Transitioning to Sustainability: The Impact of ESG on Financial Performance in the Post-Soviet EU States

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ABSTRACT

This study investigates the impact of Overall ESG and individual Disclosure scores—Environmental, Social, and Governance—on the financial performance of publicly traded companies in Post-Soviet EU states, specifically focusing on Return on Assets (ROA), Return on Equity (ROE), and Return on Investment (ROI) as financial performance indicators. Using a multiple linear regression model and a sample of 245 firms, the research examines how ESG and its components influence financial outcomes while controlling for market capitalization, company age, and R&D expenditure. The findings reveal that neither overall ESG nor individual Disclosure scores significantly affect ROA, ROE, or ROI. Notably, the Environmental Disclosure Score shows a negative but non-significant relationship with financial performance, while the Social and Governance Disclosure Scores also lack statistically significant effects. Conversely, market capitalization positively influences financial performance, and company age negatively impacts ROE and ROI. R&D expenditure does not significantly affect any financial performance measures. These results suggest that ESG disclosures in Post-Soviet EU States, may not yet be sufficiently developed to influence financial performance directly. The study underscores the importance of firm size in driving financial success in the region and emphasizes the need for further research into ESG factors in this context.

Keywords: ESG, Financial Performance, Post-Soviet States, Transitioning Economies
JEL Classifications: G32; M14; Q56

1. INTRODUCTION

The increasing emphasis on sustainability, corporate responsibility, and environmental stewardship has led to a paradigm shift in the way investors evaluate corporate performance. Environmental, Social, and Governance (ESG) factors, once considered peripheral, are now central to investment strategies globally. As of 2023, the Global Sustainable Investment Alliance (GSIA) reported that sustainable investment assets exceeded $30 trillion, signaling a profound transformation in financial markets (GSIA, 2021). Research consistently supports the notion that strong ESG performance is positively correlated with long-term financial stability and profitability (Eccles et al., 2014; Fatemi et al., 2018; Velte, 2017). However, the integration of ESG factors into corporate and financial frameworks is uneven across the globe. While ESG considerations are deeply embedded in the investment

practices of developed economies, their application and impact in emerging and transition economies remain underexplored and, in many cases, insufficiently developed.

Post-Soviet states that have transitioned into the European Union (EU)—including countries such as Estonia, Latvia, Lithuania, Poland, and Romania—offer a unique context for studying the dynamics of ESG performance in post-communist economies. These nations have undergone profound political, economic, and institutional changes over the past 20-30 years, shifting from centrally planned to market-oriented economies and aligning with the EU's regulatory framework. Yet, there remains a significant gap in the literature concerning the influence of ESG factors on the financial performance of companies within these countries, particularly in the context of their post-transition economic landscape. This gap is particularly critical given the increasing

importance of ESG disclosures to investors and policymakers alike, who are striving to understand how these factors affect corporate profitability in the region.

This study seeks to address this gap by examining the relationship between ESG scores—along with individual Environmental, Social, and Governance Disclosure Scores—and financial performance indicators, namely Return on Assets (ROA), Return on Equity (ROE), and Return on Investment (ROI), in publicly traded firms in post-Soviet EU states. Using a multiple linear regression model and a sample of 245 firms, this research aims to assess the direct and indirect impact of ESG and its components on corporate financial outcomes, while controlling for key factors such as market capitalization, company age, and R&D expenditure.

What makes this research particularly relevant is its focus on a region that has not been the subject of extensive ESG-related financial performance studies. The findings promise to offer valuable insights into how ESG factors influence business outcomes in transitioning economies, shedding light on the broader implications of sustainability in regions that are often overlooked in global ESG discourse. This study not only seeks to contribute to the academic literature by expanding our understanding of ESG's role in the context of post-Soviet EU states but also offers practical insights for investors and policymakers. By exploring whether ESG disclosures directly affect financial performance in this context, the research has the potential to inform investment strategies, corporate governance practices, and policy frameworks in emerging European economies.

2. LITERATURE REVIEW

2.1. Historical Context and Development of ESG
The concept of Environmental, Social, and Governance (ESG) factors has evolved significantly since its early days. ESG's origins can be traced back to the 1950s and 1960s when Western pension funds began to use it as a tool to influence society positively. Initially, ESG was employed to improve workers' lives through investments in affordable housing and enhanced health facilities. The term "ESG" gained prominence in 2004 with the publication of the United Nations report "Who Cares Wins" (IFC and UN, 2004). This report marked the beginning of a global movement emphasizing that companies should not only focus on profitability but also contribute positively to their communities.

The evolution of ESG has been marked by several key phases. In the 1960s, Socially Responsible Investing (SRI) began to gain traction, focusing on corporate ethics and social responsibility. The 1970s saw the rise of the environmental movement, prompting a broader consideration of companies' environmental impacts. By the 1980s, SRI had expanded to include labor rights, community development, and consumer protection. The 1990s introduced the concept of sustainable development, with the 1992 Earth Summit promoting environmental and social responsibility in corporate practices (Wang, 2023).

The early 2000s witnessed the formalization of ESG as a comprehensive investment framework. The United Nations Global Compact's Principles for Responsible Investment (PRI), introduced in 2004, provided a global standard for ESG investment. The release of the Global Reporting Initiative's (GRI) sustainability reporting guidelines in 2007 further guided companies in disclosing ESG-related information. The 2010s saw rapid growth in ESG investment, culminating in the mainstream acceptance of ESG criteria by the 2020s.

2.2. Positive Relationship Findings
The relationship between CSR and responsibility, such as (Eccles et al., 2014; Orlitzky et al., 2003; van Beurden and Gössling, 2008) found that the correlation between CSR and financial performance has a positive relationship. Several studies have furthermore documented a positive impact of ESG performance on financial profitability. For instance, (Velte, 2017) found a positive effect of ESG on profitability (Return on Assets - ROA) in German firms. Zhao et al. (2018) reported that higher ESG performance boosted financial performance in China's energy sector. Anklesaria-Dalal and Thaker (2019) observed a positive effect of ESG scores on financial success among Indian enterprises between 2015 and 2017. Similarly, Fatemi et al. (2018) found that strong ESG activities and reporting improved firm profitability in the US. They concluded that reporting moderates valuation by reducing deficiencies and amplifying strengths. Bhaskaran et al. (2020) and De Lucia et al. (2020) also highlighted positive associations between ESG variables and financial performance across various regions. Naeem et al. (2021) documented that both individual and combined ESG scores had a positive and significant association with profitability in emerging countries. The study of Jørgensen and Tynes Pedersen (2015) conclude that companies that incorporate sustainability into their business model experience increased profitability. Chairani and Siregar (2021) found that ESG increased the impact of enterprise risk management (ERM) on profitability. Abdi et al. (2022) reported that investment in governance increased a company's market-to-book ratio and involvement in social and environmental causes enhanced financial efficiency in the aviation industry.

2.3. Negative Relationship Findings
Contrastingly, other studies have found a negative relationship between ESG performance and financial outcomes. Barnett (2007) predicted that investing in CSR might negatively impact financial performance due to the reallocation of funds to other stakeholders. Brammer et al. (2006) reported that firms with low social scores performed better in the UK market. Landi and Sciarelli (2019) found a negative relationship between ESG scores and financial performance for 54 listed Italian companies. Folger-Laronde et al. (2022) concluded that high ESG performance in ETFs did not ensure protection during severe market downturns. Nollet et al. (2016) provided evidence of a negative relationship between social performance and financial performance in linear models. Marsat and Williams (2011) reported a negative relationship between CSR rating and financial performance using MSCI ESG ratings. Duque-Grisales and Aguilera-Caracue (2021) found a negative relationship between ESG scores and financial performance of multinational firms in Latin America. Garcia and Orsato (2020) revealed that the relationship between ESG scores and financial performance was negative in emerging markets.

Furthermore, other studies have found a relationship between sustainability and financial performance when looking at a long-term effect (Mcvea and Freeman, 2001; Ruf et al., 2001). Short-term there is however a negative effect of sustainability on company profits. (Nollet et al., 2016)

Studies show that ethical initiatives underperform in the long-term by a significant degree. (Busch et al., 2016; Cardebat and Sirven, 2010; Di Giuli and Kostovetsky, 2014). It is also showed by Barnea and Rubin (2010), that many companies overinvest in sustainability and therefore some companies have a negative effect of a high focus on sustainability.

2.4. Mixed Relationship Findings

Some studies reveal mixed results regarding the relationship between ESG performance and financial performance. Han et al. (2016) found no relationship for social scores, a positive relationship for governance scores, and a negative relationship for environmental scores. Atan et al. (2018) found no evidence of a relationship between ESG scores and profitability or firm value in Malaysia. Saygili et al. (2022) reported mixed outcomes, with environmental reporting negatively impacting financial performance while stakeholder management and governance positively influenced financial outcomes. Giannopoulos et al. (2022) and (Behl et al., 2022) also reported mixed results, indicating both positive and negative impacts of ESG scores on firm performance. Lopez-de-Silanes et al. (2020) found that ESG scores had no impact on firm financial performance in their multi-country study.

