



ISSN: 2543-6821 (online)

Journal homepage: <http://ceej.wne.uw.edu.pl>

Karolina Siwiec, Renata Karkowska

Relationship between ESG and Financial Performance of Companies in the Central and Eastern European Region

To cite this article

Siwiec, K., Karkowska, R. (2024). Relationship between ESG and Financial Performance of Companies in the Central and Eastern European Region. Central European Economic Journal, 11(58), 178-199.

DOI: 10.2478/ceej-2024-0013

 To link to this article: <https://doi.org/10.2478/ceej-2024-0013>



Karolina Siwiec 

University of Warsaw, Faculty of Management; Szturmowa 1/3, 02-678 Warsaw, Poland

Renata Karkowska 

University of Warsaw, Faculty of Management; Szturmowa 1/3, 02-678 Warsaw, Poland
corresponding author: rkarkowska@wz.uw.edu.pl

Relationship between ESG and Financial Performance of Companies in the Central and Eastern European Region

Abstract

Observable climate change and an increase in the frequency of extreme climate events undoubtedly pose challenges for society and business operations. The changes being implemented in sustainability efforts are a response to these challenges. However, the question is how these measures affect companies' financial performance.

The study aims to verify the relationship between the reporting of sustainability scores related to three aspects: environmental, social, and corporate governance (ESG). It focuses on the financial performance of companies in the Central and Eastern Europe (CEE) region in 2017-2021. The study will use panel regression and cross-sectional analysis. The results indicate a positive relationship between the disclosure of ESG activities and the financial performance of companies as measured by ROA. It was also observed that for companies operating in the financial sector, the correlation is greater, compared to companies operating in other sectors. This study contributes to the ongoing debate on the environment, society, and governance in the economy.

Keywords

ESG reporting | ESG policy | profitability | Central and Eastern Europe

JEL Codes

G21, G23, Q51, Q54

1. Introduction

The aspects of sustainability presented represent activities that are not directly aimed at generating profit for the company. The study aims not so much to identify cause-and-effect relationships, but more to indicate the existence of correlations. Therefore, the purpose of this study is to verify the relationship between reporting environmental, social, and corporate governance (ESG) activities and the financial performance of companies from different sectors of the Central and Eastern Europe (CEE) region.

The concept of corporate social responsibility (commonly used abbreviation - CSR) is not a new concept emerging with economic and social development. The first activities that could now be categorised as socially responsible appeared as far

back as antiquity. In the 21st century, corporate social responsibility has been increasingly combined with the strategy of sustainable development. Discussing sustainable development, special attention should be paid to 2015, during which the leaders of the United Nations member countries undertook an ambitious roadmap for transforming and reshaping the world in which the needs of the present generation can be met sustainably, with respect for the environment and the needs of future generations. In 2016, the European Commission established an expert group to develop an overarching and detailed financing strategy, which produced a report on sustainable finance in European countries (EC, 2018). The report establishes two imperatives for the financial system: to increase the commitment of finance to long-term development that fosters social commitment and to improve financial stability by increasing awareness of environmental,

social, and governance issues when making investment decisions. Undoubtedly, the growing interest in ESG is related to the mandatory reporting of non-financial data introduced by the European Union in 2014 and modified in 2022. According to the 2014 European Union directive¹, the obligation to report non-financial data covered public trust entities that had more than 500 employees and met one of the conditions: they had either €40 million in net revenue from sales of products and goods or €20 million in total balance sheet assets at the end of a given fiscal year. Assuming the above criteria, in practice, the obligation to report non-financial data applied only to the largest listed companies, banks, and insurers. Under the Corporate Sustainability Reporting Directive published in December 2022², the scope of companies subject to non-financial reporting was significantly expanded. In 2024, companies that have at least 250 employees and meet one of the conditions indicated by the existing reporting rules (€40 million in revenue, €20 million in total assets) will be required to report on environmental, social, and corporate governance activities for 2023. Regulatory solutions toward ESG awareness have been followed by financial investors, who, according to the European Central Bank Financial Stability Review, have increased ESG-friendly assets from \$500 billion in 2015 to more than \$1.3 trillion in 2020 (ECB, 2020). Pressure from regulators and owners is leading to a transformation of business models, so non-financial ESG metrics are also attracting the attention of managers.

Previously, the results of empirical studies on the relationship between ESG activity and the value of companies are inconclusive. Some researchers find that ESG activity improves the performance of companies (Buallay, 2019; Cheng et al., 2013). In contrast, others point out that investments in ESG activities can lead to opportunity costs associated with inefficient capital allocation (Haans et al., 2016; Heli et al., 2008). In the case of banks with low profitability, the discovery of the relationship between ESG activities and profitability achieved can be a problem between maintaining income stability and bank insolvency.

The answer to the basic research question raised a series of further questions: Do ESG activities positively affect the profitability of companies, or is there a negative relationship? Does the strength of this relationship depend on the sector in which the companies operate? Do companies in the financial sector respond in the same way as companies representing other sectors? Using a sample of 48 companies from the CEE region over the period 2017-2021, the relationship between ESG and corporate performance was confirmed.

One of the primary findings of the research is the establishment of a positive correlation between the assessment of environmental, social, and governance initiatives and the financial outcomes of companies. The cross-sectional analysis performed in this study enabled the identification of notable disparities in the evaluation of sustainability across enterprises from various countries within the Central and Eastern European area. Moreover, notable disparities were also noted in these evaluations, as shown by the magnitude of ESG ratings among various industries. The combination of this observation and the conclusions derived from the cluster analysis allowed for a more profound comprehension of the variation in the reported sustainability level of conducted activities based on the sector of operation.

Comparing data on ESG contributes to practice by showing how a company's business model and commitment to ESG practices are changing. Therefore, the results will help investors, policymakers, regulators, managers, and auditors to notice differences and adopt appropriate measures that could improve companies' financial performance.

Thus, the study should fill an undoubted research gap in the literature. The article consists of five parts: I. - Introduction, II. - A review of the literature on the subject, III. - Description of the data and the adopted research method, IV. - presentation of the results obtained, and V. - conclusions.

2. Literature review

Today, two basic theories can provide a basis for considering the relationship between ESG and financial performance: stakeholder theory and trade-off theory. These theories offer opposing predictions, and each is supported by empirical evidence. In the stakeholder theory, a company has an ethical

-
- 1 Directive 2014/95/EU of the European Parliament and of the Council of October 22, 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large entities and groups
 - 2 Directive (EU) 2022/2464 of the European Parliament and of the Council of December 14, 2022 amending Regulation (EU) No. 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU with regard to corporate sustainability reporting

obligation to maximise the value of all stakeholders. Stakeholder theory argues that companies that engage in ESG activities should have greater sources of opportunity and competitive advantage, rather than an increase in costs and constraints (Azmi et al., 2021). According to this theory, a company's management is obliged to maximise the long-term value of the company, taking into account the competing interests of all stakeholders. Therefore, managers should engage in ESG activities to strengthen relationships with various stakeholders and promote favourable business conditions (Jo & Harjoto, 2011; Ruf et al., 2001). On the other hand, the trade-off view treats ESG as a potentially inefficient use of resources. This theory argues that managers should maximise the value of the company and thus refrain from charitable, socially responsible initiatives (Friedman, 1970). The relationship between the reporting of ESG factors and the financial performance of companies is a trendy topic among researchers. There are many publications available on global level analysis—probably one of the most popular publications is by Friede, Busch, and Bassen, presenting the aggregated results of more than 2000 empirical studies (Friede et al., 2015)—and on specific countries, e.g., Germany (Velte, 2017) or India (Anklesaria-Dalal & Thaker, 2019). Moreover, there is no shortage of publications on the Polish market and the impact of ESG reporting on measures of an entity's financial performance (Bek-Gaik & Rymkiewicz, 2015; Chojnacka & Jadanowska, 2020).

Conducting a meta-analysis encompassing the results of nearly 2200 individual studies published since the 1970s that examined the relationship between ESG factors and companies' financial performance, Friede, Busch, and Bassen (2015) present by far the most comprehensive study on the subject. Approximately 90% of the studies reviewed indicate a non-negative relationship between ESG and companies' financial performance; moreover, the vast majority of studies indicate that the relationship is positive. The authors also emphasise that this positive impact is constant over time, which is undoubtedly a very promising result. Most studies examining the correlation between ESG practices and the worth of companies primarily concentrate on non-financial corporations located in emerging economies. Nevertheless, the level of governance, transparency, and regulatory obligations in emerging markets is comparatively lower than that in industrialised markets (Khanna & Palepu, 2000). These economies are marked by increased uncertainty, and banks in these markets

implement anti-cyclical buffers for capital (Bilgin et al., 2021; Moudud-Ul-Huq, 2019).

