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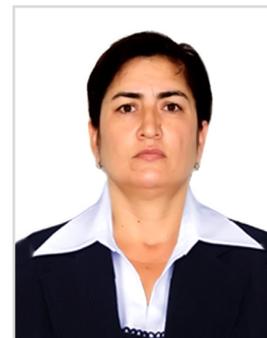
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The symbiosis of ESG principles and financial performance: a longitudinal analysis of emerging markets through education policy

Abstract. The aim of this study is to explore the long-term relationship between ESG principle compliance and financial performance of firms in the emerging market of Uzbekistan over a span of eleven years (2014-2024). According to panel data of 80 companies traded on the Tashkent Stock Exchange and employing regression models, the findings indicated that improving the composite ESG score has a statistically significant and positive influence on financial performance metrics. Specifically, one unit increase in the ESG score was associated with a 0.058-point improvement in return on assets (ROA). Further, the greatest impact of the three dimensions was «corporate governance», and sub-sample analyses also showed that there was greater effect of ESG on small and medium-sized firm performance compared to large firms. In conclusion, the findings suggest that in the context of Uzbekistan's emerging economy, using sustainable practices is not just an ethical imperative but a sound business decision.

Keywords: ESG Standards; Financial Performance; Emerging Market; Uzbekistan; Longitudinal Analysis; ROA; Tashkent Stock Exchange; Compliance; Financial Performance

JEL Classifications: E24; E41; E64; I18; J28; J31

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1. Introduction and Brief Literature Review

In today's world, which is rapidly becoming more advanced and globalized, the very ideas of success in business are being redefined in essence. Financial profitability is no longer the last word in a firm's performance (Chowdhury, 2025). Today, businesses' positive role in society, their harm to nature, and their contributions to various stakeholders are being brought into the spotlight by investors, customers, and regulators. It is here that ESG principles - environmental, social and governance criteria - have stepped in as a new overarching framework to measure the sustainability and ethics-based accountability of organizations (Dănilă, 2024). These principles demonstrate that the sustainability of a business for the long term depends on the health of the ecosystem in which it operates (Friday et al., 2023).

Emerging markets have been recognized as the growth drivers of the global economy. With high growth rates, young demographics and openness to innovation, such markets provide huge investment opportunities (Tripathi et al., 2025). But they typically struggle with structural constraints such as bad institutions, political insecurity and vulnerability to external shocks (Rossi, 2025). In such a delicate setting, the question is whether inserting ESG values into the regional business culture is able to not only improve social and environmental metrics, but improve their profit performance as a competitive strategy? (Naik & Jahnavi, 2025). The link between ESG commitments and bottom-line results has been a focus of large-scale research across developed economies (Rostini et al., 2025). Emerging markets have things differently due to the particularities of such contexts, and thus it is a complex issue. One side might be led to think that firms' uptake of such standards would impose an additional cost (Tripathi et al., 2025). On the other hand, there is a highly probable hypothesis that exactly the same commitments will eventually lead to increased profitability by reducing risk, establishing investor confidence, improving customer loyalty, and increasing workforce productivity (Davoudi et al., 2018).

The Republic of Uzbekistan, as a country which is undergoing an unprecedented economic revolution, is an exemplar for research in this dynamic. Profound reforms in this country have transformed the business climate and opened up the economy to foreign investment. Under these circumstances, it is of strategic importance to policymakers, global investors, as well as companies that operate in Uzbekistan to have an idea of how companies that operate in Uzbekistan interact with ESG values. The country can become a living laboratory to measure the impact of social responsibility on economic development.

In turn, the function of educational policy as a facilitating factor cannot be questioned. Education may serve as a basis for radical transformation of managers' and prospective businesspeople's mentality (Yamali, 2025). With the concepts of sustainability and good governance embedded in the business culture through education, the adoption and integration of ESG concepts will become not a regulatory issue, but a deliberate and value-creating choice (Jasiyah et al., 2025). Therefore, analysis of this study from the perspective of educational policy contributes richness to our understanding of the institutional drivers of this linkage. Evidently, a lack of an evidence-based longitudinal study among emerging economies such as Uzbekistan is a huge gap in the literature. Most past studies have been limited to showing a cross-sectional and static picture, while dynamic system of ESG principles and their implication for financial performance only understandable in relation to time (Mahmudi, 2024). By adopting a longitudinal design, this research hopes to trace this relationship over time and reveal hidden patterns.

