

Does ESG Performance Drive Long-Term Sustainable Economic Growth in Asia? Insights from a Novel ESG Index and Panel Cointegration Analysis

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Abstract

Background: Rapid population growth and the depletion of natural resources pose significant global challenges. These issues are further exacerbated by unethical corporate practices, such as accounting fraud and financial scandals, which contribute to economic downturns. This study investigates the role of Environmental, Social, and Governance (ESG) performance in fostering sustainable economic growth in Asia.

Methods: This study adopts an explanatory research design, utilizing panel data collected from the World Bank for 46 Asian countries spanning the period from 1990 to 2022. The causality was determined using a robust panel regression model to examine the long-term and short-term effects of ESG performance on economic growth.

Results: The findings reveal a strong positive long-term relationship between ESG performance and GDP per capita, suggesting that sustainable practices enhance productivity, attract investment, and contribute to human capital development. However, short-term effects are largely insignificant, except in specific Asian countries where targeted policies and rapid transitions yield immediate benefits.

Conclusion: The study underscores the critical role of ESG performance in driving long-term sustainable economic growth in Asia. It highlights clear long-term benefits, including increased productivity, investment, and human capital development, despite limited short-term effects in certain regions. These findings emphasize the need for policymakers and stakeholders to integrate ESG criteria alongside financial metrics, enabling them to enhance economic resilience, drive innovation, improve financial performance, and address environmental and social challenges.

Novelty: This research creates novelty by contributing in three ways. First, it develops a unique ESG index in the absence of a standardized ESG index for Asian countries. Second, while most existing studies focus on the impact of ESG adoption on firm-level performance, this study shifts the perspective to a macroeconomic scale, examining how ESG performance influences overall economic growth. Thirdly, it provides empirical evidence on the impact of ESG performance on economic growth in the region, offering valuable insights for sustainable development policies.

Keywords: ESG Index Development, Economic Growth, Sustainable Development, Asian Economies

JEL Classification: Q01, O44, E01, C23, C22, F63

Introduction

In recent years, Environmental, Social, and Governance (ESG) considerations have gained significant global attention as sustainability challenges intensify. The increasing frequency of climate-related disasters, social inequalities, and corporate governance failures has underscored the need for responsible business practices and policy frameworks that support long-term economic stability ([Friede, Busch, & Bassen, 2015](#)). Governments, investors, and international organizations are emphasizing ESG integration as a crucial element in achieving sustainable economic development. Global initiatives, such as the United Nations Sustainable Development Goals (SDGs) and the Paris Agreement, highlight the importance of ESG-focused strategies to ensure inclusive growth while mitigating environmental and social risks ([United Nations, 2015](#)). Moreover, financial markets have responded to this paradigm shift, with sustainable investment assets surpassing \$35 trillion globally, reflecting investors' growing preference for ESG-aligned businesses ([Alliance, 2016](#)).

ESG performance refers to a country's or organization's effectiveness in managing environmental sustainability, social responsibility, and governance practices. The environmental dimension focuses on climate action, resource efficiency, and ecological preservation. The social component addresses issues such as labor rights, income equality, and

community engagement. The governance aspect pertains to transparency, corporate ethics, regulatory compliance, and institutional quality ([Atan et al., 2018](#)). Economic growth, on the other hand, is typically measured by the increase in a nation's gross domestic product (GDP) per capita, reflecting improvements in productivity, income levels, and overall economic prosperity ([Diaye, Ho, & Oueghlissi, 2022](#)). The growing recognition of ESG performance as a key determinant of sustainable economic growth has led to extensive research examining the interdependencies between these factors ([ZHANG, 2023](#)).

The role of ESG performance in shaping a nation's economic trajectory has become increasingly important. Countries with strong ESG frameworks tend to attract foreign direct investment (FDI), enhance financial market stability, and promote long-term economic resilience ([Wang, Yu, & Zhong, 2023](#)). A well-regulated ESG environment fosters innovation, drives resource efficiency, and enhances institutional trust, all of which contribute to higher economic productivity ([Capelle-Blancard, Diaye, & Oueghlissi, 2019](#)). In contrast, weak ESG policies can result in economic inefficiencies, increased sovereign borrowing costs, and reduced investor confidence. Given Asia's rapid industrialization and growing economic influence, the region faces both challenges and opportunities in integrating ESG principles into its growth strategy.

