectively monitor was greatly questioned undermining the substantial need of independent directors to be on board of a business.

The mixed results on the topic could be explained by several factors. Sometimes it is difficult to determine whether a director is truly independent, they could be selected due to recommendations of good governance and in the case of their departure the value of a company can drop. Furthermore, independent directors could lack the crucial expertise to execute their advisory work or their advice might not be echoed in the value of a company. For example, there is evidence to conclude that research and development intensive companies have higher numbers of internal directors as specific business and industry knowledge is extremely

important (Coles et. al., 2008). Additionally, there could be issues or limitations within the methodology used in studies.

Studies also point out that there is a relationship between independence of the board, company size and company's age. The younger the company is, the more reliant it is on the internal directors. This could be explained that at the beginning of the operations business requires more specialized knowledge which can mostly be provided by internal actors. It is really clear when taking firm expansion into consideration – if a firm decides to enter another market (foreign or international) it would lack the necessary expertise and advice to do everything right. Moreover, it could also mean that depending on the age and size of the company the advice and supervision required also differs.

1.5.1. Agency theory: emergence of the issue and its control

The corporate management agency theory is one of the most important theories renounced in the studies regarding boards influence on the firm's performance. Agency theory is an economic concept that views a firm as a set of contracts among self-interested individuals, primarily the firm's management and its shareholders (owners). An agency relationship is created when the principal authorizes an agent to act on his or her behalf. The issue arises from the risk that the agent might act in his or her own interest and not act to the best interests of the principal. In the corporate governance context, the principals are the owners of the firm and the agents are the management of the firm.

The agency theory is crucial in theoretically supporting the idea of board monitoring (Jensen and Meckling, 1976). The idea of board monitoring means that the primary function of the board is to reduce the agency costs arising from the probable conflict of interest between firm ownership and firm management. This is achieved by separating the shareholders from direct control and giving it to the board in terms of supervision, advice and monitoring of the management. As a result of this, the board of directors oversee decisions and activities made by the management (Hsu and Wu, 2014).

1.6. CEO duality and its impact on firm performance

Another quite important characteristic of corporate governance studies in terms of the scope of the analysis of this thesis is looking at the element of CEO duality. Simply put, CEO duality is a business practice where the CEO of the company (head of management) also holds

the position of the chairman of the board (Rechner and Dalton, 1991). As mentioned before, the role of the board of directors is ensuring that CEOs carry out their duties in a way that serves the best interests of shareholders (Fama and Jensen, 1983). As a result of this, boards can be depicted as a corporate body that aligns the interests of shareholders to that of a CEO. In the case of CEO duality, the CEO is able to use significant executive power to make critical business decisions in a more efficient way. Additionally, the concentrated power of executive management and board allows to overcome some of the unequal information problems between the management and the board of directors. One person holding both CEO and chairman of the board positions allows for an enterprise to make faster decisions as direct confirmation or approval from the executive unit is no longer required. It allows for a company to develop at a faster rate while maintaining strong and more unified leadership. As CEO and chairman of the board are the two most powerful positions in a company, combining these occupations into one person consolidates the power and grants the ability to control are parts of the business better and reassures the shareholders (Finkelstein and D'Aveni, 1994). Moreover, CEO duality might help for a company to be more adaptable in terms of the industry and economic changes. It is crucial for any firm to be able to change, stay relevant and adapt to the changing economic environment.

On the contrary, as a disadvantage of this scenario, CEO duality can fossilize the governance power of the company, thus making it a serious issue for the board of directors to effectively monitor, supervise and discipline the management (Mallette and Fowler, 1992; Millstein, 1992). Furthermore, one of the most important disadvantages of CEO duality is possible conflicts of interest between the executive branch of the company and board of directors. Since chairman can greatly influence board decisions and supervision of the management, a CEO can abuse their position on the board to gain personal additional financial gains. Moreover, CEO duality in theory grants a possibility of overall corporate governance abuse – the person, that is CEO and chairman of the board at the same time could use their position to provide themselves with dishonest leverage or participate in fraudulent activities for personal financial gains. Additionally, the person being CEO and chairman of the board at the same time has to divide his or her time for both of these positions which in turn can lead to worse company performance than expected. This is the result of personal effort and time management – the same person can hardly perform exceptionally well while being in both positions at the same time.

Another interesting point in the discussion of CEO duality is that the same person being CEO and chairman of the board affect the relationship between company management and its owners in terms of agency theory. In other words, shareholders are the principal and management with the CEO at the top are the agent. Executive managers have the incentive to make decisions that lead to the growth of their own personal wealth while optimizing the risks at the expense of the shareholders' value (Elsayed, 2007). Due to this reason, it has been argued that in order to control the management more effectively, conflict of interest between shareholders and management has to be avoided at all costs and in case of CEO duality there is a higher probability of that conflict of interest arising. Therefore, internal and external monitoring mechanisms are crucial in facilitating conflict of interest issues – where one person commands a firm, the role of the independent director becomes vague (Rechner, 1989).

Another curious point presented in the relevant discussion is that the CEO does not necessarily act as an agent but rather as an administrator (ibid.). This theory is known as a stewardship theory and simply put it claims that managers, left on their own, will act as responsible stewards of the assets that they control. Argumentation is based on the notice that good performance of the company brings strong satisfaction for the managers. This would make the CEO not an opportunistic loafer of wealth but a person who wants to do a good job for the company. It is also argued that the idea of managers being more as a steward rather than agents is determined by the executive structure of the firm (ibid.). The structure of the company must be allowing for a manager to actually care about the business not only from his or her personal interest point of view.

In general, it seems that most academic studies argue that separate individuals in the positions of CEO and chairman of the board is better and leads to more transparent governance structures. Despite this, the relevant question is whether this leads to more effective monitoring of the management and is capable of increasing the financial performance of the firm. Firstly, there are econometric findings that indeed reveal that CEO duality can increase the performance of companies (Bunget et. al., 2020). These conclusions were made by analyzing the data from five stock exchanges in Europe and using ROA and ROE as a financial performance indicator. Secondly, another study did not find any conclusive relationship between CEO duality and performance of the firm (Braun and Sharma, 2007). Despite not finding a significant relationship between CEO duality and financial performance of the firm, Braun and Sharma concluded that the relationship between CEO duality and performance is contingent on the family's ownership stake in the firm – financial performance is inversely

related to the family ownership level (ibid.). Finally, Martin and Herrero (2018) found a negative relationship between the excess power of CEO and ROA. Therefore, they came to the conclusion that positions of CEO and chairman of the board have to be separated in order to increase the chances of higher financial performance of the firm. Furthermore, the excess power of the CEO in general should be avoided so that the CEO would not have the opportunity to expropriate the wealth of the shareholders (ibid.).

1.7. Diversity of board composition and firm performance

In the corporate governance studies diversity of board composition is also used as a measure for board structure. Board diversity is mostly measured by the gender and age composition of board of directors. Diversity can also be measured by experience, nationality, race of directors etc. Overall, the results of finding a relationship between board diversity and firm financial performance alter from study to study. It was found that diversity has a positive and significant relationship with performance of the firm only if the firm's performance is measured by ROA (Martin and Herrero, 2018). It is meaningful to point out that diversity is positively associated with ROA but has no significant relationship when using Tobin's Q ratio as a financial measure (Carter et. al., 2010). Even if some studies cannot conclusively state that more independent boards are more successful, they found that diversity and the financial performance of the firm is at least partially supported (Martin and Herrero, 2018).

