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A Quantitative Analysis of ESG Integration and Financial Performance in the Indian Equity Market

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***Abstract*—The adoption of the Environmental, Social and Governance (ESG) aspects in investment decision-making has become a trend in the international financial markets. In this paper, the correlation between ESG performance and financial returns in the Indian equity market is explored using the quantitative portfolio analysis of the Nifty 500 companies between 2019-2024. The study measures the absolute returns and risk characteristics and risk-adjusted performance measures of the High-ESG and Low-ESG portfolios in terms of Sharpe Ratio, Sortino Ratio, and the Alpha of Jensen. It has been shown that the High-ESG portfolios are more resilient in times of market decline and show higher risk-adjusted returns than Low-ESG portfolios. Individual pillars Governance scores have the best correlation with financial performance and Environmental/Social factor has sector-specific materiality. The article presents empirical data to the support of ESG integration as a strategic process of improving the performance of any portfolio and overseeing the downside risk in the conditions of the emerging market.**

***Index Terms*—ESG Integration, Financial Performance, Indian Equity Market, Portfolio Analysis, Risk-Adjusted Returns, Sustainable Investing.**

I. INTRODUCTION

The world of investment has experienced a paradigm shift in the last decade as the Environmental, Social and Governance factors have turned out to be the focus of the margins of ethical issues and have become the focus of the investment decisions. The rationale behind this change is increasing awareness that ESG considerations can have a significant impact on corporate risk profiles, financial performance and long-term sustainability. The Global Sustainable Investment Alliance (2022) has suggested that in five major investment markets, 35.3 trillion in assets of sustainable investment assets amount to 35.9 percent of the total assets under management, a definite sign of mainstream inclusion in both developed and emerging economies.

This has been enhanced in the Indian context especially after the regulatory interventions within the Indian Securities and Exchange Board. This has institutionalized sustainability reporting into the corporate governance structure, with the introduction of the Business Responsibility and Sustainability Reporting framework in 2021 which required that top 1,000 businesses by market capitalization are required to disclose their sustainability reports accordingly. At the same time, the Indian investment community has shown a growing interest in ESG-themed products, and the amount of assets under management of sustainable funds has risen by both 6,500 crores in 2019 and over 22,000 crores in 2023, according to the Association of Mutual Funds in India.

But, behind this visible agreement, there is an underlying conflict that is the fundamental aspect of this research question, that the existence of ESG criteria in the investment decision making process in the Indian equity market increases, decreases, or does not change the risk-adjusted financial returns of investors. Advocates of ESG integration believe that those firms with high-quality ESG performance have a greater capacity of dealing with risks, have better relationships with their stakeholders, and are more innovative which translates to a financial performance that outperforms full market cycles. Opponents argue, however, that ESG screening limits investment universes, sacrificing returns in the interests of ethics, or its expenses exceed the money that might be earned by shareholders.

II. REVIEW OF LITERATURE

International academic literature has abundantly studied the relationship between ESG factors and corporate financial performance which has offered a basis in which to study the relationship. A meta-analysis of over 1,000 studies (2019702020) by Friede, Busch and Bassen (2021) found that an ESG-financial performance relationship is overall non-negative, with most studies reporting positive correlation. Their review has highlighted that ESG integration is a risk-reducing strategy and not an ethical decision of socially responsible investors, which might explain why positive results are still evident in various methodological designs.

Berg, Kölbel, and Rigobon (2022) investigated the variation between the ESG ratings of various rating agencies, which demonstrates major methodological issues with ESG measurements. They found that three major sources of disagreement in ratings are scope divergence in terms of what attributes are measured, measurement divergence in terms of how the attributes are quantified and weight divergence in terms of the relative importance of various components. These results have a significant implication on research design and indicate that the selection of ESG data provider can have a significant effect on the study results.

Sharma and Mehta (2022) performed an analysis of 200 Indian firms between 2015 and 2020 and found that the companies that had higher ESG disclosure scores had superior operational efficiency, profitability ratios in terms of return on assets and return on equity. Their study also revealed a significant correlation of the governance scores and financial performance in the Indian context, and this is because family-owned business where the governance mechanisms have a higher impact in securing the interest of minority shareholders.

