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# Association Between Board Gender Diversity and Company Performance in Baltic States

Master's Thesis

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We have written this master's thesis independently. All viewpoints of other authors, literary sources and data from elsewhere used for writing this paper have been referenced.

## Abstract

This paper is based on the analysis of the relationship between companies' financial performance and board gender diversity in Baltic States considering the high-level gender-based wage gap in Baltics and lack of research on board gender diversity issues for Baltics in existing literature. Descriptive analysis of the data presents evidence for single-sexed boards in Baltics and the fact that older companies from Baltics have more female in their corporate boards. Female existence in boards found to be correlated positively with Net Profit Margin (NPM) while higher share of female in boards has a negative association with NPM based on cross-sectional data analysis. From panel data analysis, authors find negative correlation between BLAU index and profitability ratios (ROE and ROA) and lagged negative relation between number of female board members and ROE while not finding any support for Critical Mass theory based on Estonian data. In contrast, PSM analysis results imply that adding one more female to the corporate boards has positive lagged association with ROA.

## Introduction

Improving diversity in boards has become one of the common ways to achieve better corporate governance quality (Alvarado et al., 2015). Alongside with other types of diversity, board gender diversity and its impact on company performance is one of the frequently visited topics in recent economic literature (Arora (2021), Brahma et al. (2021), Campbell & Minguez-Vera (2008), Darmadi (2011), etc). However, the issue is not analyzed in deep for the case of Baltic countries where gender-based wage gap is high and board gender diversity is low (Šilingienė & Radvila (2014), Deloitte (2016)). According to Nasdaq (2015) report, almost half of the managerial boards do not have any female members in Baltics while Latvia is mentioned as a leader for board gender diversity among Baltic countries. As suggested by Masso et al. (2021), one of the tools to lower firm level gender-based wage gap in Baltics is to appoint female board members.

In this paper, authors aim to understand how the relationship between board gender diversity and financial performance of the company based on the Baltic data. Following Masso et al. (2021), by identifing any positive correlation between board gender diveristy and company's financial performance in Baltics we can present an incentive for management to appoint female board members. The paper starts with the theoretical explanation of why gender diverse boards are expected to perform better and why it is needed to increase women participation in boards by refering to the different skills, attitudes, and social expectations towards male and female. Literature Review also suggests why women could perform worse than men by referring stereotype threat theory, critical mass theory, glass cliff phenomenon, and others.

To be able to identify the relationship between these two variables clearly, both cross-sectional and dynamic panel data analysis has been conducted. With this approach, authors are able to both comment about the association between the two phenomenon of company performance and board gender diversity and how the increase in board gender diversity correlates with company performance over the years. To understand the country-level differences, the descriptive comparison of board gender diversity level for three Baltic countries is provided while empricial analysis is also done in country level. In addition to linear regression analysis, PSM method is applied to understand the different characteristics of companies with and without female board members. By using Granger-causality test, authors tried to clarify if there is reverse causality in the regression analysis.

In addition to identify relationship between board gender diversity and company performance, authors also try to test different hypothesis regarding gender appointment to the boards and dynamics of board gender diversity that are provided in previous literature. Estonian panel data enables authors to see the dynamics of board gender diversity and female share of the boards between 1996 and 2020 while based on Baltic cross sectional data authors aim to find association between firm size and female appointment to boards.

Section 1 of the paper is devoted to the in depth analysis of existing literature on the current topic while also digging into the theoretical implications of gender diversity in a group. This section provides overview of indicators of company's financial performance and board gender diversity that are used in existing literature and will touch to gender equality related data for Baltics. Here, the authors also mention about the differentiated attitudes of male and female towards risk, communication, leadership, work ethics, and others which may affect company performance and shape the board appointment decision for male and female candidates. Section 2 and Section 3 provide the research methodology and descriptive data analysis where autors try to explain the data and empirical model built for the analysis. The results of the empirical analysis are presented and the discussion around the empirical analysis results are provided in Section 5. The authors conclude on the findings, clarify the limitations of the current research, and identify the prospects for future research on the topic in Section 5.

**CERCS code:** S180 Economics, econometrics, economic theory, economic systems, economic policy

## 1. Literature Review

In broad terms, gender inequality refers to how people are treated in different ways based on their gender, where, on average, men are provided with better treatment standards by the society. While there is a growing trend of implementing a variety of strategies to support diversity in the organizations, most of these strategies avoid gender inequality issues by focusing on other categories of diversity (Embrick, 2011). While some of the employers implement policies that improve workplace diversity to generate better employee performance, some of them try to avoid fines and other types of punishments from the government by implementing these policies

(Scarborough et al., 2019). Another evidence for the formality of gender diversity policies of the companies is from Ujunwa et al. (2012) where it was identified that while number of female board members is increasing, new female board members do not replace the male ones, and inclusion of women to boards in these companies only increases the size of the board. While the number of female leaders increases in Europa, the significantly higher proportion of male in leadership positions compared to female is still existing (Jourová, 2016). One of the reasons for companies to avoid changing the gender composition of the boards because is that it is considered as a costly process (Bøhren & Strøm, 2010). Existing literature is more focused on gender diversity issues in boards while other types of diversity are not addressed much (Knyazeva et al., 2021).

Overall, high level of diversity in a group is considered to have positive impact on performance because of the fact that more diverse group means existence of people with different knowledge and skill background in a group (Erhardt et al., 2003). Kim et al. (2021) mentioned about reasons of the positive effects of gender diversity on company performance which includes possible competencies in the skills and knowledge of male and female employees and the fact that female involvement in decision-making improve the quality of results. Based on the gender-related roles assigned to the female and male in the society, female employees' attitudes as a team player are also expected to be different and more cooperative compared to the male (Eagly, 2007). Because of the differentiated skills and values of male and female, less developed small European economies are likely to benefit more from board gender diversity because of the uniqueness of the skills will be brought by female directors (Ionascu et al., 2018). Woolley et al. (2010) mentions about the higher level of group intelligence in the case of existence of women in the group as women found to better understand the body language of people and generate insights about the ideas of others. The authors also mention about higher equality in the groups, which involve women. According to Bear & Woolley (2011), one of the reasons why gender diverse groups are performing better is because of the different interpersonal skills of male and female – while women are good at equality in communication and leadership, men are better at eye contact. Within all parts of social life, including work and family, male found to be more task focused while female found to be social-emotional focused which brings out the fact that gender diverse teams will perform better instead of the teams which includes only male or only female (Aries, 1976). According to Kim & Starks (2016), newly appointed women add more new skills to the board's

existing skillset compared to newly men which, in turn, improve the advisory effectiveness of the board based on data for S&P SmallCap 600 companies.

Gender diversity is a bigger issue for high level positions and having boards that only consist of males makes the board not able to represent the society they operate and serve (Brammer et al., 2007). Tomala & Słowak (2020) identified difficulties for women to be appointed for high-level positions – such as political positions, alongside with their findings towards a positive relationship between gender equality and economic growth (measured by GDP per capita) – and high level gender-based wage differences. As mentioned by Nielsen & Huse (2010), the more diverse the team, more ideas and options will be provided which will cause continuous brain-storming in the team. While because of the belief that people who commit masculine behavior are more competent in holding high-level positions in an organization male are thought to be better board members, previous literature suggests that female are more effective in company to prevent the unethical behavior of management and, consequently, in protecting the shareholder value (Eagly et al., 2004; Franke et al., 1997). Alvarado et al. (2015) points also agency theory as one of the explanations why women presence in boards could affect financial performance positively through increased control and better commitment to shareholders' interests. Nielsen & Huse (2010) also suggests that the expectation regarding female will provide worse performance as board members than male affects the actual female board members' performance negatively based on the stereotype threat theory. Another explanation for why women appointment to boards is followed by the low performance is "glass cliff" phenomenon – which refers to the fact that women are more likely to get higher level positions when the possibility of failure is high (Bruckmüller & Branscombe, 2010). However, "Glass cliff" phenomenon is tested by Bechtoldt et al. (2019) based on the data from 233 German and British companies for the 2005-2015 period. The analysis results shows that there is a negative reaction of the shareholders to the female becoming a board member in the short-term which is not consistent with what is referred by "glass cliff".

Another part of the literature focuses on the different attitudes of women and men towards risk. Female have stronger direct response to risk and ambiguity compared to male (Borghans et al., 2009). From financial perspective, female construct and maintain lower risk portfolios (Charness & Gneezy, 2012). Analysis done by Faccio et al. (2016) based on data from 18 countries shows that female CEOs are more risk averse in decision-making process compared to men. According

to (Schadewitz & Spohr, 2021), the higher risk aversiveness of women is one of the reasons behind the lower number of female in boards. However, the analysis of the previous literature done by Nelson (2015) shows that the gender differences for risk aversion is exaggerated – the identified gap is either statistically insignificant or very small. Additionally, Bajtelsmit & Bernasek (1997) suggests that the reason behind the identified gender-based differences in risk attitude is because of the inappropriateness of collected data and chosen method. In particular, authors suggest designing better methods and collect more information to be able to exclude the impact of any other factors on risk attitudes except gender differences.