The relationship between diversity of board composition and performance of the firm can probably be explained by increased communication issues within the corporation (Earley and Mosakowski, 2000). This is the case due to provoked conflicts among the board members that makes meaningful consensus more difficult to make. In other words, more heterogeneous boards have higher chances of not reaching an agreement and thus making them less effective (Hambrick, Cho and Chen, 1996). On the other hand, a more diverse board can provide a firm's management with more extensive industry and business management knowledge and expertise (Kaplan and Reishus, 1990). This is useful in order to expand the business more rapidly and increase profits. It might be the case that diversity increases overall board independence and thus reduces the urge for conspiracy among the directors of the board to artificially change the interests of shareholders.

1.7.1. Board composition by gender and age, and firm performance

Most notable measure for board diversity is the number of female board members. In Baltic states females make up to one-fifth of the total number of boards of directors as calculated by Butkevičiūtė (2020). The study conducted by Butkevičiūtė (2020) analyzed the relationship between board composition and firm's financial performance in the Baltic states – Lithuania, Latvia and Estonia. The analysis has shown that there is no significant relationship between board diversity and performance of the firm thus no particularly strong conclusions have been drawn. Additionally, no significantly strong conclusion could be drawn when measuring the relationship between diversity of board composition and economic performance of the firm when analyzing Norwegian publicly listed companies as well.

When looking at the picture drawn from the analyses conducted over all academic areas, one can find rather different results. For example, in the study made by Simionescu, Gherghina, Tawil and Sheikha (2021) it was found that econometric outcomes show no statistically significant association among the board gender diversity and ROA. On the other hand, it was found that there is a positive relationship between the number and percentage of women on the board and the firm's price-to-earning (PE) ratio. Also, in the research conducted by Garanina and Muravyev (2021) Russian companies were analyzed and the positive relationship between females on the board and firm financial performance was found. It was concluded that gender-diverse boards have higher market values and better profitability. Interestingly, the relationship appeared to be stronger during bad economic times.

In terms of board composition diversity of age, studies have also reached mixed results. For instance, Dagsson and Larsson (2011) have found that age diversity significantly affects firm performance as measured by ROA, but not when measured as Tobin's Q ratio. Moreover, the relationship holds only if measuring small capitalization companies which have market cap below EUR 150 million (ibid.). Furthermore, according to the analysts it is crucial to understand that the degree of relationship depends on the time frame of the data – when the age of directors was taken and when the financial performance of the firm is pivoted. For example, the effect of age diversity is slightly lower for ROA measured during the same year than compared to the ROA measured two years later (ibid.). On the contrary, a study conducted by Emadeldeen, Elbayoumi, Basuony and Mohamed (2021) indicates a negative relationship between age diversity and firm performance. They concluded that young board members enhance and increase performance of the company (ibid.). Also, it was found that education

diversity has a negative effect on firm performance but gender diversity has positive effect on firm performance (ibid.).

1.8. Limitations of research

The most notable limitation of results of the research on this topic is the impeccable variability of conclusions reached by previous studies. This is the limitation of decisive results – conclusions vary due to different samples of companies, countries, governance structures, culture and regulation, certain tradition of hierarchies and power allocation, selected timeframes, financial performance measures, even differences in accounting practices. As a result of this, there is a limitation of needing to select a particular setting of characteristics to conduct a study on this topic.

Another limitation is data gathering. Some studies have pointed out that there are some difficulties in gathering data about board composition and structure and firm performance. That would include age of directors, nationality, also, Tobin's Q ratio is not always available for all companies. Additionally, it is challenging to choose all relevant measures for board composition. For instance, Martin and Herrero (2018) have suggested for future studies to use such characteristics for board measures as number of meetings conducted, remuneration structure of directors and institutional ownership of the firm. Moreover, quality of information available to external directors could also be used as a board quality measure (ibid.).

Furthermore, when searching for a relationship between board composition and firm financial performance it is important to keep in mind that other external factors might also have influence on the relationship. This limitation of research is usually facilitated by introducing dummy and control variables into the study.

1.9. An ongoing discussion on the topic and formulation of hypothesis

There is an ongoing discussion on the topic of concern of this thesis. Most notably, academics are in the argument that firm performance could be unrelated to board structure or board composition and the diverse conclusions made by the studies could be the consequence of a unique firm's organizational, national culture and philosophy of corporate governance. The argument is that certain institutional and cultural aspects take a long time to develop and changing board composition or CEO would not make a significant difference. As a result of

unique customs of life of corporate governance, board structure characteristics might not be that important.

Due to this insight, it might be pointless to look at certain mathematical combinations of board size or board composition to find out the prospects of firm performance. After doing some research, one could even state that there is no optimal board size for a firm in general, since it mostly depends on the characteristics of the firm. Despite this, I urge to formulate a hypothesis regarding the relationship between board size and firm performance. In this case, I am encouraged to raise the most recurrent result for these two variables according to Coles et. al (2008). The observation is that there is an inverted U-shaped relationship between board size and firm performance, therefore the first hypothesis of this thesis is formulated as follows:

Hypothesis 1: There is an inverted U-shaped relationship between board size and firm performance for NASDAQ Baltic listed companies.

Another point that researchers stress is this discussion requires more board composition variables to be included. For example, it would be meaningful to study the same topic in consolidation with data about the maturity of industry the company operates in, capital and ownership structure, number of shares issued, investments, network of competitors and customers. Regardless of this, due to lack of similar studies made (except for Butkevičiūtė (2020)) the number of independent directors will be taken into consideration as it is one of the most prominent variables taken in similar corporate governance studies. As a result of this decision, the second hypothesis is formulated as follows:

Hypothesis 2: The greater the independence of the board, the better firm performance for NASDAQ Baltic listed companies.

Originally it was decided to include gender and age of board directors to look for a relationship in terms of firm performance but similar study with these variables have already been done a few years prior by Butkevičiūtė (2020). Consequently, the initial thought had to

be changed and in this thesis board of directors' composition in terms of gender and age will not be taken into consideration.

2. THE EMPIRICAL RESEARCH METHODOLOGY

In the empirical research methodology section, a comprehensive analysis of key variables is presented to investigate the relationship between board characteristics and firm performance for NASDAQ Baltic listed companies. The dependent variable, Tobin's Q ratio, is calculated based on market capitalization, total debt, and total assets. Independent variables include BoardSize (total number of board members), NumIndDir (number of independent directors), and IndPro (proportion of independent members). Control variables encompass financial metrics such as ROE, ROA, DE, EBITmargin, EBITDAmargin, and managerial attributes like CEOduality, CEOtenure, and ChairTenure. This strategic selection aligns with the existing literature's emphasis on understanding the nuanced interplay between board structures and firm performance.

2.1. Data sample

The final dataset used in the analysis consists of 64 Baltic NASDAQ listed companies. 28 companies are Lithuanian-based, 25 are Estonian listed companies and 11 are Latvian listed companies. Used sample is not the population of the NASDAQ Baltic listed companies – the total number of populations is 75 but 11 companies could not have been used for the analysis. The reason behind this decision is that for 9 companies some data could not have been retrieved with undeniable accuracy. For some it was the financial metrics like EBIT, EBITDA, but for most companies that have been dismissed the number of independent directors could not be found. Also, two companies have been considered an outlier and had extraordinary outlying EBIT and EBITDA margins and/or Tobin's Q ratios. In order to maintain clean and consistent data, the decision was made to exclude these companies from the analysis.

Furthermore, publicly listed companies were chosen because it is easier to gather data for these companies rather than for private enterprises. Information about members of publicly listed companies' boards is far more reachable – board members have some level of publicity. Additionally, the words, opinions, actions, and recommendations of board directors in publicly traded firms have a strong influence on a company's strategy and results. Publicly listed

companies' board directors, who are often public figures, can be easily researched online. Private companies often emulate the actions and strategies of public companies, making the data sample of public board directors valuable for assessing overall market trends in board diversity and corporate governance.