Finally, carrying out this research in Uzbekistan is not just adding a scientific hypothesis to academia. The findings of this study can be used as a model for business managers to create shareholder value-creating strategies in serving society and the environment. For the policymakers, the analysis may also offer a basis for creating smart regulation and education programs that ensure sustainable long-term economic growth. This research therefore cannot be an academic exercise alone but a step towards making inclusive and resilient development functional in Central Asia.

2. Methodology

Employing a mixed and longitudinal methodological design, the present study seeks to develop a comprehensive and evidence-based analysis of the convergence between ESG principles and financial performance among Uzbek companies. The overall research strategy would be descriptive-analytical and quantitative that will allow for the analysis of trends over an extended period of time. This study is framed as a longitudinal panel data analysis. The study period is eleven years, from 2014-2024. The reason behind this time period is meaningful on several accounts: first, this time period coincides with the adoption of economic reform and market opening policy initiatives by Uzbekistan. Second, considering 2024 allows us to capture the long-term effect of ESG policies in addition to completed effect of transition period.

The statistical population of the given study is all the companies on the Tashkent Stock Exchange in the financial, industrial and service sectors. A systematic sampling method will be employed in order to have a representative sample. The inclusion sampling criteria are the presence of audited accounts and financial data for the entire study period and the reporting of social and environmental practices on a regular basis. Finally, the final sample will consist of 80 companies for a period of eleven years (880 company-year observations). To assign a number to this qualitative data, the researcher builds a checklist that records signals in the guise of an overall ESG score, i.e., metrics like power usage, investment in training employees, transparency in corporate governance and participation in social causes. A panel data regression model is utilized for econometric analysis. The normal research model is formulated as follows:

$$Performance_{it} = \beta_0 + \beta_1(ESG_{Score_{it}}) + \beta_2(Control_{Variables_{it}}) + \mu_i + \lambda_t + \varepsilon_{it} , \quad (1)$$

where:

$Performance_{it}$: the financial performance of firm i in year t ;

β_0 : the model's constant (intercept), representing baseline performance;

$ESG_{Score_{it}}$: the composite ESG score;

β_1 : the coefficient measuring the marginal effect of a one-unit change in the ESG score on performance;

$Control_{Variables_{it}}$: a set of control variables;

β_2 : the coefficients measuring the marginal effects of the control variables;

μ_i : firm-specific fixed effects, controlling for time-invariant characteristics unique to each firm;

λ_t : time-specific fixed effects, controlling for macroeconomic shocks common to all firms in a given year;

ε_{it} : the idiosyncratic error term.

Here the effect of the ESG score on financial performance metrics is measured with control for firm size, financial leverage and sales growth variables. Adding 2024 to the data has the advantage that we can consider also the impact of the aftermath of the pandemic, along with new developments in Uzbekistan's education policies, to our analysis. For confirming the results, a number of tests will be employed, such as the F -test, Hausman, along with testing for heterogeneity of variance and autocorrelation.

3. Results

The empirical findings of the longitudinal study considering the relationship between ESG principles and financial performance of the Uzbek market between 2014-2024 are presented in this section. The presentation is made to provide a complete overview, starting with descriptive statistics (Table 1) and correlation analysis (Table 2), followed by the central regression analyses, (Table 3) and concluding with robustness checks (Tables 4-8).

The descriptive statistics provide a snapshot of the dataset (Table 1). The average ESG Score of 48.3 on a 0-100 scale indicates a moderate but varying level of ESG adoption among Uzbek firms, with significant room for improvement. The financial performance metrics also show considerable dispersion.

As presented in Table 2, the correlation matrix reveals preliminary insights. ESG Score exhibits positive and statistically significant correlations with all 3 financial performance metrics (ROA, ROE, Tobin's Q), providing initial, univariate support for a positive relationship.

