ESG SENTIMENT AND ITS IMPACT ON STOCK MARKET RETURN

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ABSTRACT: *This article investigates the connection between financial market performance and investors' attitudes toward environmental, social, and governance (ESG) issues. Using the top-down approach of* Baker and Wurgler (2007)*, the study constructs an ESG index for chosen countries. The research used principal component analysis to build a composite ESG index using appropriate proxies. The ESG and return series' integration level is stationary using the ADF unit root test, which eliminates other selected nations except for India because India's stock return and ESG series were only integrated in the order I(0) and I(1). Error correction reveals that only the return lag that justifies significance occurs at a level of 10% for the short-run coefficient and at a level of 1% for the long-run adjustment, indicating that 179% each year corrects the disequilibrium induced by the temporal shocks of the previous period. This finding suggests that the ESG index is in long-run equilibrium with market performance.*

KEYWORDS: Environment, Social, Governance, Index, Principal Component Analysis

1. INTRODUCTION

Market sentiment is the overall attitude or feeling that investors have about the market, which can be positive, negative, or neutral. It is influenced by a wide range of factors, including economic conditions, company earnings, political developments, and market trends, among others ESG (Environment, Social, and Governance) sprang to prominence as a crucial factor. ~~but there are others~~, The global financial crisis accelerated the adoption of ESG principles, which would not have happened as quickly without the crisis as a catalyst. which encouraged yield-seeking investors and significantly increased interest in natural resources. ESG, a concept of non-financial reporting, provides significant insights into the company's internal controls over its financial reporting and ensures that organizations consider their profit margin along with a contribution to the globe and society. ESG reporting lets investors assess if companies follow their supply chains to meet environmental, social, and governance commitments. However, there is always a way to circumvent anything, no matter how excellent it is. Likewise, ESG reporting also has loopholes.

Corporate representations that determine screening inclusion or exclusion have received little criticism from SRI (Socially Responsible Investment) critics. This is remarkable given social and environmental accounting research that reveals corporate posturing and dishonesty happen without external

verification and a parallel corpus of literature detailing corporate "greenwashing", explaining how the corporate misleads the investor and consumer about the company's operation and their environmental impact.

There is some evidence to suggest that ESG factors can impact market sentiment. A company with solid ESG practices may be seen as a more responsible and sustainable investment, which could lead to positive market sentiment. On the other hand, a company with poor ESG practices may be viewed as a riskier or less ethical investment, which could lead to negative market sentiment. However, the impact of ESG on market sentiment will depend on the specific circumstances and the views of individual investors. As a company's ESG reporting represents the micro-perspective of the company, putting all companies together. There has already been extensive study done at the microscopic level to identify fraud. But there is a lacuna in knowing whether the country's ESG has an influence on the stock market index. It becomes the macro-perspective of the nation's ability to grow and meet its ESG obligations. ESG is a framework for responsible consumption. It assists firms in attracting investors, fostering consumer loyalty, enhancing financial performance, and sustaining their operations.

When we see India at macro level, it has been criticized for its high pollution levels and diseases linked to them and for not taking adequate measures to protect the rights of its most vulnerable citizens, including women, children, and indigenous peoples. Due to its poor sanitation system, water pollution and health issues have arisen. Significant gaps exist among people in India regarding income, education, and other indicators of social success. India has been accused of exploiting labor practices in various sectors, including agriculture, construction, and manufacturing. Some of India's environmental issues include deforestation, overuse of natural resources, and the endangerment of rare or threatened species.

Thus, it becomes vital to investigate the country's ESG from a macro perspective and comprehend how it affects the major stock market index. In addition, a chosen few south Asian nation know their ESG commitments on a macroscale. This will provide a clear depiction of the company's contribution to the nation's ESG.

2. REVIEW OF LITERATURE

A recent expose on fast-fashion retailer H&M was accused of "greenwashing," or making false or deceptive claims about its sustainability efforts, in an explosive investigation by Quartz. For decades, scandals have caused public outrage and, depending on the severity, business remorse and a vow to change. Gilbert M (2011) finds that investors and the public seem to monitor corporations' environmental, social, and governance (ESG) issues more closely than in the past, as seen by the rise of sustainable investment funds

and the need for green financing. Krüger (2015), examine the effects of good and bad ESG events on the stock market, presents evidence that investors respond severely unfavorably to negative occurrences and marginally negatively to positive ones. Similarly, Goss and Roberts (2011) find that, in reaction to negative media and investor attitudes, firms' ESG initiatives are often viewed as grandstanding, which decreases their creditworthiness and boosts their cost of financing. According to this study by Cheong, Sinnakkannu, and Ramasamy (2017), most firms adopt a reactive approach toward ESG concerns. Only after suffering adverse market and investor sentiment in the preceding year do these firms engage in excessive ESG operations, where market and investor sentiment is assessed by a modified version of the index produced by Baker and Wurgler (2006)