The results of having female executives for company performance have been addressed many times in the previous literature with different conclusions. Ryan & Haslam (2005) finds out that when appointing female board members, companies with low performance get even worse results in the coming periods compared to those which hire men. However, the authors also mention about the fact that companies invite female members to their boards when they are performing bad as it can give stakeholders a sign of organizational changes to tackle problems inside the company. Arora (2021) and Chen et al. (2017) have contradictory results on the impact of female board members on dividend payout level when higher dividend payout is suggested as a tool for female board members for higher level of monitoring while authors agree on the overall positive impact of board gender diversity on financial performance. Dezsö & Ross (2012) finds out that the positive impact of gender diversity on company performance depends significantly on other variable – innovativeness of company strategy. Overall, gender diversity on boards can affect financial performance through the channels of innovativeness, skills, knowledge, social expectations, and others (Dezsö & Ross (2012), Kim et al. (2021), Eagly (2007))

As mentioned by Brown et al. (2002), having gender diverse boards should have real impact on the company performance and companies should not appoint females to boards to only show how diverse they are. Referring to critical mass theory, which suggests that the number of people from a group should be more than a certain level to be able to affect the outcome, the impact of female board members on company performance is also dependent on the number of them in the board (Lückerath-Rovers, 2013). In contrast, Arora (2021) provided empirical evidence on the positive effects of including even one female board member on profitability ratios of the company. Female directors also improve the performance of the company from CSR perspective by providing new

perspectives in this area (Beji et al., 2021). Gender diverse boards improve the relationship between the stakeholders, especially customers, and company by signaling the efforts of the company to be aligned to the regulations which brings better performance (Lückerath-Rovers, 2013). According to the findings of Kim et al. (2021), more gender diverse environment in the company decreases the negative impact of undesirable changes in the organization, such as frequent changes in C-level positions. Another positive side of having female board members is presented by the findings of de Cabo et al. (2011), where authors find a positive relationship between having a female board member in the company and the probability of appointing new female board member which translates as lower level of gender discrimination in the company.

The existing literature uses different approaches to measure the impact of board gender diversity on company performance. While Boulouta (2013) uses different Corporate Social Performance (CSP) metrics to measure the performance of the company, Campbell & Minguez-Vera (2008), Arora (2021) and Naseem et al. (2017) analyzes the impact of board gender diversity on financial performance. To identify the relationship between having gender diverse boards and strengths of CSR performance, Bear et al. (2010) uses CSR ratings as a measure of company performance which is calculated based on the strengths of CSR strategy of the companies.[1] Galbreath (2016) mentions that there is an indirect effect of gender diverse boards on company's financial performance. According to the author, women's participation in boards improves the strengths of the company's CSR strategy which has a proven positive impact on financial performance as also identified by Kaur & Singh (2021) based on the secondary panel data for 40 companies for 14 years. As a different approach, Chapple & Humphrey (2014) confront the stock performance of companies with different levels of board gender diversity.

Existing literature measures board gender diversity mainly by two indicators – presence of women in boards included as dummy variable and share of women in boards. Adams & Ferreira (2009) author one of these papers and concentrate on the different impact of gender diverse boards on financial performance based on the strength of governance in the company. In other words, the panel data analysis done on the sample of S&P 500 companies for the period between 1996 and 2003 clarifies a positive impact of increase in female board member on company's financial

[1] Bear et al. (2010) uses KLD database for CSR ratings which provides ratings for strengths and concerns. The authors focuses on strenghts ratings and uses institutional and technical strenghts ratings. Diversity issues are covered by institutional strenghts ratings.

performance when company has a weak governance while in the case of strong governance, the impact is negative.[2] Darmadi (2011) presented the cross-sectional analysis of 169 Indonesian companies for 2007 to identify the impact of board diversity (gender, age, and national diversity) on company performance. The results show that only gender diversity has a negative impact on company performance which is statistically significant while other 2 diversity indicators have either neutral or positive impact. This can be explained by the fact that the paper presents a cross-sectional analysis and the percentage of female board members in Indonesia is very low. Another difference of Darmadi, (2011) from previous literature is the fact that it also includes BLAU index as a measure of board gender diversity. Blau diversity index value ranges between 0 and 0.5 where 0.5 indicates the highest degree of diversity (Abad et al., 2017).

Campbell & Minguez-Vera (2008) measures the firm's financial performance with Tobin's Q. Tobin's Q is market value of the company divided by the value of the company's tangible assets (Villalonga, 2004). As an addition to Tobin's Q, Arora (2021) also includes Return on Assets (ROA), Return on Equity (ROE), and Net Profit Margin (NPM) as a measure of company's financial performance to the empirical analysis. Arora (2021) finds out that while the impact of the presence of women in the board on company performance is statistically insignificant but positive, the impact of higher ratio of number of women to men directors is both statistically significant and positive while using Tobin's Q as a measure of company performance based on data from India. Interestingly, Campbell & Minguez-Vera (2008) gets exactly same results using Tobin's Q to measure financial performance based on Spanish data. Considering the NPM as a measure of financial performance, Arora, (2021) finds out that gender diversity has a statistically insignificant impact on company performance, does not depending on the measure of board gender diversity. To clarify the impact of board gender diversity targeting 2010 French law, by using ROA and Tobin's Q as a measure of financial performance in difference-in-difference method, Ben Slama et al. (2019) mentions about the improvement in financial performace of firms which were performing already in high-level. By using same measures for financial performance as Ben Slama et al. (2019), Brahma et al. (2021) identifies both an evidence for critical mass theory based on the data of 100 British firms and the importance of personal characteristics and professional

[2] Strength of governance is measured by Governance index developed by Gompers et al. (2003). The index shows the strength of the governance based on data for 24 indicators which represents the rules that are applied within the firm to protect the company from external threats.

and educational background of women appointed to boards on the post-appointment value created by the commpany. Additionally, it was identified that the highest level of financial performance can be generated when 40% of board members are female. Erhardt et al. (2003) includes also Return on Investment (ROI) as a dependent variable to the model and finds a positive correlation between board gender diversity and ROI.

Table 1 below presents the summary of existing literature on board gender diversity and firm's financial performance by including the data used and results generated. According to Table 1 there are empirical evidences of positive, negative, and no impact of inclusion of female to corporate boards on financial performance while some papers also concludes that the direction of impact depends on some other factors such as existing level of company performance and strength of governance.

**Table 1**

Summary of Existing Literature on the relationship between board gender diversity and company performance

| **Article** | **Data** | **Result** |
|---|---|---|
| Naseem et al. (2017) | 179 companies from Pakistan Stock Exchange (PSX) for 2009-2015 | No support for the positive impact of including females to the boards on financial performance |
| Mahadeo et al. (2012) | 42 companies from Mauritus Stock Exchange for 2007 | Positive impact of women representation in boards on financial performance |
| Darmadi (2011) | 169 companies from Indoneasian Stock Exchnage for 2007 | Significant negative relationship between gender diversity and financial performance |
| Ben Slama et al. (2019) | 89 French companies from CAC All-Tradable for 2008-2011 | Decrease in performance in already low performing firms and increase in performance for others by the increase in number of women into boards |
| Brahma et al. (2021) | FTSE 100 companies in UK for 2005-2016 | Significant positive effect of existence of women in boards on financial performance and support for critial mass theory |
| Erhardt et al. (2003) | 127 US companies for 1993-1998 | Positive impact of GDB on ROI and ROA |
| Chapple & Humphrey (2014) | 577 listed Australian companies for 2004-2011 | No impact of gender diversity on financial performance found. |
| Pathan & Faff (2013) | 212 publicly traded US commercial banks for 1997-2011 | Positive relationship between GDB and compay performance was found for the period before crisis. The relationship |

| Article | Data | Result |
|---|---|---|
| | | neutralized during crisis (2007-2011). |
| Arora (2021) | Top 442 companies from Bombay Stock Exchange for 2015-2019 | Strong positive relationship found in the case of using both presence of women and increase in number of women in board as a measure of board gender diversity. |
| Campbell & Minguez-Vera, (2008) | 68 companies from Spanish Stock Exchange for 1995-2000 | Presence of women in boards does not have any impact on firm value. |
| Chen et al. (2017) | 1691 S&P 1500 companies for 1997-2011 | Appointment of female board members improve dividend payout when the company had a weak governance before the appointment of female directors. |
| Adams & Ferreira (2009) | 1939 S&P 500, S&P MidCap, S&P SmallCap firms for 1996-2003 | Positive impact of GDB on financial performance of the board in the case of existing weak governance. Otherwise, the increase in women in boards has a negative impact on firm's value. |
| Ionascu et al. (2018) | 343 firm-year observations from Bucharest Stock Exchange (BSE) for 2012-2016 | Positive but not robust relationship between GDB and financial performance |

The topic of board gender diversity and its relationship with company performance in Baltic countries has not been visited much in the existing literature. According to European Institute for Gender Equality (EIGE), the gender equality index for Estonia, Latvia, and Lithuania is 60.7, 60.8, and 56.3 respectively which is under the EU average of 67.4 for 2020 (EIGE, 2020). The boards are twice less gender diverse in Baltic countries compared to Western European countries Zumente & Lace (2020). The percentage of women in boards was around 8%, 30%, and 13% for Estonia, Latvia, and Lithuania for 2016 with increasing trend for Estonia and decreasing trend for other two countries (Deloitte, 2016). There is no strict quotas implemented by the government in any of these three countries to address the issue while in Latvia there is a positive measures implemented in public sector for 2016 (Jourová, 2016). Data analysis done by Šilingienė & Radvila (2014) shows that gender-based wage gap is very high in Baltic countries - while for Latvia (13.6%) and Lithuania (12.9%) is close to EU average (16.2%), Estonia have almost twice higher gender-based

wage gap (27.3%). According to EUROSTAT (2022), the gender-based wage gap decreased for Estonia to 21.1% and for Lithuania to 9% while surged to 22.3% for Latvia.

