Board Gender Diversity and ESG disclosure in V4 countries

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Abstract: The study examines the relationship between board gender diversity and ESG disclosure in publicly listed companies in Visegrád Group (V4) countries. It aims to investigate whether a higher representation of women on corporate boards drives companies to disclose more environmental, social, and governance (ESG) practices. Using 642 firm-year observations from 2012 to 2021, the regression analysis reveals a statistically significant and positive association between gender diversity on corporate boards and ESG disclosure in V4 countries. A higher representation of women on boards is correlated with increased transparency and disclosure regarding ESG issues. This finding suggests that gender diversity is crucial in shaping companies' decisions to disclose their sustainability

practices in V4 countries, potentially reflecting a broader commitment to social responsibility and transparency.

Keywords: Board Gender Diversity, ESG Disclosure, V4 Countries

1 Introduction

With climate change and environmental issues getting severe, environmental, social, and governance (ESG) has received great attention in recent years; it effectively assesses a company's capacity to operate sustainably and socially. As stakeholders increasingly demand transparency and accountability, companies must disclose their ESG practices to demonstrate commitment to sustainable and socially responsible operations. Among the factors influencing ESG disclosure, board gender diversity has emerged as a significant area of interest. A diverse board, particularly with higher female representation, is often associated with broader perspectives, enhanced ethical oversight, and improved stakeholder engagement.

The Visegrád Group (V4) countries—comprising the Czech Republic, Hungary, Poland, and Slovakia—present a unique context for studying this relationship. These Central European economies have experienced dynamic transitions in their corporate governance frameworks, aligning with European Union directives and global sustainability standards. Prior studies concerning issues related with ESG reporting have mostly focused on countries of America and Western Europe [1]. It might not be possible to generalize the findings of these studies for Central and Eastern European countries, especially for V4 countries. As these countries have experienced legal or institutional reform, the methods that are suitable for old EU member states may not be suitable for them. Moreover, these countries have undergone market reforms, as well as social and political transformations that could have caused stakeholders (i.e., civil organizations, media, consumers) from V4 countries to be less influential than those from the old EU Member States. Gender diversity on corporate boards in V4 countries remains a significant issue, with slow progress in achieving gender parity despite growing awareness and EU-driven initiatives. Thus, the purpose of this study is to illustrate the status of ESG reporting in V4 countries, to assess the degree of these practices' quality, as well as examine the relationship between board gender diversity and ESG disclosure.

Through a regression analysis of 642 firm-year observations from 2012 to 2021, this research reveals that there is a significant positive relationship between board gender diversity and ESG disclosure. By examining this link, the study contributes to the broader discourse on corporate governance and sustainability, offering insights that could inform policymakers, corporate leaders, and stakeholders in fostering diversity and enhancing ESG transparency. Ultimately, this research underscores the potential of board gender diversity not only as a governance best

practice but also as a catalyst for promoting sustainable business practices and reinforcing companies' commitments to social responsibility and transparency.

2 Literature Review and Hypothesis Development

A company's ESG practices and disclosures benefit from effective corporate governance. [2]. ESG factors are regarded as a key corporate governance issue, with the board of directors playing a crucial role in determining the success or failure of a company [3]. Besides, the board of directors also acts as a management oversight body, providing direct and indirect information to all stakeholders, and monitors management choices pertaining to the sustainable development of internal management and society [4], [5]. The reform of the board governance is effective on ESG performance, which can have significant effects on various listed firms in worldwide [5], [6].

Historically, corporate boards in the V4 region have been characterized by lower gender diversity, with male-dominated leadership and limited female representation. While the EU has promoted gender diversity initiatives, including voluntary targets and proposed quotas, progress in the V4 countries has been slower compared to Western Europe. Board structures in the V4 region typically follow a two-tier system, separating supervisory and management boards, which is common in Central and Eastern Europe. The supervisory boards are often composed of representatives with financial, legal, and industry expertise, but diversity in terms of gender, age, and international experience remains limited. Recent regulatory changes and growing investor pressure gradually encourage V4 companies to adopt more transparent governance practices, including enhancing board independence, implementing diversity policies, and improving ESG disclosure.