The relationship between ESG performance and economic growth is complex and varies across different economies. While some studies highlight a positive correlation between ESG adoption and GDP per capita in the long run, the short-term impact remains inconclusive in many countries ([Diaye et al., 2022](#)). The potential economic benefits of ESG integration include improved corporate profitability, reduced financial risks, and enhanced creditworthiness at the sovereign level ([Capelle-Blancard et al., 2019](#)). However, the effectiveness of ESG policies depends on various factors, including institutional quality, regulatory enforcement, and market maturity. This necessitates a deeper exploration of how ESG performance influences economic growth across diverse national contexts, particularly in Asia.

Research Objective

Existing studies have extensively analyzed micro-level analysis of ESG adoption and firm performance. Some studies have found a positive impact of ESG adoption on firm performance in the form of improved ESG outcomes—such as reduced carbon emissions and increased diversity—to higher firm value, better credit ratings, enhanced productivity, greater competitiveness, and stronger financial performance ([Clark, Feiner & Viehs, 2015](#); [Cek & Eyupoglu, 2020](#); [Whelan et al., 2021](#); [Kong, Li, & Lei, 2024](#)). While others have explored how environmental and social regulations influence firm-level outcomes and how macroeconomic conditions shape firms' ESG adoption ([Zhou et al., 2020](#); [Baldini, et al., 2018](#)). However, there is limited empirical research on the broader macroeconomic effects of ESG adoption. Therefore, this study aims to address this gap by analyzing the impact of ESG performance on economic growth in Asia over a three-decade period. Understanding this relationship will help policymakers design effective sustainability strategies, guide investment decisions, and

promote long-term economic resilience. By providing empirical insights into the role of ESG in shaping Asia's economic future, this study contributes to the broader discourse on sustainable development and economic policy.

Review of Literature

The relationship between Environmental, Social, and Governance (ESG) performance and economic growth has received increasing attention in recent years, particularly in emerging and developing economies. Strong ESG performance enhances resource efficiency, fosters innovation, promotes social stability, and strengthens governance, ultimately improving productivity and attracting investment ([Atan et al., 2018](#)). These factors contribute to sustainable and inclusive economic development.

Pioneer work of [Porter \(1995\)](#) provides a theoretical foundation for understanding how ESG performance drives economic growth. Porter challenges the conventional view that environmental regulations hinder competitiveness by arguing that well-designed policies can stimulate innovation, improve resource efficiency, and enhance long-term economic performance. Companies incorporating ESG principles—such as reducing carbon emissions, optimizing supply chains, and adopting sustainable practices—can gain a competitive advantage, attract investment, and improve financial stability, ultimately contributing to economic growth. Likewise, in developing an ESG index, [Jiang et al. \(2024\)](#) develop a national ESG index covering 121 countries and highlight widening disparities in ESG performance. Their findings reveal that higher-income nations lead in ESG growth, while a pattern of "club convergence" emerges, wherein countries with similar ESG performance levels tend to group together. This underscores the importance of developing comprehensive ESG indices to track national sustainability progress.

ESG considerations are particularly vital in Asia, where rapid industrialization has led to severe environmental degradation, heightened climate vulnerabilities, and persistent social inequality, often exacerbated by governance challenges such as corruption. Despite these obstacles, the region presents significant opportunities for ESG integration, particularly through investments in renewable energy and sustainable finance. Coordinated efforts from governments, businesses, and civil society are essential to ensuring sustainable development, as investors increasingly recognize the long-term benefits of ESG adoption in fostering more resilient economies ([Diaye et al., 2022](#)).

Several studies provide insights into how ESG performance influences economic growth across different regions and sectors. At the firm level, [Biju et al. \(2024\)](#) explore the relationship between ESG performance and national economic growth in India. Using data from firms listed on the National Stock Exchange's ESG index, the study finds a positive correlation between aggregate ESG scores and GDP per capita. A sectoral analysis highlights that both energy and non-energy firms contribute to economic growth, though the governance pillar has a negative impact in the non-energy sector. Furthermore, the study confirms that the implementation of Business Responsibility and Sustainability Reporting (BRSR) regulations positively influences economic growth, particularly in the non-energy sector. At the macro level, [Wang, Yu, and](#)

[Zhong \(2023\)](#) examine country-level ESG performance across 109 nations and find a significant positive relationship between ESG improvements and economic growth. Their findings suggest that higher national ESG scores drive growth through channels such as energy efficiency, human capital accumulation, and increased foreign investments. The impact is stronger in high-income and high-emission countries, whereas resource-dependent nations exhibit weaker effects, concluding varying impact of ESG performance in economic growth. Similarly, [Diaye, Ho, and Oueghlissi \(2022\)](#) found that improved ESG performance is positively associated with higher GDP per capita in the long run across 29 OECD countries from 1996 to 2014, though short-term effects are limited.