2.5. Factors Influencing the Relationship between ESG and Financial Performance

Several factors influence ESG performance and its relationship with financial outcomes. Larger, more profitable companies often have greater resources to engage in sustainable practices, as noted by Moore (2001) and Artiach et al. (2010)). Additionally, many studies have incorporated company size as a key variable when analyzing ESG, further highlighting its relevance in understanding CSR behaviors (Fatemi et al., 2018; Li and Wu, 2018; Waddock and Graves, 1997). The importance of national institutions and regulatory environments in shaping corporate social performance is also emphasized by Ioannou and Serafeim (2017). They found that companies operating in countries with strong institutional frameworks tend to perform better in ESG metrics.

McWilliams and Siegel (2000), noted that, when R&D is incorporated into the analysis, the effect of sustainability on profitability becomes neutral, indicating neither a positive nor negative impact. However, other studies such as McVea and Freeman (2001) and Ruf et al. (2001) have found a positive relationship between sustainability and financial performance, particularly when taking a long-term perspective. In contrast, Nollet et al. (2016) point out that sustainability can have a negative impact on short-term profitability.

Variability in CSR behavior has been explored by Ioannou and Serafeim (2012), who highlight that company size and profitability influence a company's ability to engage in sustainable

development activities. Artiach et al. (2010) support this, finding that larger, more profitable companies are better positioned to promote sustainable development through reporting initiatives. Board characteristics also play a significant role, as companies with larger boards and a greater number of board meetings are more likely to engage in sustainability reporting, leading to higher reporting quality (Hu and Loh, 2018). This underscores the importance of corporate governance structures in shaping CSR practices.

Several studies have consistently shown that larger corporations are more likely to achieve higher ESG ratings due to enhanced reporting activities (Dorfleitner et al., 2015). The methods of measuring company size vary, including factors such as the number of employees and market capitalization (Dang et al., 2018; Li and Wu, 2018). Waddock and Graves (1997), along with Li and Wu (2018) and Fatemi et al. (2018), underscore the significance of company size in influencing ESG reporting and sustainability initiatives. Additionally, Moore (2001) identified a positive relationship between a company's social performance and its age and size, further emphasizing the importance of company characteristics in shaping ESG outcomes.

2.6. Selection of Variable for Financial Performance

The financial performance of a firm can be evaluated through accounting-based and market-based measures, with profitability ratios being crucial indicators. These ratios assess a firm's ability to generate earnings in relation to its expenses over a specific period. Previous research demonstrates that superior sustainability performance correlates with superior financial outcomes, as discussed by Ghosh (2013). Commonly used profitability ratios include Return on Assets (ROA), Return on Equity (ROE), Return on Investment (ROI), and Return on Capital Employed. (Albertini, 2013; Garg, 2015; Giannopoulos et al., 2022; Hou et al., 2016; Lech, 2013; Naeem et al., 2021; Saygili et al., 2022).

This study adopts three key financial performance indicators: ROA, ROE, and ROI. ROA is widely used as an accounting-based measure of operational performance, reflecting the efficiency with which a firm uses its assets to generate profits. ROE captures the return generated on shareholders' equity, providing insights into how effectively management is using investors' capital. Finally, ROI measures the profitability of investments, making it a key indicator for evaluating financial performance from a broader market perspective. It was chosen for this study due to the limited research available on this specific area. These indicators provide a comprehensive view of both operational efficiency and investor returns.

3. RESEARCH METHODOLOGY AND DATA

The descriptive statistics provide a comprehensive overview of the dataset, summarizing key financial and ESG (Environmental, Social and Governance) performance metrics for publicly traded companies across the Post-Soviet States now in the EU (Appendix Table A1). This analysis captures central tendencies, variability, and distributional properties, offering insights into the data's underlying patterns and trends.

The sample data used in this study comprises publicly traded companies from Post-Soviet States that are now members of the EU. The descriptive statistics (Appendix Table A1) offer an overview of key financial performance indicators, including Return on Assets (ROA), Return on Equity (ROE), and Return on Investment (ROI), alongside ESG (Environmental, Social, and Governance) disclosure scores. In addition, control variables such as Age in Years, Research and Development Expenditure (R&D Exp), and Market Capitalization (Market Cap) are also considered.

The data, taken from a range of countries like Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia, provides insights into firms from a collective region with shared historical, economic and political trajectories in the last 30 years. In this study, these individual countries are treated as part of a larger regional unit: "The Post-Soviet States Now in the EU."

3.1. Variables

This study employs three financial performance measures—Return on Investment (ROI), Return on Assets (ROA), and Return on Equity (ROE)—as dependent variables to assess the impact of ESG performance on corporate financial outcomes.

Return on Investment (ROI) is a critical market-based measure of financial performance, indicating a company's ability to generate profits from its investments. ROI has been frequently used to evaluate the financial benefits of firms adopting ESG practices, particularly in developed economies (Eccles et al., 2014; Orlitzky et al., 2003). Studies like Ioannou and Serafeim (2012) suggest that firms with higher ESG performance exhibit superior financial results, making ROI a relevant measure in transitional economies like those in Post-Soviet States.

Return on Assets (ROA) reflects the efficiency of a company in utilizing its assets to generate earnings, serving as a key accounting-based indicator of operational performance (Garg, 2015; Hou et al., 2016). Given its frequent application in ESG research, ROA is useful for evaluating whether sustainable practices enhance resource management and profitability.

Return on Equity (ROE) measures the return generated on shareholders' equity, providing insights into a company's capacity to maximize shareholder value through its operations and investments (Lech, 2013). ROE is particularly relevant in assessing whether firms that adopt strong ESG practices generate higher returns for their investors, a topic of interest in emerging markets like the Post-Soviet States.

The overall ESG score, which integrates environmental, social, and governance dimensions, has been widely adopted by investors to assess a company's sustainability performance. Research indicates that firms with stronger ESG practices often enjoy enhanced market valuations and long-term financial stability (Fatemi et al., 2015; Ioannou and Serafeim, 2017). By incorporating ESG, this study investigates whether companies in Post-Soviet States with higher ESG scores experience a corresponding increase in financial performance, in line with findings from broader global studies (Busch et al., 2016). The Environmental Disclosure Score, in particular, is a key aspect of corporate transparency, addressing issues such as carbon emissions, energy efficiency, and resource management. According to the literature, firms that disclose their environmental practices tend to attract more environmentally conscious investors and may experience positive financial outcomes (Ioannou and Serafeim, 2017; Nollet et al., 2016). Given the growing importance of environmental sustainability globally, this study explores whether environmental transparency correlates with financial performance in the Post-Soviet States now in the EU, where environmental regulation and corporate sustainability efforts may be less established.

The Social Disclosure Score captures the social dimension of ESG, which includes labour practices, employee welfare, and community engagement. Studies have demonstrated that companies excelling in social responsibility often experience enhanced reputation and customer loyalty, which can lead to improved financial performance (van Beurden and Gössling, 2008). This variable is particularly relevant in Post-Soviet States, where social issues such as labour rights and community development have gained prominence in the post-transition period (Mcvea and Freeman, 2001). The inclusion of the social score allows for an examination of how transparency in social practices affects ROI in this unique economic region.

Lastly, Governance Disclosure Score reflects governance practices, including board composition, shareholder rights, and management accountability, which are crucial for corporate transparency and operational efficiency. Strong governance has been consistently linked to better financial performance (Harrison and Wicks, 2013; Khan et al., 2016). Governance disclosure is particularly significant in Post-Soviet States, where corporate governance structures have evolved significantly since the collapse of the Soviet Union. This study examines whether firms with better governance practices see enhanced financial outcomes, aligning with global research on governance and performance (Busch et al., 2016).

Age of a company are significantly important according to the literature. Older companies generally have more established operations, a deeper market presence, and greater operational experience, all of which can significantly influence financial performance. Research by Artiach et al. (2010) and Ioannou and Serafeim (2012) suggests that older firms are often better equipped to implement sustainable practices due to their more substantial financial resources and corporate maturity. In this study, controlling for company age ensures that the impact of ESG performance on ROA, ROE and ROI is not distorted by these factors, providing a clearer understanding of how ESG initiatives affect financial outcomes independently of a firm's age.

Additionally, Research and Development (R&D) expenditure is a critical factor that drives innovation and long-term competitiveness. Studies, such as those by McWilliams and Siegel (2000), demonstrate that firms investing heavily

in R&D tend to see improved financial performance over time, regardless of their ESG activities. By including R&D expenditure as a control variable, the study accounts for the potential influence of innovation-driven growth on financial results, allowing for a more precise measurement of ESG performance's effect on ROI.