Boards with female directors can enhance monitoring processes and strengthen reporting discipline. Specifically, female directors may be more effective in overseeing ESG reporting practices by increasing focus on social and environmental issues. Additionally, they tend to be well-prepared for meetings, often gathering and analyzing information related to ESG disclosure more thoroughly [7]. Moreover, a board with female directors is more likely to uphold ethical standards and show a greater commitment to considering the interests of a broader range of stakeholders and society [8], this suggests that including female directors could lead to enhanced ESG disclosure. Thus, we propose the following hypothesis:

H1: There is a significant positive relationship between board gender diversity and ESG disclosure in V4 countries

3 Methodology

3.1 Sample and Data

This study investigated the relationship between board composition and ESG disclosure, also known as environmental, social, and governance (ESG) factors, by companies operating in the V4 countries. To achieve this objective, Bloomberg's database collected ESG disclosure scores for publicly listed companies in the V4 countries, providing a preliminary sample of 8,290 firm-year observations. The reason for utilizing Bloomberg's database as the principal data source in this study was predicated on its robust coverage of sustainability and financial data for publicly traded firms in the V4 countries. Adopting a standardized approach to computing ESG scores facilitated comparing sustainability performance among different companies and industries. Bloomberg's database is widely recognized and respected as a trustworthy source of ESG data, lending credibility and dependability to the findings of this investigation. Moreover, the database's archival of historical data provided a means to discern trends and patterns in the sustainability reporting practices of companies over a protracted duration. However, missing data in some of the observations resulted in a reduction of the sample size to 642 usable observations spanning the years 2012-2021.

3.2 Measurement

This study utilized the percentage of women on the board to measure the board's gender diversity; these variables were adopted as explanatory variables, while ESG disclosure served as the dependent variable. In addition, it is expected that firms with larger assets and stronger financial performance would allocate more resources towards social and environmental projects, firm size, ROA, leverage, GDP growth, and corporate governance-related characteristics, including board size, the percentage of non-executive directors on the board, and CEO duality were employed as control variables in the analysis. The selection of these proxies was informed by previous studies conducted [9], [10], [11], [12]. Table 1 provides a detailed account of the measurement of these variables.

3.3 Model of study

The objective of our study was to explore the potential relationships between board composition variables, including gender diversity, board size, non-executive directors on the board, CEO duality, and ESG disclosure. To test our formulated hypotheses, we employed a two-way random effects regression model, shown as follows:

$$\text{ESG Disclosure Score}_{i,t} = \beta_0 + \beta_1\ \text{PctWomenOnBoard}_{i,t} + \beta_2 \text{BoardSize}_{i,t} + \beta_3\ \text{PctOfNonExecDirectorOnBoard}_{i,t} + \beta_4\ \text{CEODuarity}_{i,t} + \beta_5\ \text{FirmSize}_{i,t} + \beta_6\ \text{ROA}_{i,t} + \beta_7\ \text{Leverage}_{i,t} + \beta_8\ \text{GDPGrowth}_{i,t} + \varepsilon_{i,t}$$

Where: i represents an individual firm, t represents year, $\varepsilon_{i,t}$ is the error term.

Using a random effects model allows us to control unobserved heterogeneity across the units (e.g., individuals, firms, countries) in our panel data. This is important because if we do not account for this heterogeneity, it can bias our estimates and lead to incorrect conclusions. In statistical analysis, the conventional approach involves examining the means of individual levels of the fixed factors. However, an alternative approach is to focus on the variance of means across the levels of a random factor. In cases where there are a limited number of firms being estimated, and the variation across firms with respect to the independent variables, such as board composition and control variables, is anticipated to be low due to their similar average behavior, the implementation of a random-effects model is likely to provide more reliable estimates of the regression coefficients [13]. In order to determine the most appropriate panel regression model for our sample, we conducted an analysis of both fixed and random effects models. Despite the use of fixed effects, the adjusted R-squared was found to be negative (-0.30666), indicating a very low level of explanation towards the response variable. As a result, the use of a random effects model is recommended to better capture the variability within the data and provide a more accurate and reliable model for our analysis. To test the robustness of the results, the Newey-West standard errors [14] are also computed, which allow for the presence of both autocorrelated errors over a specified lag length and heteroskedasticity, providing more accurate estimates of standard errors and improving the precision of statistical inferences.Furthermore, this study incorporated environmental, social, and governance disclosures as dependent variables in a sensitivity analysis. The objective was to investigate whether board composition potentially influenced each dimension of ESG disclosure. Consequently, three additional regression equations were formulated and presented as follows:

$$\text{Environmental Disclosure Score}_{i,t} = \beta_0 + \beta_1 \text{ PctWomenOnBoard}_{i,t} + \beta_2 \text{BoardSize}_{i,t} + \beta_3 \text{ PctOfNonExecDirectorOnBoard}_{i,t} + \beta_4 \text{ CEODuarity}_{i,t} + \beta_5 \text{ FirmSize}_{i,t} + \beta_6 \text{ ROA}_{i,t} + \beta_7 \text{ Leverage}_{i,t} + \beta_8 \text{ GDPGrowth}_{i,t} + \varepsilon_{i,t}$$

$$\text{Social Disclosure Score}_{i,t} = \beta_0 + \beta_1 \text{ PctWomenOnBoard}_{i,t} + \beta_2 \text{BoardSize}_{i,t} + \beta_3 \text{ PctOfNonExecDirectorOnBoard}_{i,t} + \beta_4 \text{ CEODuarity}_{i,t} + \beta_5 \text{ FirmSize}_{i,t} + \beta_6 \text{ ROA}_{i,t} + \beta_7 \text{ Leverage}_{i,t} + \beta_8 \text{ GDPGrowth}_{i,t} + \varepsilon_{i,t}$$

$$\text{Governance Disclosure Score}_{i,t} = \beta_0 + \beta_1 \text{ PctWomenOnBoard}_{i,t} + \beta_2 \text{BoardSize}_{i,t} + \beta_3 \text{ PctOfNonExecDirectorOnBoard}_{i,t} + \beta_4 \text{ CEODuarity}_{i,t} + \beta_5 \text{ FirmSize}_{i,t} + \beta_6 \text{ ROA}_{i,t} + \beta_7 \text{ Leverage}_{i,t} + \beta_8 \text{ GDPGrowth}_{i,t} + \varepsilon_{i,t}$$

Variable	Definition	Measurement
Dependent variables		
ESG Disclosure Score	ESG disclosure score	The Bloomberg ESG disclosure score is a numerical indicator used to evaluate the transparency and quality of a company's environmental, social, and governance disclosures, ranges from 0 to 100, with higher scores indicating greater transparency and quality in a company's ESG disclosures
Environmental Disclosure Score	Environmental disclosure score	Bloomberg environmental disclosure score, ranging from 0 to 100
Social Disclosure Score	Social disclosure score	Bloomberg social disclosure score, ranging from 0 to 100
Governance Disclosure Score	Governance disclosure score	Bloomberg governance disclosure score, ranging from 0 to 100
Explanatory variables		
PctWomenOn Board	Percentage of women on board	The percentage of women serving on the company's board of directors
Control variables		
BoardSize	Board size	The total number of board members at the end of the year
PctOfNonExec DirectorOnBoard	Percentage of non-Executive directors on board	The percentage of non-executive directors serving on the company's board of directors
CEODuality	CEO duality	The CEO duality is a binary indicator, taking a value of 1 when the CEO holds both the positions of CEO and chair of the board of directors and 0 otherwise.
FirmSize	Firm size	The natural logarithm of total assets
ROA	Return on assets	Net income divided by total assets
Leverage	Financial leverage	Total liability divided by total assets
GDPGrowth	GDP growth	The annual growth rate of the country's GDP in which the firm operates.

Table 1

Variables measurement

4 Analysis and Results

4.1 Descriptive Analysis

The ESG disclosure score for each country shows an overall increasing trend from 2012 to 2021 (See **Table 2**). In the Czech Republic, the score starts at 6.86 in 2012 and increases to 34.41 in 2021. In Hungary, the score starts at 39.53 in 2012, peaks at 45.07 in 2017, and then decreases to 32.51 in 2021. In Poland, the score starts at 18.92 in 2012, increases to 35.45 in 2017, and then decreases to 26.72 in 2021. In Slovakia, the score fluctuates over the years but shows a general upward trend from 2015 to 2020, with a slight decrease in 2021. The trend suggests an increasing emphasis on ESG factors by companies in these countries over the years. Overall, Hungary has consistently had the highest ESG levels compared to the other three countries.