[Gidage and Bhide \(2024\)](#) analyze the link between ESG performance, economic growth, and Sustainable Development Goal (SDG) attainment in 12 developing countries. Their study, employing a Panel ARDL model with the PMG estimator, demonstrates a positive relationship between ESG performance and economic growth, reinforcing the need for integrated ESG-economic strategies to drive sustainable development. Additionally, [Khanchel and Lassoued \(2024\)](#) assess the role of excessive ESG disclosure in reducing economic risk, measured through the cost of capital. Their study of S & P 500 firms suggests that greater transparency in ESG reporting enhances investor confidence and lowers perceived financial risk, particularly through environmental and social disclosures. Moreover, Corporate Social Responsibility (CSR) assurance weakens the negative relationship between excessive ESG disclosure and cost of capital, indicating that third-party verification strengthens ESG credibility. Similarly, [Capelle-Blancard, Diaye, and Oueghlissi \(2019\)](#) examined the relationship between ESG performance and sovereign borrowing costs in 20 OECD countries, finding that strong social and governance performance significantly lowers sovereign bond yield spreads, enhancing financial stability.

Focusing on the Gulf Cooperation Council (GCC) region, [Alharbi \(2024\)](#) finds that ESG reforms positively influence economic growth, with financial development acting as an amplifier. This suggests that integrating ESG policies with financial development strategies can foster sustainable economic progress, particularly in resource-rich economies. In contrast, using panel data of 27 EU member states, [Norocel and Vierescu \(2024\)](#) find a negative relationship between country-level ESG scores and economic growth. Their study highlights the potential short-term trade-offs associated with ESG adoption, particularly in financial intermediation through banks, where green lending does not necessarily stimulate economic growth. Moreover, [Delova-Jolevska et al. \(2024\)](#) find mixed results of ESG impact on economic growth. They analyzed data from North Macedonia, Albania, Montenegro, Bosnia and Herzegovina, and Serbia, using multiple regression analysis with fixed effects. Their findings indicate that none of the ESG components had a significant impact on the annual GDP growth of these countries. However, for Southeast European countries that are EU members, life expectancy at birth and labor force participation showed a certain impact on GDP growth. Therefore, there is a need to give a fresh perspective on causal linkage between ESG performance and economic growth.

From the above literature review, it can be inferred that most studies find a positive link between ESG adoption and economic growth, while regional and sectoral differences play a crucial role in shaping these outcomes. These findings suggest that ESG initiatives can foster sustainable development, though short-term economic trade-offs may exist, necessitating well-integrated policies to maximize long-term benefits. Understanding the relationship between ESG performance and economic growth in Asia enables stakeholders to build a more sustainable, inclusive, and prosperous future.

Methodology

This study employs a causal research design to examine the relationship between the ESG index and economic growth in the context of Asian countries. While the impact of ESG on economic growth can be analyzed globally, Asia presents a unique case due to its dynamic economic transformations, diverse market conditions, and critical sustainability challenges (Ng et al., 2020). The United Nations recognizes 49 countries in Asia; however, we selected 46 countries for this study, excluding Cyprus, Georgia, and Turkey as they are sometimes considered transcontinental between Europe and Asia.

To ensure data availability and consistency, we collected secondary data from the World Development Indicators (World bank, 2024) for the period 1990 to 2022. Given that the dataset consists of 46 cross-sectional units (countries) over a 33-year time span, it constitutes a panel dataset with 1,518 observations. To analyze this data effectively, we applied a robust panel regression model, accounting for potential heteroskedasticity, autocorrelation, and cross-sectional dependence.