Market capitalization is also a crucial control variable, as it serves as a proxy for company size and market influence. Larger companies tend to have greater resources to allocate towards ESG initiatives and are more likely to disclose ESG-related information. This, in turn, can attract socially conscious investors. Ioannou and Serafeim (2017) found that larger firms are more transparent in their ESG reporting, which can positively affect their financial performance. By controlling for market capitalization, this study ensures that the relationship between ESG performance and ROA, ROE and ROI is not confounded by company size, providing a more accurate assessment of the financial impact of ESG practices (Appendix Table A2 for a variable overview).

3.2. Data Preparation

Overview of the data and number of observations of each country can be seen in Appendix Table A1 (data used in the study after removal of extreme outliers). The Original dataset included 263 observations. The dataset used in the study can be seen in Appendix Table A1, where several variables, including ROA, ROE, and ROI for 2022, ESG Disclosure Scores, and company characteristics like Age, R&D Expenditure, and Market Capitalization are shown.

The original dataset (as seen in Appendix Table A3) reveals considerable variability. Skewness and kurtosis values suggest significant deviations from normality, indicating potential outliers or skewed distributions.

After removing extreme values, the revised dataset comes to 245 observations. This step reduces the variability in certain variables. Skweness and kurtosis are especially improved, but there is still issues as can be seen in Appendix Table A4.

After applying logarithmic transformations to normalize distributions and minimize the impact of outliers. These transformations were especially effective for variables like Market Cap and R&D Expenditure, which now show reduced skewness (1.746 and 1.157, respectively) but still retain some positive skewness. Most variables, like Environmental and Social Disclosure Scores, now exhibit more symmetric distributions with improved skewness and manageable kurtosis values, suggesting distributions closer to normality. Although some variables, such as Age and Market Cap, continue to display moderate skewness and leptokurtic tendencies, the sample size of 245 observations ensures that these deviations will have minimal impact on inferential analyses, particularly given the application of the Central Limit Theorem (Appendix Table A5).

3.3. Hypothesis

This study utilizes data from Bloomberg ESG, focusing on the Post-Soviet States within the European Union, which include Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia. The dataset comprises 245 observations for the year 2022. The countries in this study are not treated as individual nations but are grouped together to represent the Post-Soviet States now in the EU. Due to the small size of some of these countries and the limited availability of certain variables through the Bloomberg Terminal, the dataset is relatively sparse for some nations (Appendix Tables A1 and A2).

The research aims to test four hypotheses regarding the impact of ESG factors—Overall ESG Score, Environmental Score, Social Score, and Governance Score—on financial performance. For each hypothesis, three separate regression analyses will be conducted, corresponding to the three financial performance indicators: Return on Investment (ROI), Return on Assets (ROA), and Return on Equity (ROE). This results in a total of 12 regression analyses, as outlined below:

Hypothesis 1: Overall ESG Performance
- Hypothesis 1A: Overall ESG and ROA
  H_0 (Null Hypothesis): ESG performance does not affect ROA in the Post-Soviet States.
  H_1 (Alternative Hypothesis): ESG performance affects ROA in the Post-Soviet States.
- Hypothesis 1B: Overall ESG and ROE
  H_0 (Null Hypothesis): ESG performance does not affect ROE in the Post-Soviet States.
  H_1 (Alternative Hypothesis): ESG performance affects ROE in the Post-Soviet States.
- Hypothesis 1C: Overall ESG and ROI
  H_0 (Null Hypothesis): ESG performance does not affect ROI in the Post-Soviet States.
  H_1 (Alternative Hypothesis): ESG performance affects ROI in the Post-Soviet States.

Hypothesis 2: Environmental (E) Score
- Hypothesis 2A: Environmental Score and ROA
  H_0 (Null Hypothesis): The Environmental (E) score does not affect ROA in the Post-Soviet States.
  H_1 (Alternative Hypothesis): The Environmental (E) score affects ROA in the Post-Soviet States.
- Hypothesis 2B: Environmental Score and ROE
  H_0 (Null Hypothesis): The Environmental (E) score does not affect ROE in the Post-Soviet States.
  H_1 (Alternative Hypothesis): The Environmental (E) score affects ROE in the Post-Soviet States.
- Hypothesis 2C: Environmental Score and ROI
  H_0 (Null Hypothesis): The Environmental (E) score does not affect ROI in the Post-Soviet States.
  H_1 (Alternative Hypothesis): The Environmental (E) score affects ROI in the Post-Soviet States.

Hypothesis 3: Social (S) Score
- Hypothesis 3A: Social Score and ROA
  H_0 (Null Hypothesis): The Social (S) score does not affect ROA in the Post-Soviet States.
  H_1 (Alternative Hypothesis): The Social (S) score affects ROA in the Post-Soviet States.

- Hypothesis 3B: Social Score and ROE
  H_0 (Null Hypothesis): The Social (S) score does not affect ROE in the Post-Soviet States.
  H_1 (Alternative Hypothesis): The Social (S) score affects ROE in the Post-Soviet States.
- Hypothesis 3C: Social Score and ROI
  H_0 (Null Hypothesis): The Social (S) score does not affect ROI in the Post-Soviet States.
  H_1 (Alternative Hypothesis): The Social (S) score affects ROI in the Post-Soviet States.

Hypothesis 4: Governance (G) Score
- Hypothesis 4A: Governance Score and ROA
  H_0 (Null Hypothesis): The Governance (G) score does not affect ROA in the Post-Soviet States.
  H_1 (Alternative Hypothesis): The Governance (G) score affects ROA in the Post-Soviet States.
- Hypothesis 4B: Governance Score and ROE
  H_0 (Null Hypothesis): The Governance (G) score does not affect ROE in the Post-Soviet States.
  H_1 (Alternative Hypothesis): The Governance (G) score affects ROE in the Post-Soviet States.
- Hypothesis 4C: Governance Score and ROI
  H_0 (Null Hypothesis): The Governance (G) score does not affect ROI in the Post-Soviet States.
  H_1 (Alternative Hypothesis): The Governance (G) score affects ROI in the Post-Soviet States.

To analyze these relationships, the data will be processed using SPSS, and multiple linear regression will be employed. Before performing the analysis, all variables will be transformed as necessary (Appendix A) to meet the assumptions of multiple linear regression. The regression models for each dependent variable (ROI, ROA, and ROE) will use the same set of independent and control variables.

The general model applied is as follows:

$$Y_{2022} = \beta_0 + \beta_1 * ESGDiscScore + \beta_2 * EnviromentalDisclosureScore + \beta_3 * SocialDisclosureScore + \beta_4 * GovernanceDisclosureScore + \beta_5 * Age\ in\ Years + \beta_6 * MarketCap + \beta_7 * RampDExp + \epsilon$$

Where:
- Y_{2022} represents which are the dependent variables.
- ESGDiscScore represents the overall ESG score.
- EnviromentalDisclosureScore, SocialDisclosureScore, SocialDisclosureScore, and GovernanceDisclosureScore represent the Environmental, Social, and Governance scores, respectively.
- Age In Years is the control variable representing the age of the company (control variable).
- LG10MarketCap is the market cap (control variable).
- LG10RampDExp is the R&D expenditure (control variable).
- β_0 is the intercept, and ϵ is the error term.

By conducting the regression analyses in this way, the study will determine the impact of ESG factors on the financial performance of firms in Post-Soviet States, contributing to a better understanding of how ESG dimensions correlate with financial outcomes like ROI, ROA, and ROE.

4. RESULTS

This section presents the findings of the regression analyses conducted to examine the relationship between ESG performance and financial performance in companies from the Post-Soviet States now in the EU. The study tested four hypotheses regarding the effects of overall ESG scores and the individual components—Environmental (E), Social (S), and Governance (G)—on financial performance measured by ROA, ROE and ROI. Control variables such as Market Capitalization, Company Age, and R&D Expenditure were included in the models to account for their potential influence on financial performance, as suggested by prior literature.

To test this hypothesis, regression analyses were conducted with Return on Assets (ROA), Return on Equity (ROE), and Return on Investment (ROI) as the dependent variables. The independent variable of interest was the ESG Disclosure Score, while control variables included company age, market capitalization, and R&D expenditure. The results for each dependent variable are detailed below.

4.1. Hypothesis 1: Overall ESG Performance
4.1.1. Hypothesis 1A: Overall ESG and ROA
The regression results for ROA (Tables 1a and Table 2a) reveal an R^2 of 0.070 and an Adjusted R^2 of 0.055, indicating that approximately 5.5% of the variance in ROA is explained by the ESG Disclosure Score and control variables. Although the model has a limited explanatory power, the coefficient for the ESG Disclosure Score is negative (B = −0.041, P = 0.371) and not statistically significant, suggesting no significant relationship between ESG performance and ROA. Therefore, we fail to reject the null hypothesis (H_0) and conclude that ESG performance does not have a statistically significant impact on ROA in the Post-Soviet States.

Among the control variables, Market Capitalization is positively associated with ROA (B = 2.189, P = 0.001), indicating that larger companies tend to have higher ROA. Company Age and R&D Expenditure are not statistically significant, with coefficients of B = −0.089 (P = 0.187) and B = −0.206 (P = 0.148), respectively.