The authors (Patil and Joshi, 2023) analyzed the NSE-listed firms between 2018 and 2022 and found that portfolios made with high ESG scores had an alpha of 2.3 percent per year, as compared to portfolios made with low-ESG scores. They also observed that ESG performance paid off downside protection in case of market corrections and that high-ESG stocks had smaller drawdowns and steeper recovery paths aftermarket stress events which implies that sustainability attributes could be a hedge in times of increased uncertainty.

III. RESEARCH GAP AND PROBLEM FORMULATION

The analysis of available literature indicates that there are several important gaps that are to be filled in by this study. First, most of the Indian research are based on disclosure-based scores of what companies report and not performance-based scores of what companies perform. This conflation may be destructive in the view of possible greenwashing, in which enterprises might produce plenty of reports and do little to change anything substantially. Second, the research on building and back-testing real investment portfolios as per the ESG criteria has a paucity in India. Correlations at the firm-level tend to be studied but not converted into practical investment strategies with definite risk-return curves, which can be of value to practitioners.

Third, numerous research works refer to the short periods of three to five years because the standardization of the ESG data in India is rather new. An extended horizon with several market stages will be required to evaluate the performance under various economic circumstances and support the soundness of results. Fourth, there are limited studies that disaggregate the concept of ESG into the pillars to assess their varied effects on financial performance in India. Knowing how material financially the governance strengths are relative to environmental performance is crucial to the investor and managers who would want to focus more on sustainability initiatives.

The situation is aggravated by several factors that are peculiar to the Indian market. Current literature is insufficient in its coverage of risk-adjusted indicators, with a bias toward unstable returns as opposed to complete risk description. In addition to that, the Indian market is characterized by certain peculiarities which make it unlike the developed markets, which include the system of other ownership, the different degree of institutional investors involvement, the various regulatory pressure, and the different priorities of the investors which are caused by culture and economy.

IV. RESEARCH OBJECTIVES

The given research is expected to fill the identified research gaps with the help of the following objectives:

1. To find the High-ESG and Low-ESG portfolios of the Indian equity market and make a comparison with the absolute financial performance of the markets against the market leader which is the Nifty 500 index.
2. To compare the risk profile including volatility, beta, and downside risk of ESG based portfolios with conventional portfolios built without ESG screening.
3. To determine the risk-adjusted performance of ESG portfolios in terms of Sharpe Ratio, which is excess performance divided by total risk, Sortino Ratio, which is downside deviation, and Alpha by Jensen, which is risk-adjusted excess performance.
4. The individual effects of Environmental, Social, and Governance pillars on portfolio returns and risk characteristics using disaggregated analysis.
5. To determine how ESG portfolios can withstand various market environments such as bull market, bear market and stable market to get the consistency of the performance of the portfolio in diverse market environments.
6. To tabled evidence-based guidelines to investors and the portfolio managers on the strategies to incorporate ESG in the Indian equity market.

V. RESEARCH METHODOLOGY

The research design adopted in this study is a descriptive and analytical research design to investigate and assess the relationship between ESG integration and financial performance in Indian equity markets. The descriptive method enables one to make a systematic observation as well as explain the performance metrics of the portfolios, but the analytical segment enables one to identify the statistical association between the ESG scores and the financial performance through the application of rigorous quantitative approaches.

Population and Sample: The population will cover the companies listed in Nifty 500 index, which reflects the large-cap, mid-cap and small-cap firms in the Indian equity market, which represent a big part of the Indian market. The purposive sampling technique was used to select a sample of 100 companies and included companies that had regular ESG ratings by reputed agencies over the five years since 2019 to 2024. The sample is representative of the larger market as it covers different sectors such as financial services, information technology, energy, consumer goods, pharmaceuticals and manufacturing.

Data Collection: he key source of this study is secondary data, which will consist of annual reports and sustainability disclosures of some chosen companies that will provide in-depth information about ESG practices and results. CRISIL ESG Scores and Morningstar Sustainalytics provided ESG scores and thus offered a good coverage and rigo in methodology. The data of the stock prices and the financial statements were obtained using the National Stock Exchange databases, Bloomberg terminals, and annual reports of the companies, and therefore, it is possible to calculate the returns and risk measures accurately. The other sources used to generate additional data included research papers, journals and reports of the Securities and Exchange Board of India and publications on sustainable finance in the industry.