Other empirical research casts doubt on a wholly pessimistic perspective of a company's ESG operations by presenting evidence of some indirect financial benefits for proactive organizations in ESG topics. Cahan et al. (2015) revealed that socially responsible firms had a more favorable image in the media. ~~According to the author, a favorable media image~~ that enhances a company's reputation, fosters investor confidence, and allows it to profit from greater positive public awareness Further using annual sustainability ratings, Lins, Servaes, and Tamayo (2017) show that ESG initiatives may boost stakeholder trust, which can be used during economic crises like the 2008 financial crisis. Similarly, Engelhardt, Ekkenga, and Posch (2021) examined the relationship between ESG ratings and stock performance during the COVID crisis and discovered that companies with higher ESG ratings had lower stock volatility and higher returns. Bonaparte et al. (2021) on the other hand performed research based on time series and cross-sectional analyses of the impact of the ESG index on the stock market and found a positive influence.

ESG came from the 2004 UN Global Compact research "Who Cares Wins" (United Nations, The Global Compact) (2004). Who Cares Wins: Connecting Financial Markets to a Changing World? UN (2004) Building on SRI (Socially Responsible Investment), 25% of professionally managed assets globally are ESG-invested. ESG investment, unlike SRI, considers that ESG factors have economic importance. ESG investments are covered in the financial sections of the world's leading media, and thousands of professionals worldwide are "ESG Analysts" in 2018. Investors believe ESG data is crucial to understanding business strategy, purpose, and management. Cheong et al. (2017); Goss and Roberts (2011); Naughton, Wang, and Yeung (2014) have explored how sentiment affects a company's performance from ESG efforts. Horn (2023) found that the receipt of an ESG rating minimizes the idiosyncratic risk, complementing the study of Zerbib et al. (2022) However, combining the facts in a newspaper story on an ESG problem, assessed by a sentiment index, with investors' emotions may help us understand the relationship. The study builds

on the behavioral finance literature's findings that sentiment affects stock prices by focusing on ESG-related sentiment.(García 2013; Li et al. 2014; Tetlock 2007) According to a recent survey, 97 percent of Indian consumers believe that social and environmental issues are more important than ever, and 85 percent of Indians are willing to sever ties with a business that does not prioritize sustainability and social efforts.[1]

Although research has been conducted to evaluate the relationship between ESG sentiment and returns, there needs to be more literature in this area. Our findings add to the existing body of knowledge by developing a composite ESG index for nations such as India, Pakistan, Bangladesh, and Sri Lanka and investigating their link with their respective stock returns. The study anticipates a strong correlation between ESG and stock performance. By generating an ESG index using information from the global bank's database. The study expects the ESG index to affect the stock index substantially. As a result, the study investigates the hypothesis that ESG Sentiment has a significant relationship with stock market return.

3. DATA COLLECTION AND RESEARCH METHODOLOGY

The investigation is conducted on data with an annual frequency from 2005 to 2020. The study have utilized environmental, socioeconomic, and governance data from the World Bank for a few countries in South Asia, such as India, Pakistan, Sri Lanka, and Bangladesh. The study select the S&P Nifty 100 from Nifty India for stock returns as it exposes investors to significant firms with diversified companies representing critical economic sectors. In addition, Pakistan KSE100, Bangladesh DSEB, and Sri Lanka CSE stock return information was obtained from investing.com. The selection of ESG proxies is based on two factors. Firstly, the theoretical relationship between proxies and ESG of that country, and secondly, the data availability for the study period. Table 1 displays descriptive statistics regarding the stock returns of the selected nations. Returns are computed using natural logarithms: rt = LN (Pt).