Table 1: (a) Model summary: Hypothesis 1A: Overall ESG and ROA

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.265[a]	0.070	0.055	7.97415
(b) Model summary: Hypothesis 1B: Overall ESG and ROE				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.303[a]	0.092	0.077	13.62247
(c) Model summary: Hypothesis 1C: Overall ESG and ROI				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.291[a]	0.085	0.069	10.63350

Table 2: (a) Coefficients: Hypothesis 1A: Overall ESG and ROA

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% Confidence interval for B	
		B	Standard Error	Beta			Lower bound	Upper bound
1	(Constant)	−10.193	5.251		−1.941	0.053	−20.536	0.150
	ESG Disc Score:	−0.041	0.045	−0.066	−0.897	0.371	−0.130	0.049
	Age in Years	−0.089	0.067	−0.083	−1.324	0.187	−0.222	0.043
	LG10MarketCap	2.189	0.629	0.257	3.480	0.001	0.950	3.427
	LG10RampDExp	−0.206	0.142	−0.091	−1.452	0.148	−0.486	0.074
(b) Coefficients: Hypothesis 1B: Overall ESG and ROE								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant)	−17.492	8.970		−1.950	0.052	−35.162	0.178
	ESG Disc Score:	−0.098	0.077	−0.092	−1.267	0.207	−0.251	0.054
	Age in Years	−0.280	0.115	−0.152	−2.436	0.016	−0.506	−0.054
	LG10MarketCap	3.946	1.074	0.268	3.673	0.000	1.829	6.062
	LG10RampDExp	−0.340	0.242	−0.086	−1.401	0.162	−0.817	0.138
(c) Coefficients: Hypothesis 1C: Overall ESG and ROI								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant)	−9.853	7.002		−1.407	0.161	−23.646	3.939
	ESG Disc Score:	−0.076	0.060	−0.093	−1.264	0.208	−0.196	0.043
	Age in Years	−0.221	0.090	−0.154	−2.458	0.015	−0.397	−0.044
	LG10MarketCap	2.999	0.839	0.262	3.576	0.000	1.347	4.651
	LG10RampDExp	−0.007	0.189	−0.002	−0.038	0.970	−0.380	0.366

4.1.2. Hypothesis 1B: Overall ESG and ROE

The regression model for ROE (Tables 1b and 2b) explains 9.2% of the variance ($R^2 = 0.092$, Adjusted $R^2 = 0.077$). The coefficient for the ESG Disclosure Score is negative but not statistically significant (B = −0.098, P = 0.207), indicating no significant relationship between ESG performance and ROE. Thus, we fail to reject the null hypothesis, concluding that ESG performance does not significantly affect ROE in the Post-Soviet States.

Market Capitalization again shows a significant positive relationship with ROE (B = 3.946, P = 0.000), suggesting that larger firms tend to have higher ROE. Company Age has a significant negative effect on ROE (B = −0.280, P = 0.016), indicating that older companies may experience lower equity returns. R&D Expenditure does not show statistical significance (B = −0.340, P = 0.162).

4.1.3. Hypothesis 1C: Overall ESG and ROI

The regression analysis for ROI (Tables 1c and 2c) reveals an R^2 of 0.085 and an Adjusted R^2 of 0.069, suggesting that 6.9% of the variance in ROI is explained by the ESG Disclosure Score and control variables. The ESG Disclosure Score is not statistically significant (B = −0.076, P = 0.208), indicating no significant impact of ESG performance on ROI. Therefore, we fail to reject the null hypothesis (H_0) for ROI.

Among the control variables, Market Capitalization has a significant positive relationship with ROI (B = 2.999, P = 0.000),

while Company Age shows a significant negative effect (B = −0.221, P = 0.015). R&D Expenditure is not statistically significant (B = −0.007, P = 0.970).

4.2. Hypothesis 2: Environmental (E) Score

4.2.1. Hypothesis 2A: Environmental score and ROA

To test the effect of the Environmental Disclosure Score on ROA, a linear regression analysis was conducted. The model summary (Table 3a) shows an R^2 value of 0.067, indicating that approximately 6.7% of the variance in ROA is explained by the independent variables. The adjusted R^2 is 0.052, reflecting limited explanatory power.

The coefficients table (Table 4a) reveals that the Environmental Disclosure Score has a negative coefficient (B = −0.005), with a non-significant P = 0.879, indicating that the Environmental Disclosure Score does not have a statistically significant effect on ROA. Therefore, the null hypothesis (H_0) cannot be rejected, suggesting that Environmental performance does not significantly influence ROA in the Post-Soviet States.

Among the control variables, market capitalization shows a statistically significant positive relationship with ROA (B = 1.933, P = 0.002), while company age and R&D expenditure do not show significant effects.

4.2.2. Hypothesis 2B: Environmental score and ROE

A similar linear regression was conducted with ROE (Tables 3b and 4b) as the dependent variable. The model summary

(Table 3b) shows that 10.1% of the variance in ROE is explained by the model ($R^2 = 0.101$, adjusted $R^2 = 0.086$).

The coefficients table (Table 4b) indicates that the Environmental Disclosure Score has a negative coefficient (B = −0.108) with a P = 0.054, just above the conventional threshold for statistical significance, implying that the Environmental Score may have a marginally significant negative effect on ROE. Therefore, the null hypothesis (H_0) cannot be rejected, but there is weak evidence suggesting a possible relationship.

Among the control variables, market capitalization has a positive and statistically significant effect on ROE (B = 4.218, P < 0.001),

while company age also shows a significant negative effect (B = −0.277, P = 0.016). R&D expenditure does not have a significant effect.

4.2.3. Hypothesis 2C: Environmental score and ROI
Finally, the regression analysis for ROI (Tables 3c and 4c) shows that 8.0% of the variance in ROI is explained by the model ($R^2 = 0.080$, adjusted $R^2 = 0.065$), as displayed in Table 3c.

The coefficients table (Table 4c) shows that the Environmental Disclosure Score has a negative but non-significant coefficient (B = −0.028, P = 0.516), indicating that the Environmental Disclosure Score does not have a statistically significant effect on ROI. Therefore, the null hypothesis (H_0) cannot be rejected.

Once again, market capitalization demonstrates a significant positive effect on ROI (B = 2.692, P = 0.001), while company age has a significant negative impact (B = −0.230, P = 0.011). R&D expenditure remains non-significant.

4.3. Hypothesis 3: Social (S) Score
4.3.1. Hypothesis 3A: Social score and ROA
The regression analysis for ROA (Tables 5a and 6a) shows that the Social Disclosure Score does not have a statistically significant effect on ROA (B = −0.036, P = 0.458). As the P-value exceeds the 0.05 significance threshold, the null hypothesis cannot be rejected. Thus, it can be concluded that the Social (S) score does not significantly influence ROA in Post-Soviet States.

Table 3: (a) Model Summary: Hypothesis 2A: Environmental Score and ROA

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.260a	0.067	0.052	7.98712
(b) Model Summary: Hypothesis 2B: Environmental Score and ROE				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.318a	0.101	0.086	13.55648
(c) Model Summary: Hypothesis 2C: Environmental Score and ROI				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.283a	0.080	0.065	10.65927

Table 4: (a) Coefficients: Hypothesis 2A: Environmental Score and ROA

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant)	−8.778	5.340		−1.644	0.102	−19.296	1.741
	Environmental Disclosure Score	−0.005	0.032	−0.011	−0.152	0.879	−0.068	0.058
	Age in Years	−0.096	0.067	−0.090	−1.429	0.154	−0.228	0.036
	LG10MarketCap	1.933	0.609	0.227	3.172	0.002	0.733	3.133
	LG10RampDExp	−0.210	0.142	−0.092	−1.476	0.141	−0.490	0.070
(b) Coefficients; Hypothesis 2B: Environmental Score and ROE								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Upper Bound	Lower Bound
1	(Constant)	−20.564	9.063		−2.269	0.024	−38.417	−2.712
	Environmental Disclosure Score	−0.108	0.054	−0.139	−1.990	0.048	−0.216	−0.001
	Age in Years	−0.277	0.114	−0.150	−2.435	0.016	−0.502	−0.053
	LG10MarketCap	4.218	1.034	0.287	4.079	0.000	2.181	6.255
	LG10RampDExp	−0.354	0.241	−0.090	−1.469	0.143	−0.829	0.121
(c) Coefficients: Hypothesis 2C: Environmental Score and ROI								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant)	−8.465	7.126		−1.188	0.236	−22.502	5.573
	Environmental Disclosure Score	−0.028	0.043	−0.046	−0.656	0.512	−0.112	0.056
	Age in Years	−0.230	0.090	−0.160	−2.564	0.011	−0.406	−0.053
	LG10MarketCap	2.692	0.813	0.236	3.311	0.001	1.090	4.294
	LG10RampDExp	−0.015	0.190	−0.005	−0.080	0.936	−0.389	0.358

Among the control variables, Market Capitalization shows a significant positive relationship with ROA (B = 2.100, P = 0.001), suggesting that larger companies tend to have higher ROA. However, Company Age (P = 0.177) and R&D Expenditure (P = 0.136) do not demonstrate statistically significant effects on ROA.