2.2. Data sources

The data sample was gathered, structured and validated by the author. Firstly, Bloomberg terminal was used to collect financial and board related data. That would include total debt, total assets, net income, total equity, total assets, total liabilities, revenue, EBIT, EBITDA, number of board members, number of independent board members, CEO duality, CEO tenure in years, chairman of the board tenure in years of the company. For most NASDAQ Baltic Stock Exchange listed companies, the data was available on the Bloomberg terminal. However, due to incomplete data on Bloomberg terminal some data had to be taken from the NASDAQ Baltic webpage and annual reports of the companies. Additionally, some more data on the board structure had to extracted via other public sources like LinkedIn and MarketScreener. Crucial to mention that most public sources are not extremely trustworthy and only vast minority of final data observations were taken from this kind of sources. The data was collected either as of the end of 2022 or for the whole year of 2022.

After the data was collected and checked for consistency, calculations of relevant financial metrics were done. That would include return on equity (ROE), return on assets (ROA), Tobin’s Q ratio, debt-to-equity (D/E) ratio, EBIT and EBITDA margins. More detailed information of how these financial rations were calculated is presented in the following section and table summarizing all data variables used in this analysis.

2.3. Description of variables

In this section, dependent, independent and control variables used in this study are presented and discussed. The following table provides an overview of the variables used in the analysis conducted in this thesis. The dependent variable is Tobin's Q ratio, which is calculated based on the market capitalization, total debt, and total assets of the company as of the end of 2022. The independent variables include BoardSize, NumIndDir, and IndPro, which respectively represent the total number of board members, the number of independent directors/members, and the proportion of independent members on the board. Important to

mention that after multicollinearity check it was decided to remove variable IndPro from the final analysis. The table also includes several control variables such as ROE, ROA, DE, EBITmargin, EBITDAmargin, CEOduality, CEOtenure, and ChairTenure, which capture different aspects of the company's financial performance, debt structure, profitability, and leadership composition.

Table 2

A summarized description of variables used in the study

Variable name	Description
Dependent variable	
TobinsQ	Tobin's Q ratio = (Market cap + total debt) / (total assets) as of end of 2022.
Independent variables	
BoardSize	Total number of board members as of end of 2022.
NumIndDir	Number of independent directors/members on the board as of end of 2022.
IndPro	Proportion of independent members on the board (expressed in percentage). Removed from the analysis due to high correlation with NumIndDir.
Control variables	
ROE	Return on equity (calculated as net income/total equity as of end of 2022) (expressed in percentage).
ROA	Return on assets (calculated as net income/total assets as of end of 2022) (expressed in percentage).
DE	Debt-to-equity ratio (calculated as total liabilities/total equity as of end of 2022).
EBITmargin	Profitability of a company (calculated as EBIT/Revenue as of end of 2022) (expressed in percentage).

EBITDAmargin	Profitability of a company (calculated as EBITDA/Revenue as of end of 2022) (expressed in percentage).
CEOduality	Dummy variable of CEO being also a chairman of the board (1 - CEO at the same time occupy a Chairman of the Board position, 0 - otherwise).
CEOtenure	Length of time in years the CEO has been in the position.
ChairTenure	Length of time in years the Chairman of the Board has been in the position.

Sources: author

2.3.1. Dependent variable

In order to measure the relationship between board structure – board size and independence in particular – the measure of financial performance for a company must be used. During the literature review on the topic, it was quite clear that most studies tend to use accounting-based financial performance measures including ROE and ROA or market-based measure Tobin's Q ratio. For instance, Dehaene et. al. (2001) using ROE found out that there is a positive relationship between the number of external directors and financial performance of the company. Elsayed (2007), Carter et. al. (2010), Dagsson and Larsson (2011) ant others used ROA to determine the relationship between firm's financial performance and board structure measured in various ways – gender, age, ethnic diversity of the board members. However, by far the most popular variable to measure firm's financial performance in relevant studies is Tobin's Q ratio. Ammari et. al. (2014) found that board structure is a determinant factor for French firm performance using Tobin's Q ratio. Also, Brick and Chidambaran (2010) using Tobin's Q ratio found that board activity has a positive impact on firm's value. Additionally, Butkevičiūtė (2020) while also using Tobin's Q ratio for measuring firm financial performance, did not find a significant relationship between gender and age of the board and firm financial performance studying a sample of Norwegian and Baltic publicly listed companies.

In this study, Tobin's Q ratio has been chosen as a dependent variable. It was calculated by dividing company's market capitalization plus total debt by total assets. Both total debt and total assets were taken as book values. Market capitalization was calculated or extracted directly for NASDAQ Baltic webpage – Morningstar report of the company. However, it is

important to note that Tobin's Q may not always provide a comprehensive depiction of a firm's financial performance. As mentioned before, in certain cases, it can primarily reflect growth prospects resulting from external circumstances rather than managerial choices (Pham, Suchard, and Zein, 2011). It is argued that Tobin's Q measure is considered a more reliable performance indicator and a preferred signal of a firm's competitive advantage due to its ability to reflect future performance based on evolving market expectations (Campbell & Minguez-Vera, 2008). In essence, Tobin's Q provides valuable insights into a company's prospects and its ability to outperform its competitors in the long run. Therefore, Tobin's Q ratio has been selected for this analysis as the main financial metric and ROE with ROA has been selected as control variables of the study.

2.3.2. Independent variables

The structure and nature of independent variables used in the analysis highly depend on the hypotheses raised in the paper. Independent variables can be divided into two separate groups that correspond to the number of hypotheses raised.

First group consists of only one variable regarding the number of members on the board (BoardSize). This variable is used to find out what is the relationship between the number of members on the board and firm financial performance. It was used in other relevant corporate finance studies on the topic including Cheng (2008). The researcher found out that larger boards have lower variability of enterprise performance.

Second group of independent variables are used to find out the results on the second hypothesis raised about the relationship between the independence of the board and firm financial performance. This group consists of two variables – number of independent directors on the board (NumIndDir) and proportion of independent directors compared to the size of the board expressed in percentage (IndPro). IndPro was calculated by the author by dividing the number of independent directors on the board by the number of board members in total. The most notable study analyzing the impact of independence of the board and firm financial performance is that done by Dehaene et. al. (2001). They found a positive relationship between the number of external directors and the return on equity.

Additionally, I opted against examining the supervisory board due to the diverse corporate structures on the NASDAQ Baltic Stock Exchange. Not all companies here follow a supervisory board model, making its inclusion impractical for a thorough study. This practical

decision helps maintain the research focus, ensuring its relevance across a wider range of firms. Furthermore, exploring the dynamics of the supervisory board, though potentially informative, falls outside the scope of this study. This approach allows for a more targeted investigation into the intricate relationship between specific board characteristics and a firm's financial performance.

2.3.3. Control variables

As previously mentioned, financial indicators ROE and ROA were selected as control variables for this study. In some studies, analyzing the same or similar question, ROE and ROA were selected as dependent variables (Ammari et. al., 2014; Carter et. al., 2010; Elsayed, 2007). Despite this and due to the fact that Tobin's Q ratio is more widely used as a dependent variable in relevant studies, ROE and ROA are selected as control variables while Tobin's Q ratio is used as a dependent variable of the analysis.

Furthermore, as control variable debt-to-equity (DE) ratio is incorporated. By incorporating the debt-to-equity ratio as a control variable in this study, it becomes possible to investigate how the company's capital structure might influence the connection between independent variables (like board size and composition) and the dependent variable (Tobin's Q ratio). This control variable allows the study to separate the distinct impacts of board characteristics on the company's performance from the potential influence of its capital structure. In essence, it enables the study to isolate and analyze the specific effects of board variables on performance, independent of the company's capital structure.

