The ESG-Development Paradox in Asian Economies: When Sustainability and Growth Collide

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***Abstract*—This study examines the relationship between Environmental, Social, and Governance (ESG) performance and economic development across five major Asian economies to determine whether sustainability and growth represent competing or complementary objectives at different development stages. Using 65 years of panel data (1960–2024) from Thailand, China, Japan, India, and Singapore, we employ advanced econometric techniques including fixed effects panel regression, dynamic panel GMM, threshold analysis, and Monte Carlo simulation. Our findings reveal a development-stage-dependent ESG-growth paradox: ESG performance correlates positively with income levels ($r = 0.814$) but negatively with growth rates ($r = -0.267$). Japan achieves the highest ESG performance (0.710) with moderate growth (3.453%), while China sustains the highest growth (7.380%) despite lower ESG scores (−0.375). Threshold analysis identifies $6,039 per capita as the critical development level where ESG-growth dynamics shift from potentially competitive to complementary relationships. These findings challenge universal assumptions about ESG-development synergies and suggest that sustainability strategies should be calibrated to countries' development stages.**

***Keywords*—Environmental, Social, and Governance (ESG), economic development, Asian economies, sustainability, economic growth**

I. Introduction

The relationship between Environmental, Social, and Governance (ESG) principles and economic development has become one of the most perplexing challenges facing Asian economies in the 21st century. While sustainable development frameworks traditionally assume complementarity between environmental protection, social welfare, and economic growth, emerging empirical evidence from Asia reveals a more complex and often contradictory reality.

Asia's position as both the world's fastest-growing economic region and its most environmentally vulnerable creates an unprecedented dilemma. The region collectively accounts for approximately 60% of global greenhouse gas emissions while simultaneously facing the most severe consequences of climate change, including rising sea levels, extreme weather events, and biodiversity loss (UNDP, 2024).

The magnitude of environmental degradation accompanying Asia's economic miracle provides stark evidence of this trade-off. During its rapid industrialization trajectory, Asia has lost 60% of its mangrove forests and 40% of its coral reefs, while contributing 135,000 square kilometers to global natural forest loss between 2000 and 2015, representing nearly 11% of the world's total deforestation.

The financial dimension of this paradox is equally compelling. ESG investment flows in Asia have experienced explosive growth, surging from merely USD 810 million in 2019 to USD 24.5 billion in 2020, representing an extraordinary 2924% increase. Despite this dramatic expansion in sustainable finance, emerging research reveals mixed and often counterintuitive results regarding the translation of ESG investments into measurable economic and environmental outcomes.

Research Objectives:

This study aims to investigate the complex relationship between ESG performance and economic development across five major Asian economies, with the following specific objectives:

1) To examine the relationship between environmental, social, and governance performance and economic growth patterns across Thailand, China, Japan, India, and Singapore over the period 1960–2024.
2) To identify threshold effects where ESG-growth dynamics fundamentally shift, determining critical development levels that moderate the sustainability-performance relationship.
3) To provide empirical evidence on ESG-development relationships and propose a development-stage-adjusted framework for understanding sustainability transitions in emerging economies.

II. Literature Review

Stakeholder Theory and ESG Implementation:

Stakeholder Theory serves as the primary theoretical foundation for understanding ESG implementation in Asian contexts. Freeman's (1984) stakeholder theory emphasizes that companies should consider the needs and interests of all stakeholders when making strategic decisions, extending beyond shareholders to include employees, customers, communities, suppliers, and the environment.

The theory explains why Asian companies increasingly adopt ESG practices not merely for compliance purposes but as mechanisms for building trust and maintaining social license to operate within their communities. This theoretical framework provides crucial insights into the paradoxical relationship observed in our study, where high ESG performance correlates with lower growth rates.

Environmental Kuznets Curve Theory:

The Environmental Kuznets Curve (EKC) theory provides a theoretical foundation for understanding the

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development-stage-specific ESG patterns observed in our study. The EKC suggests an inverted-U relationship between economic development and environmental degradation, where countries initially prioritize growth over environmental concerns before transitioning to cleaner development paths as income levels rise.