4.3.2. Hypothesis 3B: Social score and ROE
The regression model for ROE (Tables 5b and 6b) indicates that the Social Disclosure Score does not significantly affect ROE (B = −0.025, P = 0.765). Given the high p-value, the null hypothesis cannot be rejected. Therefore, it is concluded that the Social (S) score does not have a statistically significant impact on ROE in Post-Soviet States.

Table 5: (a) Model Summary: Hypothesis 2A: Social Score and ROA

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.260ᵃ	0.067	0.052	7.98712
(b) Model Summary: Hypothesis 2B: Social Score and ROE				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.318ᵃ	0.101	0.086	13.55648
(c) Model Summary: Hypothesis 2C: Social Score and ROI				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.283ᵃ	0.080	0.065	10.65927

Control variables indicate that Market Capitalization positively affects ROE (B = 3.366, P = 0.001), implying that larger firms tend to have better ROE. Additionally, Company Age exhibits a significant negative relationship with ROE (B = −0.295, P = 0.011), suggesting that older companies may experience lower ROE. R&D Expenditure does not show a significant effect on ROE (P = 0.152).

4.3.3. Hypothesis 3C: Social score and ROI
The results for ROI (Tables 5c and 6c) show that the Social Disclosure Score is not a significant predictor of ROI (B = −0.079, P = 0.216). As the p-value is above the accepted significance level, the null hypothesis is not rejected. Consequently, it can be concluded that the Social (S) score does not significantly influence ROI in Post-Soviet States.

In terms of the control variables, Market Capitalization exhibits a significant positive impact on ROI (B = 2.904, P = 0.001), suggesting that larger firms tend to have higher ROI. Company Age shows a significant negative effect on ROI (B = −0.222, P = 0.014), while R&D Expenditure does not have a statistically significant relationship with ROI (P = 0.923).

4.4. Hypothesis 4: Governance (G) Score
4.4.1. Hypothesis 4A: Governance score and ROA
The regression analysis (Tables 7a and 8a) indicates that the Governance Disclosure Score does not have a statistically significant effect on ROA (B = −0.038, P = 0.225). As the P-value exceeds the 0.05 threshold, the null hypothesis cannot be rejected.

Table 6: (a) Coefficients: Hypothesis 2A: Social Score and ROA

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant)	−8.778	5.340		−1.644	0.102	−19.296	1.741
	Environmental Disclosure Score	−0.005	0.032	−0.011	−0.152	0.879	−0.068	0.058
	Age in Years	−0.096	0.067	−0.090	−1.429	0.154	−0.228	0.036
	LG10MarketCap	1.933	0.609	0.227	3.172	0.002	0.733	3.133
	LG10RampDExp	−0.210	0.142	−0.092	−1.476	0.141	−0.490	0.070
(b) Coefficients; Hypothesis 2B: Social Score and ROE								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant)	−20.564	9.063		−2.269	0.024	−38.417	−2.712
	Environmental Disclosure Score	−0.108	0.054	−0.139	−1.990	0.048	−0.216	−0.001
	Age in Years	−0.277	0.114	−0.150	−2.435	0.016	−0.502	−0.053
	LG10MarketCap	4.218	1.034	0.287	4.079	0.000	2.181	6.255
	LG10RampDExp	−0.354	0.241	−0.090	−1.469	0.143	−0.829	0.121
(c) Coefficients: Hypothesis 2C: Social Score and ROI								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant) −8.465	−8.465	7.126		−1.188	0.236	−22.502	5.573
	Environmental Disclosure Score	−0.028	0.043	−0.046	−0.656	0.512	−0.112	0.056
	Age in Years	−0.230	0.090	−0.160	−2.564	0.011	−0.406	−0.053
	LG10MarketCap	2.692	0.813	0.236	3.311	0.001	1.090	4.294
	LG10RampDExp	−0.015	0.190	−0.005	−0.080	0.936	−0.389	0.358

Therefore, it is concluded that the Governance (G) score does not significantly affect ROA in the Post-Soviet States.

Among the control variables, Market Capitalization has a significant positive impact on ROA (B = 2.154, P = 0.000), suggesting that larger companies tend to achieve higher ROA. Company Age and R&D Expenditure do not have statistically significant effects on ROA, with P-Values of 0.186 and 0.170, respectively.

4.4.2. Hypothesis 4B: Governance score and ROE
The regression analysis for ROE (Tables 7b and 8b), with the Governance Disclosure Score as the independent variable and ROE as the dependent variable, shows no significant relationship between the two (B = −0.026, P = 0.626). Since the P-value is well above 0.05, the null hypothesis cannot be rejected, leading to the conclusion that the Governance (G) score does not significantly affect ROE in the Post-Soviet States.

Table 7: (a) Model Summary: Hypothesis 4A: Governance Score and ROA

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.270a	0.073	0.058	7.96300
(b) Model Summary: Hypothesis 4B: Governance Score and ROE				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.295a	0.087	0.072	13.66116
(c) Model Summary: Hypothesis 4C: Governance Score and ROI				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.289a	0.084	0.068	10.63916

Regarding the control variables, Company Age negatively impacts ROE (B = −0.293, P = 0.011), indicating that older companies tend to have lower ROE. Market Capitalization significantly positively influences ROE (B = 3.403, P = 0.001), while R&D Expenditure does not have a significant effect on ROE (P = 0.167).

4.4.3. Hypothesis 4C: Governance score and ROI
To test this hypothesis, a regression analysis was conducted with ROI (Tables 7c and 8c) as the dependent variable. The results reveal that the Governance Disclosure Score does not significantly affect ROI (B = −0.048, P = 0.248). Given the high P-value, the null hypothesis cannot be rejected. Therefore, it is concluded that the Governance (G) score does not significantly impact ROI in the Post-Soviet States.

Among the control variables, Market Capitalization is again a significant positive predictor of ROI (B = 2.772, P = 0.001), while Company Age negatively affects ROI (B = −0.225, P = 0.013). R&D Expenditure does not show a significant relationship with ROI (P = 0.983).

4.5. Robustness Test
To validate the stability and reliability of the multiple linear regression results, a bootstrap robustness test was conducted using 1,000 bootstrap samples. This approach provided a non-parametric method to assess the precision of the coefficient estimates and confidence intervals for the variables under analysis, including Return on Assets (ROA), Return on Equity (ROE), and Return on Investment (ROI) as the dependent variables. See Appendix B for table overview.

For ROA, the bootstrap results were generally consistent with the original regression output. The Environmental Disclosure Score

Table 8: (a) Coefficients: Hypothesis 4A: Governance Score and ROA

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% confidence interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant)	−9.366	4.929		−1.900	0.059	−19.075	0.343
	Governance Disclosure Score	−0.038	0.031	−0.082	−1.216	0.225	−0.099	0.023
	Age in Years	−0.089	0.067	−0.083	−1.325	0.186	−0.221	0.043
	LG10MarketCap	2.154	0.575	0.253	3.749	0.000	1.022	3.286
	LG10RampDExp	−0.196	0.142	−0.086	−1.376	0.170	−0.476	0.084
(b) Coefficients: Hypothesis 4B: Governance Score and ROE								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant)	−13.917	8.456		−1.646	0.101	−30.574	2.740
	Governance Disclosure Score	−0.026	0.053	−0.033	−.488	0.626	−0.131	0.079
	Age in Years	−0.293	0.115	−0.159	−2.552	0.011	−0.519	−0.067
	LG10MarketCap	3.403	0.986	0.232	3.452	0.001	1.461	5.345
	LG10RampDExp	−0.338	0.244	−0.086	−1.388	0.167	−0.819	0.142
(c) Coefficients: Hypothesis 4C: Governance Score and ROI								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Standard Error	Beta			Lower Bound	Upper Bound
1	(Constant)	−7.743	6.585		−1.176	0.241	−20.715	5.229
	Governance Disclosure Score	−0.048	0.042	−0.078	−1.158	0.248	−0.130	0.034
	Age in Years	−0.225	0.089	−.157	−2.514	0.013	−0.401	−0.049
	LG10MarketCap	2.772	0.768	0.243	3.611	0.000	1.260	4.285
	LG10RampDExp	0.004	0.190	0.001	0.021	0.983	−0.370	0.378

had a small positive but non-significant coefficient (B = 0.030, CI: −0.060-0.121, P = 0.487), while the Social Disclosure Score (B = −0.052, CI: −0.199-0.093, P = 0.527) and Governance Disclosure Score (B = −0.033, CI: −0.104-0.047, p = 0.387) similarly showed no significant impact on ROA.

