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Sustainability's Impact of ESG-Infused Policies on Leading Economic Indicators in Asian Economies

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ABSTRACT

This study examines the correlation between Environmental, Social, and Governance (ESG) practices and important economic indicators by specifically examining the Consumer Confidence Index (CCI) and Stock Market Returns (SMR) in five Asian countries: Japan, Korea, India, China, and Malaysia. This study used panel data and quantile regression analysis to examine the heterogeneity of ESG effects from 2010 to 2023. The study finds that these impacts are both statistically significant and vary substantially across economic outcomes. Investments in renewable energy have a significant impact on economic indices, highlighting the strategic significance of ESG factors in both corporate and economic domains. The study also shows that increased carbon emission intensity has a negative effect on both consumer confidence and market performance, highlighting the increasing significance of environmental factors in economic decision-making. These results provide detailed and sophisticated knowledge of the economic effects of ESG in Asia. They provide practical insights that can be utilised by policymakers and business management dedicated to achieving sustainable development. This study enhances stakeholder theory by demonstrating the tangible significance of ESG variables to a wide range of stakeholders beyond shareholders.

KEYWORDS: environmental; social; governance; consumer confidence index; stock market returns; Asian ESG; ESG

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INTRODUCTION

The integration of ESG factors into corporations' and economies' strategic frameworks is a salient theme in modern finance and economic research. Grounded in the theoretical constructs provided by stakeholder theory, which posits that long-term corporate success requires satisfying a broad array of stakeholders beyond shareholders Freeman [1], there is a compelling argument for the role of ESG practices in enhancing economic resilience and performance. Nonetheless, empirical evidence relating specific ESG components to key economic indicators, such as CCI and SMR, remains relatively underexplored, particularly in Asian economies.

The stakeholder theory supports the integration of ESG practices as crucial to corporate sustainability and financial success, suggesting that companies that engage in ethical practices enjoy long-term success [1,2]. Nonetheless, while broader applications of ESG factors to corporate performance have been explored [3,4], research examining specific ESG aspects on real-time economic indicators in Asia is lacking. This study seeks to fill this gap by providing empirical data on how ESG factors impact the economic indices in this region.

Research has noted the aggregate benefits of environmental and social policies on corporate and national scales, such as an enhanced reputation and operational efficiency [5,6]. Nevertheless, there is a scarcity of studies exploring how these benefits translate into improvements in consumer confidence and market performance, particularly in non-Western contexts [7,8]. The relationship between governance practices and economic performance, as suggested by agency theory, emphasises the importance of governance mechanisms in reducing discrepancies between shareholders and management's interests, thus potentially improving market returns [9]. Nonetheless, the specific effects of governance reforms on stock market volatility and consumer confidence indices remain inadequately addressed [10,11].

Existing literature has predominantly highlighted the long-term financial returns associated with ESG compliance, often overlooking how these policies affect real-time economic indicators, such as the CCI and SMR [3,4]. The few studies that explore these relationships tend to rely on broad aggregated data, which obscures the nuanced ways in which individual ESG components interact with economic dynamics at the national level [12,13].

This lack of detailed analysis is particularly pronounced in Asian markets, where ESG adoption and its economic impacts can vary greatly because of differing regulatory environments, cultural examinations, and stages of economic development [8,14]. Moreover, while some studies suggest a positive relationship between ESG practices and market performance, they do not adequately address how or why these effects occur, nor do they examine the immediate impacts on consumer confidence and investor behaviour, which are critical for short-term economic planning and response strategies [7,15]. This study seeks to address these shortcomings by focusing on the specific, immediate effects of ESG policies on these leading economic indicators.

Therefore, this research aims to examine how distinct ESG investments affect CCI and SMR across Asian economics. Each country has unique economic dynamics and ESG adoption levels, making them ideal for comparative studies. The research underscores the necessity of integrating sustainability into corporate and economic strategies, demonstrating that renewable energy investments, reduced carbon emissions, and strong governance frameworks significantly enhance economic resilience, market performance, and investor confidence. It

reveals that these sustainable practices not only mitigate environmental risks but also drive economic growth by attracting sustainable investments and fostering consumer trust. These findings highlight that sustainability is crucial for long-term economic stability and competitiveness, urging policymakers and business leaders to prioritize ESG factors in their economic development plans to ensure a prosperous and sustainable future. This study contributes to the nuanced understanding of ESG's economic impact in Asia by offering valuable insights for policymakers and investors aimed at fostering sustainable economic growth.

LITERATURE REVIEW

Underlying Theory: Stakeholder Theory

Stakeholder theory, articulated by [1], fundamentally reorients corporate objectives by suggesting that successful businesses depend on their ability to manage relationships with a diverse array of stakeholders and not merely shareholders. This paradigm asserts that stakeholders, including employees, customers, suppliers, and community groups, hold vested interests in corporations' operational outcomes, thereby influencing their strategic decisions and long-term viability [16]. The core proposition of stakeholder theory is that long-term value creation is best achieved through a strategy that harmonises the interests of all stakeholders. This approach challenges the traditional shareholder primacy model, which prioritises short-term profits and shareholder returns over other considerations [17]. Stakeholder theory advocates a broader scope of management accountability, emphasising ethical governance that integrates the interests of all stakeholders into the decision-making process [2].