Relating on the study made by Butkevičiūtė (2020), EBIT (Earnings Before Interest and Taxes) and EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization) margins (EBITmargin, EBITDAmargin) have been included in the study as control variables as well. EBIT and EBITDA margins are included in this study as control variables, allowing for the assessment of their potential impact on the link between the independent variables. The study tries to take into account the effect of a company's financial performance on the observed enterprises by using these profitability metrics as controls.

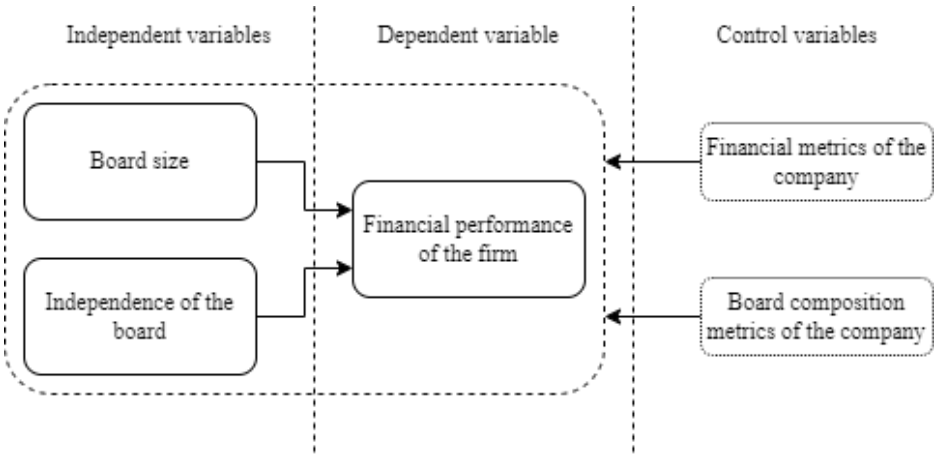
Moreover, additional three variables have been included in the study: dummy variable of CEO being also a chairman of the board (CEOduality), length of time in years the CEO has been in the position (CEOtenure) and length of time in years the Chairman of the Board has been in the position (ChairTenure). CEOduality inclusion as a control variable in this study

allows for the examination of the potential impact of CEO simultaneously occupying the position of Chairman of the Board on the relationship between the independent variables and Tobin's Q ratio. Controlling for CEOduality helps to assess whether the combination of CEO and Chairman roles influences the company's performance, independent of other board characteristics. Incorporating CEOtenure as a control variable enables to find out how the duration of the CEO's tenure impacts the relationship between independent variables and firm financial performance. By controlling for CEOtenure, the study takes into consideration the potential influence of CEO experience and time in the position on the company's performance, enabling a more detailed analysis of board variables. Furthermore, ChairTenure is added to the study as a control variable in order to examine the potential impact of the Chairman of the Board's length of time in the position on the relationship between board composition and firm financial performance. Controlling for this variable helps to assess whether the stability and continuity in board leadership influence the company's performance, independent of other board composition aspects.

The overview of the relationships between variables used in study are presented in the following graph.

Figure 3

A summarized description of relationships between variable groups used in the study



Sources: author, produced using draw.io software

2.4. Model description

In order to conduct the analysis, OLS (ordinary least squares) simple linear regression methodology has been selected. The reason for selecting the OLS model procedure for this

study is because it is well-suited and user-friendly for examining the relationship between board structure and firm performance in NASDAQ Baltic listed companies. OLS regression is widely used and trusted for analyzing the connections between continuous variables in the similar studies like Butkevičiūtė (2020).

OLS allows to estimate coefficients, determine their significance, and understand the strength and direction of the relationships (IBNET, 2021). This makes it a suitable choice for investigating raised hypotheses in the study on the links between board size, board independence, and firm performance. Additionally, OLS regression provides straightforward and easy-to-understand results, making it convenient to draw conclusions and for sharing and discussing findings with stakeholders and decision-makers if necessary. Moreover, OLS model allows to include control variables in the analysis to account for other factors that may influence the relationship, enhancing the reliability of study findings (IBNET, 2021). As mentioned before, OLS model has been previously used in similar studies like Guest (2009), Arosa et. al. (2010), Butkevičiūtė (2020). In summary, the OLS model procedure was chosen because it fits well with research objectives raised in the study, offers clear interpretation of results, and accommodates the complexities of examining board structure's impact on the outcomes of NASDAQ Baltic listed companies.

Furthermore, several regression assumptions will be tested to ensure validity and reliability of performed linear regression analysis. First, the linearity assumption necessitates a linear relationship between the dependent and independent variables (Schreiber-Gregory and Bader, 2018). To assess this, scatter plots and residual plots will be utilized to detect any evident non-linear patterns or relationships. Another important assumption is homoscedasticity, which requires the variance of the residuals to be constant across all levels of the independent variable (ibid.). This will be evaluated by plotting the residuals against the predicted values and ensuring a consistent spread of residuals. Also, it is important to check the relationships between variables for multicollinearity. Multicollinearity refers to high correlation among the independent variables and can distort the estimation of their effects (ibid.). Finally, the absence of influential outliers is crucial. Outliers, extreme observations, have the potential to significantly impact the regression results therefore data will be checked for these kinds of entries. Adhering to these assumptions is fundamental to ensure the robustness and validity of the simple linear regression analysis in this thesis.

3. THE EMPIRICAL RESEARCH

In this section, description of the data sample collected for the study, variable correlations, regression analysis and results are presented. Additionally, insights on the practical use of the research results are provided.

3.1. Description of the data sample

Firstly, it is important to have a look at the general overview of the data collected. Mainly the simple averages, median values, standard deviation (S.D.), minimum and maximum values. This data is presented in the following table which was arranged in the Microsoft Excel sheet using specific functions on the collected data of the companies.

Table 4

A summarized descriptive statistics of the data sample (data of 64 NASDAQ Baltic listed companies)

Variable	Mean	Median	S.D.	Min	Max
TobinsQ	1,17	0,88	0,94	0,20	6,04
BoardSize	4,70	5,00	1,48	2,00	9,00
NumIndDir	0,91	1,00	1,15	0,00	5,00
IndPro	18,68%	14,29%	22,46%	0,00%	100,00%
ROE	8,73%	6,79%	45,99%	-78,74%	322,10%
ROA	1,57%	3,07%	11,41%	-51,42%	23,28%
DE	1,71	1,14	3,12	-13,45	13,58
EBITmargin	20,78%	7,13%	69,94%	-72,52%	411,48%
EBITDAmargin	24,10%	13,16%	58,20%	-67,57%	411,48%
CEOduality	0,06	0,00	0,24	0,00	1,00
CEOtenure	7,55	5,44	6,69	0,58	32,08

ChairTenure	7,20	5,19	6,64	0,08	24,30

Sources: author, using Excel

Starting with the dependent variable, Tobin's Q, which measures firm performance, a mean value of 1,17 and a median value of 0,88 can be observed. The standard deviation of 0,94 indicates considerable variability in the data. The minimum Tobin's Q value of 0,20 and the maximum of 6,04 demonstrate a wide range of firm performance among the sample companies. This suggests that there are significant differences in how these companies are valued by the market – 25 companies out of 64 (40%) have a Tobin's Q ratio equal or higher than 1,00 while others have a lower value than 1,00. Interestingly, the data on Tobin's Q ratio of NASDAQ Baltic listed companies collected as of end of 2022 differs significantly compared to the same data sample collected by Butkevičiūtė (2020) at the end of 2019. In the data collection made by Butkevičiūtė (2020) the maximum value of Tobin's Q ratio was 3,12 while in the data collected for this thesis, there are 4 companies that have a higher Tobin's Q ratio than that. It might be the consequence of the 2021 boom of the stock market that appeared after the COVID-19 downturn of 2020.