Development of ESG index

Environment, Social, and Governance (ESG), index of all 46 Asian countries is not given, so we developed ESG index by using Principal Component Analysis (PCA) of ESG components because PCA is not only primarily a dimensionality reduction technique, but it can also be used for prediction when combined with regression models. In the realm of ESG, PCA shifts through numerous environmental, social, and governance Components (Factors), such as renewable energy, electricity renewable, biodiversity, consumption renewable and non-fossils, productivity, employment, life expectancy, male to female, enroll secondary, vulnerability labor, fertility, birth, primary school enrollment, primary to secondary enrollment, corruption control, gov effect, political stability, regulation quality, rule of law, voice accountability, condensing them into a concise yet comprehensive measure of a company's sustainability and ethical performance. To develop ESG index, we assigned weights to each component based on their contribution to overall ESG objectives and combining them to generate a single score or index by using equation (ii). To predict the EGS score, first, we calculate the standardized value of components by using equation (i). Since PCA is sensitive to the scale of variables, we standardize each variable:

$$Z_{ij} = \frac{X_{ij} - \mu_j}{\sigma_j} \dots \dots \dots (i)$$

where:

X_{ij} is the original value of the j^{th} variable for the i^{th} observation; μ_j is the mean of the j^{th} variable; σ_j is the standard deviation of the j^{th} variable, and Z_{ij} is the standardized value. After this, we calculate the covariance matrix, and compute the eigenvalues and eigenvectors to transfer the data into principal components. Finally, we get the index under equation (ii).

$$ESG \text{ index } (I) = \beta_0 + \sum_{j=1}^k \beta_j \sum_{m=1}^p Z_m V_{mj} + \epsilon \dots \dots \dots (ii)$$

Where, Z_m are the standardized input variables, and V_{mj} are the principal component loadings.

Baseline model

[Model \(iii\)](#) is used to analyze the impact of the ESG index on Economic Growth (GDP Per Capita). this model estimates both long-term and short-term relationships. Here, we assume that the GDP per capita function in the long run is given by:

$$GDPC_{it} = \alpha_t + \beta_t ESGI_{it} + \mu_i + \epsilon_{it} \dots \dots \dots (iii)$$

Where, GDPC is the GDP per capita (in the long run); ESGI is the ESG index; $i = 1, 2, \dots, N$ (countries); $t = 1, 2, \dots, T$ (periods); μ_i is the group-specific effect.

Results and Discussion

[Table 1](#) depicts the descriptive statistics for Eighteen factors that used to determine ESG index based on 1551 (33 years and 46 cross section of the countries) valid observations. The minimum value for each variable is 0; the maximum value is 98041.362 and the mean values range from 0.541 to 8881.985. The standard deviations range from 0.432 to 14089.126, indicating relatively high variability in the dataset. Overall, the data suggests that the responses for each variable were generally positive, with higher means indicating greater agreement with the constructs being measured.

Table 1. Descriptive statistics

SN	Variable	Mean	Std. Dev.	Min	Max
1.	Combustible renewables and waste	8.53	19.14	0.00	93.66
2.	Electricity production from renewable sources, excluding hydroelectric	0.61	2.61	0.00	25.67
3.	Forest area	23.47	24.47	0.00	78.37
4.	Fossil fuel energy consumption	49.41	42.92	0.00	100.00
5.	Renewable electricity output	19.26	30.47	0.00	100.00
6.	Renewable energy consumption	20.14	27.05	0.00	95.92
7.	Employment to population ratio	30.27	30.34	0.00	95.10
8.	Life Expectancy	68.25	13.76	0.00	84.56
9.	Ratio female to male labor force Participation	31.46	34.44	0.00	110.26
10.	School Enrollment, Secondary	49.46	40.55	0.00	134.44
11.	Vulnerability of labor	39.71	27.27	0.00	92.27
12.	Labor force participation rate for ages 15-24	21.57	26.59	0.00	94.70

13. Fertility rate, total (births per woman)	2.83	1.38	0.00	8.61
14. Birth rate, crude (per 1,000 people)	21.71	9.30	0.00	52.17
15. School enrollment, primary (gross), gender parity index (GPI)	0.71	0.43	0.00	1.15
16. School enrollment, primary and secondary (gross), gender parity index (GPI)	0.54	0.49	0.00	1.20
17. ENROLL	0.55	0.49	0.00	1.36
18. Control of corruption	28.96	29.47	0.00	99.05
19. Government effectiveness	33.36	30.74	0.00	100.00
20. Political stability	27.09	28.26	0.00	99.05
21. Regulatory quality	31.14	29.86	0.00	100.00
22. Rule of law	29.84	28.89	0.00	99.06
23. Voice Accountability	21.24	22.50	0.00	84.98
GDP per capita	8881.99	14089.13	0.00	98041.40