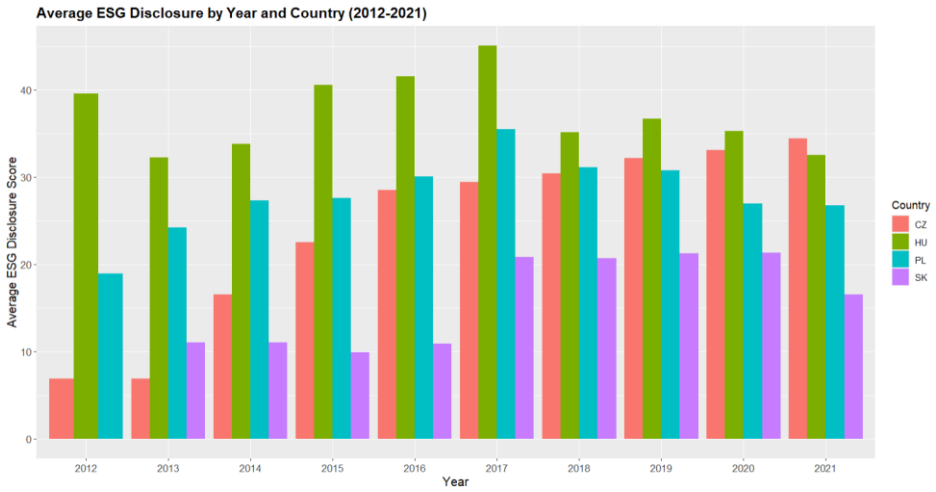

Table 2

Average ESG disclosure by countries for 2012-2021

Table 3 provides summary statistics for nine variables, including the number of observations, mean, standard deviation, median, minimum, and maximum. The ESG Disclosure Score has a mean of 28.86, with a standard deviation of 13.96 and a median of 26.07. The minimum and maximum values for ESG Disclosure Score are 4.05 and 69.59, respectively. Similarly, the other variables have been summarized with their respective statistics. PctWomenOnBoard has a mean of 14.41 and a maximum value of 71.43, indicating some variability in the data. BoardSize has a mean of 7.33 with a relatively low standard deviation of 2.44. PctOfNonExecDirectorOnBoard has a high mean value of 96.85 with a large

negative skewness indicating an asymmetrical distribution. CEODuality has a mean of 0.01 with a high kurtosis of 123.01. FirmSize has a mean of 9.27 and a maximum value of 17.13. ROA has a mean of 4.39 but has a large standard deviation of 10.24, indicating some variability in the data. Leverage has a mean of 0.61 with a relatively low standard deviation of 0.22. GDPGrowth has a mean of 2.96 with a negative skewness indicating a slightly left-skewed distribution.

	Number of observations	Mean	SD	Median	Min	Max
ESG Disclosure Score	642	28.86	13.96	26.07	4.05	69.59
PctWomenOnBoard	642	14.41	14.88	12.92	0	71.43
BoardSize	642	7.33	2.44	7	3	15
PctOfNonExecDirectorOnBoard	642	96.85	11.92	100	4	100
CEODuality	642	0.01	0.09	0	0	1
FirmSize	642	9.27	2.68	8.93	2.99	17.13
ROA	642	4.39	10.24	3.28	-90.82	111
Leverage	642	0.61	0.22	0.57	0.05	1.97
GDPGrowth	642	2.96	3.26	4.03	-5.5	6.85

Table 3
Summary descriptive statistics

4.2 Results of Regression Analysis

	Two-way random effects
Independent Variables	ESG Disclosure Score
PctWomenOnBoard	0.258***
	(0.037)
BoardSize	1.407***
	(0.241)
PctOfNonExecDirectorOnBoard	0.01
	(0.034)
CEODuality	-1.958
	(3.232)
FirmSize	3.281***
	(0.198)
ROA	-0.063
	(0.039)
Leverage	1.63
	(2.447)
GDPGrowth	0.163
	(0.145)
Constant	-16.692***
	(3.966)
Country Random Effect	Yes
Year Random Effect	Yes
Firm Random Effect	Yes
Sample Size	642
Adjusted R2	0.35

Table 4
The relationship between board gender diversity and ESG disclosure

Note: *p<0.1; **p<0.05; ***p<0.01, Newey-West standard error estimates in parentheses.