Moving on to the independent variables, we find that the mean board size is 4,70, with a median of 5,00 members per board. The standard deviation of 1,48 suggests some variation in the number of board members among the companies. The minimum board size of 2 and the maximum of 9 indicate that the sample includes companies with diverse board sizes. Interestingly, the median board size is higher than the mean, indicating a slight left-skewness in the distribution.

Considering the independence of the board, we find that the mean number of independent directors (NumIndDir) is 0,91, with a median of 1,00. This implies that, on average, there is less than one independent director on the boards of the NASDAQ Baltic listed companies in the sample. However, the standard deviation of 1,15 indicates significant variability in the number of independent directors across the companies. The minimum value of 0 and the maximum value of 5 highlight the varying levels of independence in the boards of these companies. The companies in the data sample differ in terms of board independence and that provides great possibilities for the relationship finding between board composition and firm financial performance.

Furthermore, the variable IndPro represents the proportion of independent board members as a percentage. The mean value of IndPro is 18,68%, with a median of 14,29%. The

standard deviation of 22,46% reflects considerable diversity in the level of board independence across the sample. Notably, the minimum value of 0,00% indicates that some companies have no independent board members, while the maximum value of 100,00% suggests that certain companies have entirely independent boards. This variation in board independence levels provides an interesting aspect to explore further in relation to firm performance.

Moving on to the control variables, we examine the mean ROE and find it to be 8,73%, with a median of 6,79%. The standard deviation of 45,99% indicates a wide dispersion of ROE values across the sample companies. The minimum ROE of -78,74% and the maximum of 322,10% reveal the presence of both highly profitable and underperforming companies within the dataset.

The mean ROA is 1,57%, with a median of 3,07%. The standard deviation of 11,41% suggests relatively less variability in ROA compared to ROE. The range between the minimum value of -51,42% and the maximum of 23,28% again demonstrates the diverse profitability levels of the companies.

Moreover, examining the debt-to-equity ratio (DE), we observe a mean value of 1,71. The median of 1,14 indicates that the distribution is slightly right-skewed. The standard deviation of 3,12 suggests substantial variation in the debt levels of the sample companies. Interestingly, the range between the minimum value of -13,45 and the maximum of 13,58 indicates the presence of companies with negative equity in the dataset. In this particular case, one company has significantly negative retained earnings, with losses exceeding the value of the company's common stock.

Analyzing the profitability measures, we find that the mean EBIT margin is 20,78%, with a median of 7,13%. The standard deviation of 69,94% reflects significant variability in the profitability levels among the sample companies. The minimum EBIT margin of -72,52% and the maximum of 411,48% reveal the presence of companies with both negative and exceptionally high profitability.

Similarly, the mean EBITDA margin is 24,10%, with a median of 13,16%. The standard deviation of 58,20% indicates considerable variation in the profitability levels based on EBITDA. The minimum EBITDA margin of -67,57% and the maximum of 411,48% further highlight the diversity in profitability across the companies.

Examining the CEO-related variables, we find that the mean CEO duality is 0,06, indicating that in a small portion of the sample companies, the CEO also occupies the position of the board chairman. The median value of 0,00 suggests that for most companies, these positions are held separately. The standard deviation of 0,24 indicates some variability in CEO duality across the companies. By looking at the variable of CEO tenure, we observe a mean value of 7,55 years and a median of 5,44 years. The standard deviation of 6,69 years indicates significant variation in the length of time CEOs have been in their positions. The minimum CEO tenure of 0,59 years and the maximum of 32,08 years demonstrate a wide range of CEO experience within the dataset.

Finally, for Chairman of the board tenure, we find a mean value of 7,20 years and a median of 5,19 years. The standard deviation of 6,64 years suggests variability in the length of time chairpersons have been in their positions. The minimum Chair tenure of 0,08 years and the maximum of 24,30 years indicate diverse levels of experience among the board chairs.

3.2. Correlation analysis

This section provides correlation table and analysis of the variables used in the study.

Table 5

Pearson's correlation matrix with 5% critical value (two-tailed) = 0,206 (n = 64)

	TobinsQ	BoardSize	NumIndDir	IndPro	ROE	ROA	DE	EBITmargin	EBITDAmar	CEOduality	CEOtenure	ChairTenure
TobinsQ	1,00											
BoardSize	-0,31	1,00										
NumIndDir	-0,20	0,27	1,00									
IndPro	-0,21	0,11	0,95	1,00								
ROE	-0,20	-0,07	0,04	0,04	1,00							
ROA	-0,38	0,08	0,24	0,28	0,19	1,00						

DE	-0,19	0,32	0,07	0,06	-0,53	0,14	1,00					
EBITmargin	-0,20	-0,16	-0,05	-0,04	0,09	0,40	-0,01	1,00				
EBITDAmargin	-0,26	-0,11	0,00	0,02	0,10	0,40	0,02	0,87	1,00			
CEOduality	0,29	-0,08	-0,18	-0,19	-0,04	-0,01	0,02	-0,09	-0,11	1,00		
CEOtenure	0,09	0,04	-0,17	-0,20	0,01	0,21	-0,06	0,07	0,03	0,26	1,00	
ChairTenure	0,02	-0,11	-0,17	-0,15	0,13	0,13	0,01	0,07	0,01	0,22	0,46	1,00

Sources: author, using PSPP software

The correlation coefficient between Tobin's Q and BoardSize is -0,31. This negative correlation indicates a relationship between these variables. The magnitude of the correlation suggests that as the number of the members on the board increases, there tends to be a slight decrease in firm performance. The correlation coefficient between Tobin's Q and number of independent board members is -0,20. Although the correlation is negative, indicating a weak relationship, it suggests that as the number of independent directors on the board increases, there may be a slight decrease in firm performance. Similarly, the correlation coefficient between Tobin's Q and the percentage of independent members on the board is -0,21, implying a weak negative association between the proportion of independent board members and firm performance. This finding supports the notion that greater board independence may not necessarily lead to improved firm performance.

Beyond the variables directly related to board structure, the correlation matrix also reveals associations between Tobin's Q and control variables. For instance, Tobin's Q shows a negative correlation with ROA of -0,38 and EBIT margin -0,20, indicating that higher firm performance is associated with lower returns on assets and lower profitability. These findings undermine the importance of financial indicators in understanding firm performance and does not support the validity of the Tobin's Q ratio as a measure of company performance. Positive correlation between Tobin's Q and CEO duality of 0,29 raises intriguing questions regarding the impact of concentrated power on firm performance. The positive association suggests that companies with CEOs also serving as board chairpersons tend to exhibit higher firm performance.

Surprisingly, certain assumptions commonly held regarding the relationships between the variables in this study may not hold true. One notable assumption relates to the expected correlation between variables associated with financial performance, specifically Tobin's Q and ROE. These variables are widely utilized as indicators of financial success and represent distinct facets of firm performance. However, the absence of a significant correlation between them suggests the influence of factors beyond a simplistic linear relationship. This finding highlights the need to explore potential nonlinear associations or consider additional control variables that may contribute to a better understanding of the relationship between these variables.

Similarly, it might be anticipated that Tobin's Q would display a positive correlation with variables linked to profitability, such as EBIT margin and EBITDA margin. Greater profitability is typically associated with stronger firm performance, which, in turn, might manifest in a higher Tobin's Q ratio. Nevertheless, the lack of a substantial correlation between these variables suggests the presence of other influential factors. These factors could include variations in cost structures or industry-specific dynamics, which might impact the relationship between profitability and firm performance.