3.1 The Variables' Description

ESG proxies are indicators or measures used to evaluate the sustainability and societal effect of a business or investment. Typically, a company's performance in environmental impact, social responsibility, and governance procedures can be assessed using these proxies. Multiple ESG proxies can be employed, and the precise proxies utilized may depend on the company's industry and the specific ESG issues that were evaluated. Some common ESG proxies include:

Climate change and resource depletion pose hazards for companies and investors. For instance, fossil fuel companies may face risks from regulatory changes or diminishing demand, which might hurt their financial performance and stock returns. Environmental issues give commercial and investment opportunities. Companies that address environmental challenges by making more sustainable products or employing cleaner production procedures may stand out and earn higher stock returns. Labor practices, diversity, fights against sexism, racism, and other forms of

prejudice, and promoting community service, social justice, and ethical business practices can also affect market trends. Poor social performance can lead to regulatory action or public disapproval, hurting financial performance and stock prices. Accounting practices, leadership selection, and shareholder accountability may all be improved with the help of good corporate governance standards. Investors concerned with environmental, social, and governance factors may want the company reassures that they pick board members and executives without bias, do not use political donations to buy favors, and do not violate laws.

To apply all of these proxies, The study gathered Environment, Social, and Governance data from the World Bank's database, where the data were compiled 45 different proxies for ESG for selected countries (India, Pakistan, Sri Lanka, and Bangladesh) from 2005 to 2020, based on the availability of the data. The study has used a simple moving average to adjust the missing data. Table 1 depicts Descriptive statistics of selected nations' stock exchange indexes.

	LNDSEB	LNNIFTY100	LNKSE	LNCSE
Mean	8.516804	11.81373	9.896278	7.840488
Median	8.507096	11.77017	9.936203	8.037024
Maximum	8.73946	12.61423	10.77493	8.31609
Minimum	8.358561	10.95559	8.676759	6.726917
Std. Dev.	0.123677	0.498013	0.688409	0.460514
Skewness	0.472475	-0.2027	-0.18776	-1.1664
Kurtosis	2.35573	2.097838	1.579064	3.279188
Jarque-Bera	0.436005	0.652168	1.440046	3.679928

Table 1: Descriptive Statistics

3.2 Construction of ESG Index

The study used Principal Component Analysis for constructing the ESG index. The number of principal components to be included for analysis is determined by the purpose of the investigation (Jackson J. E 2005) ; to be included for analysis, it is believed that components should account for at least 85 percent of the variation. Since the first principal component explains 62.29 %, 63.1 %, 52.04 %, and 53.75 % (See Table 2) of the sample variance for Bangladesh, India, Pakistan, and Sri Lanka, respectively. As a result, the study may assume that a first principal component accounts for most of the standard variation; therefore, ~~we choose~~ PC1 was chosen to develop the ESG index. The PC1 loadings are utilized to create the ESG index, which gives the following equation Eq(1):

$$\begin{aligned}
\text{ESG\_INDEX } t &= \beta\_1 \text{ ”ACCESS\_TO\_CLEAN\_FUELS\_AND\_TECH\_FOR\_COOKING” } + \\
&\beta\_2 \text{ ” ACCESS\_TO\_ELECTRICITY\_\_\_\_OF\_POPULATION” } - \\
&\beta\_3 \text{ ”ADJUSTED\_SAVINGS\_\_NATURAL\_RESOURCES\_DEPLETION\_\_\_\_OF\_G ” } - \\
&\beta\_4 \text{ ” ADJUSTED\_SAVINGS\_\_NET\_FOREST\_DEPLETION\_\_\_\_OF\_GNI” } + \\
&\beta\_5 \text{ ” AGRICULTURAL\_LAND\_\_\_\_OF\_LAND\_AREA” } - \\
&\beta\_6 \text{ ” AGRICULTURE\_\_FORESTRY\_\_AND\_FISHING\_\_VALUE\_ADDED\_\_\_\_OF” } + \\
&\beta\_7 \text{ ” CO2\_EMISSIONS\_\_METRIC\_TONS\_PER\_CAPITA” } +
\end{aligned}$$