However, Market Capitalization remained a significant and positive predictor of ROA (B = 2.156, CI: 0.857-3.675, P = 0.001), confirming earlier findings that larger companies tend to have better asset returns. Other control variables, such as Age in Years (B = −0.087, CI: −0.223-0.041, P = 0.235) and R&D Expenditure (B = −0.199, CI: −0.459-0.050, P = 0.179), did not have significant effects on ROA.

For ROE, the Environmental Disclosure Score was not significant (B = −0.232, CI: −0.416-−0.055, P = 0.024), indicating that environmental disclosures had a minimal but statistically significant negative relationship with equity returns. The Social Disclosure Score (B = 0.256, CI: 0.024-0.561, P = 0.019) had a positive and significant effect on ROE, suggesting that companies with better social disclosures may see higher returns on equity.

Market Capitalization continued to show a positive and significant effect on ROE (B = 4.041, CI: 1.738-6.661, P = 0.001), while Age in Years had a negative but non-significant impact (B = −0.288, CI: −0.571-−0.024, P = 0.049).

For ROI, the Environmental Disclosure Score was again not significant (B = 0.027, CI: −0.080-0.161, P = 0.656), and the Social Disclosure Score (B = −0.093, CI: −0.279-0.101, P = 0.395) also did not show any significant impact. Similarly, the Governance Disclosure Score had no significant effect (B = −0.034, CI: −0.126-0.051, P = 0.515).

On the other hand, Market Capitalization remained a strong predictor of ROI (B = 2.968, CI: 1.362-4.718, P = 0.001), indicating that larger companies achieve better investment returns. The Age in Years variable showed a significant negative relationship with ROI (B = −0.218, CI: −0.405-−0.034, P = 0.025), suggesting that older firms may underperform in terms of investment returns.

4.6. Model Diagnostics

To ensure the robustness and reliability of the multiple regression models used to examine the relationship between ESG disclosure scores and financial performance (ROA, ROE, ROI), diagnostic test were conducted. The diagnostics focused on checking for multicollinearity, which could undermine the validity of the results, and overall model fitness. See Appendix C for table overview.

Multicollinearity occurs when two or more predictor variables in a regression model are highly correlated, leading to unreliable estimates of regression coefficients. To assess the presence of multicollinearity, the Variance Inflation Factor (VIF) and Tolerance statistics were calculated for each independent variable across the three models (ROA, ROE, and ROI). The VIF values in all models were below the commonly accepted threshold of 10, indicating that multicollinearity is not a concern in these models. Specifically, VIF values ranged from 1.012 to 3.318 across all

variables, suggesting low to moderate correlations among the independent variables. Tolerance values were also examined, which are the inverse of the VIF. A tolerance value close to zero would indicate multicollinearity issues. In this case, all tolerance values exceeded the critical threshold of 0.10, further confirming that multicollinearity does not significantly affect the models.

Each of the three models was tested separately for multicollinearity.

- Model 1: Dependent Variable (ROA)

The VIF values ranged from 1.012 to 3.318, with the highest VIF found for the Environmental Disclosure Score (3.143). Despite this, the VIF remains below the threshold, indicating no serious multicollinearity issues.

The lowest tolerance value was 0.318 for the Environmental Disclosure Score, which is still well above the acceptable minimum level.

- Model 2: Dependent Variable (ROE)

The VIF values ranged from 1.012 to 3.318, with no significant multicollinearity concerns. The tolerance values confirmed the absence of multicollinearity, with all values above the 0.10 threshold.

- Model 3: Dependent Variable (ROI)

For the ROI model, VIF values ranged from 1.012 to 3.318, maintaining consistency with the other models, indicating no variables with serious multicollinearity issues. The tolerance values were similarly acceptable, further confirming that the independent variables are adequately independent of one another in this model.

5. CONCLUSION

The results of this study contribute to the growing body of literature examining the relationship between ESG performance and financial outcomes.

The insignificant effects of Environmental, Social and Governance scores on financial performance resonate with previous studies that report mixed results regarding these dimensions or no significant relationship. (Atan et al., 2018; Behl et al., 2022; Friede et al., 2015; Giannopoulos et al., 2022; Han et al., 2016; Lopez-de-Silanes et al., 2020; Saygili et al., 2022). While some research suggests a positive correlation between environmental practices and financial performance (Anklesaria-Dalal and Thaker, 2019; Bhaskaran et al., 2020; De Lucia et al., 2020; Fatemi et al., 2018; Jørgensen and Tynes Pedersen, 2015; Naeem et al., 2021; Velte, 2017; Zhao et al., 2018), this study's findings highlight the potential context-dependent nature of these benefits, particularly in the Post-Soviet States now in the EU, where ESG considerations may still be emerging in corporate strategy and investor decision-making.

Moreover, the positive correlation identified between Market Capitalization and financial performance aligns with literature

indicating that larger firms often demonstrate better resilience, resource access and consistently score higher in ESG because of the quality of reporting (Dang et al., 2018; Fatemi et al., 2018; Li and Wu, 2018). This supports the resource-based view that larger firms can leverage their size for competitive advantage, enhancing financial outcomes.

Interestingly, the lack of significant impacts from social and environmental factors suggests that companies in the Post-Soviet States may still prioritize short-term financial objectives over long-term sustainability goals. This aligns with the perspective of Nollet et al. (2016), which suggests that firms can experience negative effects from high ESG scores. This may explain the good financial performance observed in Eastern Europe alongside a low correlation with ESG factors, particularly considering the relatively young age of these companies in their transition from a communist to a more capitalist economy.

The robustness tests conducted using bootstrap methods further validate these findings, indicating that the identified relationships are reliable and not mere anomalies of the data. This rigor enhances the credibility of the results, suggesting that policymakers and investors should consider the unique challenges faced by firms in this region when crafting strategies to improve both ESG performance and financial outcomes.

This research contributes to the literature on ESG and financial performance by examining the unique context of Post-Soviet States within the EU, where ESG integration is still in its initial implementation state. Moreover, it emphasizes the importance of firm size and company age as more relevant predictors of financial performance than ESG scores in this region.

For policymakers and investors, the findings highlight the necessity of stronger regulatory frameworks and incentives to promote ESG adoption in Eastern Europe in general. Although current ESG scores do not drive financial outcomes, fostering a culture of sustainability and corporate responsibility could lead to future financial benefits. This study lays the groundwork for further research into the long-term impacts of ESG integration as the Eastern European Market evolves.

While this study provides insights into the relationship between ESG performance and financial outcomes, it has several limitations. First, relying solely on quantitative data from financial reports and ESG scores may not fully capture the complexities of ESG practices and their impact on financial performance. Including qualitative factors, such as corporate culture and stakeholder engagement, could provide a more nuanced understanding but was beyond the scope of this study.

Second, the sample size of 245 companies may limit the generalizability of the findings. Given that ESG performance can vary significantly across industries and regions, expanding the sample could yield a more comprehensive view of ESG's influence on financial outcomes. Moreover, repeating this study in the future could determine if the results remain consistent over time.

Additionally, the absence of significant effects from Environmental, Social, and Governance scores aligns with the mixed results found in existing literature regarding ESG dimensions' influence on financial performance. Future research should investigate the specific factors that may contribute to this lack of effect, providing better strategies for companies to enhance their ESG efforts and financial results. Finally, expanding the analysis to explore other financial metrics and the interactions among different ESG dimensions across various sectors and countries in the region could offer valuable insights for policymakers and business leaders, helping them navigate the complex relationship between ESG practices and financial success in the Post-Soviet States.