## 2. Research Methodology

This section will provide the information regarding sources of two different data samples used for analysis, data collection and cleaning process, the structure and explanation of the regression model developed, description and summary of data and variables will be included to the empirical analysis.

The empirical part of the paper will consist of two main parts. The first part includes the cross-sectional data analysis which will be based on the data from Estonian, Latvian, and Lithuanian companies. The second part included the dynamic analysis which will be based on the data from Estonian companies. For the purposes of cross-sectional analysis, the data is collected from Orbis database. This database provides both financial and non-financial data necessary regarding 2660 Estonian, 3003 Latvian, and 695 Lithuanian companies to analyze the relationship between financial performance and board gender diversity. The data for the purposes of dynamic analysis is collected from Estonian Business Registry *(Äriregister).* Financial and non-financial data regarding 416898 companies were presented in Estonian panel data. Panel data is unbalanced and presented for the years between 1995 and 2020 with gaps.

For cross-sectional data, because of the fact that our research question and analysis is directly related to the board composition, at the first step of data cleaning we excluded the companies which have 0 current board members and the companies for which no board data provided at all. After this step, there were 3267 companies left in our sample.

The following linear regression model is developed to be used to conduct the cross-sectional data analysis and panel data analysis:

$$y = \beta_0 + \beta_1 WD + \beta_2 BLAU + \beta_3 RWD + \beta_4 NFBM + \beta_5 KI + \beta_6 CI + \beta_7 Solr + \beta_8 Fage + \beta_9 Nemp + \vartheta$$

"$\gamma$" represents the dependent variable of the model which will measure the company's financial performance. Four different dependent variables will be included to the analysis which are ROA,

ROE, and Net Profit Margin. RWD, WD, NFBM, and BLAU are the main independent variables according to the research question of this paper and they measure board gender diversity. The rest of the variables are control variables which have found to have an importance in the relationship between gender diversity and financial performance in the existing literature. "$\vartheta$" is the error term. As an additional to the independent variables mentioned in the model, year, industry, location, and FDI dummies are also included to the model. Year dummies will help in controlling for business cycles, sectoral differences will be controlled by industry dummies based on NACE 2-digit codes while FDI dummies will distinguish between locally and foreign-owned companies. In order to understand the consequences of having additional female in corporate boards, Propensity Score Matching (PSM) method will be applied while Granger-Causality test will be used to identify the reverse causality in the model.

**Board Gender Diversity:** Ratio of female board members to total board size (RWD), a dummy variable which represents whether or not there is a female member in the board (WD), and number of female board members (NFBM) will be used to measure the board gender diversity as used by Arora (2021), Adams & Ferreira, (2009), Darmadi (2011), and Campbell & Mínguez-Vera (2008). Following Abad et al. (2017), BLAU diversity index (BLAU) will also be added to the model to measure board gender diversity. BLAU index is calculated as following where Pi is the percentage of female and male board members:

$$BLAU = 1 - \sum_{i=1}^{n} P_i^2$$

**Firm Characteristics:** Board composition and the level of diversity in the board is also affected by different firm characteristics. To control for this impact, 'firm age' and 'number of employees' as a measure of company size will be included to the regression model following Simionescu et al. (2021). 'Knowledge Intensity' and 'Capital Intensity' also included to the model as a determinants of financial performance following Campbell & Mínguez-Vera (2008). Knowledge intensity will be measured as a ratio of intangible fixed assets of the company to its number of employees while capital intensity will be measued as the ratio of tangible fixed assets to number of employees. Taking into account that existing literature suggests women are appointed to the boards during the times of the crisis, leverage of the company will also be included to the model for control purposes. As mentioned by Rahman (2017), solvency ratios are good measures of how

company is able to meet its debt obligations. Therefore, asset based solvency ratio will be included to the model as a meaure of leverage.

## 3. Data Description

This section will provide the description of the two datasets that will be used within this paper which will provide insights regarding the trends in board gender diversity for Baltic States. Descriptive analysis of data will provide implications on different assumption provided in literature review regarding relationship between company size and board gender diversity, critical mass theory, dynamics of board gender diversity over time and others. The section starts with Table 2 which presents the summary statistics of the variables that will be included to the empirical model based on cross-sectional data.

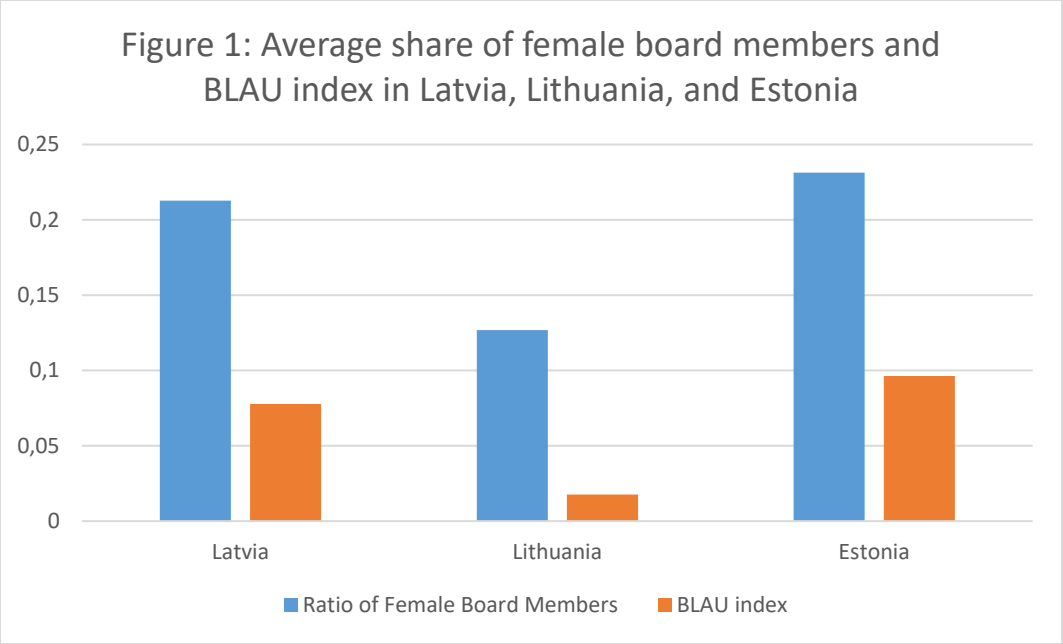
**Table 2**

Summary Statistics for Cross-Sectional Data for Latvia, Lithuania, and Estonia

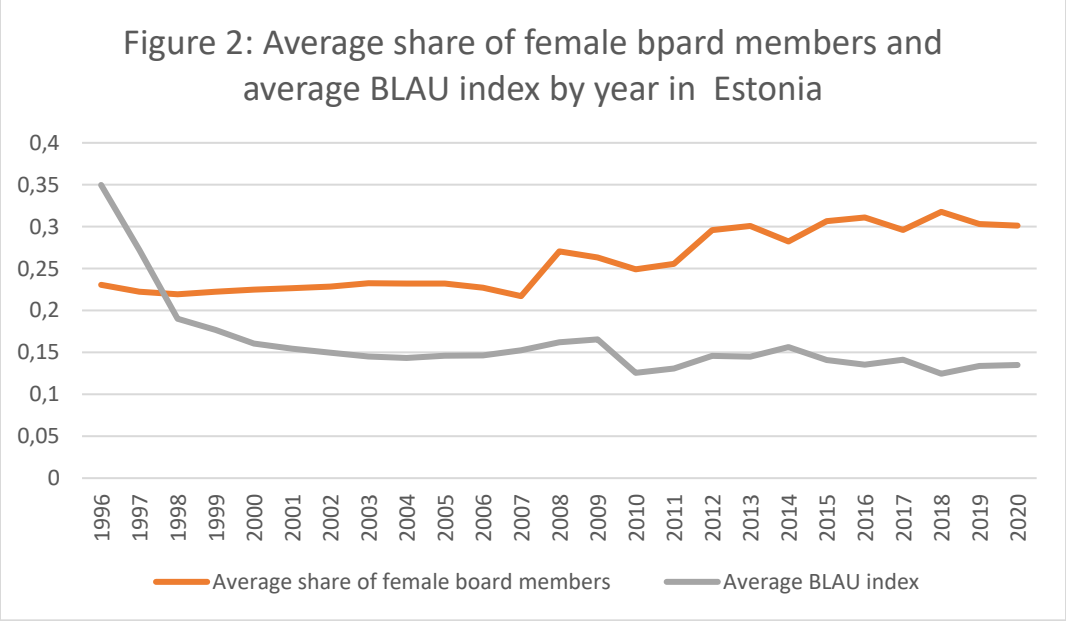
| | **Observations** | **Mean** | **Standard Deviation** | **Minimum** | **Maximum** |
|---|---|---|---|---|---|
| Net Profit Margin | 675 | -0.941 | 542.0998 | -21675 | 952210 |
| Return on Equity | 675 | 14.659 | 70.354 | -552.71 | 353.85 |
| Return on Assets | 675 | 7.297 | 26.078 | -90.37 | 96.66 |
| Number of Female Board Members | 675 | 0.403 | 0.738 | 0 | 11 |
| Ratio of Female Board Members | 675 | 0.210 | 0.356 | 0 | 1 |
| BLAU index | 675 | 0.079 | 0.173 | 0 | 0.5 |
| Knowledge Intensity | 675 | 117.674 | 4165.48 | 0.001 | 151910.5 |
| Capital Intensity | 675 | 199.26 | 3063.91 | 0 | 98898 |
| Solvency Ratio | 675 | 50.248 | 43.342 | -99.98 | 100 |
| Number of Employees | 675 | 40.223 | 215.008 | 0 | 6265 |
| Firm Age | 675 | 8.472 | 7.853 | 0 | 102 |

Observations with extreme values of ROE and ROA have been eliminated from data sample that is presented in Table 2. Observations with outliers of ROE and ROA are also eliminated from regression analysis for both cross-sectional and panel data. According to Table 2, the maximum number of female members for the Baltic boards is 11. Ratio of female board members to total board size variable has minimum value of 0 and maximum value of 1. This means that there are companies in Baltics that consist of only men or only women. Overall, in the cross-sectional data, there are 578 companies in Baltics which have both female and male in their boards, while 2277 companies have only male and 444 companies have only female board members. Statistics for firm age presents that in the cross sectional data there are some companies which are created recently and have age of less than 12 months. Sample also includes companies with 0 zero employees besides the companies which have large size in terms of number of employees. Statistics for Solvency Ratio shows that while some companies in the sample are fully able to pay its debt (Solvency Ratio equals 100), others are having negative net profit and are not able to pay back its liabilities (Solvency Ratio is negative).