Research indicates that firms engaging comprehensively with their stakeholder networks often achieve superior sustainability outcomes, which in turn drives financial performance [18,19]. For instance, environmental policies that reduce a firm's carbon footprint can mitigate regulatory risks and enhance its reputation among consumers and investors [20]. Despite these findings, there remains a significant gap in empirical evidence linking specific ESG components to key economic indicators, such as the CCI and SMR, especially in the context of Asian economies. This study aims to fill this gap by providing empirical data on how ESG factors impact the economic indices in Japan, Korea, India, China, and Malaysia.

Stakeholder theory guides this study by hypothesising that enhanced ESG practices, recognised and valued by a broad array of stakeholders, will positively influence economic indicators. This hypothesis rests on the premise that stakeholder perceptions, particularly in culturally and economically diverse regions such as Asia, play a critical role in shaping market dynamics and consumer behaviour [21]. By focusing on specific

aspects of ESG (environmental initiatives, social welfare policies, and governance structures), this study explores how these elements are perceived and valued differently across stakeholders in Asian economics and how they subsequently affect economic indicators.

The specificity of this approach allows for a detailed investigation of the immediate effects of ESG policies on consumer confidence and market performance. While previous studies have noted the aggregate benefits of environmental and social policies on corporate and national scales [5,6], few studies have examined how these benefits translate into real-time economic indicators, particularly in non-Western contexts [7,8]. Furthermore, the relationship between governance practices and economic performance, as suggested by agency theory, has been inadequately addressed in terms of stock market volatility and consumer confidence indices [10,11].

This study leverages Stakeholder Theory to address these gaps by examining the specific and immediate impacts of ESG policies on leading economic indicators in distinct Asian contexts. By doing so, it provides a nuanced understanding of ESG's economic impact, offering valuable insights for policymakers and corporate managers focusing on sustainable growth. These findings reinforce the theoretical framework of Stakeholder Theory by demonstrating the material relevance of ESG factors to a broad array of stakeholders, thereby contributing to a more comprehensive understanding of how ethical governance and sustainable practices can drive economic resilience and performance.

ESG-Infused Policies in Asian Economics

Environmental concerns, particularly in rapidly industrialising nations such as China and India, have drawn significant scholarly attention. Although robust environmental policies are linked to improved operational efficiency and financial performance [22,23], their broader economic impacts remain underexplored. Renewable Energy Investment (% GDP) and Carbon Emission Intensity (Metric Tons of CO_2 per GDP) are crucial metrics for assessing environmental sustainability. [3] correlate renewable energy investments with national energy efficiency and GDP growth. Further emphasise that reducing carbon emissions can enhance market perceptions and investor confidence [12]. Nonetheless, the immediate economic impacts of these environmental policies require more critical evaluation to understand their real-time effects on broader economic indicators.

Corporate Social Responsibility (CSR) encompasses a company's ethical obligation to positively impact society through improved labor practices, community engagement, and environmental sustainability [24]. These initiatives are crucial for enhancing employee morale, productivity, and brand loyalty, demonstrating a company's commitment to ethical business practices. However, while CSR's broader benefits are well-recognized, its direct influence on critical economic indicators such as consumer

confidence remains underexplored, highlighting a gap in understanding the full economic impact of CSR [25]. Social governance, including labour practices and community engagement, is another critical area. The authors highlight the positive effects of CSR initiatives on employee morale, productivity, and brand loyalty [26,27]; the direct impact on economic indicators, such as consumer confidence, is less documented. The Labour Standards Compliance Index (%) and Social Welfare Spending (% of Government Budget) are key indicators of social responsibility. Enhanced labour standards are linked to better productivity and corporate performance [4], and increased social welfare spending can boost consumer confidence and domestic consumption [28]. Nonetheless, the causal relationships between these social policies and economic outcomes require more rigorous analysis to clarify their effectiveness.

Governance in Asian corporations, particularly in Japan and Singapore, has been extensively studied in terms of corporate transparency and accountability. Enhanced governance structures are associated with better risk management and stable foreign investments [29,30]. The ESG Disclosure Score and Regulatory Quality Index are proxies for governance robustness. High ESG disclosure scores are linked to reduced capital costs and increased shareholder value [10,11]. The Regulatory Quality Index, as highlighted by Kaufmann [28], assesses policy efficiency and enforcement, directly impacting business operations and investment. Despite these insights, a more critical approach is needed to dissect the causal pathways between governance improvements and specific economic outcomes, such as SMR, to provide a more nuanced understanding of the impacts of governance on economic stability and growth.