Source: World Development Indicator (2024)

Principle Component Analysis

[Table 2](#) presents the result of an exploratory factor analysis conducted by using principal component analysis (PCA) on the 23 components with orthogonal rotation (varimax) method. The Kaiser–Meyer–Olkin (KMO) and Baetlett’s test of sphericity Sampling Adequacy Test is a used to determine whether EFA is appropriate in terms of sample size to extract the factor. The KMO statistic should be at least 0.6 to proceed with factor analysis. In this analysis Kaiser-Meyer-Olkin measure of sampling adequacy (overall) is 0.8127.

The eigenvalue for each principal component indicates the percentage of variation explained in the total dataset. The rotated component matrix extracted a clear three components that explained 56.6 per cent of the total variance with an eigenvalue higher than 1. The eigenvalue for the first principal component is 7.099, the second principal component is 3.223 and the third principal component is 2.702.

The ESG index constructed by PCA reveals three principal components based on highest factor loading: "governance quality index" that considers control corruption, rule of law, voice, effectiveness, political stability, and security and regulatory quality; "social development index" that includes employ, enroll sec, health, life, vulnerability labor, male-to-female labor participation, gpi secprim, fertility, enroll and birth ; and "environmental quality index" with Renewable energy, Electricity Renewable, Biodiversity, non-fossils, electro renewable-T, and Consumable energy.

Table 2. Principle Component Analysis (ESG Construct Index)

SN	Variable	Comp1	Comp2	Comp3
1.	RENEW ENERGY	-0.101	0.263	0.279
2.	ELECRENEWA~E	0.032	0.124	0.061
3.	BIODIVERSITY	0.037	0.251	0.251
4.	NON-FOSSIL	0.009	-0.057	-0.231

5. ELECTRENEW~T	-0.134	0.267	0.214
6. CONSUMPREN~Y	-0.118	0.351	0.353
7. Employment	0.217	0.156	0.097
8. Life Expectancy	0.113	0.093	-0.187
9. MALE TO FEMALE	0.212	0.188	0.157
10. ENROLL SEC	0.181	0.261	-0.289
11. Vulnerability	-0.167	0.235	0.282
12. LABOR	0.146	0.196	0.17
13. FERTILITY	-0.231	0.043	-0.099
14. BIRTH	-0.247	0.082	-0.091
15. GPIPRIM	0.119	0.342	-0.248
16. GPISECPRIM	0.115	0.367	-0.345
17. ENROLL	0.116	0.359	-0.344
18. Corruption Control	0.334	-0.078	0.092
19. Government Effectiveness	0.343	-0.068	0.094
20. Political Stability	0.274	-0.111	0.115
21. REG_QLT	0.339	-0.076	0.078
22. RULE OF LAW	0.343	-0.074	0.096
23. VOICE_ACC	0.277	0.026	0.141

Regression Results

Following the development of the ESG index, a panel regression model was utilized to examine its impact on economic growth. Due to the considerable variability in the data, a pooled OLS approach was not deemed suitable. Instead, the analysis considered either a fixed effects model (FEM) or a random effects model (REM). To determine the more appropriate approach, a Hausman test for endogeneity was conducted, suggesting that the REM would be preferable to the FEM.

Table 3. Hausman (1978) specification test

	Coef.
Chi-square test value	76.559
P-value	0

Significance P value indicates (presented in [table 3](#)) the fixed effects model is more suitable for the dataset, as it accounts for unobserved individual-specific characteristics that may affect the GDP Per Capita.

Table 4. Regression results (Fixed effect)

Lngdppc	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
ESG	.242	.008	28.85	0	.225 .258	***
Constant	7.99	.016	511.87	0	7.959 8.02	***
Mean dependent var	8.019		SD dependent var	1.596		

R-squared	0.367	Number of obs	1482
F-test	832.196	Prob > F	0.000
Akaike crit. (AIC)	2646.077	Bayesian crit. (BIC)	2656.679

*** $p < .01$, ** $p < .05$, * $p < .1$

[Table 4](#) reveals the result of fixed effect model that used to analyze impact of ESG index on economic growth that measured by GDP per capita. The overall regression model is statistically significant (F-test = 832.196, $p < 0.01$). There is a strong positive relationship between ESG performance and economic growth (GDP per Capita) in the Asian countries ($\beta = 0.242$, $p < 0.01$ or t-value = 28.85). it means countries with higher ESG performance tend to have higher GDP per Capita. The R-squared value of 0.367 indicates that approximately 36.7% of the variation in GDP per Capita is explained by the variation in ESG performance.