Anklesaria-Dalal and Thaker (2019) explored how ESG factors affect the performance of Indian public limited companies, focusing on profitability and firm value using various measures such as return on asset and Tobin's q ratio. Information derived from an analysis of 65 Indian companies listed in the NSE 100 ESG Index database for the years 2015 to 2017 was examined utilising random effects panel data regression analysis. The findings of the study indicate a positive relationship between ESG performance and financial performance measured by both Tobin's Q and ROA ratios (ang. *return on assets*). An analysis by Velte (2017) also explores the relationship between ESG performance and both accounting and market-based measures. The study covers a sample of companies listed on the German Prime Standard (the market segment on the Frankfurt Stock Exchange represents companies voluntarily meeting more stringent transparency requirements) for the years 2010-2014. The author employed correlation and regression analysis to assess potential links between ESG performance and ROA, as well as Tobin's Q. The findings show a positive impact of ESG on ROA, although they do not provide evidence of a relationship between ESG and Tobin's Q.

In contrast, Kabir and Chowdhury (2022) proved that there is no overarching consensus in the literature on the relationship between CSR and corporate financial performance. Using Panel Vector Autoregression, the authors analysed 30 listed banks in Bangladesh between 2006 and 2018 and found that better performance leads to higher CSR spending, but CSR spending does not necessarily drive better performance. Nollet, Filis, and Mitrokostas adopted a distinct methodology, investigating both linear and nonlinear relationships between ESG scores and financial performance. The study, based on companies listed in the S&P500 index and employing a panel regression model, revealed that there is no statistically significant relationship between ESG reporting and companies' financial performance (ROA and ROC). Instead, the researchers highlighted the existence of a U-shaped relationship between ESG reporting and accounting measures of a company's performance (Nollet et al., 2016).

The presence of a nonlinear relationship between ESG performance and financial performance is also one of the key findings from the study of 350 European firms from 2014 to 2019 using a time-lagged

panel regression conducted by Bruna et al. (2022). Additionally, the study examined this relationship in the context of the transition toward non-financial reporting obligations in the European Union. Findings suggest that mandatory disclosure is associated with improved ESG performance and also has a positive impact on financial performance. The authors indicate that mandatory disclosure may have compelled companies to focus more on the financial aspects of ESG practices, which also positively influence financial performance. Albitar et al. (2019) also investigate the impact of certain changes related to reporting methods, analysing the effect of ESG disclosures on the financial performance of companies listed on the FTSE350 index. Since 2013, when integrated reporting (IR) was introduced, companies have begun making voluntary decisions to disclose information related to the ESG area in their reports to address the interests of various stakeholders. Therefore, the period covered by the authors includes years both before and after the introduction of integrated reporting. The findings from estimating ordinary least squares and firm-fixed effect models indicate a positive and significant relationship between ESG disclosure score and company performance, both before and after the introduction of integrated reporting. Moreover, the authors highlight that companies voluntarily engaged in integrated reporting tend to achieve better financial performance.

Moving on to studies directly related to companies listed on the Warsaw Stock Exchange (WSE), which is the largest financial instruments exchange in the Central and Eastern Europe region. A study conducted by Bek-Gaik and Rymkiewicz for companies listed on the WSE comprising the WIG30 and mWIG40 indices from 2001 to 2013 (excluding financial institutions: banks and insurance companies) showed a weak correlation between corporate social responsibility and financial variables. A positive high correlation was shown between a company's asset size and the social reporting conducted by the company. In contrast, a positive but moderate correlation was shown between social reporting and the following variables characterising a company's financial performance: operating profit, gross profit, net profit, and net income (Bek-Gaik & Rymkiewicz, 2015). It is also worth mentioning two studies related to the WSE, in which the authors present a different approach to the topic. On the one hand, Mikołajek-Gocejna (2024) does not analyse the relationship between ESG ratings and companies' financial performance but instead focuses on the relationship between ESG ratings and the

value of firms listed on the Warsaw Stock Exchange. On the other hand, Chojnacka and Jadanowska focus on market participants' perceptions of non-financial reporting. The results of a survey of 32 companies listed on the WSE indicate that most entities do not use non-financial information to assess the condition of other entities. Nearly 60% of the respondents agreed with the statement that publishing non-financial data can have a positive impact on building relations between the company and its business environment and can influence a better perception of the company—the image of a company sustainably conducting its business. However, when asked about the motive for preparing reports with non-financial data, most companies pointed to the obligation to publish such data imposed by the legislator (Chojnacka & Jadanowska, 2020).

Responsibly conducting business while taking into account ESG impacts seems to be a very ethical solution that should have a wide range of supporters. However, there are some criticisms of this strategy in the ESG discussion. Many of the factors considered in ESG are viewed and analysed over the long term (especially environmental factors), while companies often focus on short-term performance. There is no shortage of people questioning the benefits of ESG strategies. Proponents of ESG point out that it is a win-win strategy for both the company's shareholders and the broader stakeholder community, but the available research and analysis do not conclusively confirm the existence and direction of such a relationship (Morrison, 2021).

In recent years, a phenomenon known as greenwashing has become increasingly popular as an example of a marketing strategy aimed at creating a false impression among consumers that the product they are buying, as well as the company that supplies that product, is environmentally friendly and acts in an eco-friendly manner. It is important that ESG does not become an instrument aimed only at improving a company's image among audiences that are genuinely interested in the environmental impact of a company's activities but is a tool through which companies have a significant impact on the environment and society.

The process of developing ratings for companies that employ sustainable strategies also raises doubts, particularly regarding the selection of factors considered in creating these assessments. Starting with the Polish market, Sikacz and Wolczek made a comparative analysis of information from two sources: Thomson Reuters Eikon and ASSET4 ESG. Based on

the data they obtained, they compared ESG scores obtained for companies included in the RESPECT index. ESG scores from the ASSET4 ESG database are more favourable for companies. The researchers emphasise that the qualification of a company as one operating sustainably in its business practices, and its inclusion in the index of companies characterised as sustainable in running a business, should be unambiguous and should not raise doubts (Sikacz & Wolczek, 2017). In addition, the authors note another objectionable fact—the 10th edition of the RESPECT index under review included companies with very low ESG assessment scores. In the case of the creation of the current WIG-ESG index of companies demonstrating strong environmental, social, and governance practices, a two-stage evaluation of companies is used, which makes it possible to assume that companies with low ESG scores will not be included in the index.

Based on the literature reviewed and the study of the relationship between ESG reporting and the financial performance of companies, two research hypotheses were formulated:

H1: There is a positive relationship between ESG performance and the financial performance of companies.

However, the relationship between investments in sustainability and profitability is multifaceted and contingent upon the sector in which the company operates. In financial sectors, sustainability investments often bolster long-term profitability by mitigating risks associated with environmental regulations and climate change impacts while also enhancing brand reputation and attracting conscious investors. In non-financial sectors, such as manufacturing or retail, adaptation to changing climatic and regulatory conditions can directly affect operational costs and supply chain resilience, thus influencing the profitability outcomes of sustainability investments. Therefore, the effectiveness of sustainability initiatives in enhancing profitability is intricately linked to sector-specific dynamics and the company's ability to navigate evolving environmental and regulatory landscapes. For example, energy sectors face unique challenges, where sustainability investments can lead to immediate cost savings through energy efficiency measures and renewable energy adoption but may also require substantial upfront capital for transitioning from fossil fuels. Therefore, to deepen the study, we perform cross-sectional and cluster analysis to establish the second hypothesis:

H2: The relationship between ESG reporting and company performance varies between sectors (financial and non-financial sectors).

Considering the formulated research hypotheses and the characteristics of the research sample, both in terms of geographical dimension, the region of Central and Eastern Europe, and temporal dimension, the years 2017-2021 that constitute the period when the principles of non-financial reporting were already in force, this article represents a new contribution to the existing literature and fills a gap related to research concerning the CEE region. Moreover, taking into account the new reporting requirements and changes resulting from the replacement of the Non-Financial Reporting Directive (NFRD) with the Corporate Sustainability Reporting Directive (CSRD), which include, among others, expanding the group of entities subject to sustainability reporting and the obligation to report environmental impact throughout the value chain, this article may serve as a response to the growing interest in examining the relationship between the sustainability of business activities and financial results.

The introduced legislative changes also increase the likelihood of identifying the relationship between the reported level of sustainability of business activities and financial results, as well as its direction. On the one hand, this is achieved by increasing the number of companies implementing sustainable reporting but also by requirements related to the reporting itself associated with the structuring of reported data, which in turn facilitates their analysis and comparability.

3. Data and methodology

3.1. Data characteristics

Verification of the research hypotheses required the use of a database containing ESG ratings of companies. This study used the Refinitiv Eikon database and the metrics available in it: ESG score, Environmental score, Social score, and Governance score.