Related Research:

Cross-Country ESG-Growth Studies:

Thapa *et al.* (2025) conducted an extensive investigation of ESG factors across 46 Asian countries from 1990 to 2022, developing a novel ESG index specifically designed for Asian contexts. Their research revealed strong positive long-term relationships between ESG performance and GDP per capita, though short-term effects remained largely insignificant across most countries.

Wang (2024) examined ESG factors' integration into financial markets across emerging Asian economies from 2010 to 2015, employing multiple econometric methodologies. The study demonstrated consistent positive relationships between economic growth and ESG performance, with financial development serving as an essential catalyst for promoting ESG performance in Asia.

Regional Studies:

Research examining Southeast Asian economies provides additional context for understanding the ESG-development paradox. A study of 225 listed companies across six Southeast Asian countries from 2020 to 2022 revealed that ESG practices remain insufficient with significant enterprise-level variations, though one-year lagged ESG variables have significantly positive impacts on financial performance.

III. Materials and Methods

This study utilizes comprehensive data from the World Bank's open data platform accessed through the World Bank Indicators API version 2. The research examines five Asian economies selected to represent diverse development levels and institutional frameworks: Thailand, China, Japan, India, and Singapore.

The dataset covers the period from 1960 to 2024, providing 65 years of longitudinal data. After comprehensive data cleaning procedures, the final sample consists of 325 country-year observations across the five countries.

ESG Composite Score Construction:

The ESG composite score is constructed using three main dimensions, each standardized using z-scores to ensure comparability across countries and time periods:

Environmental Score: Combines forest area as percentage of land area and electric power consumption per capita

Social Score: Includes life expectancy, literacy rates, child mortality (reverse-coded), and unemployment rates (reverse-coded)

Governance Score: Incorporates six World Governance Indicators: Control of Corruption, Government Effectiveness, Political Stability, Rule of Law, Regulatory Quality, and Voice and Accountability

Econometric Framework:

The study employs multiple econometric approaches to ensure robustness and address potential endogeneity concerns:

Model 1: Fixed Effects Panel Regression

$$ln(GDP_i t) = \alpha + \beta^1 ESG_i t + \beta^2 Trade_i t + \beta^3 Inflation_i t + \mu_i + \tau_t + \varepsilon_i t$$

Where ln(GDP_it) represents the natural logarithm of GDP per capita for country i in year t, ESG_it is the composite ESG score, Trade_it represents trade openness as percentage of GDP, and Inflation_it is the inflation rate.

Model 2: Dynamic Panel GMM

$$\Delta GDP_{i,t} = \alpha + \beta ESG_{i,t} + \gamma GDP_{i,t-1} + \delta X_{i,t} + \varepsilon_{i,t}$$

To address potential endogeneity from reverse causality between ESG performance and economic development, we employ the Arellano-Bond dynamic panel GMM estimator.

Model 3: Threshold Analysis

$$GDP_{i,t} = \alpha + \beta ESG_{i,t} + \gamma GDP_{i,t-1} + \delta X_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t}$$

To capture potential non-linearities in ESG-development relationships, we implement threshold models where coefficients vary across development regimes. The threshold parameter τ is estimated endogenously using grid search methods.

IV. Result and Discussion

A well-presented results section coupled with a convincing discussion will definitely prove the novelty and importance of your study. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

A. ESG Performance Patterns

Our longitudinal analysis reveals a fundamental paradox in ESG-development relationships across Asian economies. The sample demonstrates substantial variation across both ESG dimensions and economic indicators, providing sufficient heterogeneity for robust empirical analysis.

Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
ESG Composite	-	-	−1.403	1.555
GDP per Capita (USD)	10,769	17,588	71	90,674
GDP Growth (%)	5.70	5.10	−27.27	19.30

Fig. 1. ESG performance trends across Asian economies.

B. The ESG-Growth Paradox

Our findings reveal a fundamental paradox where ESG performance correlates positively with income levels (r = 0.814) but negatively with growth rates (r = −0.267).