Diagnostic Test

To avoid the biased and inconsistent estimates due to omitted common factors we used the following test:

Cross sectional independence

First, we checked cross-sectional independence (CSD) (presented in [table 5](#)) ensures that observations across units are not correlated, preventing biased estimates in panel data analysis. Testing for dependencies is crucial when examining ESG performance and GDP per capita across countries. Maintaining this assumption ensures accurate and reliable relationship estimation over time. Since both tests reject the null hypothesis of cross-sectional independence, there is strong evidence of cross-sectional dependence in the data. This suggests that standard fixed effects regression may produce biased results.

Table 5. Test of Cross-Sectional independence

VARIABLE	FIXED EFFECT
Pesaran's test of cross-sectional independence	88.474 [0.000]
Friedman's test of cross-sectional independence	478.862 [0.000]

Panel unit root test

Second, we run panel unit root test to check stationarity of the data that helps to ensure the robustness and reliability of subsequent econometric models.

Table 6. Panel unit root tests for GDPC and ESGI

	LLC	IPS	HTU
GDPPC	1.4539	-0.9917	0.7874
ESG	1.8781	-3.6271	-0.0764
Δ GDPC	-4.2066	-5.1233	-29.5
Δ ESG	-6.0123	-12.852	-0.8123

[Table 6](#) illustrates whether the data is stationary (I(0)) or non-stationary (I(1)). At I(0), GDPPC and ESG show mixed results, indicating the need for further testing. After applying first differencing, all values of Δ GDPPC and Δ ESG are highly negative, confirming that GDPPC and ESG become stationary after differencing. Therefore, we need to test cointegration for long run relationship between ESG and economic growth.

Panel cointegration test

Table 7. Panel cointegration test

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	3.970	0.000	3.423	0.000
Panel rho-Statistic	-9.028	0.000	-0.354	0.362
Panel PP-Statistic	-12.682	0.000	-2.894	0.002
Panel ADF-Statistic	-10.498	0.000	-1.438	0.075
Group rho-Statistic	2.315	0.990		
Group PP-Statistic	-0.440	0.330		
Group ADF-Statistic	-0.717	0.237		

[Table 7](#) shows a use of panel cointegration tests proposed by [Pedroni \(1999\)](#). Based on results of Panel Statistics: Both the Panel v-statistic, PP-statistic, and ADF-statistic suggest stationarity (I(0)) for the panel data and Weighted Statistics: Mixed results with some suggesting non-stationarity (I(1)) due to higher p-values. However, Group Statistics: All group statistics point to non-stationarity, as indicated by high p-values. Therefore, to solve cointegration issue and confirm long term relationship, we conducted panel error correction model (ECM).

Dynamic regression

The dynamic fixed effect regression, therefore, provides insights into both the immediate and lagged effects of ESG on economic growth, enhancing the analysis of country-specific economic dynamics and informing more effective policy and strategic decisions.

Table 8. Dynamic fixed effect regression with the lag of ESG

Variables	DFE Lag2	P-value
Long run Estimates ESGI	16.353	0.000
Short run Estimates Δ ESGI	-2.822	0.005
Error Correction (EC)	-6.146	0.000
Constant	6.628	0.000

[Table 8](#) reveals that the ESGI has a strong positive and significant long-run effect (coefficient 16.353, $p < 0.01$) on the GDP per capita. In the short run, ESGI may have a temporary negative effect (coefficient = -2.822), however, since the long-run coefficient is positive, this suggests that while ESGI might have short-term costs or negative effects, its long-term impact is positive. The error correction mechanism is highly significant, indicating that any deviations from equilibrium are quickly adjusted. The model confirms the importance of ESGI in long-run economic outcomes, even if short-term fluctuations occur.

Short term estimates for each Country

In panel data analysis, short-term coefficients reveal the immediate effects of ESG performance on economic growth, while the error correction term shows how quickly deviations from long-term equilibrium are corrected. These outputs are crucial for understanding the dynamic relationships within each country's data. Short-term coefficients for specific variables allow for clear comparisons of how different countries respond to changes in these variables, providing valuable insights into country-specific dynamics. These estimates are vital for understanding immediate economic conditions, aiding in policy-making, economic forecasting, market analysis, and academic research. They help researchers and policymakers make informed decisions crucial for economic stability and growth.