Figure 1 shows the average level of ratio of female board members to total board size and BLAU index for each Baltic country separately. According to Figure 1, for all 3 countries, Figure 1 presents the fact that corporate boards are not gender-diverse and they are male-oriented. However, Figure 1 also represents that Estonia has the highest board gender diversity in terms of BLAU index and highest ratio of female board members among Baltic countries which is opposed to what reported by Deloitte (2016). However, Deloitte (2016) also reported an increasing trend in the percentage of female board members for Estonia and this maybe the reason why based on the recent data Estonia have highest board gender diversity among other Baltic countries. Figure 2 represents the dynamics of BLAU index and share of female board members for Estonia for the years between 1996 and 2020. Figure 2 does not provide any strong evidence on Deloitte (2016) statement of increasing trend for board gender diversity in Estonia when measured by BLAU index. However, the increasing trend in the share of female board members is observable.

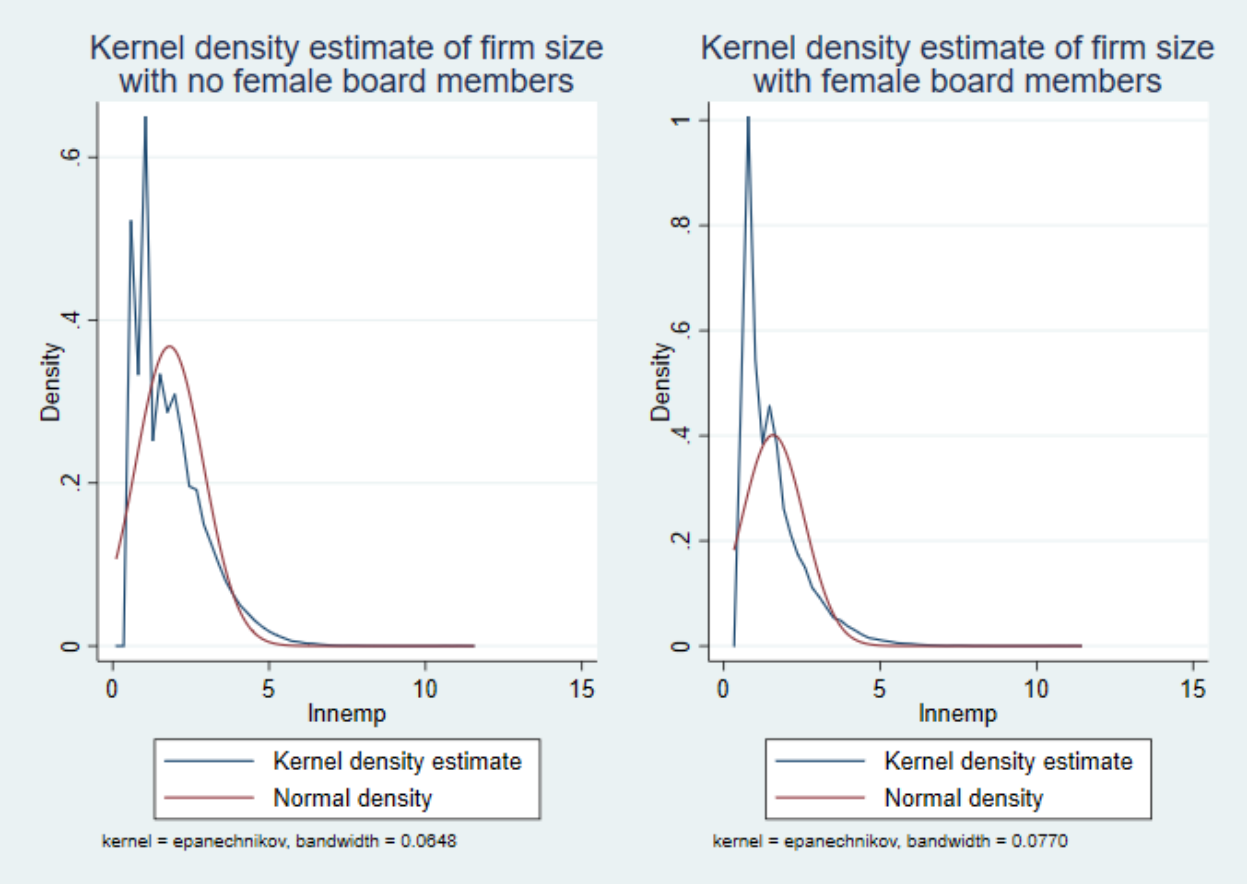



Another interesting feature of Figure 2 is the fact that the directions of 2 measures of board gender diversity are different. This is another finding on existence of single-sexed boards in Estonia. In other words, the increase in single-sexed boards improves the average share of female board members in Estonia while not improving overall board gender diversity.




The relationship between company performance and board gender diversity can be in two directions. Instead of gender diversity having a positive impact on company's financial

performance, it could be the case that bigger and older companies, which have better financial performance, appoint more women to the boards. As bigger and older companies are more interested in improvements in CSR strategies because of the attention from society and because of the fact that, as mentioned by Beji et al. (2021) and Bear et al. (2010), women can contribute to the CSR performance of the company, there is an indirect impact of company size on firm performance identified by literature. To see the relationship between firm size and board gender diversity, Figure 3 and Figure 4 represents the Kernel density for firm size for the firms with and without female board members and average BLAU index by firm age, respectively.




*Note: lnnemp represents natural logarithm of number of employees*

Figure 3: Kernel density of firm size for companies with and without female board members

According to Figure 3, there is no big different in Kernel density plot of firm size with and without female board members. However, it can be observed that when there is a female in the board, then density of smaller firms is higher compared to when there is not a female board member. This

shows that there is no support in Estonian panel data for the statement that bigger companies assign more female to their boards.

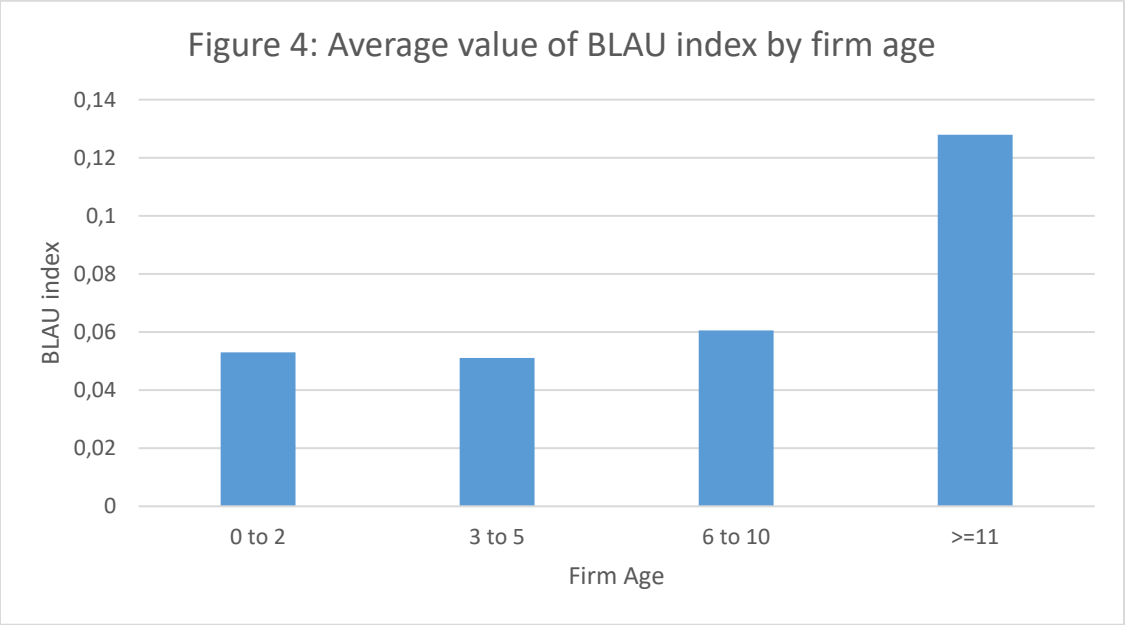



Figure 4 represents that while board gender diversity measured by BLAU index does not vary much for the companies which age between 0 and 10 years, it is quite higher for companies which age more than 10 years in comparison with younger ones in Baltics. In other words, the sample data used in this paper support the idea that older firms appoint women to boards more compared to smaller ones which is consistent with the identified positive relationship between firm age and company's financial performance (Beji et al. (2021), Bear et al. (2010)).