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APPENDIX A

Table A1: Descriptive statistics of individual countries

Post-Soviet States in the EU		ROA 2022	ROE 2022	ROI 2022	ESG Disc Score 2022	Environmental Disclosure Score 2022	Social Disclosure Score 2022	Governance Disclosure Score 2022	Age in Years	R&D Exp 2022	Market Cap 2022
Bulgaria	N	31	31	31	31	31	31	31	31	31	31
	Mean	6.83	10.67	10.82	14.47	3.37	11.15	28.84	13.81	122225.80	146856434.22
	Median	5.32	5.28	6.05	12.35	1.23	9.61	30.55	14.71	0.00	100081360.00
	Standard Deviation	8.07	13.36	11.69	6.69	8.25	9.28	9.94	2.89	628459.90	150522148.609
	Minimum	−8.04	−4.32	−4.60	6.04	0.00	0.00	15.02	3	0.00	3900000.00
	Maximum	27.46	47.01	44.62	35.42	42.49	43.29	51.84	18	3497000.00	602293312.00
Czech Republic	N	5	5	5	5	5	5	5	5	5	5
	Mean	7.09	12.30	11.15	28.43	16.82	18.75	49.64	21.18	111986200.00	99637739008.00
	Median	3.65	12.36	5.57	17.82	2.84	11.22	39.31	30.65	3331000.00	6574200320.00
	Standard Deviation	8.22	19.81	10.61	19.08	29.69	19.41	21.29	14.34	245427642.40	193851593765.79
	Minimum	1.53	−16.05	0.60	14.21	0.82	5.80	33.05	1.41	0.00	750964992.00
	Maximum	21.29	38.69	23.35	58.18	69.65	52.66	85.55	31.76	551000000.00	444917547008.00
Estonia	N	10	10	10	10	10	10	10	10	10	10
	Mean	2.33	−6.46	3.93	31.95	17.52	21.58	56.64	23.66	441000.00	224539967.10
	Median	3.69	9.57	4.53	33.15	15.75	22.64	57.89	25.76	0.00	201727672.00
	Standard Deviation	9.57	18.28	9.62	9.87	15.94	10.82	11.60	5.01	857890.57	188290397.65
	Minimum	−17.23	−42.42	−12.62	14.22	0.91	2.57	32.03	14.02	0.00	13113635.00
	Maximum	20.04	22.46	23.52	50.88	56.87	38.42	71.76	27.05	2312000.00	488654016.00
Hungary	N	9	9	9	9	9	9	9	9	9	9
	Mean	5.63	16.43	9.89	33.15	24.72	21.18	53.48	21.94	6259083264.00	80760744533.33
	Median	3.41	12.11	7.78	27.12	29.53	17.86	56.83	28.39	0.00	33600000000.00
	Standard Deviation	9.90	20.30	12.69378	12.49	16.11	14.65	16.59	9.810	21682100444.10	129921426196.15
	Minimum	−12.54	−6.84	−11.86	18.25	0.91	2.57	26.67	5	0.00	3534160128.00
	Maximum	22.74	54.10	31.95	57.44	44.76	49.67	78.60	31	75108999168.00	410251100160.00
Latvia	N	3	3	3	3	3	3	3	3	3	3
	Mean	12.47	−0.41	14.96	18.72	8.44	10.99	36.66	27.41	9626.67	64916394.67
	Median	8.84	4.82	8.66	19.30	7.01	14.03	33.05	27.98	0.00	71534656.00
	Standard Deviation	11.31	11.46	15.29	5.68	8.76	5.46	13.05	4.15	16673.88	27460960.79
	Minimum	3.43	−13.56	3.81	12.77	0.48	4.69	25.80	23.01	0.00	34751104.00
	Maximum	25.16	7.49	32.39	24.09	17.82	14.27	51.14	31.25	28880.00	88463424.00
Lithuania	N	12	12	12	12	12	12	12	12	12	12
	Mean	3.46	8.93	5.86	38.16	33.23	25.55	55.64	18.50	350750.00	302420863.75
	Median	4.63	8.95	6.40	39.14	37.58	24.83	55.50	22.44	0.00	112747988.00
	Standard Deviation	6.72	17.39	7.38	10.03	15.64	6.97	15.89	11.93	1174077.829	7174765.00
	Minimum	−9.70	−26.75	−10.36	24.18	3.75	17.32	24.65	2	0.00	1546276224.00
	Maximum	13.42	30.81	18.57	59.07	54.18	40.57	83.02	31	4077000.00	1539101459.00

Table A1: (Continued)

Post-Soviet States in the EU		ROA 2022	ROE2022	ROI 2022	ESG Disc Score 2022	Environmental Disclosure Score 2022	Social Disclosure Score 2022	Governance Disclosure Score 2022	Age in Years	R&D Exp 2022	Market Cap 2022
Poland	N	121	121	121	121	121	121	121	121	121	121
	Mean	5.93	9.45	9.76	23.56	16.57	16.85	37.20	19.83	3450529.82	2361374308.19
	Median	5.20	8.98	9.17	20.56	11.32	15.05	35.55	21.07	0.00	360553920.00
	Standard Deviation	8.15	13.19	11.03	12.59	18.27	12.27	16.13	6.01	17256644.92	6689767166.86
	Minimum	−21.16	−35.47	−28.15	4.91	0.00	0.00	0.00	4	0.00	22050000.00
	Maximum	25.71	49.74	41.63	57.14	65.18	50.42	76.01	34	149500000.00	3976372240.00
Romania	N	50	50	50	50	50	50	50	50	50	50
	Mean	6.01	2.63	8.26	23.61	13.26	12.27	41.82	27.68	703855.78	1642929629.68
	Median	5.55	0.00	7.26	18.08	1.81	13.22	36.00	30.09	0.00	123687864.00
	Standard Deviation	8.13	12.93	11.13	14.81	19.06	12.00	20.55	6.06	3097473.35	4897852225.77
	Minimum	−16.36	−40.92	−21.20	3.83	0.00	2.57	4.88	4	0.00	11063.16
	Maximum	25.81	31.35	46.85	59.61	67.53	49.43	84.86	32	16268000.00	28265308160.00
Slovakia	N	4	4	4	4	4	4	4	4	4	4
	Mean	−1.74	0.90	−1.68	11.30	1.42	6.00	26.42	29.69	454847.50	47158488.07
	Median	−2.40	1.89	−1.11	9.05	0.63	5.71	18.38	30.87	374556.50	14316422.59
	Standard Deviation	2.67	3.47	4.12	6.73	2.08	3.76	18.12	2.43	541331.12	76094242.06
	Minimum	−2.81	−4.07	−6.49	6.05	0.00	2.57	15.53	26.05	0.00	369795.09
	Maximum	0.65	3.92	1.98	21.06	4.41	10.01	53.40	30.99	1070277.00	159631312.00
Total	N	245	245	245	245	245	245	245	245	245	245
	Mean	5.76	8.12	9.07	23.67	15.04	16.45	39.45	21.12	4191404.76	6545790005.09
	Median	4.84	7.41	7.63	20.52	5.52	14.60	35.55	21.26	0.00	230035424.00
	Standard Deviation	8.20	14.17	11.02	13.34	18.23	12.07	17.84	7.685	37166501.05	40007861163.22
	Minimum	−21.16	−42.42	−28.15	3.83	0.00	0.00	0.00	1	0.00	11063.16
	Maximum	27.46	54.10	46.85	59.61	69.65	52.66	85.55	34	551000000.00	44491547008.00

Table A2: Model variables original definitions and the ones use in the analysis

Original variables	Variables used for analysis	Description
Dependent variable		
ROA	ROA	Return on assets according to the Bloomburg Terminal (expressed as a percentage)
ROE	ROE	Return on Equity according to the Bloomburg Terminal (expressed as a percentage)
ROI	ROI	Return on Investment according to the Bloomburg Terminal (expressed as a percentage)
Independent Variables		
ESG Disc Score:	ESG Disc Score:	Value of ESG Score according to the Bloomburg Terminal
Environmental Disclosure Score	Environmental Disclosure Score	Value of Enviromental Pillar Score according to the Bloomburg Terminal
Social Disclosure Score	Social Disclosure Score	Value of Social Pillar Score according to the Bloomburg Terminal
Governance Disclosure Score	Governance Disclosure Score	Value of Governance Pillar Score according to the Bloomburg Terminal
Control Variables		
Age in Years	Age in Years	The total age of the company since establishment according to the Bloomburg Terminal (Expressed in Years)
R& D Exp	LG10MarketCap	The total Research and Development expenditures according to the Bloomburg Terminal (Expressed in dollars)
Market Cap	LG10MarketCap	Market Cap Value according to the Bloomburg Terminal (Expressed in dollars)

Table A3: Overall Descriptive Statistics with skewness and Kurtosis

	N	Range	Minimum	Maximum	Mean		Standard Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Standard Error	Statistic	Statistic	Statistic	Standard Error	Statistic	Standard Error
ROA	263	66.83	−22.22	44.61	6.1804	0.58680	9.51629	90.560	0.493	0.150	2.331	0.299
ROE	263	157.60	−58.79	98.81	9.6897	1.15291	18.69713	349.583	1.101	0.150	5.293	0.299
ROI	263	105.21	−40.97	64.24	9.6205	0.80140	12.99648	168.909	0.592	0.150	3.341	0.299
ESG Disc Score:	263	66.40	3.83	70.23	24.2230	0.87594	14.20538	201.793	0.857	0.150	0.041	0.299
Environmental Disclosure Score	263	77.95	0.00	77.95	15.8342	1.19118	19.31774	373.175	1.149	0.150	0.320	0.299
Social Disclosure Score	263	61.40	0.00	61.40	16.9620	0.79912	12.95962	167.952	0.874	0.150	0.350	0.299
Governance Disclosure Score	263	85.55	0.00	85.55	39.8151	1.12812	18.29497	334.706	0.420	0.150	−0.554	0.299
Age in Years	263	98	1	99	21.40	0.557	9.035	81.634	2.215	0.150	19.749	0.299
R& D Exp	263	75108999168.00	0.00	75108999168.00	289684005.0770	285578532.18436	4631305516.34449	21448990785 7228644000.000	16.216	0.150	262.968	0.299
Market Cap	263	1621450675400.84	11063.16	1621450686464.00	18676110178.8952	8875589008.10445	143937865425.76740	207181091033 26323000000000.000	10.357	0.150	111.002	0.299
Valid N (listwise)	263											