[Table 9](#) provides a detailed breakdown of country-specific estimations, revealing that, on average across the 46 countries studied, there appears to be no short-run relationship between ESG performance and GDP per capita. This suggests that in the short term, changes in ESG performance do not consistently correlate with changes in GDP per capita across these countries. But Countries like Azerbaijan, Bangladesh, Cyprus, Iraq, Myanmar, Pakistan, Syrian Arab, Timor-Leste, Turkmenistan and United Arab Emirates show significant relationship in short run also.

Table 9. Short term estimates for each country

Countries	Δ ESG	Constant		
Afghanistan	-6.57	-0.01	-0.01	-0.99
Armenia	-27.15	0.00	3.62	-0.04
Azerbaijan	1.31	-0.28	2.40	-0.10
Bahrain	-73.75	0.00	6.74	-0.01
Bangladesh	251.14	0.00	0.41	-0.71
Bhutan	-170.21	0.00	6.29	-0.01
Brunei Darussalam	-36.83	0.00	2.81	-0.07
Cambodia	-124.11	0.00	-0.17	-0.88
China	-63.84	0.00	16.39	0.00
Cyprus	69.90	0.00	-0.96	-0.41
Georgia	-33.81	0.00	7.18	0.00
India	-186.94	0.00	9.75	0.00
Indonesia	-38.40	0.00	2.26	-0.11
Iran, Islamic Rep	-30.72	0.00	3.56	-0.04
Iraq	0.31	-0.78	15.36	0.00
Israel	-211.10	0.00	8.05	0.00
Japan	-18.71	0.00	-4.82	-0.02
Jordan	-84.12	0.00	6.04	-0.01
Kazakhstan	-5.85	-0.01	5.36	-0.01
Korea, Rep	-40.33	0.00	0.61	-0.58
Kuwait	-46.50	0.00	2.30	-0.10

Kyrgyz Republic	-35.76	0.00	5.78	-0.01
Lao PDR	-101.45	0.00	5.77	-0.01
Lebanon	-16.89	0.00	3.06	-0.05
Malaysia	-14.30	0.00	0.88	-0.44
Maldives	-138.87	0.00	5.54	-0.01
Mongolia	-79.74	0.00	7.17	-0.01
Myanmar	11.20	0.00	7.69	0.00
Nepal	-51.05	0.00	2.94	-0.06
Oman	-64.26	0.00	5.15	-0.01
Pakistan	10.30	0.00	3.42	-0.04
Philippines	-115.23	0.00	2.66	-0.08
Qatar	-33.38	0.00	1.80	-0.17
Saudi Arabia	-85.05	0.00	4.97	-0.02
Singapore	-8.82	0.00	2.15	-0.12
Sri Lanka	-80.09	0.00	9.68	0.00
Syrian Arab Republic	6.62	-0.01	0.42	-0.70
Tajikistan	-14.76	0.00	5.69	-0.01
Thailand	-18.61	0.00	0.13	-0.91
Timor –Leste	38.40	0.00	-1.12	-0.34
Turkiye	-68.32	0.00	6.97	-0.01
Turkmenistan	11.04	0.00	4.08	-0.03
United Arab Emirates	10.37	0.00	2.84	-0.07
Uzbekistan	-53.62	0.00	6.69	-0.01
Viet Nam	-55.68	0.00	5.44	-0.01
Yemen, Rep	-21.50	0.00	5.70	-0.01

Discussion

The study investigates the determinants of ESG (Environmental, Social, and Governance) performance and its impact on economic growth, specifically GDP per capita, within the Asia. A positive long-term relationship between ESG performance and GDP per capita suggests that improvements in environmental, social, and governance (ESG) factors contribute to sustained economic growth over time. The fixed-effects model used in this analysis indicates that the results are not biased by country-specific characteristics, such as cultural, geographic, or institutional differences across countries. However, this relationship may be influenced by factors such as trade openness and FDI inflows, where countries with higher levels of both tend to exhibit better ESG practices. These factors also contribute to job creation and increased productivity, which can subsequently boost GDP per capita. Additionally, well-developed financial systems play a crucial role by accelerating economic growth while simultaneously fostering better ESG compliance. The analysis reveals that there are complex interrelationships among ESG performance and economic growth, highlighting the dual-edged nature. The studies shows that countries with higher ESG Performance experience foreign direct