These findings underscore the intricate nature of the variables under investigation and challenge preconceived notions. The absence of anticipated correlations prompts a closer examination of potential nonlinear associations and the incorporation of additional variables to unravel the complexities surrounding the relationships among the variables. By adopting a more comprehensive approach, a deeper understanding of the dynamics at play within the NASDAQ BALTIC listed companies can be attained.

3.3. Testing validity and reliability of regression analysis

In this section, data and variables are tested for validity, reliability and robustness. As mentioned before, in the methodology description of this thesis, dependent and independent variables are tested for linearity, homoscedasticity, absence of multicollinearity, and absence of influential outliers.

Linearity

In order to check dependent and independent variables for linearity, scatterplots for variables had to be used. The plots have been generated using PSPP software. The scatterplot

for variables Tobin's Q and BoardSize has shown slight negative linearity between the two – the larger the board the lower the estimated Tobin's Q. The scatterplot for variables Tobin's Q and NumIndDir has shown that there is slight negative linearity between the two variables as well. In conclusion, a medium level of linearity between dependent and independent variables was found.

Homoscedasticity

Moreover, the Breusch-Pagan test has been conducted to indicate if dependent and independent variables are homoscedastic or suffer from heteroscedasticity. After calculating squared residual of the dependent variable, the auxiliary regression model has been developed. It has shown that the model does not suffer from heteroscedasticity as auxiliary regression model explains a relatively low proportion of the variance in the squared residuals (13%) or adjusted for the number of independent variables and sample size (9%). Despite this, scatterplot analysis shows a low level of heteroscedasticity between the dependent and independent variables. It is generally preferred to have a relatively constant spread of residuals across different predicted values or groups. In conclusion, the model might suffer from a low level of heteroscedasticity as scatterplots show some variability of residuals across different levels of independent variables.

Absence of multicollinearity

The analysis aimed to examine if there were strong correlations between the variables used in the study. The focus was on understanding the strength and significance of the linear relationships. The analysis revealed a moderate positive relationship between board size and the number of independent directors. This means that as the board size increases, there tends to be an increase in the number of independent directors. This relationship is visible in Table 5, where correlation indicators between different variables are presented. Additionally, a strong positive relationship was observed between the number of independent directors and the proportion of independent board members. This suggests that as the number of independent directors increases, the proportion of independent board members also tends to rise. This is not that surprising as proportion of independent directors of the board is directly calculated using board size and number of independent directors. All in all, these results indicate the potential presence of multicollinearity, which means that these variables are highly correlated with each

other. To address this issue, it was decided to exclude the proportion of independent board members as a variable from the regression analysis conducted in this thesis. By doing so, we can ensure more reliable and accurate results in our study.

Absence of influential outliers

As mentioned before, one entry from the general data list had to be removed due to having an enormous outlier value in one of the control variables. Despite this, it was decided to conduct a full-scale search for influential outliers on the dataset. One additional entry left after the initial check could also be problematic in terms of being an influential outlier. This company in particular has a Tobin's Q ratio of 10,28 and only 1 member on the board as of the end of 2022. Due to unusual nature of having such a high profitability with just one member of the board, it was decided to remove this company from the final analysis as well. That would leave us with 64 final entries in the dataset.

3.4. Regression analysis

The OLS linear regression analysis is presented in two separate models for each independent variable and one combined model number 3. Model 1 takes board size as independent variable and control variables into account for testing hypothesis number 1. The analysis results for model 1 are presented in the following table. Model 2 takes board size as independent variable and control variables into account for testing hypothesis number 2. Model 3 takes all independent and control variables into account to check if there are significant changes when including both independent variables into the regression analysis model.

Table 6

Linear regression results of model 1. Board size as an independent variable.

R	R squared	Adjusted R squared	Std. Error of the Estimate
0,48	0,23	0,10	0,89

	Sum of squares	df	Mean square	F	Sig.
Regression	12,94	9	1,44	1,82	0,085

Residual	42,65	54	0,79		
Total	55,59	63			

Independent Variable	Coefficient (TobinsQ)	Std. Error	Beta	t-value	Sig.	Lower Bound	Upper Bound
(Constant)	1,61	0,43	0,00	3,75	,000***	0,75	2,47
BoardSize	-0,05	0,08	-0,08	-0,61	,544	-0,22	0,12
ROE	-0,01	0,00	-0,32	-2,08	,042**	-0,01	0,00
ROA	-0,01	0,01	-0,16	-1,15	,255	-0,04	0,01
DE	-0,11	0,05	-0,36	-2,23	,030**	-0,20	-0,01
EBITmargin	0,00	0,00	0,07	0,30	,766	-0,01	0,01
EBITDAmargin	0,00	0,00	-0,19	-0,78	,439	-0,01	0,00
CEOduality	-0,25	0,48	-0,06	-0,51	,612	-1,21	0,72
CEOtenure	0,02	0,02	0,14	0,98	,330	-0,02	0,06
ChairTenure	0,00	0,02	-0,02	-0,17	,868	-0,04	0,04

Note: significance levels:
* significance at the 10% level
** significance at the 5% level
*** significance at the 1% level
Sources: author, using PSPP software

Firstly, the model has an R-squared value of 0,23, indicating that approximately 23% of the variance in Tobin's Q can be explained by the independent variables included in the model. The adjusted R-squared value of 0,10 suggests that the model's explanatory power is modestly improved when accounting for the number of predictors. The standard error of the estimate is 0,89, representing the average difference between the observed and predicted values of Tobin's Q.

Starting with the coefficient values, it is observed that the coefficient for the BoardSize variable is -0,05, indicating a negative relationship between board size and Tobin's Q ratio. However, the coefficient is not statistically significant (t-value = -0,61, p = 0,544). This implies that there is insufficient evidence to support a significant relationship between board size and firm performance.

Moving on to the control variables, it is notable that the ROE variable has a negative coefficient of -0,01, which is statistically significant (t-value = -2,08, p = 0,042). This suggests that a decrease in ROE is associated with a slight increase in firm performance, holding other

variables constant. Similarly, the DE variable has a negative coefficient of -0,11, which is also statistically significant at the 5% level (t-value = -2,23, p = 0,030). This indicates that higher levels of debt relative to equity are associated with lower firm performance. On the other hand, variables such as EBITmargin and EBITDAmargin do not show statistically significant relationships with firm performance. Regarding the variables related to the board structure, neither CEOduality nor ChairTenure exhibit significant relationships with firm performance.

To provide insights into hypothesis number 1 of the thesis, which proposes an inverted U-shaped relationship between board size and firm performance, it is important to note that the coefficient for BoardSize is negative but not statistically significant. This suggests that there is no conclusive evidence to support the hypothesized relationship in the context of NASDAQ Baltic listed companies. Overall, based on the results of this regression analysis model number 1, it appears that factors such as ROE and DE ratios play more significant roles in determining firm performance compared to board size. These findings do not support any of the studies who found significant relationship between board size and firm financial performance. Therefore, regression results also do not support the findings of Coles et. at. (2008) – that there is an inverted U-shaped relationship between firm financial performance and board size.

Table 7

Linear regression results of model 2. Number of independent members on the board.