METHODOLOGY

Data and Sampling

The study sources its data from renowned institutions, including S&P IQ Capital, Thomson Reuters, the Department of Statistics, and the World Bank, ensuring utmost reliability. Covering the period from 2010 to 2023, this comprehensive timeframe facilitates a thorough examination of ESG by using EViews 14, Stata 18 and Python. The period 2018–2023 is chosen due to the availability of comprehensive ESG data for all five Asian economies over the past five years. This timeframe ensures the study captures current trends and impacts, allowing for a robust analysis of ESG policies' effects on economic indicators in the context of recent significant events, including the COVID-19 pandemic. Each variable received meticulous attention, with Renewable Energy Investment and Carbon Emission Intensity sourced from the Department of Statistics and the World Bank, respectively. The Labour Standards Compliance Index and Social Welfare Spending data originate from the World Bank, while ESG Disclosure Score and Regulatory Quality Index metrics stem from S&P IQ Capital and Thomson Reuters. In this study, we selectively analyse five

distinct Asian economies—Japan, Korea, India, China, and Malaysia—each emblematic of unique economic dynamics and ESG adoption levels in Japan, ranked 5th in the Corporate Governance Index, exemplifying high standards in governance practices within developed Asian markets and providing a mature backdrop for evaluating governance impacts on economic indicators.

Instrumentations and Variables

Table 1 provides the measurements of the variables used in this study to assess the integration and impact of ESG factors across different Asian economies using a set of meticulously defined variables.

Table 1. Measurement of variables.

Variable	Description	Measurement	Relevant Literature	Source
		Environment		
Renewable Energy Investment	Measures the investment in renewable energy as a percentage of GDP.	$REI_{i,t} = \frac{Investment\ in\ Renewable\ Energy_{i,t}}{GDP_{i,t}} \times 100$	[3]	Department of Statistics, World Bank
Carbon Emission Intensity	Captures the amount of CO_2 emissions per unit of GDP.	$CEI_{i,t} = \frac{Investment\ in\ Renewable\ Energy_{i,t}}{GDP_{i,t}} \times 100$	[12]	Department of Statistics, World Bank
		Social		
Labour Standards Compliance Index	Indicates the extent to which labour standards are implemented and complied with in a country.	$LSCI_{i,t} = \frac{\sum Compliance\ Score_{i,t}}{Number\ of\ Evaluations_{i,t}}$	[4,26]	World Bank
Social Welfare Spending	Reflects the percentage of the government budget allocated to social welfare programs.	$SWS_{i,t} = \frac{Social\ Welfare\ Spending_{i,t}}{Total\ Government\ Budget_{i,t}}$	[27]	World Bank

Table 1. *Cont.*

Variable	Description	Measurement	Relevant Literature	Source
		Governance		
ESG Disclosure Score	Evaluates the quality and extent of disclosure regarding ESG practices by companies.	$EDS_{i,t} = \frac{Social\ Welfare\ Spending_{i,t}}{Total\ Relevant\ ESG\ Factors_{i,t}}$	[11]	S&P IQ Capital, Thomson Reuters
Regulatory Quality Index	Assesses the ability of the government to formulate and implement sound policies and regulations.	$RQI_{i,t} = \frac{Positive\ Government\ Indicators_{i,t}}{Total\ Government\ Indicators_{i,t}}$	[30,31]	World Bank
		Leading Economics		
Consumer Confidence Index	Measures the degree of consumer confidence in economic activity, a predictor of consumer spending and economic trends.	$CCI_{i,t} = \frac{CCI_{i,t} - CCI_{i,t-1}}{CCI_{i,t-1}} \times 100$	[32,33]	Organisation for Economic Co-operation and Development (OECD)
Stock Market Returns	Reflects the overall performance of the stock market, an indicator of economic health and investor sentiment.	$SMR_{i,t} = \frac{Index_{i,t} - Index_{i,t-1}}{Index_{i,t-1}} \times 100$	[34]	S&P IQ Capital, Thomson Reuters

Note: In the table, t represents the current time period, and $t-1$ represents the previous time period. Source: Author's compilation.

Panel Data and Quantile Regressions

Panel data, a robust statistical tool, are integral to the analysis in our study because of their capacity to incorporate multiple dimensions of data across both entities and time. Additionally, the longitudinal nature of panel data helps to understand the temporal dynamics and potential causal relationships between ESG practices and economic indicators while providing a more comprehensive understanding of both cross-sectional and intertemporal variations within the data. The panel data regression was formulated as follows:

For CCI:

$$CCI_{i,t} = \beta_0 + \beta_1 REI_{i,t} + \beta_2 CEI_{i,t} + \beta_3 LSCI_{i,t} + \beta_4 SWS_{i,t} + \beta_5 EDS_{i,t} + \beta_6 RQI_{i,t} + \varepsilon_{i,t} \quad (1)$$

For SMR:

$$SMR_{i,t} = \alpha_0 + \alpha_1 REI_{i,t} + \alpha_2 CEI_{i,t} + \alpha_3 LSCI_{i,t} + \alpha_4 SWS_{i,t} + \alpha_5 EDS_{i,t} + \alpha_6 RQI_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where i represents the country and t represents the time period. $\varepsilon_{i,t}$ is the error terms, capturing the idiosyncratic shocks to each model that cannot be explained by the independent variables.