Data Analysis Techniques: To analyze ESG scores and financial performance, descriptive statistics such as mean, median, and standard deviation were used to compare ESG scores and financial metrics in the sample. The correlation analysis involved the examination of correlation between ESG factors and financial performance indicators. Regression analysis was used to measure the ability of ESG scores to explain returns used to control the effects of traditional risk factors. The study compared portfolio returns of High-ESG and Low-ESG portfolios to a study period using portfolio back-testing.

Risk-Adjusted Performance Metrics: Sharpe ratio was determined as portfolio excess return/standard deviation, which is the measure of the returns per unit of total risk. Instead of total standard deviation, Sortino Ratio was calculated with downside deviation, paying attention to harmful volatility. Jensen Alpha
was estimated as a regression of portfolio returns against market returns that reflects risk-adjusted excess returns that were due to ESG characteristics.

VI. RESULTS AND ANALYSIS

A. Portfolio Performance and Descriptive Statistics

The comparison of ESG scores among the sample of 100 companies showed that there was quite a few variations in the performance of sustainability. There was a steady performance of governance scores over both Environmental and Social scores, and the mean governance score was 71.2 against 62.4 and 58.7 in the sample period respectively. The trend is related to the focus on corporate governance in Indian regulatory frameworks historically, starting with the Satyam scandal and other reforms of corporate governance introduced by the Securities and Exchange Board of India.

Table 1: Portfolio Performance Metrics (2019-2024)

Metric	High-ESG Portfolio	Low-ESG Portfolio	Nifty 500 Index
Annualized Return (%)	16.8	11.5	14.2
Annualized Volatility (%)	18.4	22.7	19.8
Beta	0.92	1.18	1.00
Maximum Drawdown (%)	-21.3	-31.8	-24.6
Sharpe Ratio	0.78	0.42	0.62
Sortino Ratio	1.12	0.58	0.87
Jensen's Alpha (%)	2.8	-1.9	0.0

The High-ESG portfolio showed better performance in various metrics of returns than the Low-ESG portfolio and the market benchmark. The five-year annualized returns of the High-ESG portfolio were 16.8 percent, as compared with 14.2 percent of the Nifty 500 benchmark return and way higher than the 11.5 percent of the Low-ESG portfolio returns. This .3 percent per annum performance difference between High-ESG and Low-ESG portfolios is a good argument in favor of the positive correlation between ESG performance and financial returns.

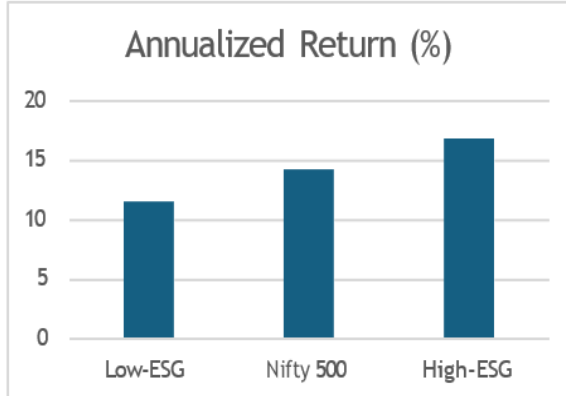

Figure 1: Annualized Returns Comparison (2019-2024)

The volatility analysis showed significant risk properties of ESG-based portfolios. High-ESG portfolio had lower annualized volatility of 18.4 percent than 22.7 percent of Low-ESG portfolio and 19.8 percent of the market benchmark. This less volatility indicates that ESG characteristics can lead to more stable returns by practicing more risk management and having more resilient business models. This tendency was supported by the beta, with the values of High-ESG portfolio beta of 0.92 showing low systematic risk compared with the market and Low-ESG portfolio beta of 1.18 showing high sensitivity to the market.

The maximum drawdown analysis was very strong in supporting downside protection benefits. At the market crash in early 2020, the High-ESG portfolio fell the most by 21.3 percent versus 31.8 percent in the Low-ESG portfolio and 24.6 percent in the market index. This 10.5 percentage points difference in level of drawdown has substantial effects on risk averse investors and investors who have shorter investment outlook.