The sector criterion (non-financial and financial sectors) was chosen for selecting companies for the study; companies from the Central and Eastern European areas were included in the study. Based on the OECD division, the following countries were included: Albania, Bulgaria, Croatia, Czech Republic,

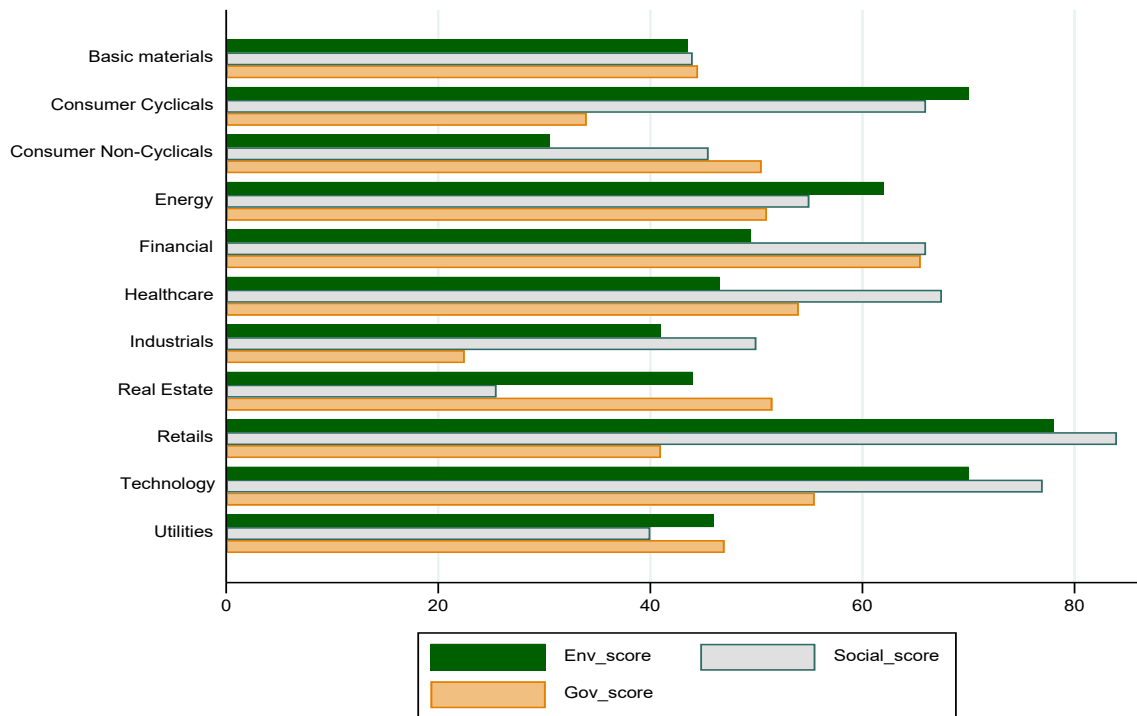


Figure 1. Industry distribution of the survey sample by environmental (Env_score), governance (Gov_scor), and social (Social_score) pillar ranking
Source: own compilation based on Refinitiv Eikon <https://eikon.refinitiv.com/> (accessed 2023-05-13)

Hungary, Poland, Romania, Slovakia, Slovenia, Estonia, Lithuania, and Latvia. The time horizon of the study is 5 years, from 2017 to 2021. With the above assumptions in mind, the ESG Peers View module available in Refinitiv Eikon was used and ESG score data was downloaded for companies in the selected region and the indicated period. Taking into account the inadequate number of ESG rating observations, the final research sample of 48 unique public companies, representatives of five countries: Poland, Czech Republic, Romania, Slovenia, and Hungary. The majority of which are Polish companies listed on the Warsaw Stock Exchange. A graphical representation of the distribution of the research sample is presented in Figure 1.

Among the 11 sectors analysed, only in one case - the basic materials sector - similar levels of Environmental score, Social score, and Governance score indicators are observed. The remaining sectors are characterised by wide variation in the value of indicators corresponding to the individual areas behind the ESG acronym. For example, in the consumer cyclicals sector, both the Environmental score and Social score reach levels above 60, while the Governance score is below 40. An even greater disparity is observed in the retail sector. This sector achieves the highest Environmental score and Social

score among the analysed sectors. At the same time, the value of the index describing the corporate governance activities of companies in the sector remains at a low level (the third lowest value of the Governance score among the 11 sectors analysed).

Analysis of Figure 1 leads to two observations. First, the analysed sectors are characterised by high inter-sectoral variability. The observed levels of Env_score, Social_score, and Gov_score in each sector vary greatly. In addition, it is not possible to identify a single area (environment, social, corporate governance) that achieves the highest (or lowest) values in all sectors. Secondly, intra-sectoral variation is noticeable. The differences between the values of indicators corresponding to individual ESG pillars, analysed within a single sector, are significant, which indicates a kind of specialization in specific activities undertaken by companies operating in different sectors.

Due to the sectoral diversity of the research sample, descriptive statistics were performed separately for each sector (Table 1). These statistics allowed us to observe differences in ESG ratings between sectors.

The lowest average ESG score value in the study period is observed in the real estate sector, while

Table 1. Descriptive statistics results for the ESG_score indicator across sectors

Sector	Mean	Median	Std. dev.	Min	Max
Basic Materials	44.3200	39.3000	12.1891	30.7100	72.3700
Consumer Cyclical	55.5475	55.0650	7.8532	48.5800	63.4800
Consumer Non-Cyclical	43.5933	44.1000	5.6499	35.1200	53.2400
Energy	56.9795	58.2200	10.9479	30.4900	74.2000
Financial	59.6758	58.9700	14.7235	31.0500	87.1500
Healthcare	58.1330	58.0200	5.8753	49.7800	68.5300
Industrials	45.6570	40.2750	11.7227	34.2400	61.1000
Real Estate	39.8300	39.8300	0.1838	39.7000	39.9600
Retail	65.6400	65.9900	9.2005	51.1300	76.5700
Technology	63.9395	67.4600	10.5718	48.9000	79.9600
Utilities	46.0243	43.3900	11.0404	32.1700	71.8400
Total	55.0022	54.7200	14.0555	30.4900	87.1500

Source: own study

the highest is in the retail sector. For 5 out of the 11 analysed sectors, the average values are below the average value for the entire research sample (without sectoral division). In the case of the basic materials and industrials sectors, there is the greatest difference between the levels of the average and median. A lower median value than the mean indicates a greater concentration of observations from these sectors in lower ESG score values. Moving on to the measure of variability, the greatest variability is observed in the financial sector, which is the largest sector in the analysed research sample (the standard deviation value is 14.72). For companies in this sector, ESG score values in the study period ranged from 31.05, being one of the lowest among the sectors studied (the lowest ESG score level appears in the energy sector and is 30.49), to 87.15, which is the highest observed ESG score level in the entire sample.

3.2. Cross-sectional analysis

To further understand the diversity in the level of ESG scores achieved by the companies included in the research sample, a cross-sectional analysis was carried out, considering two dimensions: geographical location (Table 2) and industry sector (Table 3). The conducted analysis allowed for examining the dynamics of sustainability scores related collectively

to 3 ESG aspects throughout the period from 2017 to 2021.

Between 2017 and 2021, the average values of the ESG score for companies from selected countries varied significantly (Table 2). Looking at the average ESG score over the 5 years examined, the lowest value is observed for companies from Poland (52.87), while the highest is for companies from Hungary (66.33), the difference between the results obtained by these two countries is just under 14 points. Analysing the average ESG scores obtained over the years, an interesting case is observed in Romania. It is precisely the companies from Romania that presented the lowest average ESG score in 2017, reaching a level of just under 40, while for companies from other countries, the average ESG score was at least 51.07. At the same time, it is Romanian companies that achieve the highest ESG score rating, reaching a level of 77.78 in 2021, which is significantly higher than the results obtained by companies from other countries. Furthermore, it is noteworthy that for four countries, there is a discernible increase in the assessment of corporate activities in the ESG sphere, as measured by the ESG score. An exception to this trend is Poland, where the average ESG score in 2017 was higher than the average values observed in the following years.

Significant variation in ESG score values is observed not only at the country level but also at the sector level (Table 3). Except for 2017, the highest average ESG score is observed in the retail sector.

Table 2. Average value of the ESG score across countries in the years 2017-2021

Country	2017	2018	2019	2020	2021	Mean
Czech Republic	51.0733	52.4467	52.8433	59.3033	65.2600	56.1853
Poland	54.5091	52.4403	52.6769	51.6522	53.6426	52.8712
Romania	39.6650	42.3900	53.5500	71.8900	77.7767	60.0175
Slovenia	58.5300	58.1200	59.2100	57.9200	66.9700	60.1500
Hungary	63.7550	64.8900	64.3725	67.8125	70.8375	66.3335

Source: own study

Table 3. Average value of the ESG score across sectors in the years 2017-2021

Sector	2017	2018	2019	2020	2021	Mean
Basic Materials	72.3700	44.0400	43.2900	43.2217	41.2260	44.3200
Consumer Cyclicals	48.5800	49.0200		63.4800	61.1100	55.5475
Consumer Non-Cyclicals	39.5450	40.6000	43.1033	47.2967	45.8150	43.5933
Energy	58.7300	57.4150	53.4400	55.3900	60.0020	56.9795
Financial	54.1429	56.7356	60.1163	60.9841	65.2765	59.6758
Healthcare	56.3550	53.9500	55.8950	56.7150	67.7500	58.1330
Industrials		43.2300	47.7850	50.4700	43.4567	45.6570
Real Estate				39.9600	39.7000	39.8300
Retails	51.1300	65.9900	65.9800	68.5300	76.5700	65.6400
Technology	64.8425	61.9575	64.9875	63.8975	64.0125	63.9395
Utilities	46.9650	45.4575	42.6640	45.0800	50.0300	46.0243

Source: own study

Conversely, companies in the consumer non-cyclicals (2017-2018), utilities (2019), and real estate (2020-2021) sectors are found on the other end. The largest difference between the best and worst ESG score was observed in 2021, amounting to nearly 37 points, while the smallest, observed in 2019, was 23. In the case of cross-sectoral analysis, a systematic increase in the average ESG score rating is observed each year from 2017 to 2021, exclusively for companies within the financial sector.