In this study, quantile regression was employed to examine the differential impact of ESG factors on the CCI and SMR across various quantiles, providing a nuanced view of how ESG may vary across five specific quantiles: 10th, 25th, 50th, 75th, and 90th percentiles. This method allows for a more detailed exploration of the conditional distributions of CCI and SMR rather than merely estimating the mean effects, as is typical in ordinary least squares (OLS) regression.

For the CCI across different quantiles τ:

$$Q_{CCI_{i,t}}(\tau|X_{i,t}) = \beta_0(\tau) + \beta_1(\tau)\cdot REI_{i,t} + \beta_2(\tau)\cdot CEI_{i,t} + \beta_3(\tau)\cdot LSCI_{i,t} + \beta_4(\tau)\cdot SWS_{i,t} + \beta_5(\tau)\cdot EDS_{i,t} + \beta_6(\tau)\cdot RQI_{i,t} + \varepsilon_{i,t}(\tau) \quad (3)$$

For SMR across different quantiles τ:

$$Q_{SMR_{i,t}}(\tau|X_{i,t}) = \alpha_0(\tau) + \alpha_1(\tau)\cdot REI_{i,t} + \alpha_2(\tau)\cdot CEI_{i,t} + \alpha_3(\tau)\cdot LSCI_{i,t} + \alpha_4(\tau)\cdot SWS_{i,t} + \alpha_5(\tau)\cdot EDS_{i,t} + \alpha_6(\tau)\cdot RQI_{i,t} + \varepsilon_{i,t}(\tau) \quad (4)$$

The indices i and t represent the countries and time periods considered, respectively, incorporating both spatial and temporal variations into the model. The matrix $X_{i,t}$ encapsulates the ESG factors for each country i at each time t, which serve as independent variables in the quantile regression models. The coefficients $\beta(\tau)$ for the CCI and $\alpha(\tau)$ for SMR are estimated at specific quantiles (τ) reflecting the 10th, 25th, 50th, 75th, and 90th percentiles to examine the impact of the ESG factors at different distribution points.

DATA ANALYSIS AND FINDINGS

Descriptive Statistics

Table 2 shows the descriptive statistics of the variables. Renewable Energy Investment, with a mean of 2.534 and a closely aligned median of 2.500, displays minimal variability, as evidenced by a standard deviation of 0.821. This suggests a relatively stable investment climate across the observed Asian economies, with a skewness of 0.205 and a kurtosis of 2.973, indicating a symmetric and slightly peaked distribution characteristic of consistent policy enforcement in the renewable energy sectors. Conversely, Carbon Emission Intensity reveals a broader spread in data with a standard deviation of 30.542, despite a mean of 350.467 and a median near 348.900, signifying substantial discrepancies in emissions among countries. This is further highlighted by the skewness of 0.500, suggesting a distribution with a pronounced right tail where a few countries may lag in implementing effective emission controls. On the economic front, CCI and SMR are critically examined; CCI shows a mean of 102.543 with a median almost identical at 102.500 and a standard deviation of 12.467, indicating diverse consumer sentiments. The SMR, with a mean of 8.432 and a median of 8.400, coupled with a standard deviation of 4.321 and skewness of 0.511, indicates occasional high returns with high mean value. This return volatility underscores the impact of external and internal market dynamics, including investor behavior and economic policies, on stock market performance.

Table 2. Descriptive statistics.

Variable	Mean	Median	Std Dev	Skewness	Kurtosis
Renewable Energy Investment	2.534	2.500	0.821	0.205	2.973
Carbon Emission Intensity	350.467	348.900	30.542	0.500	2.657
Labour Standards Compliance Index	75.321	75.500	10.234	−0.045	2.408
Social Welfare Spending	15.867	15.800	3.452	0.100	3.201
ESG Disclosure Score	65.234	65.000	8.987	0.212	2.845
Regulatory Quality Index	55.765	56.000	9.876	−0.321	2.890
Consumer Confidence Index	102.543	102.500	12.467	−0.109	2.771
Stock Market Returns	8.432	8.400	4.321	0.511	3.765

Source: Author's Compilation.

Pearson Correlation Analysis

Table 3 shows the Pearson correlation analysis. This study shows that Renewable Energy Investment positively correlates with SMR (r = 0.407), suggesting that sustainable energy investments boost market confidence. Conversely, higher Carbon Emission Intensity negatively impacts the CCI (r = −0.347), indicating that environmental concerns may dampen economic optimism. Additionally, strong correlations between compliance with labour standards and social welfare spending with other economic indicators highlight that robust social governance enhances consumer confidence through perceived stability and fairness.

Table 3. Pearson correlation analysis.