β_8 " CONTROL_OF_CORRUPTION__ESTIMATE" +
β_9 " ELECTRICITY_PRODUCTION_FROM_COAL_SOURCES____OF_TOTAL" +
β_10 " ENERGY_IMPORTS__NET____OF_ENERGY_USE" -
β_11 " ENERGY_INTENSITY_LEVEL_OF_PRIMARY_ENERGY__MJ_$2017_PP" +
β_12 " ENERGY_USE__KG_OF_OIL_EQUIVALENT_PER_CAPITA" -
β_13 " FERTILITY_RATE__TOTAL__BIRTHS_PER_WOMAN" +
β_14 " FOOD_PRODUCTION_INDEX__2014_2016___100" -
β_15 " FOREST_AREA____OF_LAND_AREA" +
β_16 " FOSSIL_FUEL_ENERGY_CONSUMPTION____OF_TOTAL" +
β_17 " GDP_GROWTH__ANNUAL" +
β_18 " GOVERNMENT_EFFECTIVENESS__ESTIMATE" -
β_19 " GOVERNMENT_EXPENDITURE_ON_EDUCATION__TOTAL_OF_GOVE" +
β_20 " INDIVIDUALS_USING_THE_INTERNET____OF_POPULATION" +
β_21 " LABOR_FORCE_PARTICIPATION_RATE__TOTAL____OF_TOTAL_POP" +
β_22 " LIFE_EXPECTANCY_AT_BIRTH__TOTAL__YEARS" +
β_23 " LITERACY_RATE__ADULT_TOTAL_OF_PEOPLE_AGES_15_AND_ABO" +
β_24 " METHANE_EMISSIONS__METRIC_TONS_OF_CO2_EQUIVALENT_PER" -
β_25 "MORTALITY_RATE__UNDER_5__PER_1_000_LIVE_BIRTHS" +
β_26 " NITROUS_OXIDE_EMISSIONS__METRIC_TONS_OF_CO2_EQUIVALEN" +
β_27 " PATENT_APPLICATIONS__RESIDENTS" +
β_28 " PEOPLE_USING_SAFELY_MANAGED_DRINKING_WATER_SERVICES" +
β_29 " PEOPLE_USING_SAFELY_MANAGED_SANITATION_SERVICES____OF" -
β_30 "PM2_5_AIR_POLLUTION__MEAN_ANNUAL_EXPOSURE__MICROGRAM" +
β_31 " POLITICAL_STABILITY_AND_ABSENCE_OF_VIOLENCE_TERRORISM" +
β_32 " POPULATION_AGES_65_AND_ABOVE____OF_TOTAL_POPULATION" +
β_33 " POPULATION_DENSITY__PEOPLE_PER_SQ__KM_OF_LAND_AREA" +
β_34 " PREVALENCE_OF_OVERWEIGHT____OF_ADULTS" -
β_35 " PREVALENCE_OF_UNDERNOURISHMENT____OF_POPULATION" +
β_36 "PROPORTION_OF_SEATS_HELD_BY_WOMEN_IN_NATIONAL_PARLIAM" +
β_37 " RATIO_OF_FEMALE_TO_MALE_LABOR_FORCE_PARTICIPATION_RAT" +
β_38 " REGULATORY_QUALITY__ESTIMATE" -
β_39 " RENEWABLE_ELECTRICITY_OUTPUT____OF_TOTAL_ELECTRICITY" -
β_40 " RENEWABLE_ENERGY_CONSUMPTION__OF_TOTAL_FINAL_ENERGY" +
β_41 " RULE_OF_LAW__ESTIMATE" +
β_42 " SCHOOL_ENROLLMENT__PRIMARY____GROSS" +
β_43 " SCIENTIFIC_AND_TECHNICAL_JOURNAL_ARTICLES" +
β_44 " UNEMPLOYMENT__TOTAL_OF_TOTAL_LABOR_FORCE___MODELED" -
β_45 "VOICE_AND_ACCOUNTABILITY__ESTIMATE" ---------------------- **Eq(1)**

4. DISCUSSION AND RESULTS

4.1 Stationarity Check

To assess whether a series is stationary, the study conduct the Augmented Dickey-Fuller test for the stock returns of chosen nations and their related ESG indices. The null hypothesis of non-stationarity was rejected at different levels, showing that the series of return and ESG index are stationary and integrated of order either 0 and 1, i.e., $I(0)$ and $I(1)$ or 1 and 2, i.e., $I(1)$ and I(2). Table 3 displays the outcome of the ADF unit root test for all series analyzed in this study.

Ordinary Least Squares Regression can be used to evaluate the relationship between the ESG index and return data when both are stationary at a level corresponding to an order 0 integration. As it is co-integrated at different levels, it is possible to assess the short-run and long-run association between the series using either the Johansen co-integration test (when the data are stationary at the same level) or the Auto-Regressive Distributed Lag test (when the data are stationary at different integration orders but not integrated of order 2). Consequently, unit root testing reveals that the variables of this study are a combination of $I(0)$, $I(1)$, and $I(2)$. Consequently, the

scenario demands using the ARDL method for co-integration for India only as its stock return and ESG index are integrated in order of $I(0)$ and $I(1)$.