Table 3 represents the correlation matrix, which is based on the Pearson correlation based on cross sectional Baltic data. Here, the main focus will be on the correlation between asset based solvency ratio as a measure of firm leverage and number of female board members. According to Table 3, it can be seen that while the correlation between solvency ratio and number of female board members is positive, the correlation coefficient is close to 0 which indicated a weak correlation. Also, the direction of the correlation is positive between all variables measuring board gender diversity and solvency ratio which means that when company is more able to pay back its liabilities it appoints more female to the boards. Therefore, we do not have enough evidence based on correlation analysis to say that women are appointed to the boards during the times of crisis in Baltic States.

**Table 3**

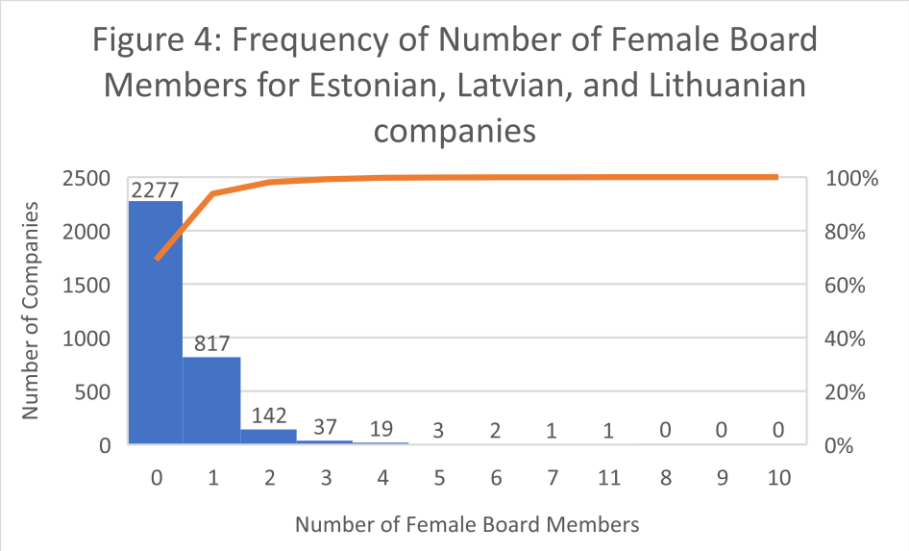
Correlation Matrix for Variables Included to Cross-Sectional Data

| | NPM | ROE | ROA | NFBM | FBR | BLAU | Nemp | Fage | Solr | CI | KI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NPM | 1.0000 | | | | | | | | | | |
| ROE | 0.0165 | 1.0000 | | | | | | | | | |
| ROA | 0.0148 | 0.6046 | 1.0000 | | | | | | | | |
| NFBM | -0.0642 | -0.0584 | -0.0324 | 1.0000 | | | | | | | |
| FBR | -0.0409 | -0.0243 | -0.0102 | 0.7022 | 1.0000 | | | | | | |
| BLAU | -0.0559 | -0.0416 | -0.0268 | 0.6804 | 0.3509 | 1.0000 | | | | | |
| Nemp | -0.0036 | 0.0250 | 0.0002 | 0.0775 | -0.0108 | 0.0578 | 1.0000 | | | | |
| Fage | -0.0480 | -0.0781 | -0.1478 | 0.2598 | 0.0401 | 0.2400 | 0.1893 | 1.0000 | | | |
| Solr | 0.0180 | 0.0717 | 0.2836 | 0.0561 | 0.0576 | 0.0405 | -0.0347 | 0.0782 | 1.0000 | | |
| CI | -0.0018 | -0.0182 | -0.0352 | 0.0761 | 0.0254 | 0.0281 | -0.0142 | -0.0317 | 0.0254 | 1.0000 | |
| KI | 0.0001 | -0.0166 | -0.0424 | -0.0211 | -0.0215 | -0.0191 | -0.0060 | -0.0463 | 0.0352 | -0.0024 | 1.0000 |

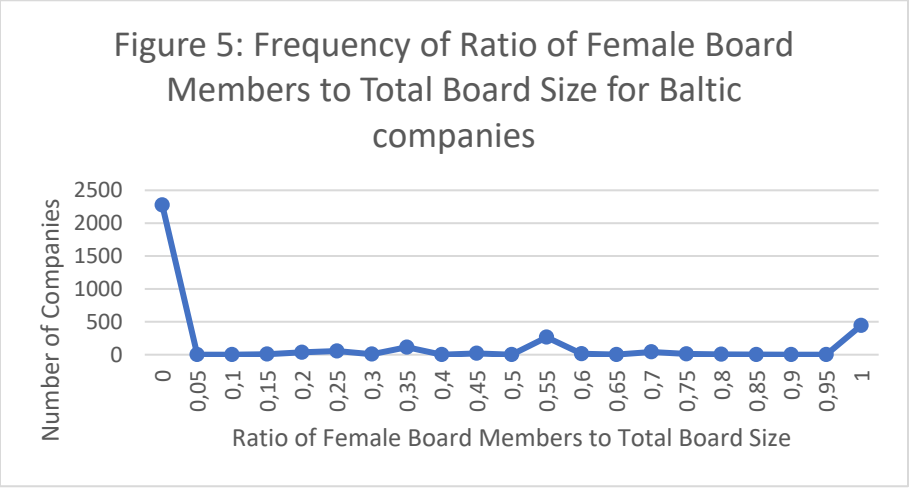
Correlation coefficients in Table 3 have implications regarding positive correlation between Solvency Ratio and ROA – higher the profitability of the company as a percentage of total assets, higher the ability of the company to pay back its liabilities. There is a strong positive correlation between number of female board members and BLAU index which is consistent with the fact that boards in Baltics are male-based currently and any new female appointment increases board gender diversity. Interestingly, the correlations between firm age and profitability ratios (ROE and ROA) are negative which means, in Baltics, older companies become less profitable.

Figure 4 shows the histogram of number of female board members for Latvian, Lithuanian, and Estonian companies. Orange line in Figure 4 shows the accumulating percentage of companies by each number of female board members. Orange line becomes its pick (100% of companies) when there are 11 female board members for one of the companies. Here, one can observe that in most of the cases the number of female board members is less than or equal to 2. This figure supports the idea that most of the companies are appointing female board members in a symbolic way to represent the society that they care about the gender diversity issues that are existing in the society and to be aligned with the regulations. One can also see that most of the companies have 0 female

board members in Baltics which accounts for 70% of the companies that are existing in our sample data.




Taking into account that one can consider the board as highly gender diverse in the case if the ratio of female board members to total board size is around 0.5, the sample dataset used for analysis in this paper shows that only small part of the Latvian, Lithuanian, and Estonian companies can be considered as gender diverse as shown in Figure 5. RWD frequency shows that the boards in Baltic States are mainly single-sex based.




## 4. Empirical Analysis

Table 4 and Table 5 below presents the results of the cross sectional data analysis based on the data from Latvian, Lithuanian, and Estonian companies and panel data analysis based on the data

from Estonian companies. Cross-sectional data analysis is done by OLS linear regression estimations while panel data analysis is done by linear fixed-effects model.

**Table 4**

Results of cross-sectional data analysis – OLS linear regression

| Dependent variable / Independent variable | lnNPM | ROE | ROA |
|---|---|---|---|
| WD | 0.716* | -11.619 | 4.979 |
| | (0.379) | (22.242) | (7.334) |
| NFBM | 0.072 | -0.952 | -0.625 |
| | (0.101) | (6.048) | (1.936) |
| RWD | -1.079*** | 5.259 | -7.052 |
| | (0.398) | (23.397) | (7.684) |
| BLAU | -0.151 | 37.015 | 1.573 |
| | (0.540) | (32.048) | (10.345) |
| lnNemp | 0.070** | 3.057* | 0.448 |
| | (0.027) | (1.676) | (0.521) |
| Fage | 0.021*** | -1.089 | -0.412*** |
| | (0.006) | (0.331)*** | (0.106) |
| Solr | 0.001 | 0.139* | 0.252*** |
| | (0.001) | (0.084) | (0.018) |
| CI | 0.0001*** | -0.0003 | -0.0002 |
| | (0.00001) | (0.0007) | (0.0002) |
| KI | -0.00001 | -0.0004 | -0.0003*** |
| | (0.000001) | (0.0005) | (0.0002) |
| R-squared | 0.3346 | 0.1223 | 0.2278 |
| Number of Observations | 1126 | 982 | 1132 |

*Notes: ***, **, * represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. Standard errors are presented inside the parantheses. lnNPM represents natural logarithm of Net Profit Margin (NPM) and lnNemp represents natural logarithm of Number of Employees (Nemp).*

Results presented in Table 4 shows that, overall, there is no significant association of board gender diveristy on company's financial performance if we take a look at profitability ratios as dependent variables (ROE and ROA). In the case of Net Profit Margin (NPM), while female existence in boards is associated with an increase in NPM, the ratio of number of female board members to total board size is found to have statistically significant negative correlation with financial performance, which mean higher ratio of female members in the board relates with the financial performance of the company negatively. Results in Table 4 are for the model where all 4 measures of board gender diversity (WD, NFBM, RWD, BLAU) are included altogether. These variables are also included to the regression model one by one and the results are reported in Table 1, Table

2, and Table 3 in Appendix. It is observable that when only WD and NFBM are included to the regression model, the R-squared is low and there is no identified correlation between any of the variables measuring board gender diversity and measures of financial performance. Statistically significan relationships appear after the inclusion of RWD to the model. The same regression model is also tested for Latvia, Lithuania, and Estonia seperately and results are presented in Table 4, Table 5, and Table 6 respectively in Appendix. For the case of Lithuania, no statistically significant relationship between board gender diversity and company performance is identified seperately.