Variable	REI	CEI	LSCI	SWS	EDS	RQI	CCI	SMR
REI	1.000							
CEI	−0.312	1.000						
LSCI	0.245	−0.209	1.000					
SWS	0.158	−0.125	0.637	1.000				
EDS	0.271	−0.143	0.552	0.423	1.000			
RQI	0.180	−0.165	0.590	0.475	0.689	1.000		
CCI	0.389	−0.347	0.448	0.509	0.531	0.613	1.000	
SMR	0.407	−0.261	0.416	0.345	0.498	0.572	0.687	1.000

Source: Author's Compilation.

ESG-Infused Policies on CCI and SMR

Table 4 presents the panel data regression results examining the effects of ESG-infused policies on the CCI and SMR. Using EViews 12, the Hausman test results, ranging from 0.002 to 0.042 across the models, suggest a preference for the fixed-effects specification over random effects, affirming the importance of controlling for unobservable individual heterogeneity. The Chow test, with *p*-values as low as 0.001 and not higher than 0.039, indicated significant differences across groups, underscoring the heterogeneity of ESG impacts across different countries. The LM test statistics, which notably varied from 0.230 to 0.410, highlight the presence of significant country-specific effects, again reinforcing the fixed-effects model choice. White's test, with values between 0.014 and 0.413, primarily suggests heteroskedasticity within the dataset, implying that the variance across observations is nonconstant. Thus, robust standard errors may be

required to ensure the consistency of the coefficient estimates. Finally, the Pesaran Scaled Test and Pesaran CD Test, with p-values extending from 0.171 to 0.555 and 0.267 to 0.481, respectively, are indicative of cross-sectional dependence.

This study delineates the impact of ESG factors on the CCI for each Asian economy. In Japan, Renewable Energy Investment has a positive effect on CCI, as evidenced by a coefficient of 0.023, which is significant at the 10% level, suggesting a burgeoning recognition among consumers of the benefits of sustainable energy initiatives. Conversely, Carbon Emission Intensity shows an adverse impact, with a coefficient of −0.015, which is significant at the 5% level, implying consumer concern over environmental health.

In Korea, both the Labor Standards Compliance Index and the Regulatory Quality Index exhibit statistically significant positive relationships with CCI, with coefficients of 0.037 and 0.056, respectively, and significance at the 5% and 1% levels. This underscores a substantial consumer confidence response to robust labour standards and governance structures. India's REI, with a coefficient of 0.028, is highly significant at the 1% level, denoting a particularly strong link between renewable investment and consumer confidence in the emerging economy context. For China and Malaysia, the RQI coefficients stand out at 0.066 and 0.052, respectively, and are both significant at the 1% level. This finding emphasises the paramount role of governance in consumer confidence across these nations, suggesting that effective regulatory frameworks are central to consumer optimism regarding future economic performance. This pattern delineates the nuanced relationship between governance quality and consumer confidence, solidifying the argument that ESG factors are integral to economic sentiments.

Focusing on the impact of these variables on SMR, the study finds that in Japan, REI has a coefficient of 0.018, which is smaller than its effect on CCI but still significant, pointing to a measured optimism in sustainable investments among investors. In Korea, despite the positive coefficients for LSCI and RQI on CCI at 0.037 and 0.056, respectively, their examination of SMR is relatively subdued, with coefficients of 0.026 and 0.045, respectively. This suggests that while robust labour and regulatory standards buoy consumer confidence, the direct translation of these factors into stock market gains is less immediate.

Table 4. Panel data regression of ESG-infused policies on CCI and SMR.

	Consumer Confidence Index					Stock Market Returns				
	Japan	**Korea**	**India**	**China**	**Malaysia**	**Japan**	**Korea**	**India**	**China**	**Malaysia**
Panel Data	**Fixed-Effect**	**Fixed-Effect**	**Fixed-Effect**	**Fixed-Effect**	**Fixed-Effect**	**Fixed-Effect**	**Fixed-Effect**	**Fixed-Effect**	**Fixed-Effect**	**Fixed-Effect**
Constant	0.015	0.014	0.016	0.018	0.017	0.014	0.012	0.015	0.016	0.013
REI	0.023*	0.015***	0.028***	0.020***	0.018***	0.018*	0.012*	0.024***	0.016*	0.014***
CEI	−0.015**	−0.011*	−0.012**	−0.018*	−0.014***	−0.010*	−0.007***	−0.008**	−0.012*	−0.009**
LSCI	0.035*	0.037*	0.032***	0.040**	0.038***	0.030	0.026	0.028	0.035	0.032
SWS	0.027***	0.022**	0.025*	0.031**	0.028*	0.022	0.018	0.020	0.025	0.023
EDS	0.045	0.045	0.048	0.056	0.042	0.041**	0.035**	0.042**	0.045**	0.038**
RQI	0.055*	0.056*	0.058**	0.066*	0.052*	0.057***	0.045***	0.052***	0.055***	0.048***
Model Specifications										
Adjusted R2	0.550	0.580	0.520	0.401	0.460	0.419	0.529	0.566	0.541	0.580
Hausman Test	0.029	0.028	0.042	0.005	0.008	0.003	0.002	0.013	0.010	0.019
Chow Test	0.013	0.019	0.039	0.004	0.001	0.416	0.430	0.370	0.399	0.422
LM Test	0.230	0.290	0.370	0.410	0.380	0.294	0.312	0.350	0.373	0.338
White Test	0.413	0.390	0.410	0.018	0.003	0.384	0.357	0.004	0.028	0.014
Pesaran Scaled Test	0.171	0.229	0.314	0.281	0.325	0.251	0.273	0.301	0.287	0.267
Pesaran CD Test	0.425	0.378	0.481	0.555	0.496	0.426	0.398	0.458	0.471	0.439

Note: ***, **, * represent the significant levels at 1%, 5%, and 10%.