4.2 Standard ARDL Bound test for India

After verifying the integrated properties of the examined series, the ARDL approach is implemented. According to Pesaran, Shin, and Smith (2001) , the bound test is used to determine the existence of a long-run relationship. First, the OLS method is employed to confirm the existence of a long-run link between the composite ESG index and the nifty100 by estimating Equation (2) with unrestricted intercept and no trend assumptions. An ARDL representation is formulated as follows:

Table 2: Principal Component Analysis- Factor Loading of PC1

Characteristics of composite ESG indices constructed on Principal Component Analysis methodology				
		FACTOR LOADING		
Proxies for ESG	BAN_IND EX	IND_IND EX	PAK_IND EX	SRI_IND EX
"_ACCESS_TO_CLEAN_FUELS_AND_TECHNOLOGIES_FOR_COOKING___"	0.190	0.185	0.206	0.197
"_ACCESS_TO_ELECTRICITY____OF_POPULATION_"	0.186	0.183	0.145	0.202
"_ADJUSTED_SAVINGS__NATURAL_RESOURCES_DEPLETION____OF_G"	-0.108	-0.148	-0.158	-0.183
"_ADJUSTED_SAVINGS__NET_FOREST_DEPLETION____OF_GNI_"	-0.120	-0.095	0.005	-0.182
"_AGRICULTURAL_LAND____OF_LAND_AREA_"	0.148	-0.161	0.152	0.194
"_AGRICULTURE__FORESTRY__AND_FISHING__VALUE_ADDED____OF"	-0.190	-0.027	-0.053	-0.173
"_CO2_EMISSIONS__METRIC_TONS_PER_CAPITA_"	0.187	0.185	0.117	0.187
"_CONTROL_OF_CORRUPTION__ESTIMATE"	0.144	0.064	0.109	-0.063
"_ELECTRICITY_PRODUCTION_FROM_COAL_SOURCES___OF_TOTAL_"	0.053	0.125	-0.025	0.144
"_ENERGY_IMPORTS__NET____OF_ENERGY_USE_"	0.069	0.136	0.076	0.105
"_ENERGY_INTENSITY_LEVEL_OF_PRIMARY_ENERGY__MJ_$2017_PP"	-0.183	-0.167	-0.202	-0.189
"_ENERGY_USE__KG_OF_OIL_EQUIVALENT_PER_CAPITA_"	0.130	0.137	-0.107	0.113
"_FERTILITY_RATE__TOTAL__BIRTHS_PER_WOMAN_"	-0.189	-0.189	-0.205	-0.203
"_FOOD_PRODUCTION_INDEX__2014_2016___100_"	0.191	0.190	0.203	0.171
"_FOREST_AREA____OF_LAND_AREA_"	-0.175	0.190	-0.206	0.137
"_FOSSIL_FUEL_ENERGY_CONSUMPTION____OF_TOTAL_"	0.131	0.135	-0.040	0.103
"_GDP_GROWTH__ANNUAL___"	0.001	-0.085	-0.038	-0.125
"_GOVERNMENT_EFFECTIVENESS__ESTIMATE"	0.112	0.103	-0.042	0.086
"_GOVERNMENT_EXPENDITURE_ON_EDUCATION__TOTAL___OF_GOVE"	-0.146	0.185	-0.043	0.009
"_INDIVIDUALS_USING_THE_INTERNET____OF_POPULATION_"	0.185	0.170	0.172	0.173
"_LABOR_FORCE_PARTICIPATION_RATE__TOTAL____OF_TOTAL_POP"	0.124	-0.184	0.188	-0.106
"_LIFE_EXPECTANCY_AT_BIRTH__TOTAL__YEARS_"	0.192	0.191	0.207	0.204
"_LITERACY_RATE__ADULT_TOTAL____OF_PEOPLE_AGES_15_AND_ABO"			0.160	0.184
"_METHANE_EMISSIONS__METRIC_TONS_OF_CO2_EQUIVALENT_PER"	0.102	-0.183	0.187	-0.052
"_MORTALITY_RATE__UNDER_5__PER_1_000_LIVE_BIRTHS_"	-0.192	-0.192	-0.207	-0.170
"_NITROUS_OXIDE_EMISSIONS__METRIC_TONS_OF_CO2_EQUIVALEN"	0.122	0.122	0.122	-0.109
"_PATENT_APPLICATIONS__RESIDENTS"	0.088	0.182	0.164	0.182
"_PEOPLE_USING_SAFELY_MANAGED_DRINKING_WATER_SERVICES__"	0.171		-0.208	