**Table 5**

Results of Panel Data Analysis – Fixed effects regression

| Dependent variable / Independent variable | lnNemp | ROE | ROA |
|---|---|---|---|
| WD | 0.064 | 2.882 | 3.301 |
| | (0.168) | (8.263) | (2.317) |
| NFBM | -0.088 | 0.402 | -0.005 |
| | (0.059) | (2.892) | (0.811) |
| RWD | 0.017 | -6.541 | -10.920 |
| | (0.607) | (30.037) | (8.421) |
| RWD2 | 0.002 | 3.355 | 9.047 |
| | (0.456) | (22.552) | (6.323) |
| BLAU | 0.063 | -8.648*** | -1.730* |
| | (0.069) | (3.266) | (0.916) |
| lnNemp | 0.170*** | -3.263*** | 0.447** |
| | (0.017) | (0.793) | (0.222) |
| Fage | -0.021** | -0.676 | -0.329*** |
| | (0.009) | (0.439) | (0.123) |
| Solr | 1.350*** | -6.516*** | -29.844*** |
| | (0.059) | (2.002) | (0.561) |
| lnCI | -0.068*** | -0.659 | 1.116*** |
| | (0.009) | (0.462) | (0.130) |
| lnKI | 0.008*** | -0.229** | -0.019 |
| | (0.002) | (0.096) | (0.027) |
| R-squared | 0.0655 | 0.0065 | 0.1568 |
| Number of Observations | 35246 | 48362 | 48362 |

*Notes: ***, **, * represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. Standard errors are presented inside the parantheses. lnNPM represents natural logarithm of Net Profit Margin (NPM), lnNemp represents natural logarithm of Number of Employees (Nemp), lnKI represents natural logarithm of Knowledge Intensity (KI), lnCI represents natural logarithm of Capital Intensity (CI), and RWD2 represents the square of Ratio of Female Board Members (RWD)..*

Table 5 shows that, as opposed to the results of the cross-sectional data analysis, when ROE and ROA used as the measure of financial performance, BLAU has a statistically significant negative

correlation with the company's performance. While different non-linearities of variables measuring board gender diversity are tested, none of them were found to impact the results. Table 5 represents the model where square of RWD is included. As an addition to the non-linearities, different lags of WD, NFBM, RWD, and BLAU are tested. Table 7 in Appendix represents that the 1st lag of NFBM has statistically significant negative association with ROE.

Propensity Score Matching (PSM) method is applied on Estonian panel data to understand the differences between the companies which have and do not have female in their corporate boards. Treatment is measured by NFBM variable. If there is an additional female in the board, then the company is a treated company, otherwise it is control. The results presented for PSM testing probit model are in Table 6. Table 7 represents the ATTs, in other words, the changes in the outcome variables (measures of company's financial performance) after the inclusion of female board member. The authors included the lags of the dependent variables to the model as outcome variables too in order to see if there is lagged association of new female board member on company's financial performance. The test to check the strength of the applied probit model is done and results are added under Table 8 in Appendix. According to the results in Table 6, companies which appoint new female board members are larger in terms of number of employees but younger in terms of firm age. Although appointment of new female board members is found to be associated with higher solvency (Solr) and higher Knowledge intensity (KI), it is also associated with lower Capital Intensity (CI). Table 7 presents that there is no statistically significant difference in NPM, ROE, and ROA as a measure of financial performance for companies which do and do not appoint female board member in the treatment year t and a year after t+1. In period t+2, companies which appoint female board members have, on average, 2.052 percentage points more ROA compared to companies which do not appoint female board members. This finding implies the lagged positive association of female appointment to boards on financial performance.

**Table 6**

Results for Propensity Score Matching (PSM) test – probit model

| | **Coefficient** | **Standard Error** |
|---|---|---|
| Solr | 0.206** | 0.092 |
| lnNemp | 0.083*** | 0.014 |
| Fage | -0.014*** | 0.004 |
| lnCI | -0.042*** | 0.012 |
| lnKI | 0.016*** | 0.004 |

*Notes: ***, **, * represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. lnNemp represents natural logarithm of Number of Employees (Nemp), lnKI represents natural logarithm of Knowledge Intensity (KI), and lnCI represents natural logarithm of Capital Intensity (CI). Number of observations is 24,572. Pseudo R-squared is 0.0511.*

**Table 7**

ATT effects of having new female board member

| Dependent Variable | ATT | | |
|---|---|---|---|
| | t | t+1 | t+2 |
| lnNPM | -0.047 | -0.086 | -0.072 |
| | (0.083) | (0.084) | (0.085) |
| ROE | 2.247 | 4.143 | 7.851 |
| | (1.509) | (3.175) | (5.582) |
| ROA | 0.579 | 3.338 | 2.052 |
| | (0.677) | (2.402) | (0.888)** |

Notes: ***, **, * *represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. lnNPM refers to log of Net Profit Margin (NPM). Standard Errors are represented in parantheses.*

Because of the possible two-sided relationship between company performance and board gender diversity, we also use Granger-Causality model to identify the existence of reverse causality in the model. According to the results in Table 9 in Appendix, no Granger causality, in other words reverse causality, is identified.

Finally, according to the Ujunwa et al. (2012), newly appointment women to the boards do not replace men but only increase the board size. To test this, fixed effects panel linear regression model has been applied on Estonian panel data. Models with different lags have been estimated. However, the most robust model is the model with 1 lag. According to the results in Table 10 in Appendix, increase in number of female board members has a statistically significant positive correlation with number of total board members as expected but the estimated coefficient is less than 1 which means that appointment of one women to the board is related to an increase of less than one board member. This, in turn, means that female appointment to the board is related with male board member's leave. Empirical results also shows that an increase in number of female

board members has a statistically significant negative correlation with number of male board members directly at the year of appointment. However, the first lag of number of female board members has a statistically significant positive correlation with male's appointment to the boards.

When considering the results of the cross-sectional data analysis, it seems that there is no evidence to suggest that higher gender diversity in the boards is associated with the company performance positively. Especially for the cases where profitability ratios are used as dependent variable, no correlation between female existence of the board and gender diversity found. These findings are in line with Naseem et al. (2017) and Chapple & Humphrey (2014). Taking into account that the existing literature suggests women and men's skills and attitudes are complementary in the group to achieve the high-level performance, the reason behind the negative or insignificant correlation of board gender diversity on company performance can have different explanations. First one is the fact that many companies appoint female to the boards in a symbolic way to represent their social responsibility in the community while not providing gender equality within the board's decision-making process (Scarborough et al., (2019)). The second reason could be what is already identified by existing literature that women are appointed to the boards when the company faces a crisis. Additionally, the critical mass theory could be another explanation of why there is no identified positive relationship between board gender diversity on company's financial performance. As provided by Figure 4, for most of the cases, there are 2 or less women in the board which could be less than the threshold for number of female in the boards to be able to contribute company's financial performance (Alvarado et al, 2015).

The statistically significant association between BLAU index on and profitability ratios (ROE and ROA) for Estonian data shows that the increased gender diversity in boards is related with a decrease in financial performance of the company over the years which can be considered as a risk by the companies when appointing women to the boards. Taking into account that, in most of the cases, even when the board gender diversity increases for the company, men capture the majority of the board and considering that male-oriented groups has more centralized leadership structure and more authority for men (Berdahl & Anderson (2005)), it is understandable why women struggle to bring their skills and competences to improve company performance. Therefore, it is important to be able to identify the percentage of male and female that should be included to the

boards and build and maintain a group structure that will allow equal gender participating in brainstorming and decision-making process.

## 5. Conclusion and Limitations

Considering that equality of opportunities is one of the building blocks of ideal corporate governance model (Akca & Caliskan, 2018), gender diversity issues related to top-level positions gained importance in current empirical research. Each companies aims to structure its sources to achieve high level of competitiveness and profitability. Considering the high level gender-based wage gap (Masso et al., 2021), lack of empirical literature on board gender diversity issues for Baltic data, and to identify the existence of incentives for management to appoint female board members, this paper analyzes how the gender diversity in the boards is associated company's financial performance in Baltic States.

From cross-sectional data analysis based on data from Baltic countries, no significant relation of any variables measuring women presence in boards on profitability measures (ROE and ROA) found. The significant correlations are found when Net Profit Margin is used as the measure of company performance. It was found that while existence of a female board member associated with 0.7 percentage points increase in Net Profit Margin, increase in the share of female in corporate boards is associated with a 1.08 percentage points decrease in Net Profit Margin.

From panel data analysis based on Estonian data, increase in board gender diversity, measured by BLAU index, is associated with lower profitability measures (ROE and ROA). In other words, one unit increase in BLAU index is related with 8.6 percentage points decrease in ROE and 1.7 percentage points decrease in ROA. Additionally, PSM analysis results shows that women existence in boards is associated with higher ROA two periods after the appointment of female board member while no statistically significant differences for other measures of company performance based on PSM analysis. By using Grange-Causality test, we identified that there is no reverse causality in the regression model developed in this paper for Baltics.