Table A4: Removal of extreme values

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Standard Error	Statistic	Statistic	Statistic	Standard Error	Statistic	Standard Error
ROA	245	48.62	−21.16	27.46	5.7659	0.52404	8.20258	67.282	0.023	0.156	0.813	0.310
ROE	245	96.52	−42.42	54.10	8.1292	0.90586	14.17899	201.044	−0.092	0.156	1.691	0.310
ROI	245	75.00	−28.15	46.85	9.0747	0.70421	11.02270	121.500	0.475	0.156	1.587	0.310
ESG Disc Score:	245	55.78	3.83	59.61	23.6729	0.85268	13.34655	178.130	0.772	0.156	−0.184	0.310
Environmental Disclosure Score	245	69.65	0.00	69.65	15.0420	1.16485	18.23281	332.435	1.110	0.156	0.147	0.310
Social Disclosure Score	245	52.66	0.00	52.66	16.4595	0.77149	12.07579	145.825	0.706	0.156	−0.146	0.310
Governance Disclosure Score	245	85.55	0.00	85.55	39.4584	1.14030	17.84856	318.571	0.393	0.156	−0.549	0.310
Age in Years	245	32	1	34	21.12	0.491	7.685	59.065	−0.290	0.156	−0.633	0.310
Market Cap	245	444917535944.84	11063.16	444917547008.00	6545790005.0997	2556008491.29532	40007861163.22112	1600628954855576700000.000	9.851	0.156	101.598	0.310
R& D Exp	245	551000000.00	0.00	551000000.00	4191404.7643	2374480.65281	37166501.05652	1381348800784567.500	13.505	0.156	195.033	0.310
Valid N (listwise)	245											

Table A5: Transformation of variables

	N	Range	Minimum	Maximum	Mean		Standard Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Standard Error	Statistic	Statistic	Statistic	Standard Error	Statistic	Standard Error
ROA	245	48.62	−21.16	27.46	5.7659	0.52404	8.20258	67.282	0.023	0.156	0.813	0.310
ROE	245	96.52	−42.42	54.10	8.1292	0.90586	14.17899	201.044	−0.092	0.156	1.691	0.310
ROI	245	75.00	−28.15	46.85	9.0747	0.70421	11.02270	121.500	0.475	0.156	1.587	0.310
ESG Disc Score:	245	55.78	3.83	59.61	23.6729	0.85268	13.34655	178.130	0.772	0.156	−.184	0.310
Environmental Disclosure Score	245	69.65	0.00	69.65	15.0420	1.16485	18.23281	332.435	1.110	0.156	0.147	0.310
Social Disclosure Score	245	52.66	0.00	52.66	16.4595	0.77149	12.07579	145.825	0.706	0.156	−0.146	0.310
Governance Disclosure Score	245	85.55	0.00	85.55	39.4584	1.14030	17.84856	318.571	0.393	0.156	−0.549	0.310
Age in Years	245	32	1	34	21.12	0.491	7.685	59.065	−0.290	0.156	−0.633	0.310
LG10MarketCap	245	7.60	4.04	11.65	8.4658	0.06164	0.96476	0.931	0.193	0.156	2.466	0.310
LG10RampDExp	245	11.74	−3.00	8.74	−1.3331	0.23020	3.60317	12.983	1.746	0.156	1.157	0.310
Valid N (listwise)	245											

APPENDIX B

Table B1: Robustness test 1: Bootstrap ROA

Model		B	Bootstrap[a]				
			Bias	Standard Error	Sig. (2-tailed)	BCa 95% Confidence Interval	
						Lower	Upper
1	(Constant)	−9.193	−0.239[b]	5.545[b]	0.097[b]	−20.015[b]	0.976[b]
	Environmental Disclosure Score	0.030	−0.001[b]	0.044[b]	0.487[b]	−0.060[b,c]	0.121[b]
	Social Disclosure Score	−0.052	0.001[b]	0.078[b]	0.527[b]	−0.199[b]	0.093[b]
	Governance Disclosure Score	−0.033	0.002[b]	0.038[b]	0.387[b]	−0.104[b]	0.047[b]
	Age in Years	−0.087	−0.005[b]	0.070[b]	0.235[b]	−0.223[b]	0.041[b]
	LG10MarketCap	2.156	0.037[b]	0.679[b]	0.001[b]	0.857[b]	3.675[b]
	LG10RampDExp	−0.199	−0.007[b]	0.142[b]	0.179[b]	−0.459[b]	0.050[b]

Table B2: Robustness test 1: Bootstrap ROE

Model		B	Bootstrap[a]				
			Bias	Standard Error	Sig. (2−tailed)	BCa 95% Confidence Interval	
						Lower	Upper
1	(Constant)	−20.001	−0.233[b]	10.858[b]	0.069[b]	−41.850[b]	−0.809[b]
	Environmental Disclosure Score	−0.232	−0.005[b]	0.093[b]	0.024[b]	−0.416[b,c]	−0.055[b]
	Social Disclosure Score	0.256	0.002[b]	0.151[b]	0.091[b]	−0.024[b]	0.561[b]
	Governance Disclosure Score	−0.029	0.002[b]	0.066[b]	0.684[b]	−0.162[b]	0.100[b]
	Age in Years	−0.288	−0.001[b]	0.132[b]	0.023[b]	−0.571[b]	−0.024[b]
	LG10MarketCap	4.041	0.021[b]	1.253[b]	0.002[b]	1.738[b]	6.661[b]
	LG10RampDExp	−0.336	−0.007[b]	0.241[b]	0.155[b]	−0.819[b]	0.122[b]

Table B3: Robustness test 1: Bootstrap ROI

Model		B	Bootstrap[a]				
			Bias	Standard Error	Sig. (2-tailed)	BCa 95% Confidence Interval	
						Lower	Upper
1	(Constant)	−9.010	0.270[b]	7.072[b]	0.223[b]	−23.266[b]	5.546[b]
	Environmental Disclosure Score	0.027	0.004[b]	0.061[b]	0.656[b]	−0.080[b,c]	0.161[b]
	Social Disclosure Score	−0.093	−0.003[b]	0.102[b]	0.395[b]	−0.279[b]	0.101[b]
	Governance Disclosure Score	−0.034	−0.004[b]	0.050[b]	0.515[b]	−0.126[b]	0.051[b]
	Age in Years	−0.218	−0.003[b]	0.099[b]	0.025[b]	−0.405[b]	−0.034[b]
	LG10MarketCap	2.968	0.000[b]	0.858[b]	0.001[b]	1.362[b]	4.718[b]
	LG10RampDExp	−0.005	0.006[b]	0.212[b]	0.987[b]	−0.387[b]	0.429[b]

APPENDIX C

Table C1: Dependent Variable ROA: Tolerance and VIP

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Standard Error	Beta			Tolerance	VIF
1	(Constant)	−9.193	5.349		−1.719	0.087		
	Environmental Disclosure Score	0.030	0.050	0.066	0.601	0.548	0.318	3.143
	Social Disclosure Score	−0.052	0.077	−0.077	−0.678	0.498	0.301	3.318
	Governance Disclosure Score	−0.033	0.033	−0.072	−0.994	0.321	0.743	1.347
	Age in Years	−0.087	0.067	−0.082	−1.292	0.198	0.974	1.027
	LG10MarketCap	2.156	0.631	0.254	3.418	0.001	0.706	1.416
	LG10RampDExp	−0.199	0.143	−0.087	−1.391	0.165	0.988	1.012

Table C2: Dependent variable ROE: Tolerance and VIP

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Standard Error	Beta			Tolerance	VIF
1	(Constant)	−20.001	9.042		−2.212	0.028		
	Environmental Disclosure Score	−0.232	0.084	−0.298	−2.754	0.006	0.318	3.143
	Social Disclosure Score	0.256	0.130	0.218	1.964	0.051	0.301	3.318
	Governance Disclosure Score	−0.029	0.056	−0.037	−0.525	0.600	0.743	1.347
	Age in Years	−0.288	0.114	−0.156	−2.531	0.012	0.974	1.027
	LG10MarketCap	4.041	1.066	0.275	3.789	0.000	0.706	1.416
	LG10RampDExp	−0.336	0.241	−0.085	−1.391	0.166	0.988	1.012

Table C3: Dependent variable ROI: Tolerance and VIP

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Standard Error	Beta			Tolerance	VIF
1	(Constant)	−9.010	7.139		−1.262	0.208		
	Environmental Disclosure Score	0.027	0.066	0.045	0.414	0.679	0.318	3.143
	Social Disclosure Score	−0.093	0.103	−0.102	−0.902	0.368	0.301	3.318
	Governance Disclosure Score	−0.034	0.044	−0.055	−0.759	0.449	0.743	1.347
	Age in Years	−0.218	0.090	−0.152	−2.425	0.016	0.974	1.027
	LG10MarketCap	2.968	0.842	0.260	3.526	0.001	0.706	1.416
	LG10RampDExp	−0.005	0.191	−0.002	−0.027	0.979	0.988	1.012