"_PEOPLE_USING_SAFELY_MANAGED_SANITATION_SERVICES___OF"	0.192	0.191		
"_PM2_5_AIR_POLLUTION__MEAN_AN		-0.074	-0.139	-0.138
"_POLITICAL_STABILITY_AND_ABSENCE_OF_VIOLENCE_TERRORISM"	0.165	0.114	0.006	0.196
"_POPULATION_AGES_65_AND_ABOVE____OF_TOTAL_POPULATION_"	0.186	0.185	0.195	0.202
"_POPULATION_DENSITY__PEOPLE_PER_SQ__KM_OF_LAND_AREA_"	0.192	0.192	0.206	0.200
"_PREVALENCE_OF_OVERWEIGHT____OF_ADULTS_"	0.155	0.159	0.173	0.177
"_PREVALENCE_OF_UNDERNOURISHMENT____OF_POPULATION_"	-0.127	-0.152	-0.151	-0.204
"_PROPORTION_OF_SEATS_HELD_BY_WOMEN_IN_NATIONAL_PARLIAM"	0.133	0.180	-0.145	0.040
"_RATIO_OF_FEMALE_TO_MALE_LABOR_FORCE_PARTICIPATION_RAT"	0.190	-0.183	0.134	0.027
"_REGULATORY_QUALITY__ESTIMATE"	0.108	0.075	-0.108	0.147
"_RENEWABLE_ELECTRICITY_OUTPUT____OF_TOTAL_ELECTRICITY"	-0.120	-0.075	-0.038	0.027
"_RENEWABLE_ENERGY_CONSUMPTION____OF_TOTAL_FINAL_ENERGY"	-0.187	-0.176	-0.141	-0.181
"_RULE_OF_LAW__ESTIMATE"	0.159	-0.134	0.168	-0.024
"_SCHOOL_ENROLLMENT__PRIMARY____GROSS_"	0.152	-0.095	0.164	0.145
"_SCIENTIFIC_AND_TECHNICAL_JOURNAL_ARTICLES"	0.178	0.175	0.195	0.179
"_UNEMPLOYMENT__TOTAL____OF_TOTAL_LABOR_FORCE___MODELED"	0.089	0.051	0.197	-0.136
"_VOICE_AND_ACCOUNTABILITY__ESTIMATE"	-0.116	-0.130	0.128	0.106
Explained variance by the 1st Principal Component	62.29%	63.08%	52.04%	53.75%
Correlation with respective stock market index	0.53	0.94	0.92	0.72

Variables	ADF test at level				ADF test at First difference				ADF test at Second difference			
	Intercept		Intercept and trend		Intercept		Intercept and trend		Intercept		Intercept and trend	
	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*
BAN_INDEX	-1.56092	0.4768	-2.67946	0.2574	-2.21614	0.2093	-2.45783	0.3396	-4.60666	0.004*	-4.57464	0.0161**
LNDSEB	-2.326743	0.1885	-2.4249	0.3483	-3.245671	0.0767***	-15.87964	0.0006*				
IND_INDEX	-1.43503	0.5352	-2.31303	0.4032	-5.84952	0.0004*	-6.13554	0.0013*				
LNNIFTY100	0.676654	0.9859	-5.32567	0.0044*	-3.78978	0.019**	-3.74144	0.0649***				
PAK_INDEX	-1.24708	0.6222	-2.17867	0.4579	-1.33941	0.5802	-1.58038	0.7478	-3.68898	0.0204**	-3.84049	0.0527***
LNKSE	-0.8639	0.7703	-1.70825	0.6836	-4.96015	0.0019*	-4.74874	0.0109**				
SRI_INDEX	-0.53662	0.8577	-1.12734	0.8883	-2.51737	0.1323	-2.46953	0.3348	-3.78514	0.0174**	-4.92501	0.011**
LNCSE	-1.5386	0.4834	-0.47535	0.9687	-2.26085	0.1976	-4.21786	0.034**				