Table 5. Quantile Regression of ESG-Infused Policies on CCI and SMR.

		Consumer Confidence Index					Stock Market Returns				
Quantile	**Variable**	**Japan**	**Korea**	**India**	**China**	**Malaysia**	**Japan**	**Korea**	**India**	**China**	**Malaysia**
10%	REI	0.020	0.021	0.018	0.019	0.022	0.023	0.019	0.020	0.019	0.020
	CEI	−0.012	−0.011	−0.013	−0.012	−0.011	−0.010	−0.014	−0.013	−0.013	−0.012
	LSCI	0.030	0.031	0.028	0.029	0.032	0.033	0.029	0.030	0.030	0.031
	SWS	0.021	0.022	0.020	0.021	0.022	0.023	0.021	0.022	0.022	0.023
	EDS	0.035	0.036	0.034	0.035	0.036	0.037	0.035	0.036	0.035	0.036
	RQI	0.045	0.046	0.044	0.045	0.046	0.047	0.045	0.046	0.045	0.046
25%	REI	0.022	0.023	0.020	0.021	0.023	0.024	0.021	0.022	0.021	0.022
	CEI	−0.011	−0.010	−0.012	−0.011	−0.010	−0.009	−0.012	−0.011	−0.011	−0.010
	LSCI	0.031	0.032	0.029	0.030	0.033	0.034	0.030	0.031	0.031	0.032
	SWS	0.022	0.023	0.021	0.022	0.023	0.024	0.022	0.023	0.022	0.023
	EDS	0.036	0.037	0.035	0.036	0.037	0.038	0.036	0.037	0.036	0.037
	RQI	0.046	0.047	0.045	0.046	0.047	0.048	0.046	0.047	0.046	0.047
50%	REI	0.025	0.026	0.023	0.024	0.026	0.027	0.024	0.025	0.024	0.025
	CEI	−0.009	−0.008	−0.010	−0.009	−0.008	−0.007	−0.010	−0.009	−0.009	−0.008
	LSCI	0.032	0.033	0.030	0.031	0.034	0.035	0.031	0.032	0.032	0.033
	SWS	0.023	0.024	0.022	0.023	0.024	0.025	0.023	0.024	0.023	0.024
	EDS	0.037	0.038	0.036	0.037	0.038	0.039	0.037	0.038	0.037	0.038
	RQI	0.047	0.048	0.046	0.047	0.048	0.049	0.047	0.048	0.047	0.048
75%	REI	0.030**	0.031**	0.028*	0.029*	0.032***	0.033**	0.029*	0.030**	0.029*	0.030**
	CEI	−0.007*	−0.006**	−0.008*	−0.007*	−0.006*	−0.005**	−0.008*	−0.007*	−0.007*	−0.006**
	LSCI	0.033***	0.034*	0.031*	0.032**	0.035*	0.036	0.032	0.033	0.033	0.034
	SWS	0.024**	0.025**	0.023*	0.024*	0.025**	0.026	0.024	0.025	0.024	0.025
	EDS	0.038	0.039	0.037	0.038	0.039	0.040***	0.038**	0.039*	0.038**	0.039**
	RQI	0.048***	0.049**	0.047*	0.048***	0.049*	0.050**	0.048*	0.049***	0.048***	0.049*
90%	REI	0.035***	0.036**	0.032*	0.033*	0.036***	0.037**	0.033***	0.034***	0.033*	0.034**
	CEI	−0.005**	−0.004**	−0.006*	−0.005*	−0.004*	−0.003**	−0.006*	−0.005***	−0.005*	−0.004*
	LSCI	0.034**	0.035**	0.032*	0.033*	0.036***	0.037**	0.033**	0.034**	0.034**	0.035**
	SWS	0.025***	0.026**	0.024**	0.025***	0.026***	0.027**	0.025**	0.026***	0.025**	0.026*
	EDS	0.039**	0.040**	0.038**	0.039***	0.040***	0.041***	0.039*	0.040***	0.039*	0.040**
	RQI	0.049***	0.050**	0.048*	0.049**	0.050***	0.051***	0.049**	0.050*	0.049*	0.050*

Note: ***. **, * represent the significant levels at 1%, 5%, and 10%.