The regression analysis in **Table 4** demonstrates a statistically significant and positive association between board gender diversity and ESG disclosure, with a coefficient estimate of 0.258 and a p-value of less than 0.01. The results suggest that the presence of gender diversity on corporate boards can catalyze greater transparency and disclosure regarding ESG issues. This is due to the fact that companies with a greater representation of women on their boards may view ESG disclosure as a critical component of their broader sustainability strategy and may be more willing to report on their ESG practices publicly.

Furthermore, the analysis reveals a significant and positive relationship between board size and ESG disclosure, with a coefficient estimate of 1.407 and a p-value of less than 0.01. The findings suggest that companies with larger board sizes are more likely to prioritize ESG disclosure as a fundamental aspect of their sustainability strategy. This highlights the importance of board composition and size in promoting ESG transparency and accountability among companies operating in V4 countries. However, the analysis did not find a significant relationship between the percentage of non-executive directors on board and CEO duality with ESG disclosure. This implies that these variables do not play a significant role in shaping companies' decisions to disclose their ESG practices. These results have important implications for policymakers and other stakeholders seeking to enhance corporate sustainability and promote greater ESG disclosure among companies operating in V4 countries.

4.3 Sensitivity analysis

Independent Variables	Dependent variable:		
	Environmental disclosure score	Social disclosure score	Governance disclosure score
PctWomenOnBoard	0.297***	0.243***	0.141**
	(0.048)	(0.037)	(0.043)
BoardSize	1.730***	1.534***	0.885**
	(0.313)	(0.274)	(0.273)
PctOfNonExecDirectorOnBoard	0.023	0.018	-0.009
	(0.05)	(0.033)	(0.051)
CEODuarity	-4.133	-2.845	1.125
	(6.448)	(4.964)	(5.61)
FirmSize	3.737***	2.679***	2.950***
	(0.257)	(0.224)	(0.236)
ROA	-0.039	-0.012	-0.147*
	(0.048)	(0.041)	(0.063)
Leverage	-0.532	4.716	-5.101
	(3.209)	(2.579)	(2.75)
GDPGrowth	0.269	0.24	0.082
	(0.209)	(0.148)	(0.201)
Constant	-33.385***	-24.098***	13.954*
	(5.528)	(3.885)	(5.649)
Country Random Effect	Yes	Yes	Yes
Year Random Effect	Yes	Yes	Yes
Firm Random Effect	Yes	Yes	Yes
Sample Size	642	642	642
Adjusted R2	0.251	0.265	0.234

Note: *p<0.1; **p<0.05; ***p<0.01, Newey-West standard error estimates are in parentheses.

Table 5

The relationship between board gender diversity and E, S and G disclosure

In sensitivity analysis, we test the robustness of our model by introducing small changes to the model specifications and observing how the coefficients and statistical significance of the independent variables are affected. The results of the sensitivity analysis are presented in Table 5.

The results show that the coefficients and statistical significance of the independent variables are generally robust to changes in the model specifications. The coefficients for the variable PctWomenOnBoard remain statistically significant across all three dependent variables, indicating that they have a strong association with ESG disclosure. The coefficient estimates for these variables are also relatively stable across the three dependent variables.

Conclusion

The empirical results verify that gender diversity has a positive and significant relationship with ESG disclosure in V4 countries. It suggests that the presence of gender diversity on corporate boards can serve as a catalyst for greater transparency and disclosure regarding ESG issues. This result is aligned with [15]. A company with a larger board can include directors who are more likely to advocate voluntary disclosure, thereby strengthening management oversight and enhancing corporate legitimacy. From the perspective of corporate governance, focusing on gender diversity helps enhance corporate sustainability and align global ESG standards.

However, ESG disclosure has far-reaching implications for corporate governance and is crucial in shaping how businesses operate and thrive. For the V4 countries, the challenge is not just about 'catching up' with their Western counterparts but about fully embracing and integrating ESG into their business models and corporate governance practices.

Moreover, it's essential to acknowledge the study's limitations, such as potential data constraints and the need for further research to explore additional factors influencing ESG disclosure. Additionally, while gender diversity on boards emerges as a significant factor in promoting ESG disclosure, other variables related to board composition may also warrant investigation in future studies to provide a comprehensive understanding of governance practices and their impact on sustainability reporting. In conclusion, the study underscores the importance of gender diversity in corporate governance and its implications for ESG disclosure in the V4 countries. It highlights the potential policy implications of promoting gender diversity on corporate boards to enhance transparency, accountability, and sustainability practices within the region's listed companies.

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