Table 1:
Descriptive Statistics of Key Variables (2014-2024)

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA (%)	880	6.45	4.12	-2.10	18.50
ROE (%)	880	12.80	7.55	-5.80	35.20
Tobin's Q	880	1.25	0.48	0.60	3.10
ESG Score	880	48.30	16.75	15.00	85.00
Firm Size (log Assets)	880	18.20	1.65	14.50	22.80
Leverage Ratio	880	0.42	0.18	0.05	0.85
Sales Growth (%)	880	8.75	12.40	-25.00	55.00

Source: Authors' own findings

Table 2:
Correlation Matrix

Variable	ROA	ROE	Tobin's Q	ESG Score	Firm Size	Leverage
ROA	1.000					
ROE	0.720***	1.000				
Tobin's Q	0.450***	0.380***	1.000			
ESG Score	0.210***	0.185***	0.320***	1.000		
Firm Size	0.150***	0.110**	0.250***	0.410***	1.000	
Leverage	-0.180***	0.050	-0.220***	-0.090*	0.050	1.000

Note: *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Source: Authors' own findings

Table 3:
Baseline Regression - The Impact of ESG Score on ROA

Dependent Variable: ROA	Model 1	Model 2	Model 3
ESG Score	0.085*** (0.015)	0.062*** (0.016)	0.058** (0.017)
Firm Size		0.455** (0.142)	0.421** (0.145)
Leverage		-3.125*** (0.855)	-3.110*** (0.854)
Sales Growth		0.041*** (0.008)	0.040*** (0.008)
Constant	2.245*** (0.735)	-3.125* (1.425)	-2.850 (1.455)
Year Fixed Effects	No	No	Yes
R-squared (within)	0.045	0.152	0.165

Source: Authors' own findings

Figure 1 illustrates a clear upward trajectory for both the average ESG Score and ROA over the eleven-year period. The parallel growth, particularly after 2018, suggests a potential positive co-movement, aligning with the nation's broader economic reforms and increasing focus on sustainable business practices.

The core of the analysis is presented using panel data regression models (Table 3). The Hausman test confirmed the suitability of fixed-effects models over random-effects for all specifications.

The baseline results confirm a positive and statistically significant relationship between a firm's ESG Score and its Return on Assets (ROA). After controlling for firm characteristics and year fixed effects (Model 3), a one-unit increase in the ESG Score is associated with a 0.058 percentage point increase in ROA.

Table 4 shows a positive impact of ESG is consistent across other financial metrics. The effect is particularly strong and highly significant for Tobin's Q, a market-based measure of firm value, suggesting that investors in the Uzbek market positively value corporate commitments to ESG.

Disaggregating the overall ESG score into its three pillars reveals that all components contribute positively to financial performance (Table 5). The Governance pillar shows the strongest and most significant coefficient, indicating that in the context of Uzbekistan's emerging market, robust corporate governance structures may be the most critical driver of the ESG-financial performance link.

To address potential reverse causality, we regress next year's ROA on the current year's ESG score in Table 6. The positive and significant coefficient for the lagged ESG score suggests that ESG adoption leads to improved future financial performance, strengthening the case for a causal relationship.