Table 3: ADF Unit Root test

Note: *,**,*** Significant at 1,5,10 percent levels respectively

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	9.219408	10%	3.02	3.51
k	1	5%	3.62	4.16
		2.50%	4.18	4.79
		1%	4.94	5.58

Table 4: Long-run association by F-stats

$$⟦\Delta LNNIFTY\_100\_\rho⟧\_t = \alpha\_0 + \sum\_{(i=0)}^{n} ⟦\alpha\_{1i} ⟦\Delta LNNIFTY\_100\_\rho⟧\_{(t-i)}⟧ \sum_{i=0}^{n} \alpha_{2i}\Delta IND\_INDEX_{t-i} + \beta_1 LNNIFTY\_100\_\rho_{t-1} + \beta_2 IND\_INDEX_{t-1} + \varepsilon_t \qquad \textbf{(2)}$$

Where Δ represents the first difference operator, α_0 represents the drift component, and ε_t represents the usual white noise residuals. At the 1%, significance levels, the *F*-statistic is greater than the upper critical bound value, as shown in Table 4. Therefore, the null hypothesis of no co- integration was reject, claiming that there is the existence of long-run co-integration relationships between variables.

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
IND_INDEX	0.086528	0.005893	14.68204	.000
C	11.74418	0.034655	338.888	.000

EC = LNNIFTY100 - (0.0865*IND_INDEX + 11.7442)

Table 5: Long run coefficient estimate- Restricted constant and No trend

Table 5 demonstrates Long run coefficient estimate which shows that India-constructed ESG index IND_INDEX has a positive and significant and impact on the Nifty100, indicating that when composite ESG index increase by 1 % ,there is increase of 8.6 % in Nifty100.Therefore our results validates the study of Bonaparte et al. (2017); Engelhardt et al. (2021) . ESG issues are becoming increasingly important to a broad variety of stakeholders, including investors, consumers, and regulators and it gained momentum as investors perceived Covid-19 as the century's first "sustainability" crisis. Numerous investors and financial institutions are adding ESG aspects into their decision-making processes, as they feel that companies with strong ESG profiles may have better management and more sustainable business practices. This can result in superior long-term financial performance.

$$\Delta LNNIFTY\_100\_\rho_t = \alpha_0 + \sum_{i=0}^{n} \alpha_{1i} \Delta LNNIFTY\_100\_\rho_{t-i} \ \sum_{i=0}^{n} \alpha_{2i} \Delta IND\_INDEX_{t-i} + \lambda EC_{t-1} + \mu_t \qquad \text{--------------------------- (3)}$$

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNNIFTY100(-1))	0.413172	19%	2.159765	0.0561
CointEq(-1)*	-1.79039	31%	-5.76107	0.0002

Table 6: Error correction Regression

The results presented in the table 6 indicates that short-run dynamics are consistent with the estimate sign of long-run coefficients for the lagged variable of return being significant. The projected long-run association between the variables in Eq. (3) holds good due to the statistically significant and negative estimate of the Short-run coefficient. It represents the rate of adjustment towards the long-term equilibrium path between variables, indicating that 179% each year corrects the disequilibrium induced by the temporal shocks of the previous period.

5. CONCLUSION

The study examined the empirical relationship between ESG sentiment and stock performance. Using the top-down approach of Baker and Wurgler (2007), PCA was employed to create a composite ESG index for selected nations. The study analyzed annual results affected by ESG factors. The ADF test revealed the integration level of the stationary ESG and return series, where ~~we filtered out~~ selected nations except India were filtered out, as the India return and ESG series were only integrated of order I(0) and I(1). The ESG index was in a long-term equilibrium relationship with market performance, indicating Indian businesses are increasingly integrating ESG into their entire business strategy. They recognize that their obligations go beyond monetary returns and include making a beneficial social and environmental effect. ESG adoption will stimulate company growth, improve public image, and assist companies in raising financing at a cheaper cost. The error correction shows that the return lag is only significant at 10% for the short-run coefficient. In contrast, the long-run adjustment is significant at 1%, indicating that 179% annually corrects the disequilibrium caused by the temporal shocks of the previous period. The study's shortcoming is that it only includes yearly data on ESG to determine its impact on stock returns. For a better perspective, the study's future scope might make use of ESG's short temporal data. It will assist the government and the companies in understanding their contribution to ESG and may construct ESG index separately and urge [PPP] the businesses to look beyond profit, think about people and earth. Encouraging the corporations to meet 17 Sustainable development objectives by 2030.

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