One of the limitations of the analysis done in this paper is the fact that the identification of the gender of the board members is solely based on the data provided by the Orbis database and Estonian Business Registry for the cross-sectional and panel data analysis respectively and the

paper did not focus on how the gender is reported in these databases. As also mentioned by National Academies of Sciences, Engineering, and Medicine (2022), it has become crucial to take into account the growing number of people who identify their gender different from their birth gender in scientific research. Future research can be divided into two different directions to take into account this new trend in the literature. While one of these directions should focus on gender as a birth-sex, the other should focus on the gender identity - identified by person himself/herself - of the board members.

Another suggestion for future research could be the focus on the critical mass theory to find out which is the threshold level of women in boards to enable women board members affect financial performance positively. This can be another explanation for why, according to the results of empirical analysis done in this paper based on Baltic data, women's participation in boards does not bring any significant positive impact for financial performance. Current Baltic data used for the analysis in this paper is not a good source for this type of analysis because of the low variation in the number of female board members. Another limitation of current research is the fact that individual characteristics of board members are not taken into account because of the lack of proper data to identify educational and professional background of board members.

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# Appendix

**Table 1**

Results for Cross-Sectional Data Analysis with only WD – OLS linear regression

| Dependent variable / Independent variable | lnNPM | ROE | ROA |
|---|---|---|---|
| WD | 0.098 | 1.190 | 0.359 |
| | (0.083) | (4.902) | (1.581) |
| lnNemp | 0.094*** | 3.361** | 0.602 |
| | (0.027) | (1.635) | (0.508) |
| Fage | 0.024*** | -1.043*** | -0.395*** |
| | (0.005) | (0.326) | (0.104) |
| Solr | 0.001 | 0.138* | 0.250*** |
| | (0.001) | (0.083) | (0.018) |
| CI | 0.00005*** | -0.0003 | -0.0002 |
| | (0.00001) | (0.0007) | (0.0002) |
| KI | -0.00001 | -0.0004 | -0.0003 |
| | (0.000001) | (0.0005) | (0.0002) |
| R-squared | 0.3228 | 0.1196 | 0.2253 |
| Number of Observations | 1126 | 982 | 1132 |

*Notes: ***, **, * represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. Standard errors are presented inside the parantheses. lnNPM represents natural logarithm of Net Profit Margin (NPM) and lnNemp represents natural logarithm of Number of Employees (Nemp).*

**Table 2**

Results for Cross-Sectional Data Analysis with only WD and NFBM – OLS linear regression

| Dependent variable / Independent variable | lnNPM | ROE | ROA |
|---|---|---|---|
| WD | 0.060 | 0.643 | 1.364 |
| | (0.147) | (8.768) | (2.805) |
| NFBM | 0.031 | 0.436 | -0.809 |
| | (0.098) | (5.799) | (1.865) |
| lnNemp | 0.093*** | 3.351** | 0.623 |
| | (0.027) | (1.641) | (0.510) |
| Fage | 0.024*** | -1.046*** | -0.390*** |
| | (0.006) | (0.327) | (0.105) |
| Solr | 0.0007 | 0.138* | 0.250*** |
| | (0.001) | (0.084) | (0.018) |
| CI | 0.00005*** | -0.0003 | -0.0002 |
| | (0.00001) | (0.0007) | (0.0002) |
| KI | -0.00001 | -0.0004 | -0.0003 |
| | (0.000001) | (0.0005) | (0.0002) |
| R-squared | 0.3229 | 0.1196 | 0.2254 |
| Number of Obsevations | 1126 | 982 | 1132 |

*Notes: ***, **, * represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. Standard errors are presented inside the parantheses. lnNPM represents natural logarithm of Net Profit Margin (NPM) and lnNemp represents natural logarithm of Number of Employees (Nemp).*

**Table 3**

Results for Cross-Sectional Data Analysis with only WD, NFBM, and FBR – OLS linear regression

| Dependent variable / Independent variable | lnNPM | ROE | ROA |
|---|---|---|---|
| WD | 0.626*** | 10.214 | 5.934 |
| | (0.197) | (11.723) | (3.784) |
| NFBM | 0.064 | 0.977 | -0.549 |
| | (0.097) | (5.814) | (1.869) |
| RWD | -0.988*** | -16.728 | -8.004*** |
| | (0.230) | (13.606) | (4.454) |
| lnNemp | 0.071* | 2.942*** | 0.442 |
| | (0.027) | (1.674) | (0.519) |
| Fage | 0.021*** | -1.097*** | -0.412*** |
| | (0.006) | (0.331) | (0.105) |
| Solr | 0.0008 | 0.139* | 0.252*** |
| | (0.001) | (0.084) | (0.018) |
| CI | 0.00005*** | -0.0003 | -0.0002 |
| | (0.00001) | (0.0007) | (0.0002) |
| KI | -0.00001 | -0.0004 | -0.0003 |
| | (0.000001) | (0.0005) | (0.0002) |
| R-squared | 0.3346 | 0.1210 | 0.2278 |
| Number of Observations | 1126 | 982 | 1132 |

*Notes: ***, **, * represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. Standard errors are presented inside the parantheses. lnNPM represents natural logarithm of Net Profit Margin (NPM) and lnNemp represents natural logarithm of Number of Employees (Nemp).*

**Table 4**

Results for Cross-Sectional Data Analysis for Latvia – OLS linear regression

| Dependent variable / Independent variable | lnNPM | ROE | ROA |
|---|---|---|---|
| NFBM | 0.082 | 0.298 | 0.524 |
| | (0.138) | (8.723) | (2.615) |
| WD | 0.763 | 0.956 | 2.611 |
| | (0.559) | (34.689) | (10.793) |
| RWD | -1.161** | -3.941 | -6.324 |
| | (0.579) | (35.959) | (11.228) |
| BLAU | -0.386 | 30.240 | 0.229 |
| | (0.771) | (48.186) | (14.706) |
| lnNemp | 0.171*** | 2.011 | 1.176 |
| | (0.040) | (2.629) | (0.757) |
| Fage | 0.024*** | -1.043** | -0.358** |
| | (0.008) | (0.502) | (0.151) |
| Solr | 0.0006 | 0.049 | 0.252*** |
| | (0.001) | (0.122) | (0.024) |
| CI | 0.00005*** | -0.0004 | -0.0002 |
| | (0.00001) | (0.0007) | (0.0002) |
| KI | 0.005*** | 0.024 | -0.034 |
| | (0.002) | (0.120) | (0.36) |
| R-squared | 0.3687 | 0.1632 | 0.2417 |
| Number of Observations | 673 | 572 | 679 |

*Notes: ***, **, * represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. Standard errors are presented inside the parantheses. lnNPM represents natural logarithm of Net Profit Margin (NPM) and lnNemp represents natural logarithm of Number of Employees (Nemp).*

**Table 5**

Results for Cross-Sectional Data Analysis for Lithuania – OLS linear regression

| Dependent variable / Independent variable | lnNPM | ROE | ROA |
|---|---|---|---|
| NFBM | 0.230 | 20.308 | -2.965 |
| | (1.058) | (43.051) | (24.543) |
| WD | 7.212 | 480.375 | 222.023 |
| | (11.245) | (521.263) | (260.917) |
| RWD | -6.705 | -513.036 | -219.816 |
| | (12.124) | (553.271) | (281.321) |
| BLAU | -8.287 | -441.476 | -188.441 |
| | (11.791) | (541.716) | (273.581) |
| lnNemp | -0.038 | 10.338*** | 3.895** |
| | (0.081) | (3.725) | (1.834) |
| Fage | 0.030 | -1.949** | -1.074** |
| | (0.018) | (0.791) | (0.417) |
| Solr | -0.0001 | -0.352** | 0.232*** |
| | (0.003) | (0.153) | (0.057) |
| CI | 0.0002*** | -0.0009 | 0.0006 |
| | (0.0001) | (0.003) | (0.002) |
| KI | 0.004 | -0.198 | -0.124 |
| | (0.004) | (0.159) | (0.089) |
| R-squared | 0.7021 | 0.7498 | 0.4723 |
| Number of Observations | 141 | 121 | 144 |

*Notes: ***, **, * represents the statistically significan tcorrelation at 1%, 5%, and 10% significance level, respectively. Standard errors are presented inside the parantheses. lnNPM represents natural logarithm of Net Profit Margin (NPM) and lnNemp represents natural logarithm of Number of Employees (Nemp).*

**Table 6**

Results for Cross-Sectional Data Analysis for Estonia – OLS linear regression

| Dependent variable / Independent variable | lnNPM | ROE | ROA |
|---|---|---|---|
| NFBM | 0.014 | 0.183 | -2.507 |
| | (0.146) | (9.632) | (3.310) |
| WD | 0.702 | -4.310 | 15.319 |
| | (0.490) | (32.855) | (11.098) |
| RWD | -1.385** | -11.742 | -13.877 |
| | (0.544) | (36.425) | (12.263) |
| BLAU | 0.443 | 37.752 | -0.650 |
| | (0.765) | (51.557) | (17.266) |
| lnNemp | -0.115*** | 4.358 | -1.071 |
| | (0.044) | (2.932) | (1.0007) |
| Fage | 0.019** | -1.569*** | -0.510*** |
| | (0.008) | (0.557) | (0.189) |
| Solr | -0.002 | 0.324** | 0.316*** |
| | (0.002) | (0.147) | (0.041) |
| CI | 0.002* | -0.041 | -0.035* |
| | (0.0009) | (0.057) | (0.019) |
| KI | -0.00001* | -0.0003 | -0.0002 |
| | (0.00007) | (0.0004) | (0.0002) |
| R-squared | 0.5239 | 0.2494 | 0.4026 |
| Number of Observations | 311 | 287 | 307 |