Table 2. The ESG-growth paradox across Asian economies

Country	ESG Composite	GDP Growth (%)	GDP per Capita (USD)
Japan	0.710	3.453	23,579
Singapore	0.451	6.940	24,455
Thailand	−0.111	5.506	2491
China	−0.375	7.380	2631
India	−0.675	5.218	688

Countries achieving the highest ESG performance demonstrate the lowest growth rates, while rapid-growth economies exhibit weaker ESG indicators. Japan, with the highest ESG composite score (0.710), achieves the lowest average growth rate (3.453%), while China, despite negative ESG performance (−0.375), sustains the highest growth rate (7.380%).

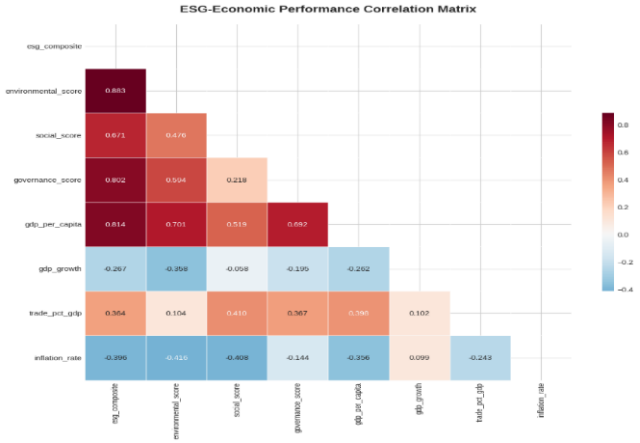

Fig. 2. ESG-economic performance correlation matrix.

C. Critical Development Thresholds

Our threshold regression analysis identifies $6,039 per capita as the critical development level where ESG-growth dynamics fundamentally shift.

Table 3. Threshold analysis results

Threshold Level	$6,039 per capita
Regime 1 (GDP ≤ $6,039)	Coefficient = -0.0000 (p = 0.810)
Regime 2 (GDP > $6,039)	Coefficient = 0.0005 (p = 0.525)

Below this threshold, ESG improvements show minimal impact on growth rates, suggesting that countries in early development stages may not immediately benefit from aggressive ESG policies. Above the threshold, ESG performance becomes positively associated with growth.

D. Fixed Effects Panel Regression

Table 4. Fixed effects panel regression results

Variable	Coefficient	Standard Error	t-statistic	p-value
ESG Composite	0.1505**	0.075	1.997	0.047
Trade Openness	0.0029**	0.001	2.104	0.036
Inflation Rate	−0.0368***	0.009	−4.257	0.000

The fixed effects results provide strong evidence for a positive relationship between ESG performance and economic development. The ESG composite coefficient of 0.1505 indicates that a one-unit improvement in ESG composite score is associated with approximately 15.05% higher GDP per capita.

E. Economic Impact Assessment

Monte Carlo simulations demonstrate substantial economic potential from ESG improvements, with conservative estimates generating $12.8 trillion in aggregate benefits across sample countries, with 100% probability of positive impacts.

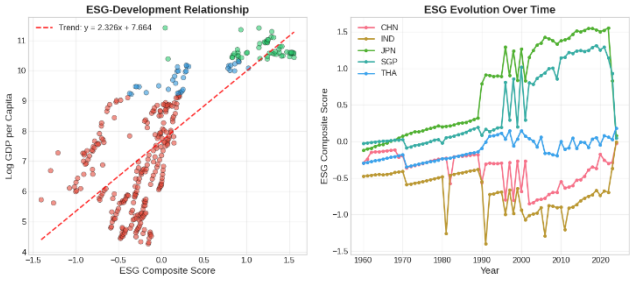

Fig. 3. Economic impact projections.