R	R squared	Adjusted R squared	Std. Error of the Estimate
0,49	0,24	0,12	0,88

	Sum of squares	df	Mean square	F	Sig.
Regression	13,60	9	1,51	1,94	0,065
Residual	41,99	54	0,78		
Total	55,59	63			

Independent Variable	Coefficient (TobinsQ)	Std. Error	Beta	t-value	Sig.	Lower Bound	Upper Bound
(Constant)	1,53	0,25	0,00	6,10	,000***	1,03	2,04
NumIndDir	-0,12	0,11	-0,14	-1,11	,272	-0,33	0,09

ROE	-0,01	0,00	-0,33	-2,17	,034**	-0,01	0,00
ROA	-0,01	0,01	-0,11	-0,74	,463	-0,03	0,02
DE	-0,12	0,04	-0,39	-2,59	,012**	-0,21	-0,03
EBITmargin	0,00	0,00	0,06	0,24	,815	-0,01	0,01
EBITDAmargin	0,00	0,00	-0,18	-0,76	,453	-0,01	0,00
CEOduality	-0,33	0,48	-0,09	-0,68	,499	-1,29	0,64
CEOtenure	0,01	0,02	0,11	0,74	,461	-0,03	0,05
ChairTenure	0,00	0,02	-0,02	-0,17	,862	-0,04	0,04

Note: significance levels:
* significance at the 10% level
** significance at the 5% level
*** significance at the 1% level
Sources: author, using PSPP software

Starting with the Model Summary table, it shows that the model has an R-squared value of 0,24, indicating that approximately 24% of the variation in Tobin's Q can be explained by the independent variables included in the model. The adjusted R-squared value of 0,12 accounts for the number of predictors and suggests that the model's explanatory power is modestly improved.

Moving to the ANOVA table, it reveals that the regression model yields a non-significant F-statistic of 1,94 with a p-value of 0,065. Although the p-value is above the conventional threshold of 0,05, it is notable that it is relatively close to the threshold, suggesting a possible marginal significance. This indicates that the independent variables, as a whole, may have some influence on explaining the variation in Tobin's Q.

Analyzing the coefficients, we find that the NumIndDir variable, representing the number of independent directors on the board, has a coefficient of -0,12, suggesting a negative relationship with Tobin's Q. However, the coefficient is not statistically significant (p = 0,272), indicating insufficient evidence to support a significant relationship between the number of independent directors and firm performance.

Examining control variables, we observe the same situation as in the model number 1 - the DE variable has a negative coefficient of -0,12, which is statistically significant (p = 0,012). Again, indicating that higher levels of debt relative to equity are associated with lower firm performance. Furthermore, the ROE variable has a negative coefficient of -0,01, which is again statistically significant as well (p = 0,034). This suggests that a decrease in ROE is associated

with an increase in firm performance when other variables are held constant. As in the first model, variables such as EBITmargin, EBITDAmargin, CEOduality, CEOtenure, and ChairTenure do not demonstrate significant relationships with firm performance.

Considering hypothesis number 2 of the thesis, which proposes that greater board independence leads to better firm performance, the analysis does not provide evidence to support this hypothesis. The coefficient for the NumIndDir variable is not statistically significant, suggesting that the number of independent directors on the board does not have a significant impact on firm performance in the context of NASDAQ Baltic listed companies.

Table 8

Linear regression results of model 3. Combined independent variables and control variables.

R	R Square	Adjusted R Square	Std. Error of the Estimate
0,52	0,27	0,13	0,91

	Sum of Squares	df	Mean Square	F	Sig.
Regression	13,69	10	1,37	1,73	0,098
Residual	41,90	53	0,79		
Total	55,59	63			

Independent Variable	Coefficient (TobinsQ)	Std. Error	Beta	t-value	Sig.	Lower Bound	Upper Bound
(Constant)	1,65	0,43	0,00	3,82	0,000***	0,78	2,52
BoardSize	-0,03	0,09	-0,05	-0,33	,740	-0,20	0,15
NumIndDir	-0,11	0,11	-0,13	-0,97	,335	-0,33	0,11
ROE	-0,01	0,00	-0,32	-2,10	,040**	-0,01	0,00
ROA	-0,01	0,01	-0,11	-0,76	,449	-0,03	0,02
DE	-0,11	0,05	-0,36	-2,30	,025**	-0,21	-0,01
EBITmargin	0,00	0,00	0,04	0,17	,867	-0,01	0,01
EBITDAmargin	0,00	0,00	-0,18	-0,75	,455	-0,01	0,00
CEOduality	-0,32	0,49	-0,08	-0,65	,517	-1,30	0,66
CEOtenure	0,02	0,02	0,11	0,79	,434	-0,03	0,06

ChairTenure	0,00	0,02	-0,03	-0,22	,826	-0,04	0,04

Note: significance levels:
* significance at the 10% level
** significance at the 5% level
*** significance at the 1% level
Sources: author, using PSPP software

The linear regression results of model 3, which takes both independent variables and all control variables into account, reveals some interesting insights. The reason behind this model is to examine how significant are all independent and control variables together in determining Tobin's Q ratio of a company. The model has an R-squared value of 0,27, indicating that approximately 27% of the variance in the dependent variable (TobinsQ) can be explained by the independent variables and control variables included in the model. The adjusted R-squared value of 0,13 suggests that when considering the number of predictors, the model's explanatory power is somewhat reduced.

Looking at the individual coefficients, just like in models 1 and 2 same variables show statistically significant relationships with TobinsQ. The variable ROE has a negative coefficient of -0,01, indicating that a one-unit increase in ROE is associated with a decrease of 0,01 in TobinsQ. This coefficient is statistically significant at the 5% level ($p < 0.05$), suggesting a meaningful impact of ROE on TobinsQ. Similarly, the variable DE has a negative coefficient of -0,11, indicating that higher levels of debt are associated with lower TobinsQ values. This coefficient is also statistically significant at the 5% level. On the other hand, variables such as BoardSize, NumIndDir, and EBITmargin do not show statistically significant relationships with TobinsQ. These coefficients have p-values greater than 0,05, indicating that the observed relationships could be due to chance.

It is worth noting that the coefficient of determination (R-squared) is relatively low, suggesting that there might be other factors not considered in the model that influence TobinsQ. Additionally, the p-values associated with the F-test for regression indicate that the overall regression model is not statistically significant ($p = 0,098$). This implies that the combined effect of all the independent variables in predicting TobinsQ might not be strong.

3.5. Results

The analysis of three regression models offers valuable insights into the interplay between board characteristics, firm performance, and Tobin's Q for companies listed on

NASDAQ Baltic. Contrary to Hypothesis 1, which posits an inverted U-shaped association between board size and firm performance, the empirical results fail to support this notion. Across all three models, the coefficient pertaining to board size lacks statistical significance, indicating inadequate evidence to establish a robust link between board size and firm performance. Likewise, the findings do not lend support to Hypothesis 2, which suggests that enhanced board independence corresponds to superior firm performance. The variable representing board independence does not exhibit a statistically significant relationship with Tobin's Q across any of the models. Nonetheless, certain variables consistently display statistically significant associations with firm performance throughout all three models. Notably, Return on Equity and Debt-to-Equity ratios showcase such relationships. A decrease in ROE coincides with an increase in firm performance, whereas higher levels of debt relative to equity are linked to diminished firm performance.

Collectively, these findings underscore the greater significance of factors such as ROE and DE ratios in shaping firm performance when compared to board characteristics, specifically board size and independence. It is crucial to contextualize these conclusions within the framework of the examined NASDAQ Baltic listed companies and acknowledge the potential influence of unexplored factors on firm performance. Consequently, further research and analysis are warranted to deepen our understanding of the intricate relationships between board characteristics and firm performance within this specific context.

3.6. Applying research results to practice

The research outcomes bear significant implications for organizations operating in the NASDAQ Baltic region. The findings indicate that board characteristics, specifically board size and independence, exhibit limited direct influence on firm performance, as they did not demonstrate statistically significant relationships with Tobin's Q in any of the three models. Consequently, organizations should avoid exclusively focusing on modifying board size or augmenting board independence as sole strategies to enhance their financial performance. Instead, the study highlights the paramount importance of financial indicators, such as ROE and DE ratios, in shaping firm performance. It is crucial for organizations to prioritize tactics that keep ROE on relatively low levels, as a consistent increase in this ratio corresponds to a decline in firm performance. Moreover, effective management of debt levels relative to equity is imperative, given the consistent linkage between higher DE ratios and diminished firm

performance. These findings underscore the significance of financial management practices that fortify profitability and maintain a balanced debt-to-equity ratio.