3.3. Cluster analysis

To investigate how homogeneous (and thus indirectly integrated) or heterogeneous the sectors under study are, we used a clustering technique. A cluster analysis based on Ward's minimum variance technique was conducted to identify the optimal number of clusters

for each period. This analysis was designed to group financial and non-financial sectors into internally homogeneous and externally heterogeneous clusters in terms of their ESG scoring. Cluster analysis is a useful tool for examining relationships between sector characteristics without imposing any a priori restrictions on the probabilistic nature of the variables. The results are presented in dendrograms (see Figure 2 - Figure 5), while descriptive statistics for individual clusters are included in Appendix 1.

Starting with the ESG score, an indicator that assesses the aggregate activities of companies in three sectors (environmental, social, and corporate governance), the dendrogram indicates that two main clusters can be delineated. On the one hand, a cluster includes companies in the financial sector, and on the other, a cluster includes companies operating in other sectors. The ESG score for the financial sector is highly standardised and significantly different from

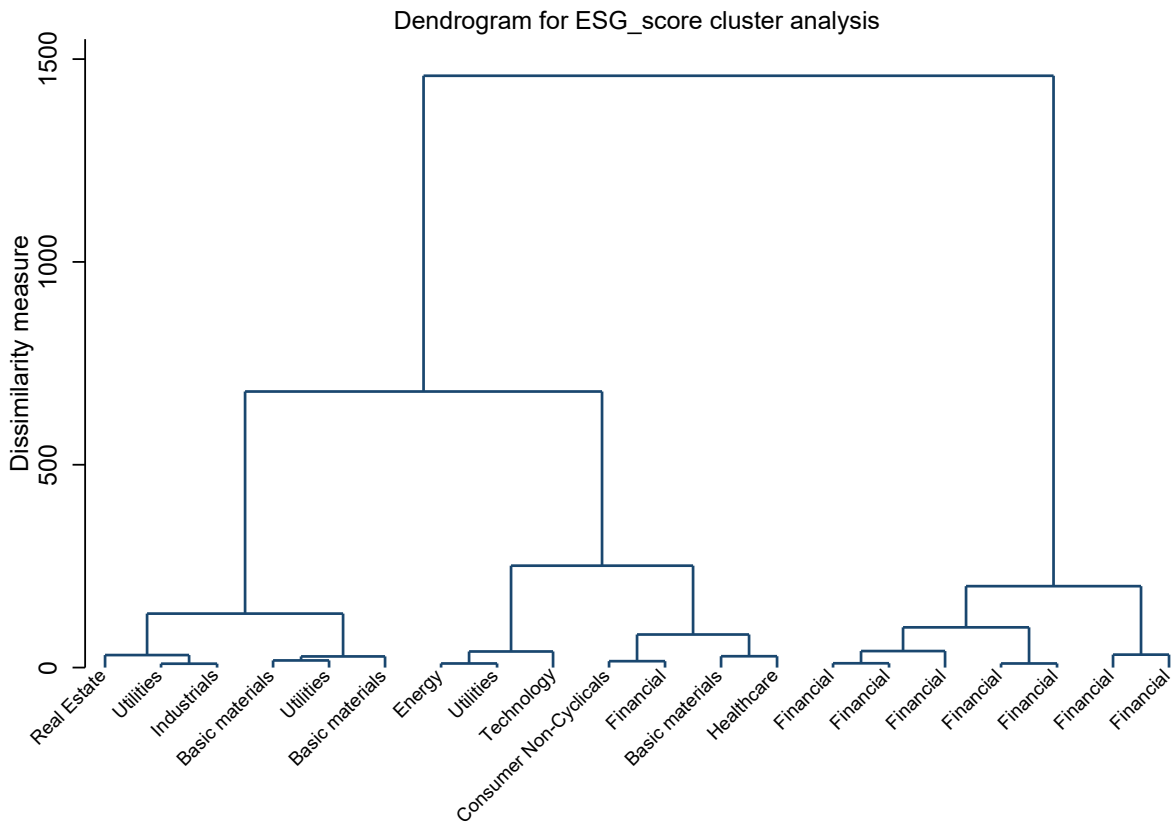


Figure 2. Dendrogram for ESG_score cluster analysis
Source: own study

that of the non-financial sectors. Within the cluster composed of non-financial sector companies, greater variation in the level of the ESG score is observed.

The cluster comprising financial companies (Table A in Appendix 1) is characterised by the highest ESG score. At the same time, companies in this group have the largest asset size and highest financial leverage. However, their profitability (measured by ROA) is below the average for the analysed groups.

The results obtained may suggest that in the research sample analysed, it is worth taking into account the division into two general sectors of companies' activities: the financial sector and the non-financial sector.

Analysis of the dendrogram provides an opportunity to identify groups of sectors achieving similar values of the analysed indicator. In the case of the Environmental score, a greater differentiation is observable than in the case of the general indicator (ESG score). The obtained shape of the dendrogram indicates that it is not possible to determine two clusters, one of which contains only companies operating in the financial sector. At the same time,

it is observable that the financial sector is becoming more similar to the energy sector.

Analysing the descriptive statistics for this clustering, it is observed that companies with the highest profitability are characterised by the lowest average value of Env_score. At the same time, these are companies with the lowest asset value (Table B in Appendix 1). This group includes companies from sectors such as: basic materials, consumer non-cyclicals, financial, and technology. At the same time, companies achieving the highest Env_score are those with the highest asset value, but their profitability is below the average for the analysed groups (group 2 containing companies from Consumer Non-Cyclicals and Financial sectors).

In the case of the other two indicators relating to the evaluation of companies' activities in the areas of social (Social_score) and corporate governance (Gov_score), more variation is apparent than in the case of the general indicator (ESG_score). At the same time, the relationship observed in the case of previous indicators persists—clusters with the highest average Social_score (Table C), and correspondingly Governance_score (Table D), are characterised by

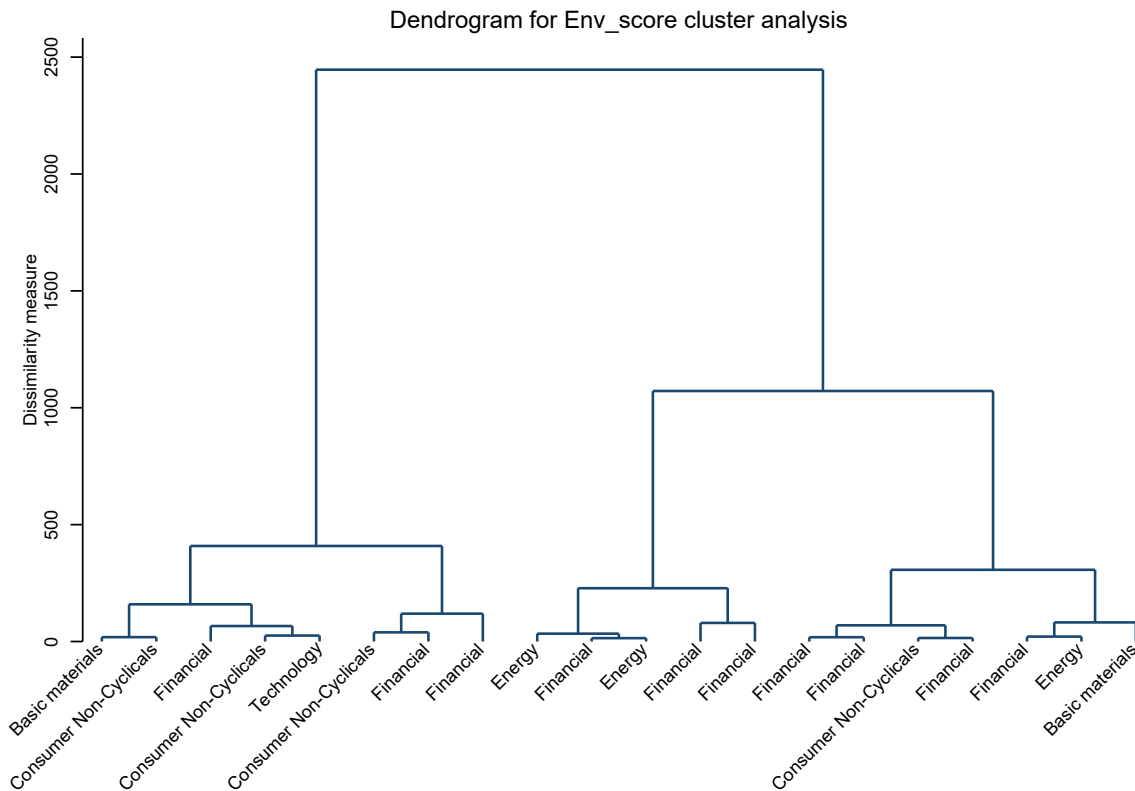


Figure 3. Dendrogram for Env_score cluster analysis
Source: own study

simultaneously having the highest asset values, the highest leverage, and profitability below the average for the entire sample. However, these groups contain companies representing different sectors. Thus, Ward's method, which is one of the popular methods of hierarchical clustering, based on analysis of variance, allows the determination of two clusters defined by the sector of companies' activities (financial and non-financial sectors) only in the case of analysis of the general indicator ESG score. In the case of the analysis of indicators relating to individual ESG pillars, the results obtained are more diverse and such a clear sectoral division is not observable, as described in the case of ESG score.