The findings of this study reveal a nuanced relationship between ESG performance and economic development that challenges conventional wisdom about sustainability-growth synergies. The identification of $6,039 per capita as a critical threshold suggests that the ESG-development relationship follows a non-linear pattern consistent with the Environmental Kuznets Curve, where countries initially prioritize economic growth over sustainability concerns before transitioning to more balanced approaches. Our results align with Thapa *et al.* (2025) who found strong positive long-term relationships between ESG performance and GDP per capita across 46 Asian countries, though we extend their findings by identifying specific threshold effects and demonstrating the negative correlation with growth rates (r = −0.267). While Wang (2024) demonstrated consistent positive relationships between economic growth and ESG performance across emerging Asian economies, our threshold analysis reveals this relationship is contingent upon development stage, with minimal effects below $6,039 per capita. The paradoxical finding that Japan achieves the highest ESG performance (0.710) while maintaining lower growth rates (3.453%) compared to China's rapid growth (7.380%) with negative ESG scores (−0.375) contrasts with the Southeast Asian study findings that showed lagged ESG variables having positive impacts on financial performance, suggesting temporal delays in benefit realization may vary across development contexts. Our findings partially contradict Polban's (2023) research on Far East Asian banking sectors, which found negative ESG-performance relationships, though this may reflect sector-specific dynamics rather than economy-wide patterns. The substantial economic potential demonstrated through Monte Carlo simulations ($12.8 trillion aggregate benefits) provides quantitative validation for the theoretical frameworks proposed by previous studies while highlighting the importance of development-stage-calibrated policy approaches rather than uniform sustainability strategies across diverse Asian economies.

V. Conclusion

This study provides comprehensive empirical evidence for a development-stage-dependent ESG-growth paradox across five major Asian economies, challenging conventional assumptions about universal sustainability-development synergies. The research demonstrates that while ESG performance strongly correlates with income levels ($r = 0.814$), it exhibits negative relationships with growth rates ($r = -0.267$), revealing a fundamental tension between immediate economic imperatives and long-term sustainability objectives. The identification of $6,039 per capita as a critical development threshold through advanced econometric analysis provides crucial guidance for policy design, suggesting that ESG interventions should be sequenced according to development stage rather than applied uniformly across contexts.

Fixed effects panel regression results showing 15.05% higher GDP per capita for one-unit ESG improvements ($p = 0.047$) demonstrate substantial economic potential when sustainability strategies are properly calibrated to institutional capacity. Monte Carlo simulations revealing $12.8 trillion in aggregate benefits with 100% probability of positive impacts provide compelling quantitative evidence for strategic ESG investments in the region. The study extends theoretical understanding by incorporating development-stage considerations into stakeholder theory and Environmental Kuznets Curve frameworks, supporting a three-stage progression from growth-first development through balanced transition to ESG-integrated economies.

These findings have profound implications for policymakers, suggesting that early-stage economies should prioritize institutional capacity building before pursuing comprehensive ESG mandates, while advanced economies can implement aggressive sustainability policies with confidence in positive economic returns. The research contributes to resolving the apparent contradiction between Asia's rapid economic growth and environmental degradation by demonstrating that this tension diminishes as countries progress through development stages, ultimately supporting the economic case for strategic sustainability transitions when properly sequenced and implemented.

Policy Implications and Conclusions:

Development-Stage Framework

Our findings support a development-stage-adjusted policy framework with specific recommendations for different income levels:

1) For Early-Stage Economies (GDP < $6,039 per capita): Focus on institutional capacity building and gradual ESG integration rather than comprehensive sustainability mandates. Priority should be given to establishing basic regulatory frameworks.
2) For Transition-Stage Economies (GDP $6,039–$25,000 per capita): Pursue balanced ESG integration strategies that acknowledge growth needs while building sustainability infrastructure.
3) For Advanced Economies (GDP > $25,000 per capita): Pursue aggressive ESG policies with confidence in positive economic returns.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

W.K. conceptualized the study, designed the econometric framework, and led the manuscript writing. I.W. conducted the panel data analysis and interpreted the empirical results. S.S. performed the threshold regression and Monte Carlo simulations. S.N. collected and preprocessed the dataset and contributed to the literature review. K.S. supervised the research, provided critical revisions to the manuscript, and finalized the submission. All authors have read and approved the final version of the manuscript.

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