Furthermore, the outcomes imply the existence of unexplored factors that exert influence on firm performance in the NASDAQ Baltic context. Hence, organizations and academia should undertake further research endeavors to gain a more comprehensive understanding of these factors and their implications. By identifying and addressing these unexplored factors, organizations can refine their strategies and decision-making processes, thereby augmenting firm performance.

CONCLUSIONS AND RECOMMENDATIONS

1. In the first part of the thesis, it was found that the topic of board composition's effect on firm performance is quite extensively analyzed. The results vary significantly in the scope of studies for board composition and firm performance. The direction and significance of the relationship of the two may vary across different geographies, timeframes and variables used. Contemporary studies mainly would use board size, board independence and various diversity of board composition variables to measure board structure characteristics. Most popular financial ratios used for measurement of firm performance are Tobin’s Q, ROE and ROA.

2. Most common variable used for board composition is board size. Some studies have found that larger boards are more preferable while others that small ones are more desirable. A significant number of studies have found the U-shaped relationship between board size and firm performance that might be explained by the nature of operations handled in either very small or extremely large companies. While using other variables like number of external directors on the board, diversity by gender, age and so on, the results maintain their variability so an extensive, cross-sectional analysis is required to draw more conclusive results.

3. The analysis utilized data from 64 Baltic NASDAQ listed companies, comprising 28 Lithuanian-based, 25 Estonian, and 11 Latvian listed companies. Although the sample does not represent the entire population of NASDAQ Baltic listed companies, with 10 companies excluded, this decision was made due to difficulties in obtaining accurate data, including financial metrics and the number of independent directors. The information collected for this analysis reflects the state of affairs at the close of the year

of 2022. The OLS regression methodology was selected for this thesis due to its suitability and user-friendliness in analyzing the relationship between board structure and firm performance in NASDAQ Baltic listed companies.

4. The results of the empirical analysis do not support Hypothesis 1, which suggests an inverted U-shaped relationship between board size and firm performance. The coefficient related to board size lacks statistical significance in all models, indicating insufficient evidence to establish a strong connection between board size and firm performance. Thus, it appears that the size of the board may not have a direct impact on the performance of companies listed on NASDAQ Baltic.

5. Similarly, the findings do not provide support for Hypothesis 2, which proposes that increased board independence leads to superior firm performance. The board independence was measured using two variables – number of independent directors on the board and proportion of independent directors compared to the size of the board expressed in percentage. The variable representing board independence does not demonstrate a statistically significant relationship with Tobin's Q across any of the regression models. Therefore, it seems that enhancing board independence may not necessarily result in improved firm performance within the NASDAQ Baltic context.

6. The analysis consistently shows statistically significant associations between firm performance and financial indicators such as ROE and DE ratios. A decrease in ROE is associated with an increase in firm performance, while higher levels of debt in relation to equity are linked to diminished firm performance. These findings emphasize the greater significance of financial management practices, particularly in terms of ROE and DE ratios, in shaping firm performance compared to board characteristics. This highlights the importance of effective financial management strategies in optimizing firm performance for companies operating in the NASDAQ Baltic region.

7. Future research on NASDAQ Baltic listed companies should go beyond just board size and independence. It could dig deeper into board diversity, looking at things like members' backgrounds and expertise or other cultural aspects of firm management. Studying how these factors affect company performance over time (longitudinal analysis) could reveal significant patterns. Comparing findings with other stock exchanges might highlight specific influences as well. Also, using interviews and case studies alongside numbers could give a richer picture. Moreover, including non-

financial aspects like innovation and social responsibility would give a fuller view of success in general and exploring if certain board traits matter more in specific industries could be even more insightful. In short, future studies should mix up their methods, consider more factors, and keep exploring to better understand how board structure and company performance connect in the NASDAQ Baltic scene.

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SUMMARY IN LITHUANIAN

VALDYBOS STRUKTŪROS ĮTAKA NASDAQ BALTIC LISTINGUOJAMŲ ĮMONIŲ REZULTATAMS

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Magistro darbas

Finansų ir bankininkystės magistro programa

Vilniaus universiteto ekonomikos ir verslo administravimo fakultetas

Darbo vadovas – Algimantas Laurinavičius, Doc., Dr., Vilnius, 2024

SANTRAUKA

59 puslapiai, 7 lentelės, 1 diagrama, 75 nuorodos.

Magistro darbe nagrinėjama valdybos struktūros įtaka NASDAQ Baltic sąraše įtrauktų įmonių finansiniams rezultatams. Studijoje iškeltos dvi hipotezės: pirmoji hipotezė teigia, kad yra atvirštinis U formos ryšis tarp valdybos dydžio ir įmonės veiklos rezultatų, o antroji hipotezė teigia, kad kuo didesnė valdybos nepriklausomybė, tuo geresni įmonės veiklos rezultatai. Darbo tikslas yra nustatyti šių sąryšių reikšmingumą ir kryptį.

Analizei atlikti naudojamas paprastosios tiesinės regresijos modelis, kuris, apžvelgus panašius atliktus tyrimus, yra tinkamas valdybos struktūros įtakos įmonių veiklos rezultatų tyrimams. Pasirinktas regresinis modelis leidžia įvertinti koreliacijos koeficientus, nustatyti jų reikšmingumą ir suprasti ryšių stiprumą bei kryptį tarp tiriamų kintamųjų. Analizėje taip pat įtraukiami kontrolės kintamieji, siekiant atsižvelgti į kitus veiksnius, galinčius turėti įtakos priklausomo bei nepriklausomų kintamųjų ryšiui.

Regresijos analizė parodė nesant pakankamai įrodymų, palaikančių pirmąją ar antrąją tyrimo hipotezes. Valdybos dydis bei didesnė valdybos nepriklausomybė nėra susijusi su geresniais įmonės veiklos rezultatais. Vis dėlto, dalis pasirinktų kontrolės kintamųjų, įskaitant nuosavybės grąžą (ROE) bei įmonės skolos ir nuosavybės santykį (DE), nuosekliai rodė statistiškai reikšmingą ryšį su įmonės finansiniais rezultatais. Tyrimo išvadose pabrėžiama apie šių finansinių rodiklių reikšmingumą formuojant įmonės veiklos rezultatus – kylant ROE bei

DE gali prastėti įmonės finansiniai rezultatai. Be to, šie finansiniai rodikliai tiriamų įmonių apimtyje turi daugiau įtakos įmonės veiklos rezultatams nei įmonių valdybos struktūrą nusakantys kintamieji. Dėl šios priežasties, išvadose pabrėžiama veiksmingos finansinės valdymo praktikos svarba optimizuojant įmonės veiklos rezultatus Baltijos regione įsikūrusioms, listinguojamoms įmonėms.

Magistro darbas baigiamas rekomendacijomis tolimesniems tyrimams bei analizėms. Rekomenduojama geriau įsigilinti į valdybos kompozicijos ir įmonės veiklos rezultatų ryšį Baltijos regione listinguojamose įmonėse. Tyrimas taip pat pabrėžia poreikį atlikti išsamesnę skirtingų kintamųjų ir geografijų visapusišką tarpvalstybinę analizę, siekiant gauti daugiau aiškių rezultatų dėl valdybos sudėties poveikio įmonės veiklos rezultatams.