3.4. Panel regression model

Panel regression with FE and RE estimators was used to verify the research hypotheses. Two tests in particular help select the estimator, the first being the Breusch-Pagan test for the presence of individual effects and the second the Hausman test. As a result, the lack of validity of the RE estimator was indicated.

The general form of the estimated model adopted the form:

$$ROA_{it} = \beta_0 + \beta_1 \log(esg_score)_{it} + \beta_2 size_{it} + \beta_3 leverage_{it} + \beta_4 GDP_growth_{it} + \beta_5 Bank + v_{it}$$

where v_{it} denotes the total random error, which is the sum of the random error and the individual effect ($v_{it} = u_i + \epsilon_{it}$). A detailed description of the variables used in the study is presented in Table 1.

The study used the most recent financial data, including the ESG variables Social, Governance, and Environment. The variables are defined according to the ESG scores methodology published in May 2022 by Refinitiv (Refinitiv, 2022). This source has previously been used in empirical studies (Buallay, 2019; Caldeira dos Santos & Pereira, 2022; Galletta et al., 2022). ESG_score provides a comprehensive scoring of a bank's ESG performance, considering three pillars. Three dimensions of ESG performance are analysed: environmental score (Environment), social score (Social), and good governance score (Governance). The assessment of the Environment pillar is based on three points: 1/ resource utilization, which reflects the bank's ability to reduce consumption of energy, water, and materials and to find complementary solutions that

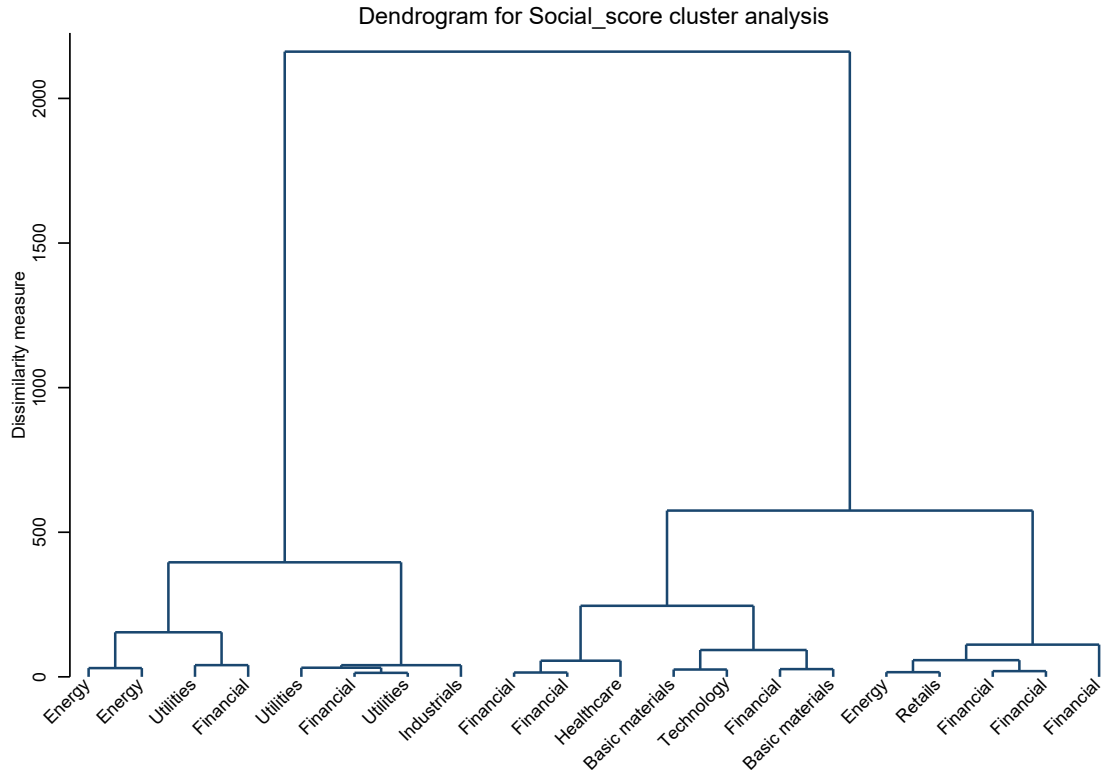


Figure 4. Dendrogram for Social_score cluster analysis
Source: own study

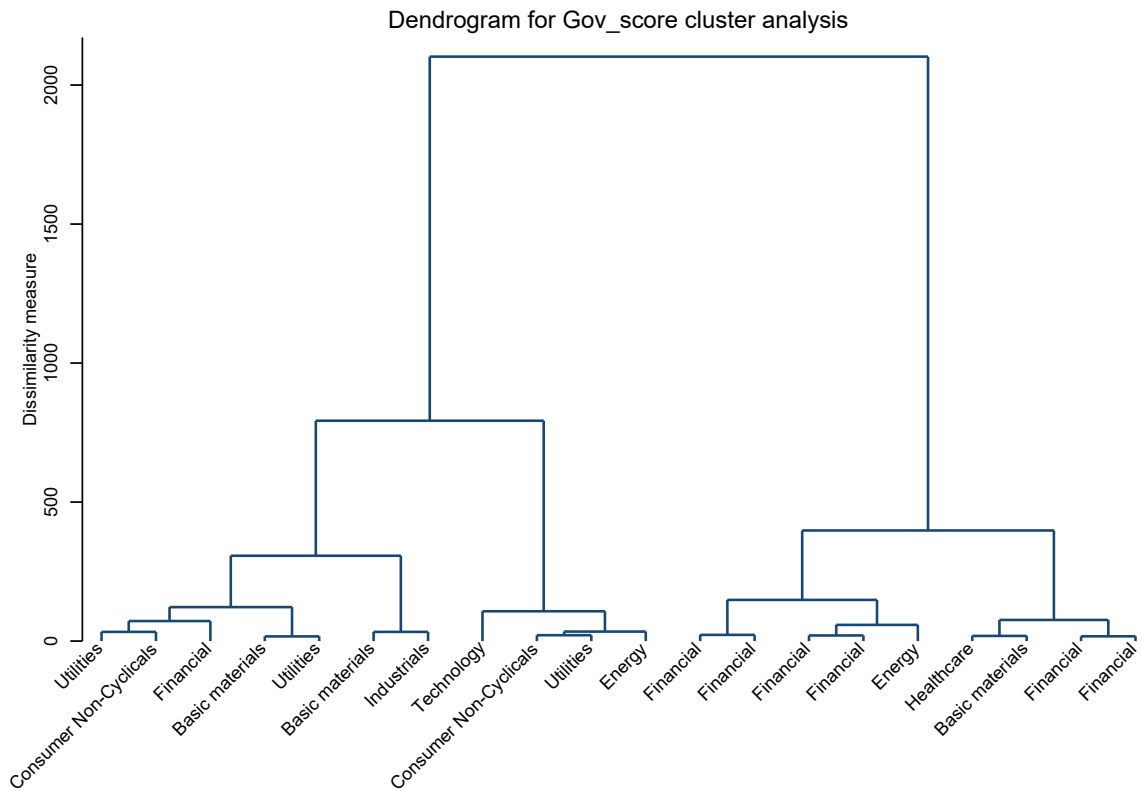


Figure 5. Dendrogram for Gov_score cluster analysis
Source: own study

Table 4. Model variables description

Variable	Description
ROA	Return on assets before taxes (expressed as a percentage)
esg_score	Value of ESG Score according to Refinitiv
env_score	Value of Environmental Pillar Score according to Refinitiv
social_score	Value of Social Pillar Score according to Refinitiv
gov_score	Value of Governance Pillar Score according to Refinitiv
size	Natural logarithm of the total asset value
leverage	The ratio of the total asset value to the total equity value (expressed as a percentage)
GDP_growth	Annual GDP growth rate at market prices based on constant local currency (expressed as a percentage)
Bank	Binary variable; takes a value of 1 if the company belongs to the financial sector, 0 otherwise

Source: own study

are greener; 2/ emission reduction, which measures the company's effectiveness and commitment to reducing emissions to the environment; 3/ innovation, which reflects the bank's ability to reduce environmental costs through new technologies or eco-projects. The Social (Social) pillar ranking considers four categories: 1/ workforce score, which measures the bank's effectiveness in providing a healthy and safe workplace, maintaining job satisfaction, along with equal opportunities for its employees; 2/ human rights, which refers to the company's compliance with basic conventions that address human rights; 3/ community score, which shows the bank's commitment to business ethics and public health; and 4/ product responsibility, which reflects the bank's ability to offer quality service. Ultimately, the assessment of the Corporate Governance pillar (Governance) combines effectiveness toward the application of best corporate governance practices, equal treatment of shareholders, and the evaluation of sustainable strategies in day-to-day operations.