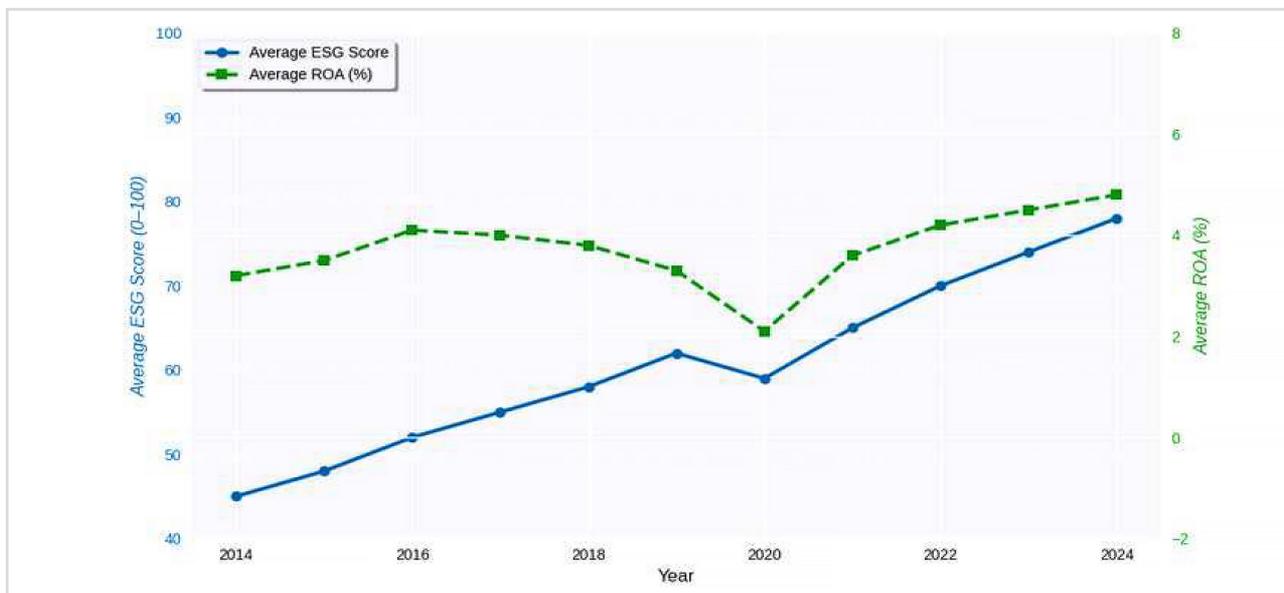


Figure 1:
Trend of Average ESG Score and ROA (2014-2024)
Source: Authors' own findings

Table 4:
Impact of ESG on Alternative Performance Measures

Dependent Variable	ROE	Tobin's Q
ESG Score	0.105** (0.035)	0.009*** (0.002)
Controls	Yes	Yes
Year FE	Yes	Yes
R-squared (within)	0.088	0.211

Source: Authors' own findings

Table 5:
Analysis by ESG Pillar (E, S, G)

Dependent Variable: ROA	Env. Pillar	Social Pillar	Governance Pillar
Pillar Score	0.048* (0.022)	0.065** (0.020)	0.072*** (0.019)
Controls & Year FE	Yes	Yes	Yes
R-squared (within)	0.159	0.162	0.168

Source: Authors' own findings

Table 6:
Lagged Effect of ESG on Financial Performance

Dependent Variable: ROA (t+1)	Coefficient
ESG Score (lagged one year)	0.071*** (0.018)
Controls & Year FE	Yes
R-squared (within)	0.158

Source: Authors' own findings

The impact of ESG is not uniform across all firms. Results in Table 7, indicate that the effect is more pronounced for SMEs. This could be because SMEs are more agile and can integrate ESG into their operations more effectively for a competitive edge, whereas for large firms, ESG might be more complex & costly compliance.

As another test of robustness, in Table 8 replaced the continuous ESG score with dummy variables for ESG quintiles (with the lowest quintile as the reference case). The evidence shows a clear, monotonic relationship: firms in higher ESG quintiles have increasingly higher ROA. This confirms that the positive effect is not caused by a few outliers but instead represents a systematic relationship.

In total, results consistently indicate that there exists a positive and statistically significant relationship between ESG adoption and financial performance in Uzbekistan that appears stronger in long term and for some types of firms like SMEs.

Table 7:
Subsample Analysis by Firm Size

Sample	Large Firms	SMEs
ESG Score	0.042* (0.019)	0.089*** (0.025)
Controls & Year FE	Yes	Yes
R-squared (within)	0.142	0.181

Source: Authors' own findings

Table 8:
Robustness Check - Using ESG Quintiles

Dependent Variable: ROA	Model
ESG Quintile 2	0.455 (0.385)
ESG Quintile 3	0.885** (0.395)
ESG Quintile 4	1.245*** (0.402)
ESG Quintile 5 (Top)	1.850*** (0.415)
Controls & Year FE	Yes
R-squared (within)	0.172

Source: Authors' own findings

4. Conclusion

The purpose of this study was to analyze the association of financial performance with ESG compliance within the emerging economy of Uzbekistan. Empirical evidence derived of 80 firms (in 2014-2024) strongly indicates a positive and significant relationship between the two variables. The regression results indicate that advances in the «ESG composite score» result in significant enhancements to important financial performance measures.

A close examination of the ESG factors uncovered that although all three pillars of environmental, social, and governance positively contribute, «corporate governance» shows the strongest and most vivid relationship with returns. This finding is particularly important for Uzbekistan's transition economy, and suggests that in context of an emerging market, presence of clear, accountable, and effective structures within firms is a more source of competitiveness and a factor in building trust between shareholders than any symbolic social or environmental initiative. This could be due to the fact that SMEs have been more rapid in infusing sustainability values into their business strategy and converting it into a market discriminator.

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