*Notes: ***, **, * represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. Standard errors are presented inside the parantheses. lnNPM represents natural logarithm of Net Profit Margin (NPM) and lnNemp represents natural logarithm of Number of Employees (Nemp).*

**Table 7**

Results of Panel Data Analysis including first lag of NFBM – Fixed effects regression

| Dependent variable / Independent variable | lnNemp | ROE | ROA |
|---|---|---|---|
| WD | 0.073 | 2.988 | 3.280 |
| | (0.168) | (8.265) | (2.321) |
| NFBM | -0.077 | 2.715 | 0.175 |
| | (0.062) | (3.017) | (0.847) |
| $NFBM_{(t-1)}$ | -0.021 | -3.867** | -0.344 |
| | (0.062) | (1.533 | (0.430) |
| RWD | -0.003 | -7.498 | -10.977 |
| | (0.607) | (30.038) | (8.434) |
| RWD2 | 0.019 | 4.012 | 9.244 |
| | (0.457) | (22.549) | (6.332) |
| BLAU | 0.061 | -8.147** | -1.660* |
| | (0.069) | (3.268) | (0.918) |
| lnNemp | 0.169*** | -3.322*** | 0.449** |
| | (0.017) | (0.793) | (0.223) |
| Fage | -0.021** | -0.565 | -0.320*** |
| | (0.009) | (0.440) | (0.124) |
| Solr | 1.352*** | -6.444*** | -29.849*** |
| | (0.056) | (2.001) | (0.562) |
| lnCI | -0.069*** | -0.739 | 1.116*** |
| | (0.009) | (0.463) | (0.130) |
| lnKI | 0.008*** | -0.221** | -0.018 |
| | (0.002) | (0.096) | (0.027) |
| R-squared | 0.0662 | 0.0063 | 0.1558 |
| Number of Observations | 35216 | 48284 | 48284 |

*Notes: ***, **, * represents the statistically significant correlation at 1%, 5%, and 10% significance level, respectively. Standard errors are presented inside the parantheses. lnNPM represents natural logarithm of Net Profit Margin (NPM), lnNemp represents natural logarithm of Number of Employees (Nemp), lnKI represents natural logarithm of Knowledge Intensity (KI), lnCI represents natural logarithm of Capital Intensity (CI), and RWD2 represents square of Ratio of Female Board Members (RWD).*

**Table 8**

Pstest results for PSM method

| | | Mean | | |
|---|---|---|---|---|
| Variable | Matched/Unmatched | Treated | Control | t-statistics |
| Fage | Unmatched | 9.8454 | 11.3 | -5.55 |
| | Matched | 9.877 | 9.7591 | 0.31 |
| lnNemp | Unmatched | 3.066 | 2.5251 | 7.76 |
| | Matched | 3.0516 | 3.0532 | -0.02 |
| Solr | Unmatched | 0.24549 | 0.23385 | 1.21 |
| | Matched | 0.24494 | 0.24168 | 0.24 |
| lnCI | Unmatched | 11.917 | 12.229 | -4.13 |
| | Matched | 11.921 | 11.982 | -0.54 |
| lnKI | Unmatched | 7.6216 | 7.0507 | 2.56 |
| | Matched | 7.6221 | 7.654 | -0.11 |

**Table 9**

Result for Granger-Causality Test

| Excluded variable | | Chi2 | Prob > Chi2 |
|---|---|---|---|
| lnNPM | | | |
| | RWD | 0.556 | 0.456 |
| | WD | 0.660 | 0.417 |
| | BLAU | 2.402 | 0.121 |
| | ROE | 0.167 | 0.683 |
| | ROA | 0.466 | 0.495 |
| ROE | | | |
| | RWD | 0.335 | 0.563 |
| | WD | 0.258 | 0.611 |
| | BLAU | 0.124 | 0.725 |
| | lnNPM | 0.906 | 0.341 |
| | ROA | 0.391 | 0.532 |
| ROA | | | |
| | RWD | 1.960 | 0.161 |
| | WD | 1.656 | 0.198 |
| | BLAU | 1.906 | 0.167 |
| | lnNPM | 3.397 | 0.065 |
| | ROE | 0.937 | 0.333 |
| RWD | | | |
| | WD | 0.528 | 0.467 |
| | BLAU | 0.387 | 0.534 |
| | lnNPM | 1.802 | 0.179 |
| | ROE | 0.952 | 0.329 |
| | ROA | 1.632 | 0.201 |
| WD | | | |
| | RWD | 1.075 | 0.300 |
| | BLAU | 0.345 | 0.557 |
| | lnNPM | 1.354 | 0.245 |
| | ROE | 0.754 | 0.385 |
| | ROA | 1.177 | 0.278 |
| BLAU | | | |
| | RWD | 0.221 | 0.638 |
| | WD | 0.000 | 0.998 |
| | lnNPM | 1.271 | 0.260 |
| | ROE | 0.019 | 0.891 |
| | ROA | 1.295 | 0.255 |

**Table 10**

| | Total Number of Board Members | Number of Male Board Members |
|---|---|---|
| NFBM | 0.590*** | -0.408*** |
| | (0.001) | (0.001) |
| NFBM(t-1) | 0.016*** | 0.016*** |
| | (0.001) | (0.001) |
| R-squared | 0.1405 | 0.2216 |
| Number of Observations | 1,643,033 | 1,643,033 |

# Juhatuste soolise mitmekesisuse ja ettevõtte tulemuslikkuse omavaheline seos Balti riikides

**Lõputöö kokkuvõte eesti keeles**

Käesolevas magistritöös teevad autorid ettevõtete finantstulemuste ja juhatuste soolise mitmekesisuse vahelise seose analüüsi Balti riikides, võttes arvesse kõrget soolist palgalõhet Baltikumis ja soolise mitmekesisuse väikest kajastust olemasolevates uuringutes.

Magistritöö eesmärk on esile tuua Balti ettevõtete stiimulid määrata oma ettevõtete juhatusse naisi, mis omakorda võib vähendada ettevõtte tasandi soolist palgalõhet. Autorid, kes on kogunud mitmeid uuringuid soolise mitmekesisuse küsimustest juhatustes, meeste ja naiste erinevast hoiakutest meeskonnaliikmetena otsustusprotsessis ning finantstulemuste ja juhatuse soolise mitmekesisuse vahelisest seosest, toovad esile naiste juhatuses osalemise teoreetilisi tagajärgi ja selle positiivseid ja negatiivseid mõjusid ettevõtte tegevusele.

Andmete kogumiseks töös kasutatakse kahte erinevat kogumit: Orbis Europe andmebaas ja Eesti Äriregister. Andmeid analüüsiti läbilõike ja paneel andmeanalüüsi abil. Baltikumi läbilõikeandmete kirjeldava ja empiirilise andmeanalüüsi abil saab teha järeldusi nii riigi tasandi erinevuste kui ka üldise seose juhatuse soolise mitmekesisuse ja ettevõtte tulemuslikkuse vahel Baltikumis. Fikseeritud efektide paneeli *(fixed effects panel)* andmeanalüüs näitab juhatuse soolise mitmekesisuse dünaamikat Eestis ja selle seost finantstulemustega. Kalduvuse skoori sobitamise (*propensity score matching*) meetodit rakendatakse Eesti paneelandmetele, et kontrollida erinevusi ettevõtete vahel, kes määravad juhatusse naisliikmeid. Samuti kasutatakse Granger'i põhjuslikkuse testi (*Granger causality test)* vastupidise põhjuslikkuse olemasolu kontrollimiseks. Kirjeldav andmeanalüüs toob tõendeid samasooliste juhatuste kohta Baltikumis, märkimisväärselt kõrge naiste osakaalu ettevõtete juhatustes ja kõrgeima sooline mitmekesisuse, naissoost juhatuste osakaalu kasvumustri Eestis aastatel 1996 kuni 2020, ning olukorda, et Baltikumis on vanemate ettevõtete juhatustes rohkem naisi. Läbilõikeandmete analüüsi tulemuste kohaselt ei tuvastatud juhatuse soolise mitmekesisuse olulist ühendus omakapitali tootlusele (*return on equity*) ja varade tootlusele (*return on assets*). Vastupidiselt naiste olemasolu juhatuses korreleerub positiivselt puhaskasumi marginaaliga (*net profit märgin*) ning naiste suuremal osakaalul juhatuses on negatiivne seos puhaskasumi marginaaliga. Paneelandmete analüüsi põhjal leiavad autorid

statistiliselt olulise, kuid negatiivse korrelatsiooni BLAU indeksi kui juhatuse soolise mitmekesisuse mõõdupuu ning omakapitali ja varade tootluse vahel, kuid kriitilise massi teooria ei leidnud Eesti andmete põhjal kinnituse. Seevastu kalduvuse skoori sobitamise (*propensity score matching)* analüüsi tulemused viitavad sellele, et ühe naise lisamine ettevõtte juhatusse on positiivne hilinenud seos varade tootlusega. Granger'i põhjuslikkuse meetodi põhjal ei leitud tõendeid vastupidise põhjuslikkuse seose kohta. Fikseeritud efektide paneeli andmete analüüs näitab ka naissoost juhatuse liikmete arvu negatiivset ühendus omakapitali tootlusele. Tulevased uuringud ettevõtte juhatuse soolise koosseisu kohta peavad olema suunatud kriitilise massi teooriale ja soolise identifitseerimise küsimustele.

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