Basic descriptive statistics for the dependent variable and explanatory variables are presented in Table 5.

The average ROA for companies in the sample is 4.3%. Among the indicators describing the companies' activities in individual ESG dimensions, the highest average value is achieved by the Social score indicator. However, the lowest average value for companies in the sample was recorded for the Environmental score. Moving on to the overall indicator, the average level of ESG score in the study period is 55 and is close to the level corresponding to the average value of the Governance score indicator. It is also worth noting

the values of the standard deviation, which is a basic measure of variability. The highest standard deviation value, 23, is observed for the variable describing the environmental performance (env_score). On the other hand, the lowest standard deviation value characterises the esg_score variable. However, when interpreting this value, it is important to remember the sample selection method and the imposed restriction on the level of the analysed variable. The average level of the natural logarithm of total assets (size variable) is 8.9 with a standard deviation of 1.5. Meanwhile, the average level of the leverage variable describing the ratio of total assets to equity is 5.5, with the standard deviation of this variable also at the level of 5. Analysing the level of the macroeconomic variable GDP_growth in the study period 2017 - 2021, the average is observed to be 3.6, and the standard deviation is approximately at the same level. It should be noted that the years 2017 - 2021 included in the study cover the period of the COVID-19 pandemic, which justifies the negative level of GDP_growth (the minimum value at -5.5).

4. Results

Based on data from 2017 to 2021, four panel models were estimated using a random effects estimator, where the dependent variable was the ROA value. Each model included explanatory variables such as: size, leverage, and the macroeconomic variable GDP_growth. The models differed in the inclusion of the binary variable Bank and the variable describing actions in the ESG area. Models 1 and 2 included the

Table 5. Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
ROA	207	4.3198	5.3402	-14.0000	26.5000
esg_score	207	55.0022	14.0555	30.4900	87.1500
env_score	207	48.3430	23.0429	0.0000	91.0000
social_score	207	57.1449	18.2235	13.0000	92.0000
gov_score	207	54.4638	19.5224	15.0000	95.0000
size	207	8.9057	1.5177	5.7854	11.5493
leverage	207	5.4819	4.9737	1.1500	36.5800
GDP_growth	207	3.6447	3.5834	-5.5030	8.2111
Bank	207	0.3865	0.4881	0.0000	1.0000
log_env_score	205	3.7084	0.7397	0.0000	4.5109
log_gov_score	207	3.9202	0.4190	2.7081	4.5539
log_social_score	207	3.9837	0.3744	2.5649	4.5218
log_esg_score	207	3.9738	0.2627	3.4174	4.4676

Source: own study

variable `log_esg_score`, which is a synthetic measure of ESG activities in three areas. Meanwhile, Models 3 and 4 included variables describing actions in one selected area, environmental (`log_env_score`) and social (`log_social_score`), respectively. The binary variable `Bank` was added to Model 2 and Model 3. The results of the study are presented in Tables 6 and 7.

In each of the models, the variable describing ESG actions is statistically significant, and the estimated coefficient takes a positive value, indicating a positive relationship between ESG reporting and companies' financial performance measured by ROA.

The obtained results confirm the hypotheses formulated at the beginning. Based on the results of the conducted study, it can be concluded that for companies from the Central and Eastern European region included in the sample, a positive relationship between ESG performance and financial performance measured by ROA is observed (Hypothesis 1). Thus, with the increase in ESG performance, the value of ROA increases (and the higher the ROA values, the better the financial situation of the company). Not only the synthetic ESG score was a statistically significant variable, but also a positive relationship was demonstrated between indicators describing actions in individual areas—environmental, social, and companies' financial performance. The results are in line with Azmi et al. (2021), who analysed a dataset

of developing market banks spanning from 2011 to 2017 and discovered a nonlinear correlation between environmental, social, and governance factors and the overall performance of these banks. Enhancements in ESG initiatives positively impact the overall performance of banks.

Also, where an additional variable `Bank` was applied in the models, this variable is statistically significant. Its positive values indicate a difference in the impact of ESG reporting on companies' financial performance between companies operating in the financial sector and companies operating in other sectors (Hypothesis 2). For companies operating in the financial sector, a greater impact of ESG reporting on financial performance is observed.

In Model 3, the variable `log_esg_score` was replaced with a variable characterizing companies' actions only in one area – the environmental area (`log_env_score`). The obtained results indicate the existence of a statistically significant positive relationship between reporting actions in the environmental area and companies' financial performance. Model 4 was created by replacing the variable characterizing companies' actions in the environmental area with a variable describing actions in the social area (variable `log_social_score`). For such a defined model, a positive relationship between reporting actions in the social area and the level of ROA is also observed.

Table 6. Relationship between ESG score and performance for CEE companies in 2017-2021

Variable	Model 1	Model 2
log_esg_score	0.0507*** (0.0163)	0.0536*** (0.0162)
size	-0.0096*** (0.0036)	-0.0121*** (0.0038)
leverage	-0.0046*** (0.0009)	-0.0052*** (0.0010)
GDP_growth	0.0035*** (0.0007)	0.0034*** (0.0007)
Bank		0.0203* (0.0117)
_cons	-0.0613 (0.0578)	-0.0548 (0.0575)
Breusch-Pagan Test:		
chi-bar-square	37.41	36.89
p-value	0.0000	0.0000
Hausman Test:		
Chi-square	3.28	2.04
p-value	0.5127	0.7276
R ² Within	0.2379	0.2402
R ² Between	0.4042	0.4345
R ² Overall	0.3360	0.3517
Number of obs	207	207

In parentheses, the values of standard errors are provided; *p-value<0.1; **p-value<0.05; ***p-value<0.01
Source: own study

Companies' actions can have positive or negative impacts on the environmental, social, and corporate governance (ESG) areas. At the same time, each of the three areas behind the ESG acronym can generate certain risks for the operation of individual firms. Awareness of these issues, reporting on their impact, and risk identification are crucial elements in managing ESG risk within an organization.

The conclusions drawn from the empirical study can provide justification for increasing actions taken by companies in the ESG area and the importance of reporting these actions. Apart from the reputational aspect (a company reporting ESG is perceived as sustainably conducting its business), companies effectively managing the ESG area can more efficiently

Table 7. Relationship between ESG_ environment score and ESG_social score and performance for CEE companies in 2017-2021

Variable	Model 3	Model 4
log_env_score	0.0109** (0.0053)	
log_social_score		0.0266** (0.0112)
size	-0.0103** (0.0042)	-0.0077** (0.0035)
leverage	-0.0053*** (0.0010)	-0.0045*** (0.0009)
GDP_growth	0.0034*** (0.0007)	0.0034*** (0.0007)
Bank	0.0300** (0.0141)	
_cons	0.0985*** (0.0316)	0.0171 (0.0436)
Breusch-Pagan Test:		
chi-bar-square	43.48	35.97
p-value	0.0000	0.0000
Hausman Test:		
Chi-square	0.80	5.26
p-value	0.9379	0.2615
R ² Within	0.2471	0.2226
R ² Between	0.3147	0.3925
R ² Overall	0.3043	0.3239
Number of obs	205	207

In parentheses, the values of standard errors are provided; *p-value<0.1; **p-value<0.05; ***p-value<0.01
Source: own study

identify and manage long-term risks associated with, for example, climate change or shifting societal expectations.

A particularly interesting area of analysis is the financial sector. As shown in the study, a greater impact of ESG reporting on financial performance is observed for companies operating in this sector compared to companies operating in other sectors. Interpreting these results, it is worth noting the significant role attributed by the European Union, among others, to the banking sector in the implementation of

sustainable finance strategies. Financial institutions are also entities for which managing the ESG area and ESG risk is particularly important, and which can be largely influenced by ESG risk factors. Analysing only environmental risk and its two components - physical risk (resulting from physical phenomena, the effects of climate change such as extreme weather events) and transition risk (also known as transition risk, resulting from the transition to a low-carbon economy and associated regulatory constraints and challenges), a direct impact on the activities of financial institutions is noticeable. For example, in the context of physical risk, extreme weather events can affect the value of real estate, which serves as collateral for transactions. For transition risk, regulations introduced by governments of individual countries may necessitate the suspension of high-emission activities, which may result in the materialization of risks such as credit or operational risk.

Growing social awareness and increasing requirements regarding the communication of the impact of companies' activities on a wide range of stakeholders and the environment in which the company operates are reflected in a growing interest in sustainable investments. In this context, issues related to socially responsible investing (SRI) and environmentally responsible investing (ERI) are emerging. The conducted study has shown the existence of a positive relationship between the assessment of ESG actions and companies' financial performance. The existence of this relationship can, in turn, be a positive signal for potential investors, both those identifying with socially or environmentally responsible investing and those who are just beginning to consider companies' activities in the ESG areas in the process of creating their investment portfolio. Regardless of the potential investor's preferences, it is crucial for them to be more aware and to consider the company holistically—through the lens of financial results but also activities in the three aforementioned areas included in the ESG framework.