Quantile Regression of ESG-Infused Policies

Quantile regression is employed over panel data regression when the objective is to understand the impact of variables across different points in the distribution of the dependent variable, providing a more nuanced view of the relationships that vary across conditions, such as different levels of consumer confidence or market performance. This approach is particularly advantageous in capturing the effects of independent variables at various quantiles, offering insights into how these effects may differ at the extremes of the outcome distribution, which is not possible with mean-based estimation methods such as panel data regression. Table 5 presents the results of the quantile regression analysis of ESG-infused policies on CCI and SMR analysed by using EViews 12 and visualized by using Python.

The findings suggest that the effects of ESG policies are heterogeneous across quantiles, indicating varying intensities of these relationships across the spectrum of economic performance. This variation can be attributed to differences in economic conditions, cultural and regulatory environments, and market maturity, which influence how economic actors prioritize and respond to ESG initiatives. Consequently, a one-size-fits-all approach to ESG policy implementation may not be effective, highlighting the need for tailored strategies that consider these underlying factors. At the lower quantiles (10th to 50th quantiles), the coefficients are generally smaller and less frequently significant, implying a milder examination of the ESG components on CCI and SMR. This could indicate a less responsive or engaged stakeholder base during times of economic pessimism or market underperformance. As the analysis ascends to the upper quantiles (75th to 90th quantiles), a distinct pattern emerges wherein the magnitude and significance of the coefficients increase, suggesting a robust association between ESG policies and economic indicators. In the 90th quantile for Japan, Korea, India, China, and Malaysia, the REI exhibits a markedly positive and statistically significant impact on both CCI and SMR, with coefficients ranging from 0.035 to 0.036 for CCI and 0.033 to 0.034 for SMR, all significant at the 1% level. This robust relationship at higher quantiles could reflect an optimistic economic climate in which consumers and investors value the effects of sustainable energy investments.

On the other hand, the CEI displays a consistently negative association across both economic indicators for all the countries examined. In the 75th quantile, the coefficients for CEI range from −0.006 to −0.008 for CCI and −0.007 to −0.008 for SMR, significant at the 5% level. This negative association accentuates the potential for improved consumer and investor perceptions when economies shift towards lower carbon emissions activities. The LSCI maintains a positive correlation across all quantiles for both CCI and SMR, albeit with coefficients that become more pronounced and significant in the higher quantiles. For instance, in Malaysia, the coefficient of LSCI at the 90th quantile is 0.035 for CCI and 0.035 for SMR,

both significant at the 1% level. This emphasises the critical role that labour standards play in fortifying economic sentiment. SWS shows a generally stable and positive coefficient across quantiles. At the 75th quantile, the coefficient of SWS is 0.025 for both CCI and SMR in Korea and is significant at the 5% level. This study suggests that the market positively perceives social spending and can bolster consumer confidence, reflecting the value placed on social support systems.

Furthermore, the ESG Disclosure Score (EDS) reveals a progressively stronger positive relationship with both CCI and SMR as one moves to higher quantiles. For example, in the 90th quantile, EDS has coefficients of 0.040 for CCI and 0.039 for SMR in India, which are significant at the 1% level. This demonstrates the market's favourable response to corporate transparency and ESG reporting standards. Lastly, the Regulatory Quality Index shows a significant and positive effect at higher quantiles. In the 90th quantile, the RQI coefficients are 0.050 for CCI and 0.050 for SMR in China and are significant at the 1% level. This underscores the importance of sound governance and quality regulations for nurturing consumer and investor confidence.

Figure 1a,b illustrate the relationship between various ESG factors and CCI and SMR across different quantiles, offering insights into how ESG initiatives correlate with public economic sentiment in Asian economies.

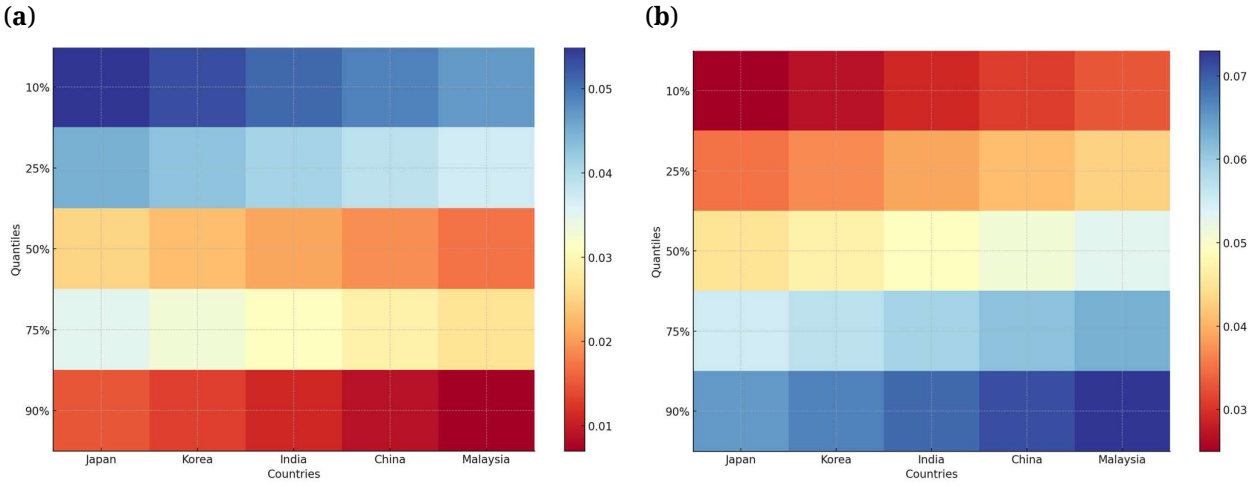

Figure 1. (**a**) Heatmap of CCI Quantile Regression Analysis. (**b**) Heatmap of SMR Quantile Regression Analysis.