investment (FDI), enhanced investor confidence, and improved institutional efficiency, all of which contribute to higher GDP per capita as supported by [Stern et al. \(1996\)](#), [Wei & Walsh \(2019\)](#), and others. Countries prioritizing ESG policies enjoy prosperity by increasing higher innovation level; minimizing financial scandal leads greater impacts on economic growth. [Diyal et al. \(2022\)](#) illustrates that ESG-driven economies attract investors significantly which inflows the capital fund for sustainable development in countries that foster economic resilience. ESG is not only for ethical consideration but also an economic driver for countries. Conversely, the adoption of ESG policies increases a short-term implementation cost like: regulatory compliance, Rule of Law, sustainable technologies which may slowdown economic progress of countries. Likewise, rapid economic growth may lead to environmental degradation by increased in pollution and resource depletion, as noted by [Grisales and Aguilera-Caracuel \(2019\)](#). [Friede et al. \(2015\)](#) have found insignificant impact over economic growth. The interplay of various factors, including technological advancements, policy interventions, societal values, and levels of development.

The study emphasizes the importance of balancing ESG Performance with economic Growth, and shows the role of environment by heading towards digitalization, use of renewable energy, Renewable electricity, Combustible renewables and waste leads to reduce carbon emission, footprints, a role shows by social encouraging participating school from an early age like school enrollment at primary to secondary, Life expectancy, employment provides opportunity to transpose towards society and governance shows an aware about financial risk to protect from too big to fail countries by controlling of corruption, Political stability and rule of law.

Additionally, the study finds that the long-term benefits of ESG performance on economic growth are influenced by Resource Dependency, Institutional, and Technology Adoption theories. These theories explain the delay in realizing economic benefits from ESG improvements due to factors like initial investments and the strength of governance structures. Policymakers are thus encouraged to prioritize sustainable infrastructure, human capital, and institutional reforms tailored to their specific contexts. For instance, Nepal can leverage its renewable energy potential and eco-tourism to drive sustainable economic growth while preserving its natural heritage. Comparative analysis with other Asian countries provides valuable insights for strategic policy-making. By learning from Nepal's focus on sustainable energy and eco-tourism, other countries can develop tailored strategies that harness their unique strengths and resources. This synthesis of previous studies and country-specific experiences offers a robust framework for policymakers to design effective interventions that promote long-term economic prosperity and environmental sustainability in the region.

Conclusion

This study, covering 46 Asian countries from 1990 to 2022, highlights the relationship between Environmental, Social, and Governance (ESG) performance and economic growth, measured by GDP per capita. While the short-term effects of ESG improvements on economic output may not be immediately evident, the findings reveal a positive long-term correlation. Notably, in 10 countries including Azerbaijan, Bangladesh, Cyprus, Iraq, Myanmar, Pakistan, Syria,

Timor-Leste, Turkmenistan and the UAE ESG performance exhibits a short-term positive impact, showing the potential for early economic benefits in certain contexts. These results emphasize the gradual and cumulative advantages of ESG adoption, reinforcing the need for policymakers to balance short-term economic challenges with long-term sustainability goals. While ESG improvements may not instantly translate into higher GDP per capita across all nations, they are vital for fostering sustainable economic growth. The impact of ESG performance is highly context-dependent. While some countries' economy responses immediately upon ESG adoption, others may only experience this change in long-run as structural changes take effect. Understanding these variations is crucial for policy design, investment strategies, and sustainable development planning. Finally, the findings emphasize the necessity of embedding ESG considerations into policymaking and decision-making processes to cultivate resilient and sustainable economies across Asia, ensuring prosperity for present and future generations.

Authors Contribution

Conceptualization: T. BS., A. B. *Data curation:* P. DD., A. B.; T BS; *Formal analysis:* P. DD., A. B.; T. BS; *Investigation:* P. DD., A. B.; T. BS; *Methodology:* A. B.; T. BS; *Supervision:* P. DD.; T BS; *Validation:* T. BS; *Software:* P. DD.; A. B.; *Writing – original draft:* P. DD., A. B.; T. BS.; *writing – review & editing:* T BS.; P. DD.

Conflicts of Interest

Authors declare no conflict of interest

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