5. Conclusions and discussion

ESG-related topics represent a very interesting area of research. These studies can take a variety of forms and dimensions: from studies analysing the activities of single entities in detail to studies spanning many countries or sectors; from studies analysing activities defined collectively as ESG to studies focusing

attention on each factor separately (or taking into account only selected specific measures such as board composition or CO₂ emissions); from qualitative studies to quantitative research.

One popular topic that has been the subject of many publications is the study of the relationship between the assessment of sustainability and the financial performance of companies. Investigating the existence of such a relationship is the purpose of this paper. The study carried out is quantitative, and the geographical aspect was chosen as a determining factor in the selection of companies for the research sample, limiting its scope to the Central and Eastern European regions. The inclusion of such a group of companies is a new approach and allows for the analysis of a market in which Poland is an important part.

The cross-sectional analysis conducted as part of this study allowed for the observation of significant differences in companies' sustainability assessment levels from various countries in the CEE region. Furthermore, significant variations, measured by ESG score, were also observed in these assessments across different sectors. This observation, combined with the conclusions drawn from the conducted cluster analysis, enabled a deeper understanding of the variability in the reported level of sustainability of conducted activities depending on the sector of operation and provided additional justification for the hypothesis formulated in the study. In the case of the overall assessment expressed by the ESG score, it was observed that there is a cluster composed solely of companies belonging to the financial sector. This cluster can be attributed to certain characteristics that distinguish it from other defined clusters. It is characterised by the highest level of assets and the highest leverage, while the level of profitability measured by ROA is lower than the average in other groups.

One of the most important conclusions of the study is the demonstration of the existence of a positive relationship between the evaluation of ESG activities and the financial performance of companies as measured by ROA. The results obtained, therefore, serve as another example of the existence of a non-negative relationship between ESG and the financial performance of companies, a finding observed by Friede et al. (2015) in their comprehensive review of studies on this subject matter.

Moving specifically to the relationship between ESG and the level of ROA, an analogous relationship was identified for companies from India (Anklesaria-

Dalal & Thaker, 2019). Concurrently, a related observation was made in a market significantly closer to the Central and Eastern European region's companies. In this study of German firms, Velte (2017) revealed a positive link between ESG factors and the financial performance measured by ROA.

Moreover, the existence of a positive relationship between the ESG rating of companies' activities in single areas, environmental, social, and financial performance, was also identified. In two of the four estimated models, a binary variable was added to indicate whether the company operates in the financial area or has business activities in another sector. Conclusions from the models thus defined indicate a difference in the correlation between ESG scores and companies' financial performance occurring between sectors. For companies operating in the financial sector, a greater relationship between ESG rating and financial performance is observed.

When analysing the results obtained, one should keep in mind the potential limitations of the sample selection. Currently, the number of companies from the CEE region for which the Refinitiv ESG score was available is not large, so it will undoubtedly be interesting to conduct a similar survey in the coming years when the EU regulations on mandatory non-financial reporting will cover more and more companies. In addition, the survey was based on only one ESG rating, provided by Refinitiv Eikon. The study did not provide clear guidance on which ESG measures are most effective for companies; however, it did show that intensifying sustainability policies does not reduce profitability and can therefore deliver measurable profits. In addition, certain ESG activities, such as environmentally friendly investments, may have secondary benefits. In turn, these secondary benefits may include improving the quality of life of a society or making it a more attractive place for foreign direct investment in the long term. When comparing this with the outcomes observed by Kwiatkowski et al. (2023), who explored the impact of formal institutional environments on the effectiveness of regional cluster policies in 20 Polish clusters and found that cluster coordinators are often institutions from the business environment, one might suggest that such a role could be taken up by companies excelling in ESG practices. Furthermore, improving the quality of life for communities can serve as an example of caring for a broad group of stakeholders, thus perfectly embodying the stakeholder theory (Azmi et al., 2021; Jo & Harjoto, 2011; Ruf et al., 2001).

The survey results can help companies make ESG decisions. In addition, regulators can see more clearly which components of the strategy need to improve operations to achieve and maintain higher financial performance with a commitment to sustainability.

Showing a positive relationship between ESG reporting and companies' financial performance can be an incentive for both investors and companies. On the one hand, investors becoming more aware can expect companies to take concrete actions in the areas of ESG. On the other hand, companies are noticing that although these activities are not, by definition, aimed at generating profit, they can bring tangible benefits.

Examining the relationship between a company's sustainability performance and its outcomes, defined in various ways, undoubtedly constitutes and will continue to constitute, an intriguing area of research that can be pursued in various directions. New research directions will also be shaped by changes introduced in the reporting methods concerning both ESG issues and financial performance measures. For instance, Maruszczyńska & Tuskiewicz (2024) highlight a change resulting from the upcoming introduction of Management Performance Measures (MPM) definitions into the International Financial Reporting Standards. According to this definition, MPMs are only measures derived from subtracting incomes and expenditures, and thus according to the definition, the ROA indicator is not an MPM. The author points out that an entirely new research direction could be the analysis of the relationship between a set of MPMs and a company's valuation, concurrently expanding this analysis to include the examination of the relationship between a set of MPMs and a company's ESG rating.

Increasing interest in ESG topics and conducting activities in this area has a positive impact on various stakeholder groups, both internal and external, and increases awareness that companies should not be analysed in isolation from the environment in which they operate. Companies are part of the broader community and part of the environment. They affect both directly and indirectly. It is worth noting that starting in 2024, the nomenclature of ESG reporting will change - by the CSRD, the new reporting format will be sustainability reporting, rather than non-financial reporting, as before.

References

- Albitar, K., Hussainey, K., Kolade, N., & Gerged, A. (2019). ESG Disclosure and Firm Performance Before and After IR: The Moderating Role of Governance Mechanisms. *International Journal of Accounting and Information Management*, 28, 1–21. <https://doi.org/10.1108/IJAIM-09-2019-0108>
- Anklesaria-Dalal, K., & Thaker, N. (2019). ESG and Corporate Financial Performance: A Panel Study of Indian Companies. *IUP Journal of Corporate Governance*, 18, 44–59.
- Azmi, W., Hassan, M. K., Houston, R., & Karim, M. S. (2021). ESG Activities and Banking Performance: International Evidence from Emerging Economies. *Journal of International Financial Markets, Institutions and Money*, 70, 101277. <https://doi.org/10.1016/j.intfin.2020.101277>
- Bek-Gaik, B., & Rymkiewicz, B. (2015). Wpływ CSR na finansowe miary dokonań jednostek. *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse, Rynki Finansowe, Ubezpieczenia, nr 73 Ryzyko, zarządzanie, wartość*, 151–165.
- Bilgin, M. H., Danisman, G. O., Demir, E., & Tarazi, A. (2021). Bank Credit in Uncertain Times: Islamic Vs. Conventional Banks. *Finance Research Letters*, 39, 101563. <https://doi.org/10.1016/j.frl.2020.101563>
- Bruna, M. G., Loprevite, S., Raucci, D., Ricca, B., & Rupo, D. (2022). Investigating the Marginal Impact of ESG Results on Corporate Financial Performance. *Finance Research Letters*, 47, 102828. <https://doi.org/10.1016/j.frl.2022.102828>
- Buallay, A. (2019). Is Sustainability Reporting (ESG) Associated with Performance? Evidence From the European Banking Sector. *Management of Environmental Quality: An International Journal*, 30(1), 98–115. <https://doi.org/10.1108/MEQ-12-2017-0149>
- Caldeira dos Santos, M., & Pereira, F. H. (2022). ESG Performance Scoring Method to Support Responsible Investments in Port Operations. *Case Studies on Transport Policy*, 10(1), 664–673. <https://doi.org/10.1016/j.cstp.2022.01.027>
- Cheng, Beiting, I., Ioannis, Serafeim, G. (2013). Corporate Social Responsibility and Access to Finance. *Strategic Management Journal*. <https://doi.org/10.1002/smj.2131>
- Chojnacka, E., & Jadanowska, E. (2020). Użyteczność i korzyści ujawniania informacji niefinansowych – wyniki badania ankietowego przeprowadzonego wśród spółek notowanych na Giełdzie Papierów Wartościowych w Warszawie. *Zeszyty Teoretyczne Rachunkowości*, 106(162), 45–65.
- Friede, G., Busch, T., & Bassen, A. (2015). ESG And Financial Performance: Aggregated Evidence from more than 2000 Empirical Studies. *Journal of Sustainable Finance & Investment*, 5(4), 210–233. <https://doi.org/10.1080/20430795.2015.1118917>
- Friedman, M. (1970). A Theoretical Framework for Monetary Analysis. *Journal of Political Economy*, 78(2), 193–238. <https://doi.org/10.1086/259623>
- Galletta, S., Mazzù, S., & Naciti, V. (2022). A Bibliometric Analysis of ESG Performance in the Banking Industry: From the Current Status to Future Directions. *Research in International Business and Finance*, 62(October 2021), 101684. <https://doi.org/10.1016/j.ribaf.2022.101684>
- Haans, R. F. J., Pieters, C., & He, Z. L. (2016). Thinking About U: Theorizing and Testing U- and Inverted U-Shaped Relationships in Strategy Research. *Strategic Management Journal*, 37(7), 1177–1195. <https://doi.org/10.1002/SMJ.2399>
- Heli, W., Jaepil, C., & Jiatao, L. (2008). Too Little or Too Much? Untangling the Relationship Between Corporate Philanthropy and Firm Financial Performance. *Organization Science*, 19(1), 143–159. <https://doi.org/10.1287/ORSC.1070.0271>
- Jo, H., & Harjoto, M. A. (2011). Corporate Governance and Firm Value: The Impact of Corporate Social Responsibility. *Journal of Business Ethics* 2011 103:3, 103(3), 351–383. <https://doi.org/10.1007/S10551-011-0869-Y>
- Kabir, M. A., & Chowdhury, S. S. (2022). Empirical Analysis of The Corporate Social Responsibility and Financial Performance Causal Nexus: Evidence From The Banking Sector of Bangladesh. *Asia Pacific Management Review*. <https://doi.org/10.1016/j.apmrv.2022.01.003>
- Khanna, T., & Palepu, K. (2000). *Emerging Market Business Groups, Foreign Intermediaries, and Corporate Governance* (pp. 265–294) [NBER Chapters]. National Bureau of Economic Research, Inc. <https://econpapers.repec.org/bookchap/nbrnberch/9012.htm>
- Kwiatkowski, T., Micek, G., & Łapczyński, M. (2023). Perceived Social Capital and Institutional Environment's Impact on the Success of Regional Cluster Policies. *Central European Economic Journal*, 10(57), 198–218. <https://doi.org/10.2478/ceej-2023-0012>