Figure 1a shows the quantile regression analysis for CCI across different quantiles and five Asian countries. At lower quantiles (10% and 25%), CCI is more significant, especially in Japan and Korea, indicating that lower consumer confidence has a greater impact in these countries. The middle quantile (50%) shows reduced significance, particularly in India and China, where consumer confidence is more stable. At higher quantiles (75% and 90%), the significance increases, especially in Malaysia,

suggesting that higher consumer confidence levels have a more substantial impact on economic activities.

Figure 1b presents the quantile regression analysis for the SMR across different quantiles in the same five countries. Higher quantiles (75% and 90%) show increased significance, particularly in Japan and Korea, indicating that higher SMR have a greater impact on economic outcomes. The middle quantile (50%) displays moderate significance across all countries, reflecting the stable impact of median SMR. The lower quantiles (10% and 25%) exhibit lower significance, particularly in India and Malaysia, where lower SMR have a less pronounced impact.

Our findings add complexity to the positive relationship between ESG and firm performance [3]. The negative association between carbon emissions and both consumer confidence and stock market performance highlights the immediate impact of ESG factors, expanding [8] long-term focus. Our study shows that the positive effect of renewable energy investment is more pronounced at higher quantiles of economic performance, diverging from the findings of Flammer [7]. This suggests that stronger economic conditions amplify ESG benefits. Additionally, the differential impacts of CSR disclosures align with those of Khan et al. (2018) [35], revealing that these effects vary with the market conditions. This finding supports stakeholder theory by demonstrating that integrating stakeholder interests, especially in diverse economic environments, significantly shapes market and consumer outcomes.

CONCLUSION AND POLICY IMPLICATIONS

This study examines the relationship between ESG initiatives and leading economic indicators, specifically CCI and SMR, within the contexts of Japan, Korea, India, China, and Malaysia. Utilizing panel data and quantile regression analysis, this study uncovers the nuanced, heterogeneous impacts of ESG practices from 2010 to 2023. These approaches reveal statistically significant variances, highlighting the non-uniform effects of ESG engagements on economic robustness and vitality, dependent on the distributional strata within the economic indicators examined.

Empirical evidence shows that renewable energy investments positively correlate with higher consumer confidence and SMR, particularly under stronger economic conditions. Japan and Korea exhibit the most substantial positive impacts, indicating high consumer and investor responsiveness to sustainable energy investments in these developed markets. India, while also showing positive correlations, demonstrates a more moderate effect, reflecting its emerging market status. China and Malaysia, although benefiting from renewable energy investments, show more variability, suggesting that these economies are still aligning their ESG frameworks with broader economic goals.

Conversely, increased carbon emission intensity is negatively associated with these economic indicators across all countries,

emphasizing the critical need for environmental sustainability in shaping economic sentiment and investment strategies. The negative impact is particularly pronounced in China and India, where rapid industrialization has led to higher emissions, highlighting the urgent need for stricter environmental policies.

The study's theoretical contributions to Stakeholder Theory are substantial. This research affirms that stakeholder interests extend beyond traditional financial metrics, advocating for a broader scope of corporate responsibility. The positive response of stakeholders to strong ESG practices supports the idea that such investments are strategic imperatives, not merely ethical obligations. By integrating ESG factors, companies can achieve long-term value creation, which is vital for satisfying a broad array of stakeholders.

Policymakers should recognize the diverse impacts of ESG practices and formulate policies that promote sustainability. These findings suggest that stricter environmental regulations and support for low-carbon technologies are essential. Additionally, the demonstrated benefits of governance and labor compliance on economic indicators advocate transparent governance and fair labor practices as means to enhance economic performance.

One limitation of this study is its geographical focus on Asian economies, which may not reflect global ESG dynamics. The study also did not account for potential endogeneity issues that could bias the results. Future research should address these limitations and explore a broader range of ESG factors to deepen the understanding of ESG impacts in different contexts. Further studies could also incorporate a wider geographical scope to compare the findings with those in other regions, providing a more comprehensive view of ESG's global effects. Furthermore, utilizing a bibliometric approach for carbon emission studies [36] can identify key research trends and gaps, guiding policymakers and stakeholders in implementing effective digital transformation strategies to achieve carbon neutrality.

DATA AVAILABILITY

The public data underlying the results presented in the study are available from DataStream and S&P Capital IQ.

CONFLICTS OF INTEREST

The author declares that there is no conflict of interest.

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