The Sharpe Ratio analysis proved that High-ESG portfolio performed better in terms of risk-adjusted returns. In comparison to Sharpe Ratio of 0.78 and 0.62 of the market and the Low-ESG portfolio respectively, the High-ESG portfolio added 78 basis points of excess returns per unit of total risk. This result indicates that an integration of ESG results in higher returns, as well as efficiency in taking risks, in building a portfolio.

The Sortino Ratio that emphasizes on downside deviation alone gave even greater support to ESG edifications. High-ESG portfolio Sortino Ratio of 1.12 was significantly higher than those of the market of 0.87 and Low-ESG portfolio of 0.58. The bigger difference in Sortino ratio than the Sharpe ratio suggests that ESG attributes are especially useful in eliminating damaging downside volatility and not total volatility which is in line with the risk management account of the ESG benefits.

VII. DISCUSSION OF FINDINGS

The empirical findings have a great support of the research objectives and have value additions to the concept of ESG-financial performance relationships in emerging markets. The fact that High-ESG portfolios are found to provide better absolute returns is in line with international research by Friede, Busch, and Bassen (2021) and their conclusions are applied to the Indian setting with its institutional and market frameworks.

The hypothesized decrease in volatility and downside risk of High-ESG portfolios is backed by the observed decrease in volatility and downside risk of the same. Firms that have good environmental policies have less regulatory and litigation risks, firms that have good social relations have more stakeholders on their side during a crisis, and those with effective governance systems make better capital allocation decisions and escape value-destructive scandals. These risk-reduction mechanisms are the reason why the high risk-adjusted performance is recorded in terms of Sharpe and Sortino ratios.

The fact that Governance score has the highest level of correlation with financial performance is specifically important to the Indian markets. The large number of family-based enterprises presents some agency issue peculiar to the relationship between majority owners and the minority shareholders. Good governance controls such as independence of the board, open-related party transactions, and efficient audit controls safeguard the interests of the minority and assure that corporate resources are used in the most efficient manner, which having a direct effect on shareholder wealth.

The sustainability of ESG portfolios through the COVID-19 market crash is the practical indication of the downside protection advantages of sustainable investing. Firms that exhibited high environmental, social and governance practices continued to operate successfully, raised capital easily and retained stakeholder trust despite the unequivocal uncertainty. This stability is directly interpreted into lower drawdowns and quicker recovery of the ESG-oriented investors.

VIII. CONCLUSION AND RECOMMENDATION

This paper offers an in-depth empirical data on the connection between the ESG integration and financial performance of the Indian equity market between the year 2019 and 2024. The results have consistently shown that those companies that have better ESG performance outperform risk adjusted returns, where the volatility of the companies is lower, downside protection is more secure when the market is stressed, and positive alpha is created as compared to the market averages. Such findings confirm the business argument of ESG integration and tend to indicate that sustainability factors are not ethical choices but comprised information that is financially material.

The study advances the academic knowledge with the contribution of localized evidence within an emerging market setting, which is the literature gap with a prevalence of developed market research. The disaggregated ESG pillars indicate the specific significance of the elements of governance in the Indian markets, and the sectoral differences in environmental and social materiality. The portfolio-based approach converts the results at the firm-level into practical investment implications that have specific implications to practitioners.

The implications of the findings are that they provide some practical recommendations to investors and portfolio managers. The integration of ESG can be perceived as a method of increasing the risk-adjusted returns, instead of limiting investment universes. Governance factors should be put into implementation with undertaking sector specific materiality frameworks to environmental and social considerations. ESG leaders within sectors should be prioritized in the construction of portfolio instead of avoiding an entire sector and still achieve a diversification and be able to reap the benefits of sustainability.

To corporate managers, the findings are a reason why they should invest in sustainability initiatives as they show how sustainability activities help it to improve its financial performance. Businesses ought to work on real performance enrichments but not on reporting boosts because markets do not applaud cosmetic sustainability actions but rather material ones. In the Indian context, the governance improvements should be especially addressed since they are highly related to financial performance.

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