Maruszczyńska, E. W., & Tuskiewicz, M. A. (2024). Boundaries of Management Performance Measures (MPMs) Disclosed in Primary Financial Statements Prepared in Accordance with New Standard Planned to Supersede IAS 1. *Central European Economic Journal*, 11(58), 1–16. <https://doi.org/10.2478/ceej-2024-0001>

Mikołajek-Gocejna, M. (2024). The Relationship Between ESG Rating and Firm Value – Evidence from Companies Listed in Poland. *Central European Economic Journal*. <https://doi.org/10.2478/ceej-2024-0011>

Morrison, R. (2021). Environmental, Social, and Governance Theory: Defusing a Major Threat to Shareholder Rights. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3845709>

Moudud-Ul-Huq, S. (2019). Banks' Capital Buffers, Risk, and Efficiency in Emerging Economies: Are They Counter-Cyclical? *Eurasian Economic Review*, 9(4), 467–492. <https://doi.org/10.1007/s40822-018-0121-5>

Nollet, J., Filis, G., & Mitrokostas, E. (2016). Corporate Social Responsibility and Financial Performance: A Non-Linear and Disaggregated Approach. *Economic Modelling*, 52, 400–407. <https://doi.org/10.1016/j.econmod.2015.09.019>

Refinitiv. (2022). *Environmental, Social and Governance (ESG) Scores from Refinitiv*. https://www.lseg.com/content/dam/marketing/en_us/documents/methodology/refinitiv-esg-scores-methodology.pdf

Ruf, B. M., Muralidhar, K., Brown, R. M., Janney, J. J., & Paul, K. (2001). An Empirical Investigation of the Relationship Between Change in Corporate Social Performance and Financial Performance: A Stakeholder Theory Perspective. *Journal of Business Ethics*, 32(2), 143–156. <https://doi.org/10.1023/A:1010786912118>

Sikacz, H., & Wołczek, P. (2017). Analiza ESG spółek z indeksu RESPECT – podsumowanie badań. *Zeszyty Naukowe SGGW, Polityki Europejskie, Finanse i Marketing*, 18(67), 170–180. <https://doi.org/10.22630/PEFIM.2017.18.67.32>

Velte, P. (2017). Does ESG Performance Have an Impact on Financial Performance? Evidence from Germany. *Journal of Global Responsibility*, 8(2), 169–178. <https://doi.org/10.1108/JGR-11-2016-0029>

Appendix 1

Table A. Descriptive statistics of ESG score for CEE companies

Number of group	Mean	Median	StandDev	Min	Max
#1					
ROA	0.04	0.03	0.05	-0.08	0.19
esg_score	38.23	39.09	3.92	30.49	43.81
size	7.95	7.49	1.24	5.79	10.76
leverage	3.33	2.46	2.53	1.32	11.32
#2					
ROA	0.06	0.06	0.06	-0.13	0.27
esg_score	53.35	54.18	5.13	44.36	62.37
size	8.79	9.06	1.45	5.80	11.52
leverage	4.97	2.53	3.86	1.15	15.52
#3					
ROA	0.03	0.02	0.04	-0.14	0.17
esg_score	71.82	71.73	6.12	63.10	87.15
size	9.89	10.05	1.22	7.49	11.55
leverage	8.02	7.80	6.56	1.25	36.58
Total					
ROA	0.04	0.03	0.05	-0.14	0.27
esg_score	55.00	54.72	14.06	30.49	87.15
size	8.91	9.06	1.52	5.79	11.55
leverage	5.48	2.65	4.97	1.15	36.58

Source: own study

Table B. Descriptive statistics of ESG Environmental score for CEE companies

Number of group	Mean	Median	StandDev	Min	Max
#1					
ROA	0.05	0.03	0.05	-0.06	0.19
env_score	23.61	25.00	10.97	0.00	39.00
size	8.27	7.68	1.47	5.79	11.42
leverage	4.59	2.53	3.81	1.15	21.75
#2					
ROA	0.03	0.02	0.04	-0.14	0.10
env_score	76.29	74.00	6.54	67.00	91.00
size	9.53	9.76	1.19	7.29	11.35
leverage	6.94	7.03	5.59	1.44	36.58
#3					
ROA	0.05	0.04	0.06	-0.13	0.27
env_score	51.94	50.00	7.23	41.00	65.00
size	9.08	9.06	1.57	6.22	11.55

Table B. Descriptive statistics of ESG Environmental score for CEE companies

Continued

Number of group	Mean	Median	StandDev	Min	Max
leverage	5.24	2.36	5.33	1.25	23.54
Total					
ROA	0.04	0.03	0.05	-0.14	0.27
env_score	48.34	48.00	23.04	0.00	91.00
size	8.91	9.06	1.52	5.79	11.55
leverage	5.48	2.65	4.97	1.15	36.58

Source: own study

Table C. Descriptive statistics of ESG Social score for CEE companies

Number of group	Mean	Median	StandDev	Min	Max
#1					
ROA	0.06	0.04	0.07	-0.08	0.27
social_score	42.41	41.00	4.80	34.00	50.00
size	8.36	8.99	1.54	5.79	10.77
leverage	3.83	2.16	3.34	1.31	11.54
#2					
ROA	0.02	0.03	0.03	-0.05	0.09
social_score	26.48	27.00	4.15	13.00	32.00
size	7.92	7.64	1.06	6.22	9.90
leverage	3.82	2.54	2.75	2.10	11.32
#3					
ROA	0.05	0.03	0.05	-0.13	0.17
social_score	63.92	64.00	5.67	52.00	73.00
size	9.18	9.37	1.47	6.51	11.42
leverage	6.00	4.61	4.65	1.15	22.01
#4					
ROA	0.03	0.02	0.04	-0.14	0.14
social_score	79.60	78.00	5.11	74.00	92.00
size	9.62	9.67	1.32	6.88	11.55
leverage	7.38	7.03	7.00	1.25	36.58
Total					
ROA	0.04	0.03	0.05	-0.14	0.27
social_score	57.14	61.00	18.22	13.00	92.00
size	8.91	9.06	1.52	5.79	11.55
leverage	5.48	2.65	4.97	1.15	36.58

Source: own study

Table D. Descriptive statistics of ESG Governance score for CEE companies

Number of group	Mean	Median	StandDev	Min	Max
#1					
ROA	0.04	0.04	0.06	-0.14	0.17
gov_score	32.41	34.00	8.45	15.00	45.00
size	8.55	8.57	1.36	5.89	11.37
leverage	4.82	2.58	5.11	1.31	36.58
#2					
ROA	0.05	0.05	0.05	-0.06	0.19
gov_score	52.82	52.50	3.81	47.00	59.00
size	8.62	8.34	1.57	5.79	11.55
leverage	3.94	2.25	3.30	1.17	11.39
#3					
ROA	0.03	0.02	0.04	-0.05	0.15
gov_score	80.68	79.00	6.24	73.00	95.00
size	9.74	9.93	1.44	6.96	11.53
leverage	8.46	8.25	5.99	1.33	23.54
#4					
ROA	0.05	0.02	0.06	-0.00	0.27
gov_score	66.24	66.00	3.09	61.00	71.00
size	8.97	9.19	1.51	5.80	11.04
leverage	5.32	2.51	3.97	1.15	14.90
Total					
ROA	0.04	0.03	0.05	-0.14	0.27
gov_score	54.46	55.00	19.52	15.00	95.00
size	8.91	9.06	1.52	5.79	11.55
leverage	5.48	2.65	4.97	1.15	36.58

Source: own study